DS #: 5278

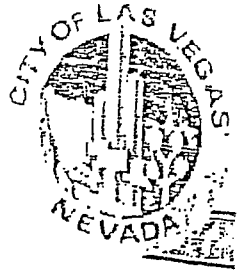
APN: 137-23-201-001

PROJECT: Summerlin West V22-Fleet Wing Avenue (Street G)

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: June 2, 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 V22 – Fleet Wing Avenue (Street G)** **(from Desert Foothills Blvd. to Kettle Ridge Dr.)**			**COPIES TO:** Atkins
Cross Streets:	Desert Foothills Blvd. & Fleet Wing Avenue			Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5278A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	137-23-201-001			CCRFCD
Zoning Action:	N/A			
FEMA Flood Zone	YES	NO **X**		
Proposed Storm Drain	YES **X**	NO		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal (Paid on 5/13/2020)	5/7/2020 & 5/13/2020	6/2/2020	See Comments Below	$400.00	3846891: $400
			TOTAL FEES (LDDRS):	**$400.00**	----

REMARKS:

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

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

1. The subject project is based on the premise that the upstream *Kettle Ridge Drive* and the downstream *Desert Foothill Drive* and the associated storm drain facilities are in place for flood protection. The subject drainage study will not be finally approved prior to the posting of the construction bonds of *Summerlin West Village 22 – Kettle Ridge Drive & Scurry Bend Drive (Lake Mead to Fleet Wing) and Summerlin West Village 22 – Desert Foothill Drive (Lake Mead to Fleet Wing)*.
2. The project proposed to construct temporary drainage facilities including drainage berms/ditches along both sides of the proposed improvements. 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. **Sheet 5/24**: The *Study* stated about SDDI #6 to be in the proposed ditches to the south of *Fleet Wing Avenue* in *Subchapter 2.1 (Drop Inlet Calculations)* under *Chapter 2 (Hydraulic Analysis)*. However, this inlet cannot be located anywhere on *Sheet 5/24* or any pertinent sheets. Address and resolve in the next submittal.

5. **Sheet 5/24, Sheet 8/24 & Sheet 9/24**:

   - Provide a SDMH between SDDI #4 and SDDI #5. The proposed 24"-RCP in *Fleet Wing Avenue* will be constructed from the SDMH to the existing regional box in *Kettle Ridge Drive*. The proposed connection directly from SDDI #5 is under the street curb and is not acceptable. Review and revise accordingly.
   - It is not understood why SDMH #8, the 48"-stub and SDCP#4 is proposed with this project. Shouldn't this either be in an update study to the regional box in *Kettle Ridge Drive* study or in a study for the future street improvements of *Fleet Wing Avenue* from *Kettle Ridge Drive* to *Scurry Bend Drive*? Address in the next submittal.

6. **Sheet 5/24, Sheet 12/24 & Sheet 13/24**: Provide a nuisance inlet at each side of *Fleet Wing Avenue* at approximately Station 20+00 to satisfy the 600'-max spacing requirement for drop inlets.

7. **Sheet 5/24, Sheet 12/24 to Sheet 15/24**: Maintain a minimum distance of 3' from the edge of the storm drain mainline to the lip of the street curb. Label as such in all the pertinent plans.

8. **Sheet 5/24, Sheet 14/24 & Sheet 15/24**:

   - At the connection point between the existing 36"-RCP and the new one (Station 15+37.83) in *Fleet Wing Avenue*, provide a connection detail such as a collar in the next submittal.

9. All storm drain inlets that are more than 10'-deep require a special structural detail and calculations. Submit structural design and calculations to *City Building & Safety Department* for review and approval prior to the final approval of the drainage study.

10. All offsite interim flood control facilities such as but not limited to berms/ditches and temporary sump are privately owned and to be privately maintained by the *Howard Hughes Company*. Provide a note as such on the grading plans.

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
ays

T/R/S: T20S/R59E/23
AREA K-23



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SUMMERLIN®

Summerlin West Village 22

Fleet Wing Avenue (Street G)

Desert Foothills Drive to Kettle Ridge Drive (Street J)

May 2020

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Fleet Wing Avenue (Street G): Desert Foothills Drive to Kettle Ridge Drive (Street J) Date: May 2020

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

East/West: Lake Mead Blvd

b) Section: 03 Township: 21S Range: 59E

c) APN: 137-14-401-007, 137-23-201-001

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: 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

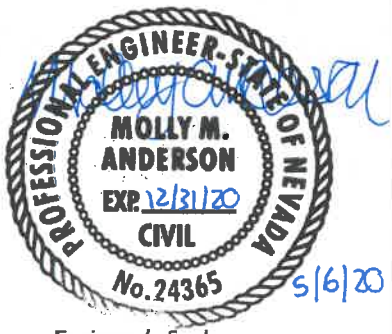
Firm: Atkins

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	x	Roadway Improvements

1. Total Owned Land Area: At Site: +/- 446 acres Being Developed/Disturbed: 5.26 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: 0 acres
6. Has the site drainage been evaluated in the past? ✔ **YES** **NO** If yes, please identify documentation: Master Conceptual Drainage Study for Summerlin West Village 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



5/6/20

Engineer's Seal

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

***New Required Field**

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

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Fleet Wing Avenue (Street G): Desert Foothills Drive To Kettle Ridge Drive	Map ID:
Firm Name: Atkins	Engineer: Molly Anderson, 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: 10801 West Charleston Blvd, Ste 300 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**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
	N/A	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
X		Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. Q_{100} d x v $\leq$ 8. Q_{10} d x v $\leq$ 6 and 12 foot dry lane for rights-of-way $\geq$ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
X		A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
	N/A	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
	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 (CCRFCD) Manual Standard Form 2. The listed items are the minimum information required prior to the City performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the CCRFCD Hydrologic Criteria and Drainage Design Manual (Design Manual).

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

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

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

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

II. GRADING PLAN INFORMATION		
Yes	No	
X		Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
X		All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
X		Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.
	N/A	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.)
X		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.
X		Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
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.

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): Desert Foothills Drive to Kettle Ridge Drive (Street J)** electronic submittal matches the paper version bound into the study.



5/6/20

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

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Appendix A. Summerlin West Village 22 Master Conceptual Drainage Study Reference

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B.2. HEC-1 Model
B.1 Parameters
B.2 HEC-1 Model

Appendix C. Hydraulics Appendix
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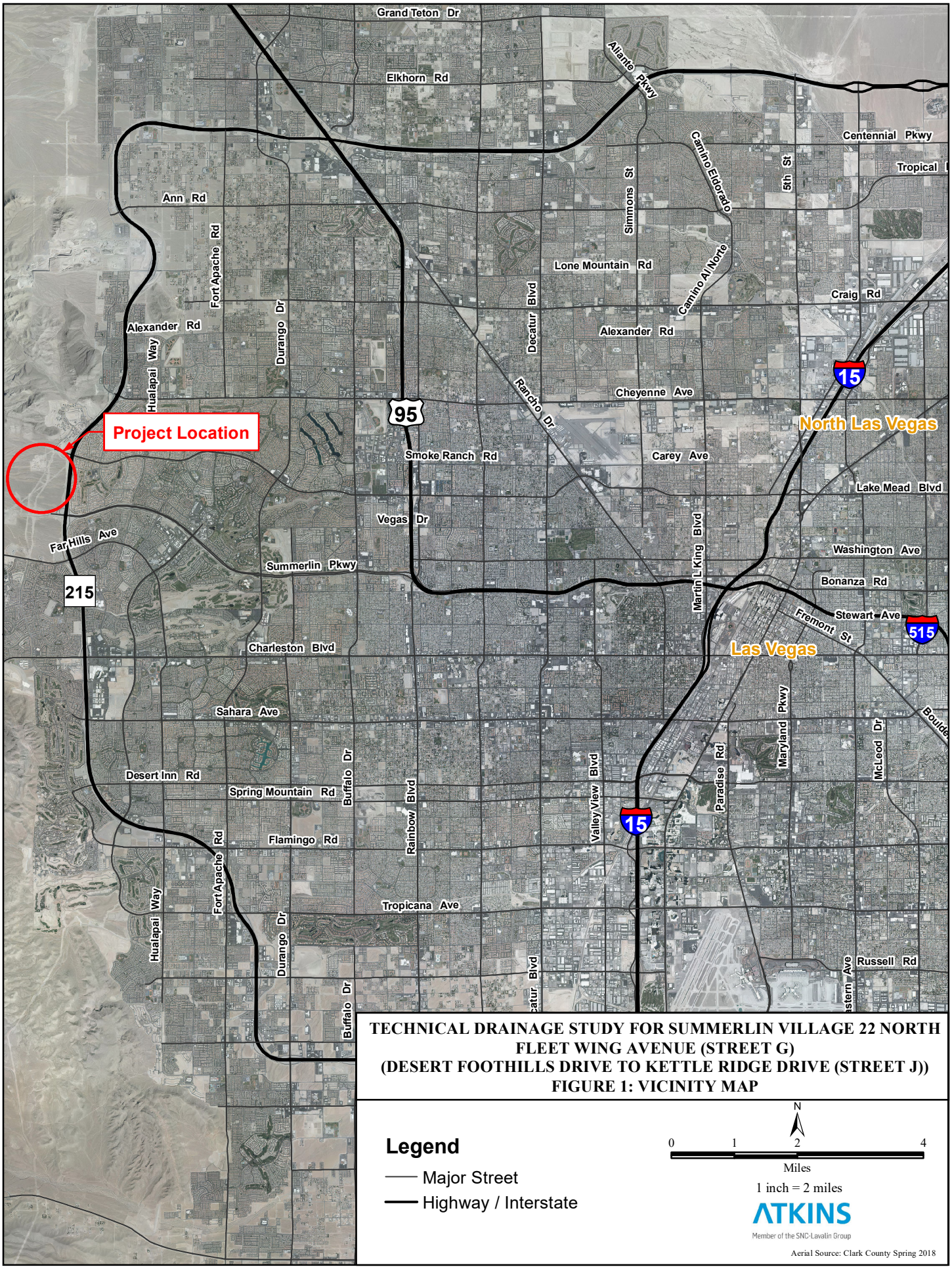
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Executive Summary

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 Desert Foothills Drive and Kettle Ridge Drive (Street J) 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. Addendum #2 to Update #1 of the MCDS was approved May 29, 2019. 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.



TECHNICAL DRAINAGE STUDY FOR SUMMERLIN VILLAGE 22 NORTH
FLEET WING AVENUE (STREET G)
(DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J))
FIGURE 1: VICINITY MAP

Legend

- Major Street
- Highway / Interstate

N

0 1 2 4

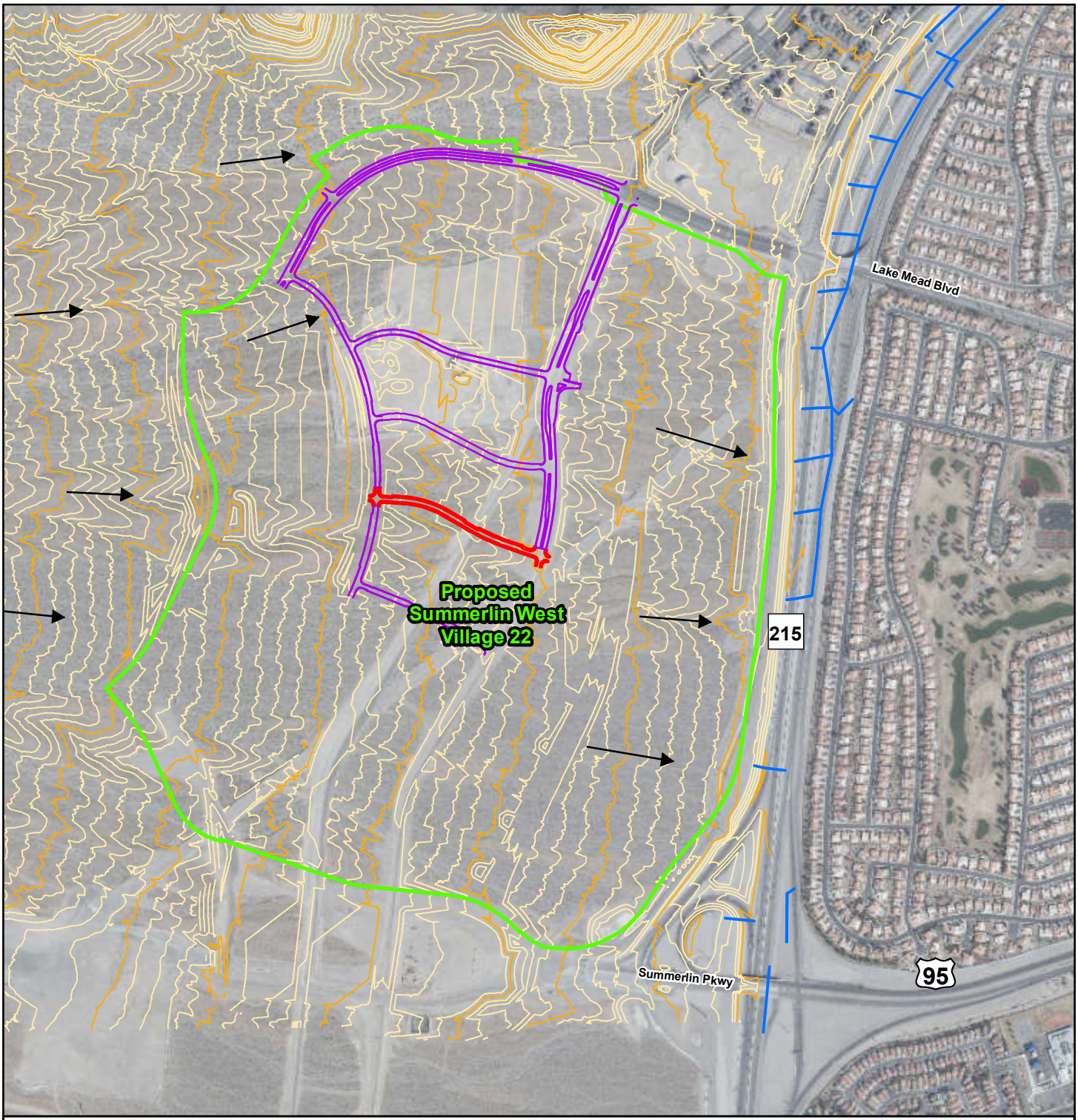
Miles

1 inch = 2 miles

ATKINS

Member of the SNC-Lavalin Group

Aerial Source: Clark County Spring 2018



TECHNICAL DRAINAGE STUDY FOR SUMMERLIN VILLAGE 22 NORTH
FLEET WING AVENUE (STREET G)
(DESERT FOOTHILLS DRIVE TO KETTLE RIDGE AVE (STREET J))
FIGURE 2: EXISTING CONDITIONS SITE MAP

Legend

- Existing Roadway
- Proposed Roadway
- Existing Storm Water Facilities
- Summerlin Village 22 Boundary
- Existing Flow Direction
- 10' contours
- 50' contours

N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

ATKINS

Member of the SNC-Lavalin Group

Aerial Source: Clark County Spring 2019

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 (JK, NOP, and NP-1). 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 Street G 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) is to be completed prior to the interim conditions of Fleet Wing Avenue. Drainage basins to the west of the newly constructed Kettle Ridge Drive will be intercepted before entering Fleet Wing Avenue in the interim and ultimate conditions. There are no offsite flows tributary to Fleet Wing Avenue in the interim or 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. Interim subbasin INT-G1 (Figure 3) collect flow in the interim swale to the south of Fleet Wing Avenue, which drain into the proposed Fleet Wing Avenue storm drains.

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 Fleet Wing Avenue (Kettle Bend Road to Desert Foothills Drive) storm drain facility. The tailwater elevation for the hydraulic model was taken from the upstream hydraulic grade line (HGL) in the approved plans. 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)
*StrJ-3E	0.00062	0.39	2	1
StrJ-4E	0.00097	0.62	2	1
StrG-N	0.00254	1.63	7	4
StrG-S	0.00153	0.99	4	2
INT-G1	0.00383	2.45	7	3

**Referenced from Kettle Ride Drive (Street J) Drainage 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)
NOP	0.0227	14.52	49
NP-1	0.0027	1.73	6

Interim Condition					Ultimate Condition			
HEC-1 Node	Tributary Area (sq mi)	Tributary Area (acres)	100-Year Discharge (cfs)	10-Year Discharge (cfs)	HEC-1 Node	Tributary Area (acres)	100-Year Discharge (cfs)	10-Year Discharge (cfs)
*StrJ-3E	0.00089	0.57	2	1	**NOP	14.52	49	-
StrJ-4E	0.00097	0.62	2	1	**NP-1	1.73	6	-
StrG-N	0.00254	1.63	7	4				
StrG-S	0.00154	0.99	4	2				
INT-G1	0.00383	2.45	7	3				

**Referenced from Kettle Ridge Drive (Street J) Drainage Study*

***Referenced from Update #2 for the MCDS for Summerlin West Village 22*

Clowder Pass Way (Street H)

Kettle Ridge Drive (Street J)

StrJ-3E

StrJ-4E

StrG-S

StrG-N

INT-G1

Fleet Wing Avenue (Street G)

Desert Foothills Drive

G - H

J - K

I

N-O-P

NP-1

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
(DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J))
FIGURE 3: HYDROLOGY WORKMAP

- Ultimate Condition Parcels
- Street G Interim Subbasins
- Street G Proposed Roadway
- Proposed Storm Drain
- Existing Storm Drain
- Interim Flow Paths
- Street H Swale
- 10-ft Contours
- 50-ft Contours
- Existing Roadways

N

1 inch = 150 feet

ATKINS

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Aerial Source: Clark County Spring 2019

0 75 150 300 450 600 Feet

2. Hydraulic Analysis

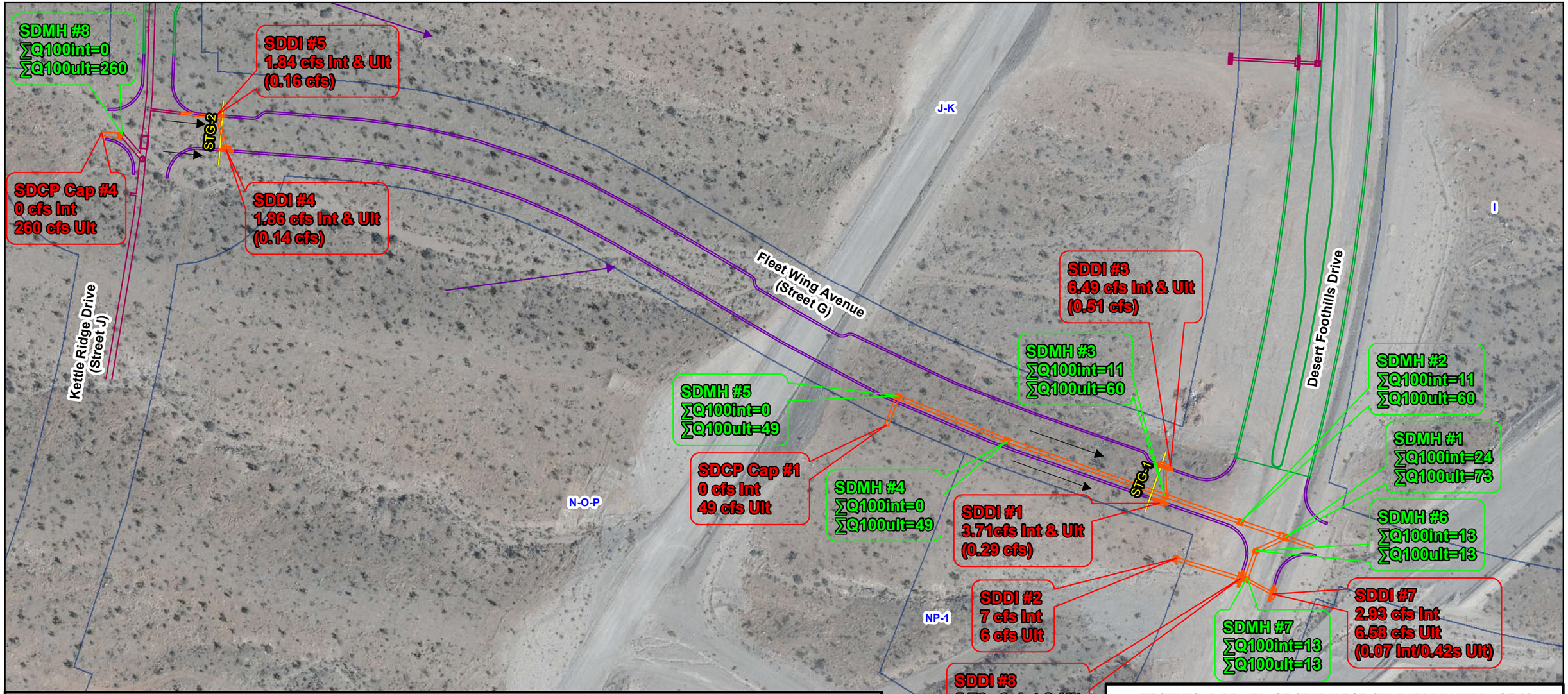
2.1. Drop Inlet Calculations

The computer program Bentley FlowMaster V10.2 was utilized to perform calculations for the six proposed drop inlets along Fleet Wing Avenue. The storm drains SDDI #2 and SDDI #6, are in the proposed ditches to the south of Fleet Wing Avenue. SDDI #2 and SDDI #6 were sized conservatively for the worst-case scenario of the 100-event. In the Interim condition SDDI #2, is subject to a higher flow than in the ultimate condition, while SDDI #6 is subject to a higher flow in the ultimate condition.

For SDDI's located on the proposed Fleet Wing Avenue roadway (SDDI #1, #3, #4, #5, #7, #8) the ultimate conditions are equal to or a slightly lower than the interim conditions. The two exceptions to this are the SDCP #1 that has no flow in the interim condition and 49 cfs in the ultimate condition and the SDCP #4 which also has no flow in the interim condition and has 260 cfs in the ultimate. 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	4.00	StrG-S	3.71	0.29
SDDI #2	7.00	Int-G1	7.00	0
SDDI #3	7.00	StrG-N	6.49	0.51
SDDI #4	2.00	StrJ-4E	1.86	0.14
SDDI #5	2.00	StrJ-3E	1.84	0.16
SDDI #7	3.00	VTN Fleet Wing TDS	2.93	0.07
SDDI #8	6.00	VTN Fleet Wing TDS	5.76	0.24
100-Year Ultimate Conditions				
SDDI #1	4.00	StrG-S	3.71	0.29
SDDI #2	6.00	NP-1	6.00	0
SDDI #3	7.00	StrG-N	6.49	0.51
SDDI #4	2.00	StrJ-4E	1.86	0.14
SDDI #5	2.00	StrJ-3E	1.84	0.16
SDDI #7	7.00	VTN Fleet Wing TDS	6.58	0.42
SDDI #8	6.00	VTN Fleet Wing TDS	5.76	0.24



Interim/Ultimate Condition (100-Year) Street Flow and Drop Inlet Calculations Summary Table

XS/SD ID	Total Discharge (cfs)	Total Discharge Source	Drop Inlet			Flow Depth in Street (ft)	Velocity of Flow in Street (ft/s)	Depth*Velocity (must be less than 8)
			Intercepted Flow (cfs)	Bypass Flow (cfs)	Sump Depth (ft)			
STG-1	**11.0**	StrG-N + StrG-S	N/A	N/A	N/A	0.20	5.80	1.16
STG-2	**4.0**	StrJ-3E + StrJ-4E	N/A	N/A	N/A	0.30	2.16	0.65
SDDI #1	**4.0**	StrG-S	3.71	0.29	N/A	N/A	N/A	N/A
SDDI #2	**7 (int) / 6 (ult)**	Int-G1/NP-1	7.00 / 6.00	N/A	0.7	N/A	N/A	N/A
SDDI #3	**7.0**	StrG-N	6.49	0.51	N/A	N/A	N/A	N/A
SDDI #4	**2.0**	StrJ-4E	1.86	0.14	N/A	N/A	N/A	N/A
SDDI #5	**2.0**	StrJ-3E	1.84	0.16	N/A	N/A	N/A	N/A
SDDI #7	**7 (ult) / 3 (int)**	**VTN Fleet Wing TDS	6.58 / 2.93	0.42 / 0.07	N/A	N/A	N/A	N/A
SDDI #8	**6.0**	** VTN Fleet Wing TDS	5.76	0.24	N/A	N/A	N/A	N/A

** Interim flows = Ultimate flows unless noted in table*

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
(DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J))
FIGURE 4: HYDRAULICS WORKMAP

- Street G Proposed Storm Drain
- Existing Storm Drain
- Street Flows
- Cross Sections
- Existing Roadways
- Street G Proposed Roadway
- Interim Flow Paths
- Ultimate Condition Parcels

Intercepted Flow (Bypass Flow)

N

1 inch = 100 feet

ATKINS
Member of the SNC-Lavalin Group

Aerial Source: Clark County Spring 2018

0 50 100 200 300 400 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	11	StrG-N + StrG-S	7.8	0.2	5.8	1.2
STG-2	4	StrJ-3E + StrJ-4E	1.1	0.3	2.2	0.7
100-year Ultimate Condition						
STG-1	11	StrG-N + StrG-S	7.8	0.2	5.8	1.2
STG-2	4	StrJ-3E + StrJ-4E	1.1	0.3	2.2	0.7

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. Interim condition modeling is only required for the system that discharges to Desert Foothills Drive because there are sections where the interim flow is higher than the ultimate. For the system that discharges to Kettle Ridge Drive, the ultimate condition is higher in all locations and therefore is not modeled in the interim condition. 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 36” RCP. The maximum velocity modeled is 25.44 ft/s and is observed in the ultimate condition between SDMH#2 and SDMH#3. Where the modeled velocity exceeds 15 ft/s, the plans call for Class IV RCP instead of Class III RCP.

Table 6 – WSPG-W Mainline Summary Table

SDMH#	WSPG-W Station	Q_{100}	$\sum Q_{100}$	HGL (Ft)
100-Interim Condition				
#1	30.77	13	11.01	3332.698
#2	81.61	0	11.01	3332.318
#3	163.41	11	0.01	3342.892
#4	335.95	0	0.01	3350.222
#5	456.72	0	0.01	3359.052
#6	64.64	14	28.0	3332.938
#7	93.43	14	14.0	3335.263
100-Ultimate Condition				
#1	30.77	13	64.0	3331.839
#2	81.61	0	64.0	3332.934
#3	163.41	11	53.0	3342.781
#4	335.95	0	53.0	3351.378
#5	456.72	49	53.0	3360.811
#6	64.64	13	26.0	3332.887
#7	93.43	13	13.0	3335.149

Appendices

Appendix A. Summerlin West Village 22 Master Conceptual Drainage Study Reference

CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DATE: 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
Howard Hughes Company, LLC
Bart Anderson, P.E., DevCo
CCRFCD
CCPW

Cross Streets:	I-215 Western Beltway & Summerlin Parkway	
File Number:	F:\Depot\DSMemos\DS5005H.doc	
Parcel Number:	137-14-401-006, 137-23-101-002	
Zoning Action:	MDR-73901	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	6/12/2018	6/28/2018 & 7/13/2018	Not Approved	$400.00	49696: $400
2nd Submittal	7/31/2018	8/22/2018	Not Approved	$400.00	497790: $400
3rd 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
CCRFCD	1/10/2019	1/10/2019	Concurrence Recv'd	N/C	N/C
4th Submittal	2/12/2019	3/6/2019	Not Approved	$100.00	503164: $100
5th Submittal	3/21/2019	4/4/2019	Conditional Approval	$400.00	3057847: $400
CCPW & CCRFCD	4/25/2019 & 5/23/2019	5/29/2019	Concurrence Received	N/C	N/C
6th 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 & CCRFCD	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.

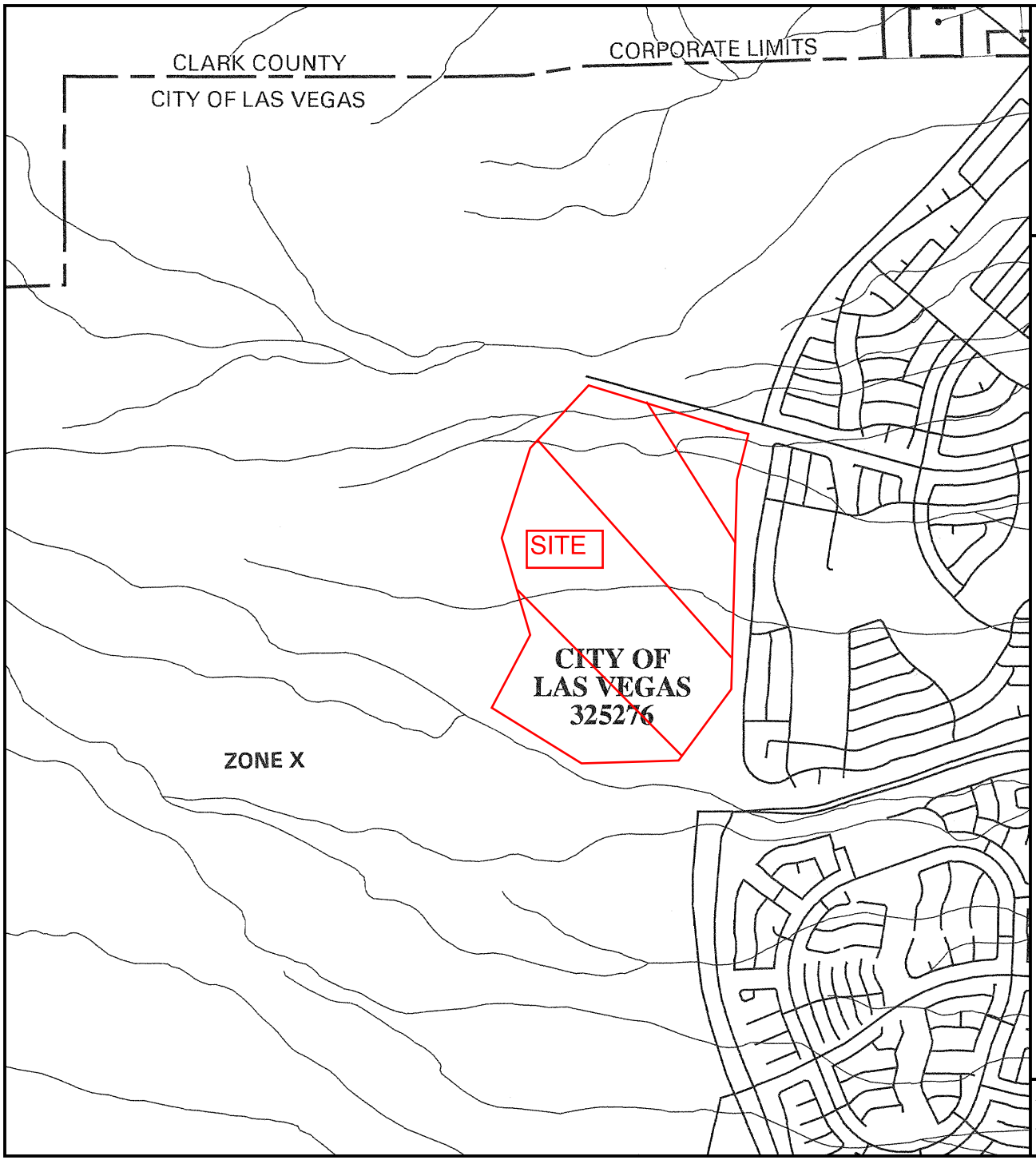
   A technical drainage study for the analysis, design and construction plans for the *Grand Park Detention Basin* must be submitted and approved by the City prior to the individual onsite parcel developments.

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



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

PANEL 2150 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2150 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	2150	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	2150	E

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

MAP NUMBER
32003C2150 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

FIGURE 3

REGIONAL FLOOD CONTROL DISTRICT

2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 24
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin

- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

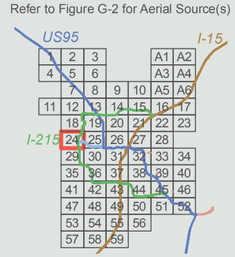
Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

N

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

Scale: 1 inch = 2,000 feet

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



SITE

GOWAN RD
CHEYENNE AV
BUTTON WILLOW DR
LAKE MEAD BLVD
THOMAS W RYAN BLVD
SNOW TRL
MISSUIN LAKES AV
SUMMERLIN PKWY
LAURELGLEN DR
FAR HILLS AV
VISTA RUN DR
ALTA DR
ANASAZI DR

GOL3 0870
GOL3 0290
GOL3 0289
GOL3 0216
GOL3 0137
GOL3 0128
GOL3 0116
GOL3 0100
GOL3 0077
GOL3 0070
GOL3 0068
GOL4 0026
GOL4 0025
GOL4 0000
GOL4 0010
GOLM 0260
GOLM 0252
GOLM 0230
GOL2 0110
0000
GOB3 0035
GOB3 0000
GOB2 0096
GOB2 0033
GOB2 0020
GOB2 0000
GOB2 0001
GOBE 0001
GOBE 0000
GOBE 0065
GOBE 0098
GOBE 0108
GOBE 0068
GOBE 0127
GOBE 0139
APDF 0123
APD5 0000
APD5 0013
APDF 0073
APDF 0028
APDF 0000
APD6 0000
APM5 0059
APM5 0057
APM5 0056
APM5 0047
APM5 0008
APM5 0213
APM5 0212
APM5 0009
APM5 0000
APF2 0000
APFH 0144
APFH 0089
APFH 0061
APFH 0024
APFH 0019
APFH 0000
APCH 0000
APCH 0003
APCH 0031
APBE 0122
APBE 0094
APBE 0081
APBE 0091
APBE 0022
APBE 0013
APBE 0000
APSP 0177
APSP 0135
APSP 0133
APAD 0225
APAD 0203
APAD 0000
APD2 0000
APD2 0002
APMD 0233
215

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	SUM5DB	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).

REGIONAL FLOOD CONTROL DISTRICT

2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F - 24

LEGEND

ID (Facility Identifier) AABB
- Parent Stream Name
- Stream Name

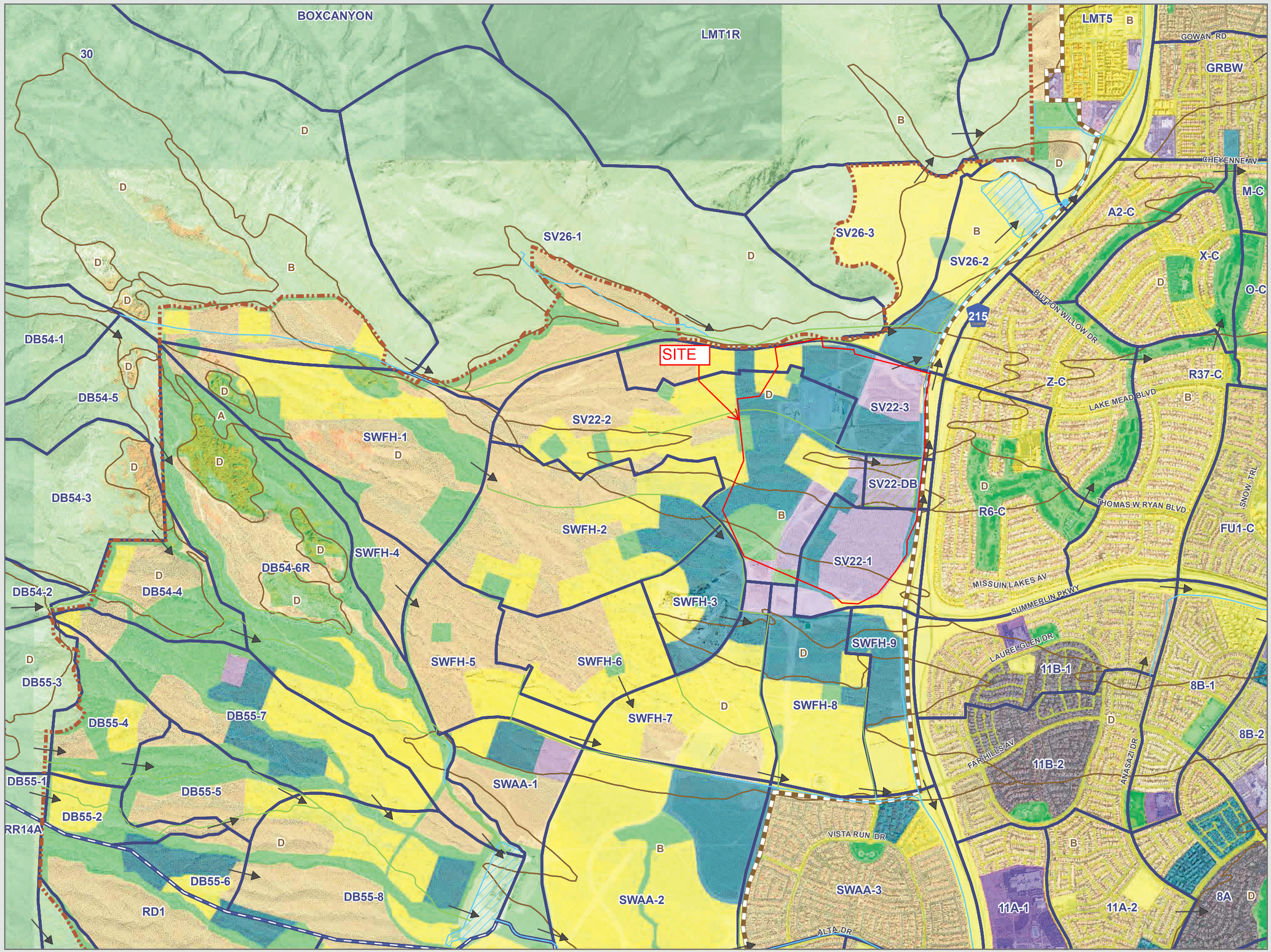
River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

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

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

Construction Features

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



REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H- 24
HYDROLOGIC SUMMARY

LEGEND

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

Flood Control Facilities

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

Type Hydrologic Soil Groups

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

Typical Land Use

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

* Drought Ordinance Applied

N

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

Scale: 1 inch = 2,000 feet

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

US95 I-15 I-215

	1	2	3											
	4	5	6											
		7	8	9	10									
11	12	13	14	15	16	17								
	18	19	20	21	22	23								
	24	25	26	27	28									
	29	30	31	32	33	34								
	35	36	37	38	39	40								
	41	42	43	44	45	46								
	47	48	49	50	51	52								
	53	54	55	56										
	57	58	59											

PBS&J PB

FIGURE 4B - MPU HYDROLOGIC SUMMARY

REGIONAL FLOOD CONTROL DISTRICT

2018 Las Vegas Valley Master Plan Update

Figure W-4
Gowan Watershed

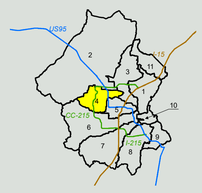
UPPER NORTHERN WATERSHED
GOWAN WATERSHED
TROPICANA/FLAMINGO WATERSHED
CENTRAL WATERSHED
LOWER NORTHERN WATERSHED

MOCCASIN OUTFALL DETENTION BASIN #2
MOCCASIN OUTFALL DETENTION BASIN #1
KYLE CANYON DETENTION BASIN
SOUTH ENVIRONMENTAL ENHANCEMENT AREA
PARK HIGHLANDS WEST DETENTION BASIN
EEKHORN SPRINGS DETENTION BASIN
FORT APACHE DETENTION BASIN
ANN ROAD DETENTION BASIN
RANCHO ROAD DETENTION BASIN
LOWER LAS VEGAS DETENTION BASIN
BOX CANYON DETENTION BASIN
LONE MOUNTAIN-BELTWAY DETENTION BASIN
LONE MOUNTAIN DETENTION BASIN
GOWAN NORTH DETENTION BASIN
VILLAGE 26 DETENTION BASIN
GOWAN SOUTH DETENTION BASIN
CAREY-LAKE MEAD DETENTION BASIN
GRAND PARK DETENTION BASIN
ANGEL PARK DETENTION BASIN
DETENTION BASIN #5
RAINBOW DETENTION BASIN
MEADOWS DETENTION BASIN
RED ROCK DETENTION BASIN
OKEY DETENTION BASIN
DESERT INN DETENTION BASIN
FAKE DETENTION BASIN
R4 DETENTION BASIN

Kyle Canyon
Elkhorn
Ann
Craig
Cheyenne
Summerlin
Spring Mountain
Flamingo
Las Vegas

Legend

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



1 Range
2 Upper Northern Las Vegas Wash
3 Lower Northern Las Vegas Wash
4 Gowan
5 Central
6 Flamingo/Tropicana
7 Duck Creek/Blue Diamond
8 Pittman
9 C-1
10 Lower Las Vegas Wash
11 Apex

N

Scale: 1 inch = 0.65 mile

0 0.325 0.65 1.3

Miles

ATKINS
Member of the SNC-Lavalin Group

Louis Berger

ID / 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**						
0203	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	SUM5DB	GOW3A	6.73	3.40
APBE		**ANGEL PARK - BELTWAY BRANCH**						
0022	E	CONC CHNL 20'W 7'D 2:1 SS	1556	3366	CCSWFH15	GOW3A	3.39	1.81
0051	E	CONC CHNL 20'W 7'D 2:1 SS	1583	3366	CCSWFH15	GOW3A	3.39	2.77
0081	E	8' X 8' RCBC @ FAR HILLS	777	1048	CSWFH-15	GOW3A	0.59	2.32
0094	E	CONC CHNL 10'W 5'D 2:1 SS	1465	1048	CSWFH-15	GOW3A	0.59	1.88
0122	E	CONC CHNL 10'W 4'D 2:1 SS	1685	1048	CSWFH-15	GOW3A	0.59	0.80
0154	P0	8' X 6' RCB	5012	781	CSWFH-12	GOW3A	0.41	1.30
0249	P0	6' X 5' RCB	2858	606	CSWFH-11	GOW3A	0.31	3.00
APCH		**ANGEL PARK - CARRIAGE HILL BRANCH**						
0000	E	8' X 6' RCB	152	399	CSWFH-14	GOW3A	0.21	0.87
0003	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		**ANGEL PARK - DESERT FOOTHILLS 2 BRANCH**						
0002	E	7' X 6' RCB	883	674	SWAA-2	GOW3A	0.68	1.08
APDF		**ANGEL PARK - DESERT FOOTHILLS BRANCH**						
0000	P0	10' X 6' RCB	1788	1428	CSWFH-9	GOW3B	0.80	3.55
0026	P0	8' X 6' RCB	1813	968	CSWFH-8	GOW3A	1.80	2.00
0073	P0	6' X 4' RCB	1922	486	CSWFH-4	GOW3A	1.52	4.40
0123	P0	42" RCP	1076	141	GPDB	GOW3A	1.29	6.00
0125	P0	130 AC-FT GRAND PARK DETENTION BASIN		1543	CSWFH-3	GOW3A	1.29	
0127	P0	6' X 6' RCB	2977	853	SWFH-1	GOW3A	0.69	3.80
0128	P0	5' X 4' RCB	2197	509	SWFH-2	GOW3A	0.37	5.70
APFH		**ANGEL PARK - FAR HILLS BRANCH**						
0000	E	2: 8' X 8' RCB	1070	2494	CCSWFH14	GOW3B	1.51	3.50
0019	E	2: 8' X 8' RCB	250	2149	CCSWFH-9	GOW3B	1.30	4.19
0024	E	16' X 8' RCAP	1951	2149	CCSWFH-9	GOW3B	1.30	5.10
0061	E	8' X 6' RCB	1435	839	CSWFH-7	GOW3A	0.50	2.00
0089	E	8' X 6' RCB	2946	839	CSWFH-7	GOW3A	0.50	2.00
0144	P0	5' X 4' RCB	2497	456	SWFH-6	GOW3A	0.28	5.50
APM5		**DETENTION BASIN #5**						
0000	E	384 AC-FT DETENTION BASIN #5		6856	SUM5IN	GOW3A	6.73	
0008	P0	CONC CHNL 50'W 4.5'D 2:1 SS	2102	3634	CCDB54-7	GOW3A	4.13	5.20
0009	P0	CONC CHNL 50'W 4'D 2:1 SS	4180	3495	CDB55-7	GOW3A	2.60	5.80
0047	E	DIVERSION BERM WITH GABION BANK PROTECTION	1000	3634	CCDB54-7	GOW3A	4.13	1.30
0056	P0	CONC CHNL 80'W 4'D 2:1 SS	264	3634	CCDB54-7	GOW3A	4.13	1.30
0057	P0	CONC CHNL 50'W 3'D 2:1 SS	9922	1664	CDB54-4	GOW3A	0.81	6.80
0059	P0	CONC CHNL 100'W 3'D 2:1 SS	9075	2606	CDB54-7	GOW3A	3.31	7.00
0212	P0	CONC CHNL 30'W 3'D 2:1 SS	6695	1092	DB55-1	GOW3A	0.64	7.50
0213	P0	CONC CHNL 50'W 3'D 2:1 SS	6522	1729	CDB55-5	GOW3A	1.30	7.30
APSP		**ANGEL PARK - SUMMERLIN PARKWAY**						
0183	E	CONC CHNL 10'W 6'D 2:1 SS	1680	884	C11B-1	GOW3A	0.84	1.70
GOB3		**GOWAN LONE MOUNTAIN SYST. 3 BELTWAY**						
0000	E	66" RCP	1370	341	SV22-1	GOW3A	0.18	4.50
GOBE		**GOWAN LONE MOUNTAIN SYST. BELTWAY**						
0000	E	20' X 10' RCBC @ ACCESS RD	30	1044	CSV22	GOW3A	0.67	5.67
0001	E	CONC CHNL 20'W 5'D 2:1 SS	1100	1044	CSV22	GOW3A	0.67	6.50
0021	E	CONC CHNL 11'W 6.8'D 0:1 SS	2143	1044	CSV22	GOW3A	0.67	6.50
0058	E	CONC CHNL 15'W 7.5'D 0:1 SS	487	1044	CSV22	GOW3A	0.67	3.93
0065	E	CONC CHNL 17'W 7.5'D 0:1 SS	844	1044	CSV22	GOW3A	0.67	0.76
0088	E	2: 10' X 9' RCBC @ LAKE MEAD	400	782	SV22-2	GOW3A	0.49	0.50
0096	E	CONC CHNL 20'W 9'D 2:1 SS	627	782	SV22-2	GOW3A	0.49	0.50
0108	E	CONC CHNL 20'W 6'D 2:1 SS	1021	782	SV22-2	GOW3A	0.49	0.50
0127	E	CONC CHNL 20'W 6'D 2:1 SS	638	782	SV22-2	GOW3A	0.49	0.50
0139	E	CONC CHNL 10'W 5.5'D 2:1 SS	1500	782	SV22-2	GOW3A	0.49	1.02
GOL3		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3**						
0010	E	CONC CHNL 20'W 10'D 0:1 SS	3037	3277	CRCLMT1R	GOW3A	7.31	2.78
0068	E	TRANSITION STRUCTURE	100	3277	CRCLMT1R	GOW3A	7.31	3.50
0070	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		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3**						
0100	E	CONC CHNL 20'W 10'D 0:1 SS	200	1271	CRCSV22	GOW3A	4.99	5.67
0115	E	96" RCP OUTLET	670	666	DET26	GOW3A	4.31	0.29
0128	E	305 AC-FT VILLAGE 26 DETENTION BASIN		3615	VIL26IN	GOW3A	4.31	
0137	E	CONC CHNL 20'W 7.5'D 0:1 SS	2720	3615	VIL26IN	GOW3A	4.31	6.50
0188	E	CONC CHNL 20'W 8'D 0:1 SS	563	3615	VIL26IN	GOW3A	4.31	3.91
0197	E	14' X 14' RCB	890	3615	VIL26IN	GOW3A	4.31	0.88
0214	E	Dual 10' X 14' RCB	124	3615	VIL26IN	GOW3A	4.31	0.57
0216	P0	CONC CHNL 50'W 4'D 2:1 SS	4060	3524	CSV26-1	GOW3A	4.02	6.08
0289	P0	CONC CHNL 50'W 3.5'D 2:1 SS	6215	2281	30	GOW3A	2.44	7.95
0290	E	NATURAL WASH 363'W	4850	1410	SV26-1	GOW3A	1.59	22.50
0370	E	NATURAL WASH 450'W	7000	2281	30	GOW3A	2.44	8.50
GOL4		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4**						
0000	E	14' X 8' RCB	554	2243	CLMT1R	GOW3A	2.33	2.50
0010	E	2: 9' X 8' RCB	820	2243	CLMT1R	GOW3A	2.33	4.74
0025	E	SOIL CEMENT CHNL 60'W 8'D 3-4:1 SS	320	2243	CLMT1R	GOW3A	2.33	2.00
0026	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).

REGIONAL FLOOD CONTROL DISTRICT

2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F-22

LEGEND

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

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

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

Construction Features

Cast in Place Concrete Pipe	CIPCP	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

ATKINS
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Louis Berger

REGIONAL FLOOD CONTROL DISTRICT

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

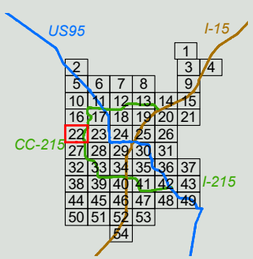
Category A	Category B
Channel	Channel
Stormdrain	Stormdrain
Crossing	Crossing

N

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

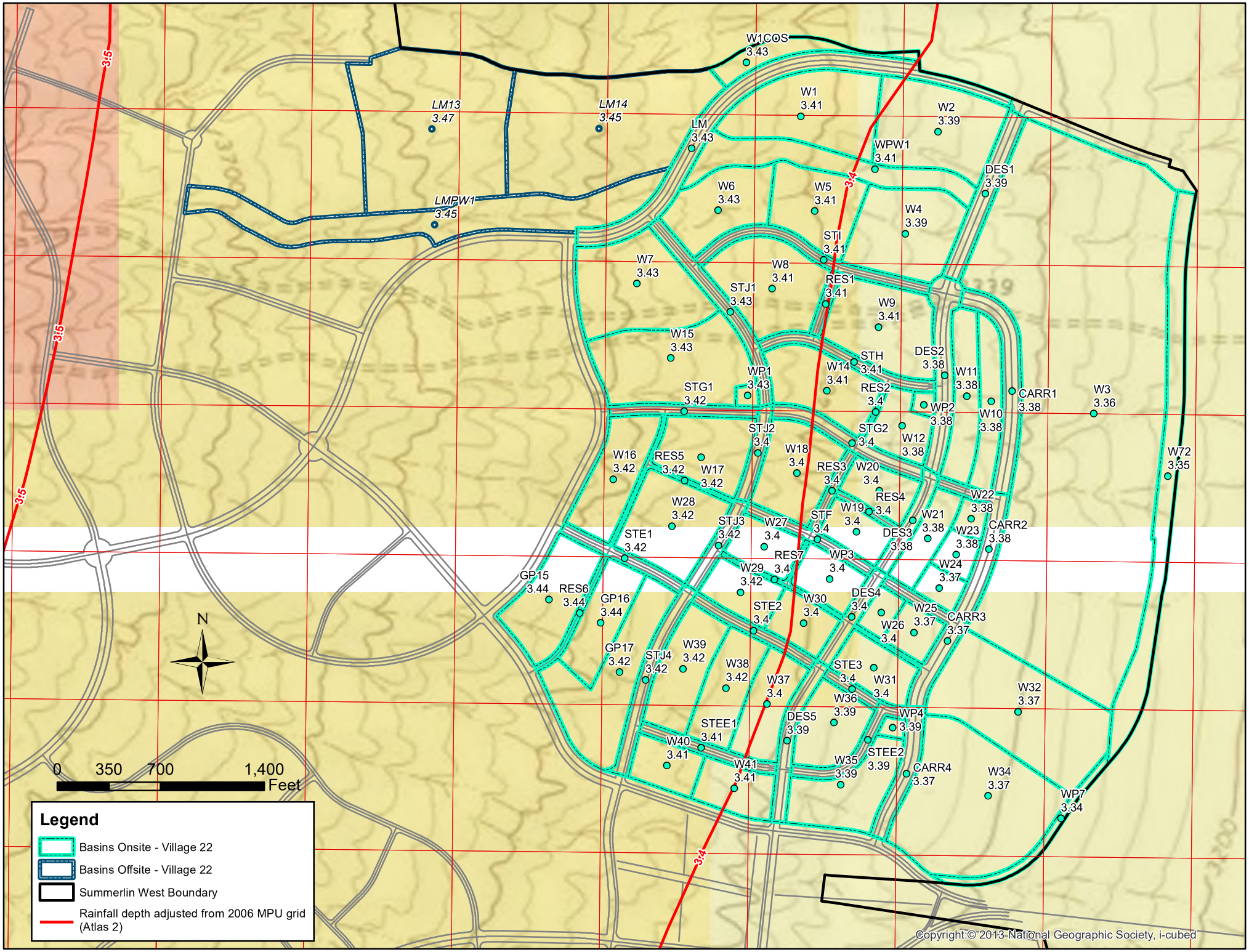
Scale: 1 inch = 2,000 feet

AerialSource:Esri World Imagery 2017

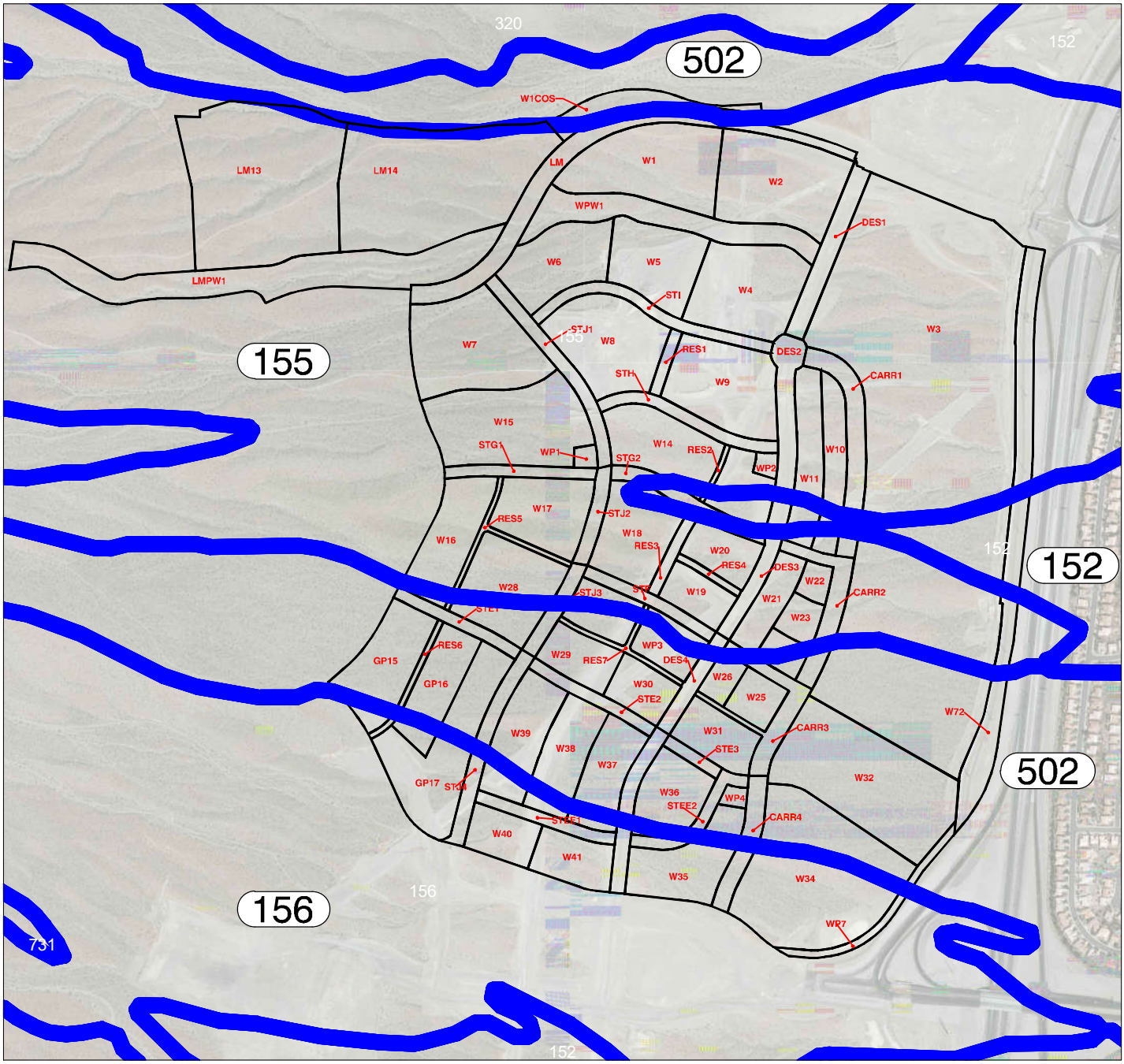


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H:\7861\Village 22 Master\GIS\Rainfall\mxd\Village22-2006MPU-Precipitation.mxd Date: 6/11/2018



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

NORTH

GRAPHIC SCALE

1000 0 500 1000 2000

1" = 1000'

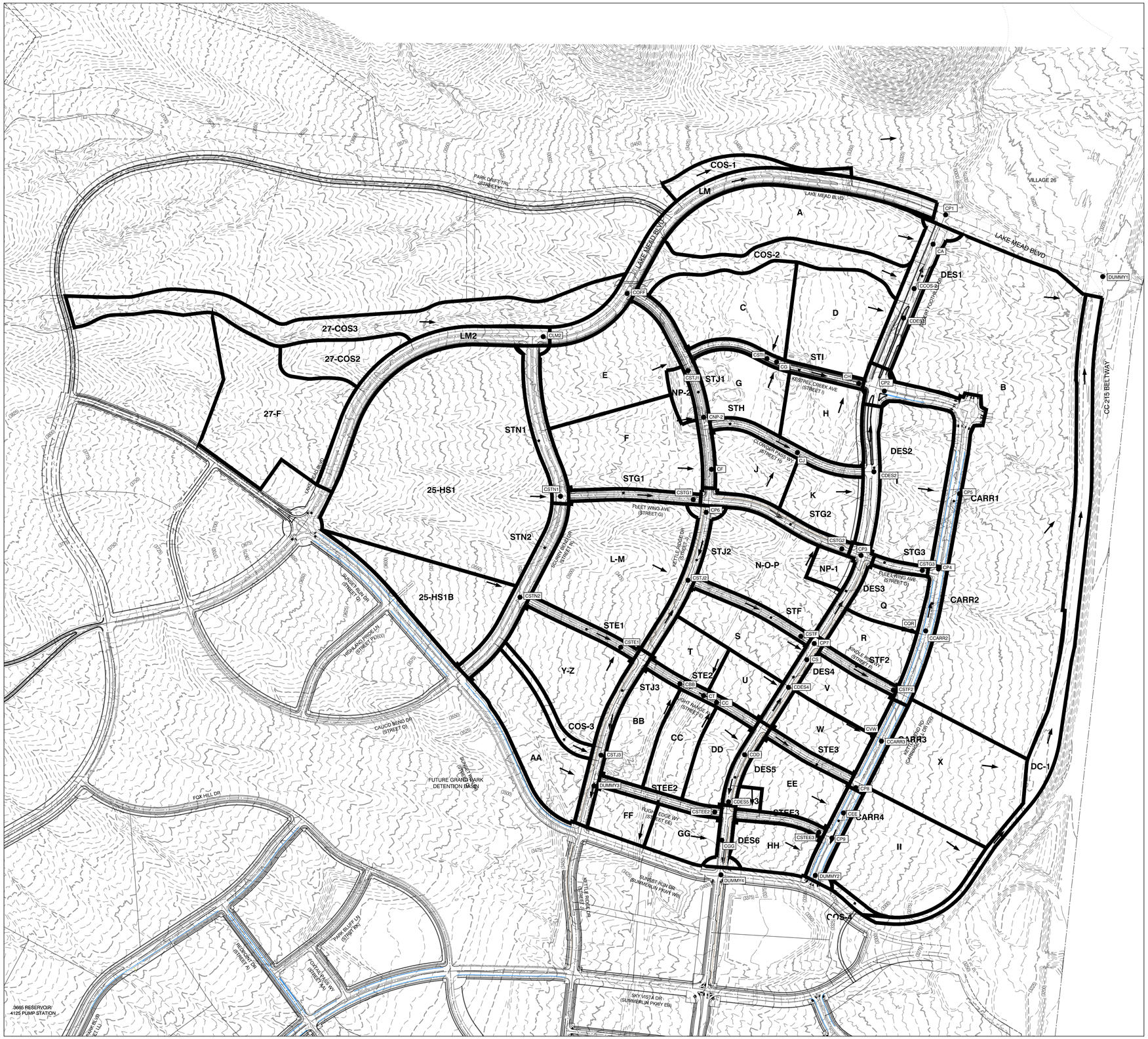
H:\7861\Village 22 Master\Drainage\A Figures\Figure 5A - Village 22 Soils Map.dwg

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



NORTH

GRAPHIC SCALE

350 0 175 350 700

1" = 350'

LEGEND

- BASIN BOUNDARY
- A — 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	L-M	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	CDD	-	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			

REVISION

BY

DATE

REV

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

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

FIGURE 6
ULTIMATE CONDITION BASIN MAP

SUMMERLIN WEST VILLAGE 22

DRAWN BY: JTA

DESIGNED BY:

CHECKED BY:

OCT 2019

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

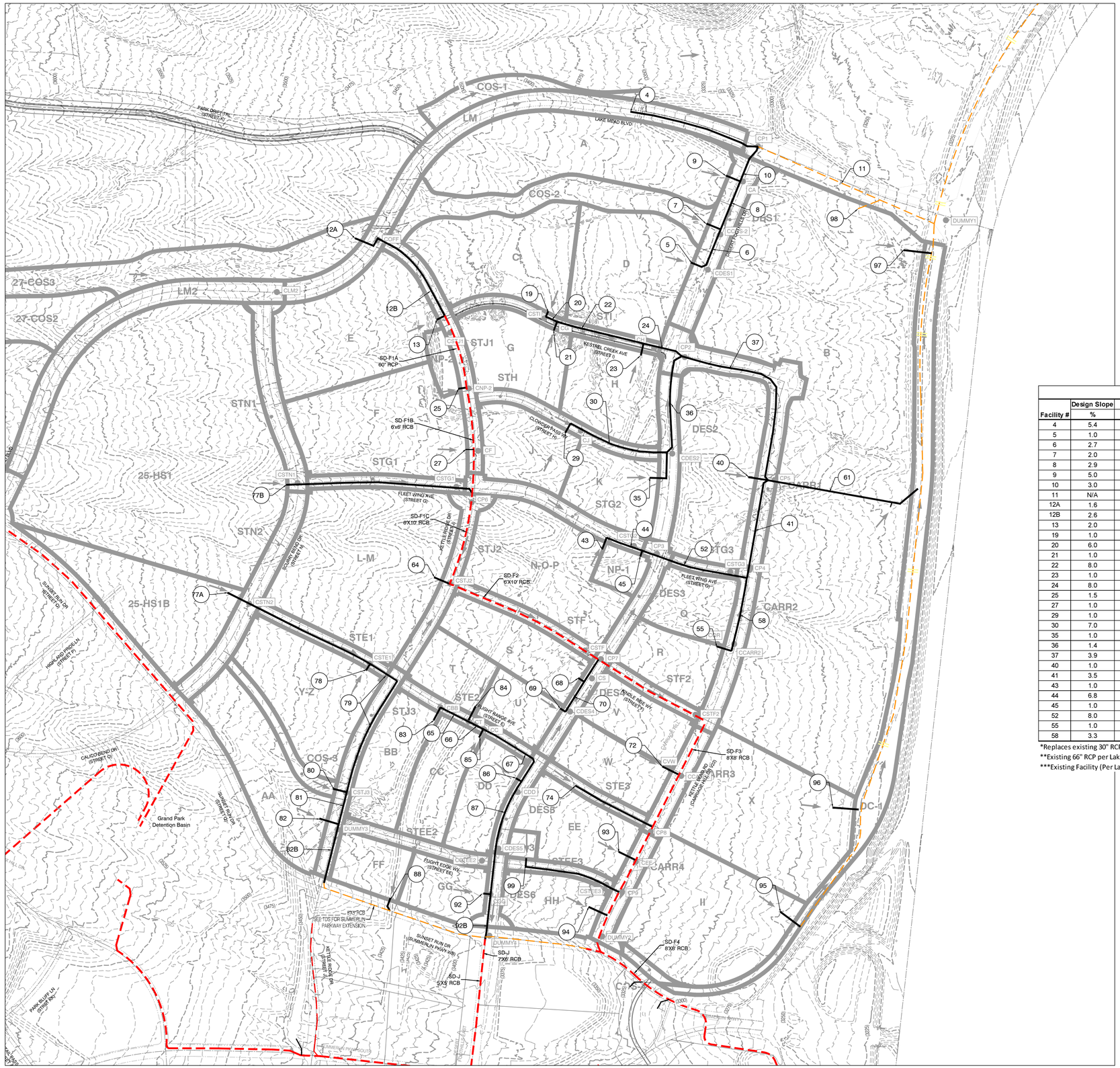
PROJECT NO: 7861

SHEET

OF SHEETS

DRAWING NO.

H:\7861\Village 22 Master\Drainage\5_LIP2\A_Figures\Figure 6 - Village 22 Drainage Basin Map.dwg


COS-1
LM
A
COS-2
B
C
D
CDES1
CDES2
CDES3
CDES4
CDES5
CDES6
CARR1
CARR2
CARR3
CARR4
CCARR2
DES1
DES2
DES3
DES5
DES6
LM2
27-COS3
27-COS2
25-HS1
25-HS1B
E
STJ1
STI
STH
F
STG1
STN1
STN2
L-M
STJ2
N-O-P
NP-1
STG2
STG3
STF
STF1
STF2
STE1
STE2
STE3
STEE2
STEE3
G
H
J
K
Q
R
S
T
U
V
W
X
Y-Z
AA
BB
CC
DD
EE
FF
GG
HH
II
COS-3
DC-1
Grand Park Detention Basin
LAKE MEAD BLVD (STREET A)
PARK DRIVE TRL (STREET N)
KESTREL CREEK AVE (STREET I)
CLOVERDALE PASS DR (STREET H)
FLEET WING AVE (STREET G)
SCURRY BEND DR (STREET M)
HIGHLAND RIDGE LN (STREET P)
SUNSET RUN DR (STREET O)
PARK SLOPE LN (STREET R)
CALICO BEND DR (STREET Q)
SUNSET RUN DR (SUMMERLIN PKWY WB)
SUNSET RUN DR (SUMMERLIN PKWY EB)
SUMMERLIN PKWY (SOUTH)
DESERT FOOT AVE
SD-F1A 60" RCP
SD-F1B 6'x6' RCB
SD-F1C 6'X10' RCB
SD-F2 6'X10' RCB
SD-F3/ 8'X8' RCB
SD-F4 8'X8' RCB
SD-J 7'X6' RCB
SD-J 5'X5' RCB
6'X7' RCB
SEE TOS FOR SUMMERLIN PARKWAY EXTENSION

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

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


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

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

1                                                  HEC-1 INPUT                                                  PAGE  1

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

                        *DIAGRAM
 *** FREE ***
              1         ID    ULTIMATE CONDITION HYDROLOGIC MODEL
              2         ID    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
                        *
```

```
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
                         *
1                                      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
                         *
1                                      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
                          *
1                                        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
                          *
1                                        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
              *
1                                    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
                *
1                                       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
                *
1                                       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   0.090   0.013       0    CIRC     4.5
              *
1                                        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
                       *
1                                        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
                       *
1                                        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
              *
1                                      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 CDES5
 601          RD     390   0.005   0.015       0    CIRC     3.5
              *

 602          KK    DES5
 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
                         *

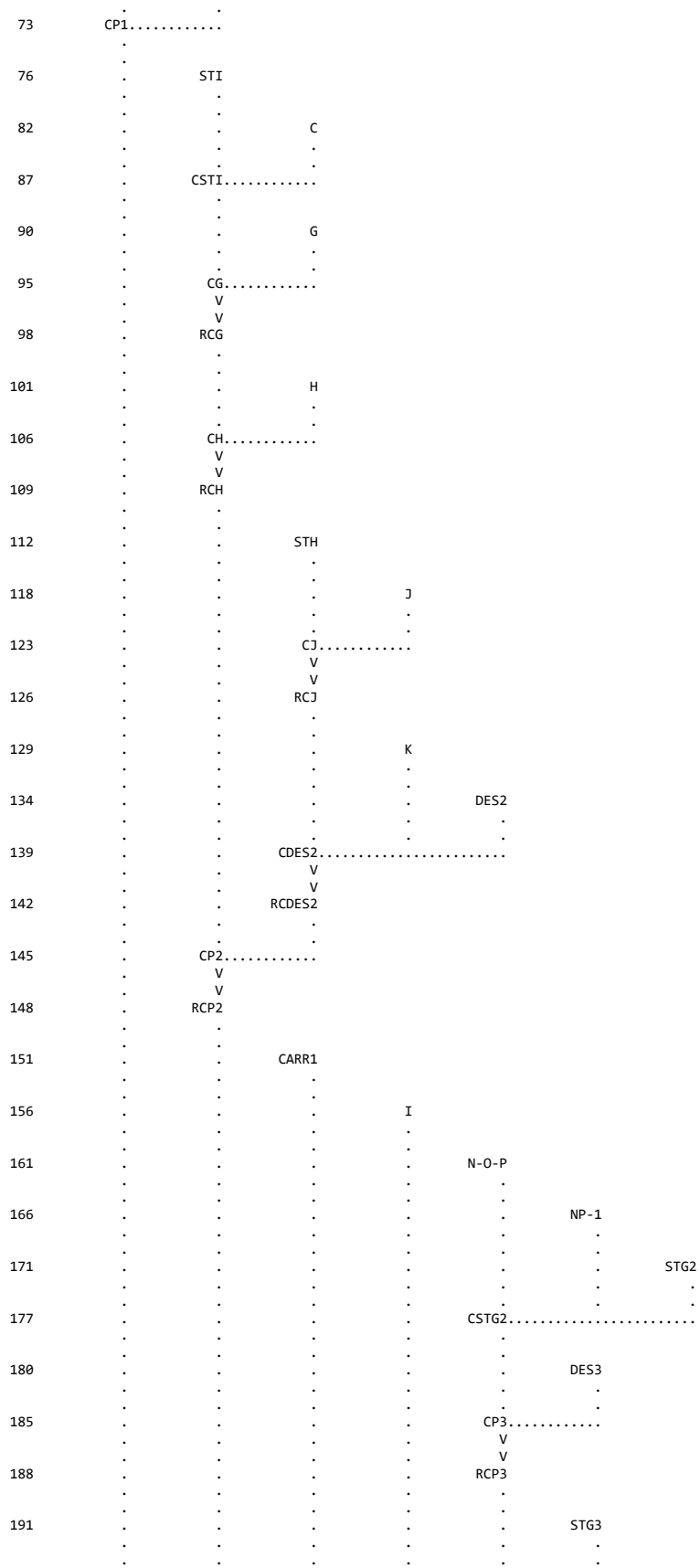
            626          KK      FF
            627          BA  0.0055
            628          PB    3.41
            629          LS       0    94.2
            630          UD   0.050
                         *
1                                              HEC-1 INPUT                                          PAGE 19

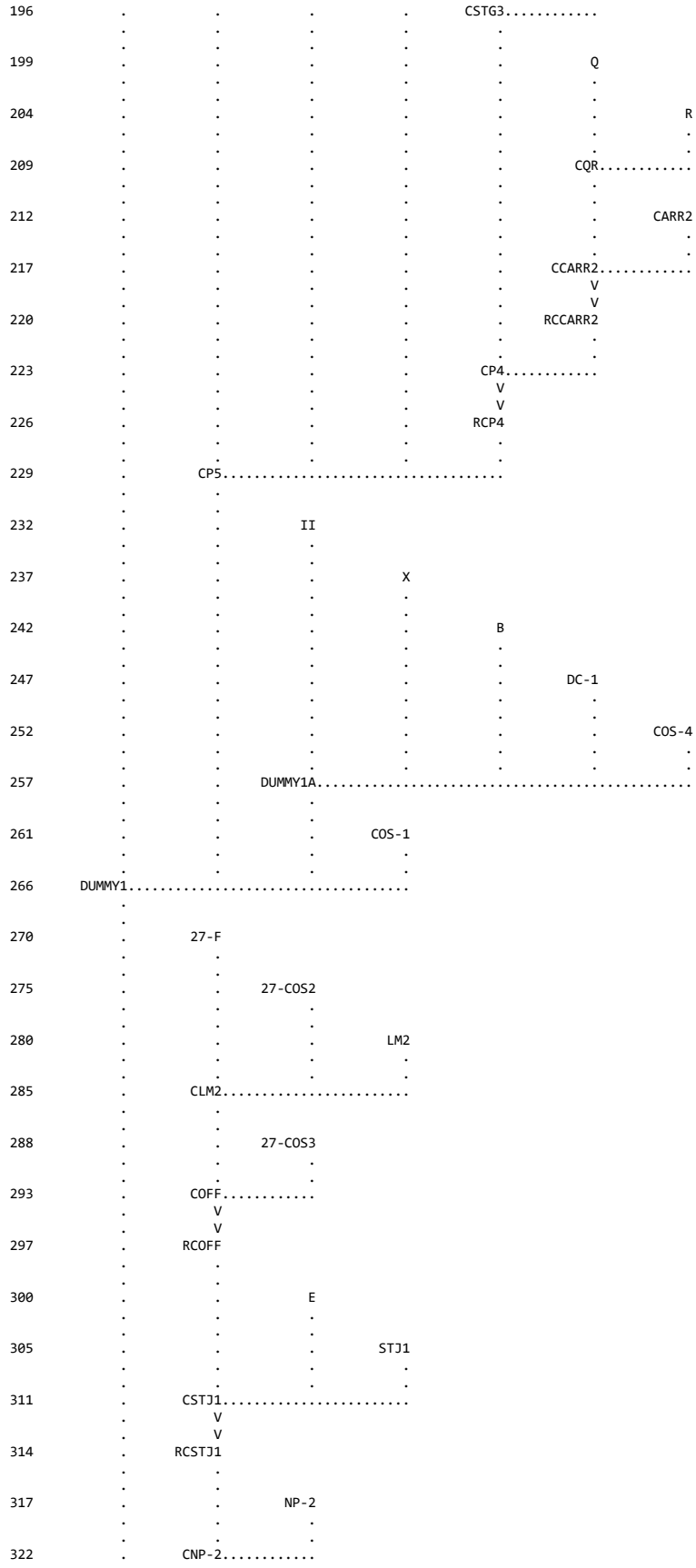
          LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

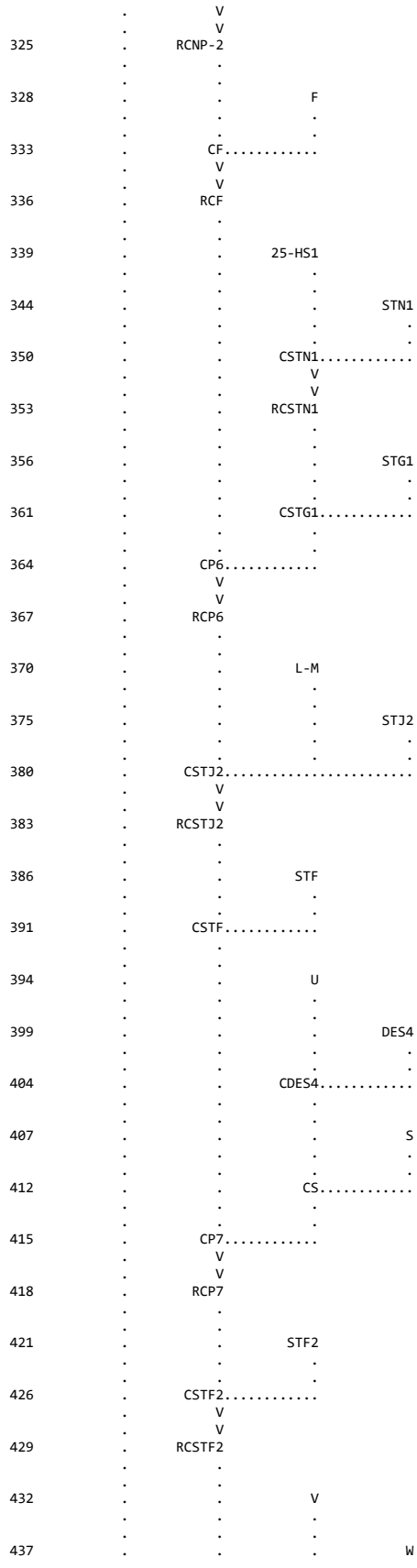

            631          KK  DUMMY4
            632          KM   COMBINE DUMMY3, FF, AND CGG
            633          HC       3
                         *
            634          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

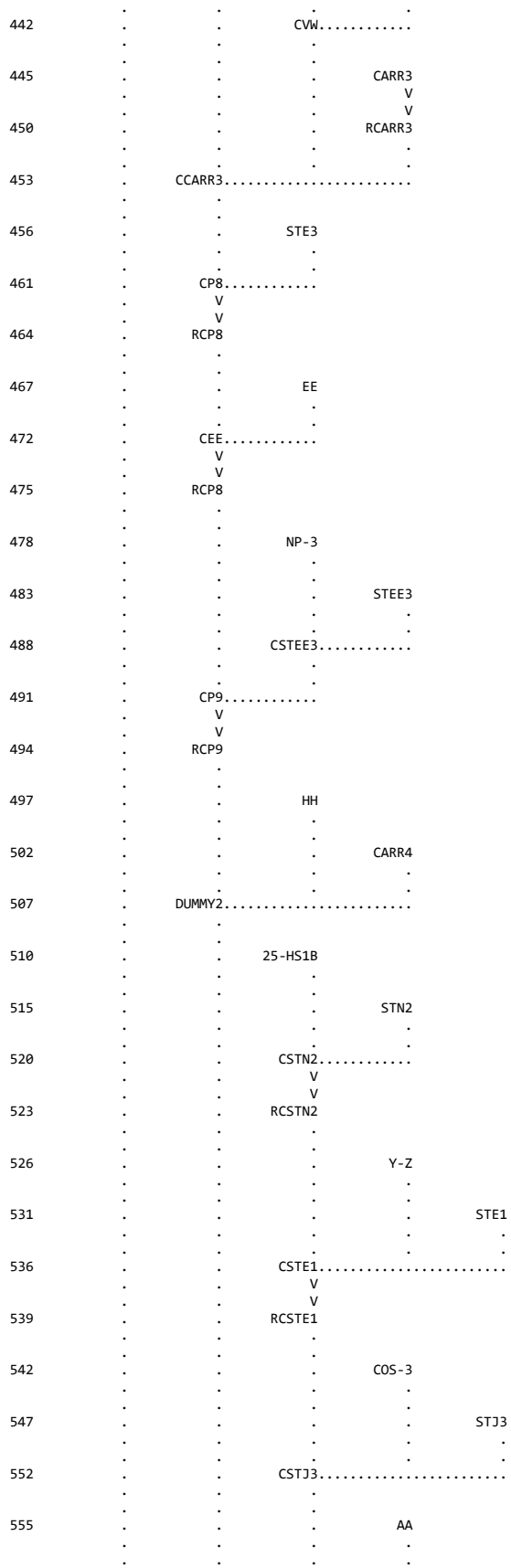
   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

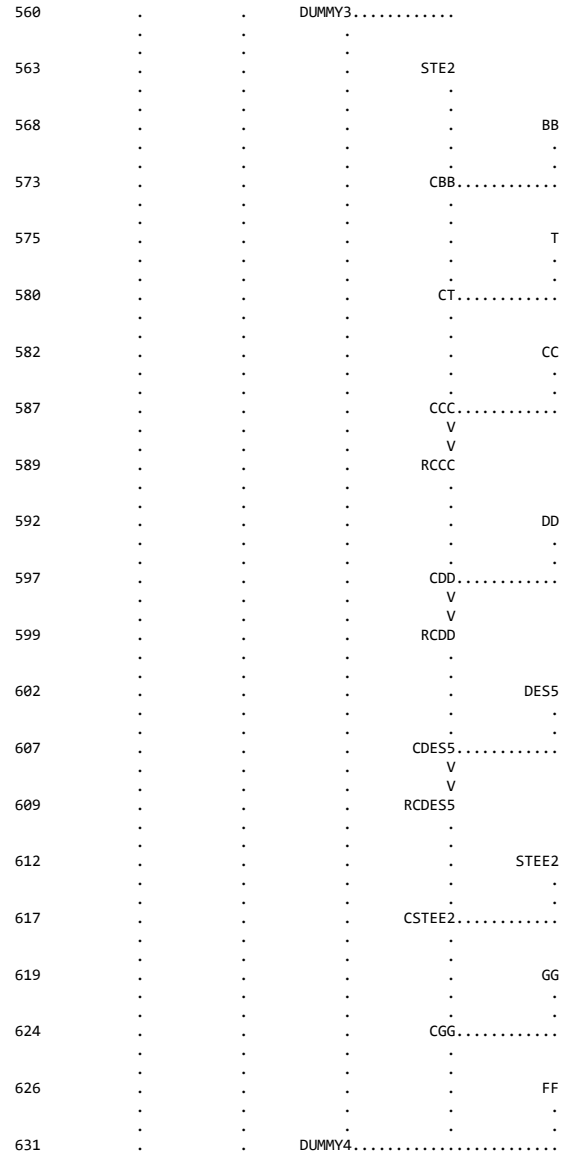
    22          LM
                 .
                 .
    35           .           D
                 .           .
                 .           .
    40           .           .       DES1
                 .           .          .
                 .           .          .
    45           .      CDES1............
                 .           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
98
RCG
101
H
106
CH
109
RCH
112
STH
118
J
123
CJ
126
RCJ
129
K
134
DES2
139
CDES2
142
RCDES2
145
CP2
148
RCP2
151
CARR1
156
I
161
N-O-P
166
NP-1
171
STG2
177
CSTG2
180
DES3
185
CP3
188
RCP3
191
STG3


CSTG3
Q
R
CQR
CARR2
CCARR2
V
V
RCCARR2
CP4
V
V
RCP4
CP5
II
X
B
DC-1
COS-4
DUMMY1A
COS-1
DUMMY1
27-F
27-COS2
LM2
CLM2
27-COS3
COFF
V
V
RCOFF
E
STJ1
CSTJ1
V
V
RCSTJ1
NP-2
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


CVW
CARR3
RCARR3
CCARR3
STE3
CP8
RCP8
EE
CEE
RCP8
NP-3
STEE3
CSTEE3
CP9
RCP9
HH
CARR4
DUMMY2
25-HS1B
STN2
CSTN2
RCSTN2
Y-Z
STE1
CSTE1
RCSTE1
COS-3
STJ3
CSTJ3
AA



(***) 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)

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

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


                                                                      RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN                        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         191.
                                           TIME        3.50

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

 HYDROGRAPH AT
+                      C       .02     1   FLOW          51.
                                           TIME        3.50

  2 COMBINED AT
+                   CSTI       .02     1   FLOW          62.
                                           TIME        3.50

 HYDROGRAPH AT
+                      G       .01     1   FLOW          30.
                                           TIME        3.50

  2 COMBINED AT
+                     CG       .03     1   FLOW          92.
                                           TIME        3.50

 ROUTED TO
+                    RCG       .03     1   FLOW          91.
                                           TIME        3.50

 HYDROGRAPH AT
+                      H       .01     1   FLOW          33.
                                           TIME        3.50

  2 COMBINED AT
+                     CH       .05     1   FLOW         124.
                                           TIME        3.50

 ROUTED TO
+                    RCH       .05     1   FLOW         123.
                                           TIME        3.50

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

 HYDROGRAPH AT
+                      J       .01     1   FLOW          24.
                                           TIME        3.50

  2 COMBINED AT
+                     CJ       .01     1   FLOW          34.
                                           TIME        3.50

 ROUTED TO
+                    RCJ       .01     1   FLOW          33.
                                           TIME        3.50

 HYDROGRAPH AT
+                      K       .01     1   FLOW          22.
                                           TIME        3.50

 HYDROGRAPH AT
+                   DES2       .00     1   FLOW          13.
                                           TIME        3.50

  3 COMBINED AT
+                  CDES2       .03     1   FLOW          68.
                                           TIME        3.50

 ROUTED TO
+                 RCDES2       .03     1   FLOW          66.
                                           TIME        3.50

  2 COMBINED AT
+                    CP2       .07     1   FLOW         189.
                                           TIME        3.50

 ROUTED TO
+                   RCP2       .07     1   FLOW         184.
                                           TIME        3.50

 HYDROGRAPH AT
+                  CARR1       .01     1   FLOW          29.
                                           TIME        3.50

 HYDROGRAPH AT
+                      I       .02     1   FLOW          38.
                                           TIME        3.50

 HYDROGRAPH AT
+                  N-O-P       .02     1   FLOW          49.
                                           TIME        3.50
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```
 HYDROGRAPH AT
+                   NP-1       .00     1   FLOW          6.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STG2       .00     1   FLOW         13.
                                           TIME         3.50

  3 COMBINED AT
+                  CSTG2       .03     1   FLOW         68.
                                           TIME         3.50

 HYDROGRAPH AT
+                   DES3       .00     1   FLOW          9.
                                           TIME         3.50

  2 COMBINED AT
+                    CP3       .03     1   FLOW         77.
                                           TIME         3.50

 ROUTED TO
+                   RCP3       .03     1   FLOW         76.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STG3       .00     1   FLOW          3.
                                           TIME         3.50

  2 COMBINED AT
+                  CSTG3       .03     1   FLOW         79.
                                           TIME         3.50

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

 HYDROGRAPH AT
+                      R       .01     1   FLOW         20.
                                           TIME         3.50

  2 COMBINED AT
+                    CQR       .01     1   FLOW         37.
                                           TIME         3.50

 HYDROGRAPH AT
+                  CARR2       .01     1   FLOW         15.
                                           TIME         3.50

  2 COMBINED AT
+                 CCARR2       .02     1   FLOW         52.
                                           TIME         3.50

 ROUTED TO
+                RCCARR2       .02     1   FLOW         51.
                                           TIME         3.50

  2 COMBINED AT
+                    CP4       .05     1   FLOW        131.
                                           TIME         3.50

 ROUTED TO
+                   RCP4       .05     1   FLOW        127.
                                           TIME         3.50

  4 COMBINED AT
+                    CP5       .15     1   FLOW        379.
                                           TIME         3.50

 HYDROGRAPH AT
+                     II       .03     1   FLOW         61.
                                           TIME         3.50

 HYDROGRAPH AT
+                      X       .03     1   FLOW         60.
                                           TIME         3.50

 HYDROGRAPH AT
+                      B       .13     1   FLOW        304.
                                           TIME         3.50

 HYDROGRAPH AT
+                   DC-1       .02     1   FLOW         36.
                                           TIME         3.67

 HYDROGRAPH AT
+                  COS-4       .00     1   FLOW          2.
                                           TIME         3.50

  5 COMBINED AT
+                DUMMY1A       .20     1   FLOW        454.
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```
                                        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
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```
+                RCSTN1       .08     1   FLOW         220.
                                             TIME         3.50

 HYDROGRAPH AT
+                 STG1       .00     1   FLOW           8.
                                             TIME         3.50

  2 COMBINED AT
+                 CSTG1       .09     1   FLOW         229.
                                             TIME         3.50

  2 COMBINED AT
+                  CP6       .21     1   FLOW         532.
                                             TIME         3.50

 ROUTED TO
+                 RCP6       .21     1   FLOW         518.
                                             TIME         3.50

 HYDROGRAPH AT
+                  L-M       .03     1   FLOW          81.
                                             TIME         3.50

 HYDROGRAPH AT
+                 STJ2       .00     1   FLOW          13.
                                             TIME         3.50

  3 COMBINED AT
+                 CSTJ2       .25     1   FLOW         612.
                                             TIME         3.50

 ROUTED TO
+                RCSTJ2       .25     1   FLOW         602.
                                             TIME         3.50

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

  2 COMBINED AT
+                  CSTF       .25     1   FLOW         610.
                                             TIME         3.50

 HYDROGRAPH AT
+                    U       .01     1   FLOW          11.
                                             TIME         3.50

 HYDROGRAPH AT
+                  DES4       .00     1   FLOW           8.
                                             TIME         3.50

  2 COMBINED AT
+                 CDES4       .01     1   FLOW          19.
                                             TIME         3.50

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

  2 COMBINED AT
+                   CS       .01     1   FLOW          29.
                                             TIME         3.50

  2 COMBINED AT
+                  CP7       .27     1   FLOW         639.
                                             TIME         3.50

 ROUTED TO
+                 RCP7       .27     1   FLOW         632.
                                             TIME         3.50

 HYDROGRAPH AT
+                 STF2       .00     1   FLOW           5.
                                             TIME         3.50

  2 COMBINED AT
+                 CSTF2       .27     1   FLOW         637.
                                             TIME         3.50

 ROUTED TO
+                RCSTF2       .27     1   FLOW         623.
                                             TIME         3.50

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

 HYDROGRAPH AT
+                    W       .01     1   FLOW          19.
                                             TIME         3.50
```

```
  2 COMBINED AT
+                    CVW       .02     1   FLOW          36.
                                           TIME         3.50

 HYDROGRAPH AT
+                   CARR3       .00     1   FLOW           8.
                                           TIME         3.50

 ROUTED TO
+                  RCARR3       .00     1   FLOW           8.
                                           TIME         3.50

  3 COMBINED AT
+                  CCARR3       .29     1   FLOW         667.
                                           TIME         3.50

 HYDROGRAPH AT
+                    STE3       .00     1   FLOW           6.
                                           TIME         3.50

  2 COMBINED AT
+                     CP8       .29     1   FLOW         673.
                                           TIME         3.50

 ROUTED TO
+                    RCP8       .29     1   FLOW         664.
                                           TIME         3.50

 HYDROGRAPH AT
+                      EE       .01     1   FLOW          25.
                                           TIME         3.50

  2 COMBINED AT
+                     CEE       .30     1   FLOW         689.
                                           TIME         3.50

 ROUTED TO
+                    RCP8       .30     1   FLOW         680.
                                           TIME         3.50

 HYDROGRAPH AT
+                    NP-3       .00     1   FLOW           2.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STEE3       .00     1   FLOW           5.
                                           TIME         3.50

  2 COMBINED AT
+                  CSTEE3       .00     1   FLOW           7.
                                           TIME         3.50

  2 COMBINED AT
+                     CP9       .30     1   FLOW         688.
                                           TIME         3.50

 ROUTED TO
+                    RCP9       .30     1   FLOW         678.
                                           TIME         3.50

 HYDROGRAPH AT
+                      HH       .01     1   FLOW          20.
                                           TIME         3.50

 HYDROGRAPH AT
+                   CARR4       .00     1   FLOW          10.
                                           TIME         3.50

  3 COMBINED AT
+                  DUMMY2       .32     1   FLOW         708.
                                           TIME         3.50

 HYDROGRAPH AT
+                25-HS1B       .02     1   FLOW          48.
                                           TIME         3.50

 HYDROGRAPH AT
+                    STN2       .01     1   FLOW          19.
                                           TIME         3.50

  2 COMBINED AT
+                   CSTN2       .03     1   FLOW          67.
                                           TIME         3.50

 ROUTED TO
+                  RCSTN2       .03     1   FLOW          65.
                                           TIME         3.50

 HYDROGRAPH AT
+                     Y-Z       .02     1   FLOW          42.
                                           TIME         3.50
```

```
 HYDROGRAPH AT
+                   STE1       .00     1   FLOW          8.
                                           TIME         3.50

  3 COMBINED AT
+                  CSTE1       .05     1   FLOW        115.
                                           TIME         3.50

 ROUTED TO
+                 RCSTE1       .05     1   FLOW        107.
                                           TIME         3.50

 HYDROGRAPH AT
+                   COS-3      .00     1   FLOW          4.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STJ3       .00     1   FLOW         14.
                                           TIME         3.50

  3 COMBINED AT
+                  CSTJ3       .05     1   FLOW        126.
                                           TIME         3.50

 HYDROGRAPH AT
+                     AA       .02     1   FLOW         33.
                                           TIME         3.50

  2 COMBINED AT
+                 DUMMY3       .07     1   FLOW        159.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STE2       .00     1   FLOW          8.
                                           TIME         3.50

 HYDROGRAPH AT
+                     BB       .01     1   FLOW         23.
                                           TIME         3.50

  2 COMBINED AT
+                    CBB       .01     1   FLOW         31.
                                           TIME         3.50

 HYDROGRAPH AT
+                      T       .01     1   FLOW         13.
                                           TIME         3.50

  2 COMBINED AT
+                     CT       .02     1   FLOW         44.
                                           TIME         3.50

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

  2 COMBINED AT
+                    CCC       .03     1   FLOW         63.
                                           TIME         3.50

 ROUTED TO
+                   RCCC       .03     1   FLOW         60.
                                           TIME         3.50

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

  2 COMBINED AT
+                    CDD       .03     1   FLOW         77.
                                           TIME         3.50

 ROUTED TO
+                   RCDD       .03     1   FLOW         74.
                                           TIME         3.50

 HYDROGRAPH AT
+                   DES5       .00     1   FLOW          7.
                                           TIME         3.50

  2 COMBINED AT
+                  CDES5       .04     1   FLOW         81.
                                           TIME         3.50

 ROUTED TO
+                 RCDES5       .04     1   FLOW         80.
                                           TIME         3.50

 HYDROGRAPH AT
+                  STEE2       .00     1   FLOW          8.
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                                        TIME         3.50

  2 COMBINED AT
+                 CSTEE2       .04     1   FLOW          88.
                                        TIME         3.50

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

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

 HYDROGRAPH AT
+                     FF       .01     1   FLOW          15.
                                        TIME         3.50

  3 COMBINED AT
+                 DUMMY4       .12     1   FLOW         282.
                                        TIME         3.50
1
                                        SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                            (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                  INTERPOLATED TO
                                                                                COMPUTATION INTERVAL
            ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                      PEAK                                    PEAK

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

          FOR PLAN = 1  RATIO=  .00
            RCDES1  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
            RCDES2  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

RCDES5	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 ***

Appendix B. Hydrology Appendix

B.1. Parameters

B.2. HEC-1 Model

B.1 Parameters

SUMMERLIN WEST VILLAGE 22

Fleet Wing Avenue (Street G)

Desert Foothills Drive to Kettle Ridge Drive (Street J)

BASIN ID	LAND USE INDEX NUMBER	LAND USE DESCRIPTION	SOIL MAP UNIT #	SUBREGION CN	SUBREGION AREA (SQ FT)	SUBBASIN AREA (SQ FT)	PERCENT OF SUBBASIN	CUMULATIVE PERCENT	AREAL WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
INT-G1	1	Undeveloped Land, Open Desert	1152	88	9580	106706	9.0%	9.0%	7.90	7.90	
INT-G1	1	Undeveloped Land, Open Desert	1155	88	97127	106706	91.0%	100.0%	80.10	88.00	**88.0**
StrG-N	7	Public Facility and Residential, 8-12 units/acre	1152	94	37387	70896	52.7%	52.7%	49.57	49.57	
StrG-N	7	Public Facility and Residential, 8-12 units/acre	1155	94	33508	70896	47.3%	100.0%	44.43	94.00	**94.0**
StrG-S	7	Public Facility and Residential, 8-12 units/acre	1152	94	14146	42768	33.1%	33.1%	31.09	31.09	
StrG-S	7	Public Facility and Residential, 8-12 units/acre	1155	94	28622	42768	66.9%	100.0%	62.91	94.00	**94.0**
StrJ-3E	7	Public Facility and Residential, 8-12 units/acre	1155	94	24821	24821	100.0%	100.0%	94.00	94.00	**94.0**
StrJ-4E	7	Public Facility and Residential, 8-12 units/acre	1155	94	27032	27032	100.0%	100.0%	94.00	94.00	**94.0**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

TDS for Summerlin Village 22 West

ATKINS
Member of the SNC-Lavalin Group

Fleet Wing Avenue (Street G)
Desert Foothills Drive to Kettle Ridge Drive (Street J)

BY: **DMS**
DATE: **3/12/2020**

INTERIM CONDITION

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag
DESIG: (1)	DEV./EX. (D or E)	CN	K (2)	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours
INT-G1	E	88.0	0.772	2.45	0.00383	100	5.5	3.3	994	5.5	3.5	6.9	3.6	6.9	N/A	**0.100****
StrG-N	D	94.0	0.851	1.63	0.00254	16	2.0	1.4	1068	7.8	5.6	8.5	2.6	4.0	16.0	**0.050***
StrG-S	D	94.0	0.851	0.99	0.00153	16	2.0	1.4	1035	7.8	5.6	8.5	2.5	3.9	15.8	**0.050***
StrJ-3E	D	94.0	0.851	0.39	0.00062	16	2.0	1.4	403	1.0	2.0	3.1	3.3	4.7	12.3	**0.050***
StrJ-4E	D	94.0	0.851	0.62	0.00097	16	2.0	1.4	621	1.1	2.1	3.2	4.6	6.0	13.5	**0.060**

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 Developed V1 = 20.2*(S/100)^1/2
V2 = 29.4*(S/100)^1/2 Developed 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)   *                    *    U.S. ARMY CORPS OF ENGINEERS       *
 *              JUN   1998               *                    *    HYDROLOGIC ENGINEERING CENTER      *
 *            VERSION 4.1                *                    *          609 SECOND STREET            *
 *                                       *                    *       DAVIS, CALIFORNIA 95616         *
 *  RUN DATE   12MAR20  TIME  13:56:08   *                    *           (916) 756-1104              *
 *                                       *                    *                                       *
 *****************************************                    *****************************************

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


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

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

1                                                  HEC-1 INPUT                                                  PAGE  1

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

                         *DIAGRAM
 *** FREE ***
               1         ID  TECHNICAL DRAINAGE STUDY
               2         ID  SUMMERLIN VILLAGE 22
               3         ID  FLEET WING AVENUE (STREET G)
               4         ID  DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)
               5         ID
               6         ID
               7         ID  MARCH 2020
               8         ID
               9         ID  JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES
              10         ID
              11         ID    AREA (SQUARE MILES)           DARF
              12         ID
              13         ID          0 - 0.5                 0.99
              14         ID          Estimated 10-year       0.57
              15         ID
              16         IT       5       0       0     300
              17         IO       5       0       0
              18         IN       5       0       0
              19         JR    PREC    0.99    0.57
                         *

              20         KK StrJ-3E
              21         BA 0.00089
              22         PB    3.42
              23         PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
              24         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
              25         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
              26         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
              27         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
              28         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
              29         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
              30         PC   0.998   0.999   1.000
              31         LS       0    94.0
              32         UD   0.089
                         *

              33         KK  StrG-N
              34         BA 0.00254
              35         PB    3.42
              36         LS       0    94.0
              37         UD   0.056
                         *

              38         KK StrJ-4E
              39         BA 0.00097
              40         PB    3.43
              41         LS       0    94.0
              42         UD   0.070
                         *

1                                                  HEC-1 INPUT                                                  PAGE  2
```

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

             43          KK  StrG-S
             44          BA 0.00153
             45          PB    3.42
             46          LS       0    94.0
             47          UD   0.050
                         *

             48          KK  INT-G1
             49          BA 0.00383
             50          PB    3.42
             51          LS       0    88.0
             52          UD   0.100
                         *
             53          ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    20     StrJ-3E
                .
                .
    33          .      StrG-N
                .           .
                .           .
    38          .           .     StrJ-4E
                .           .           .
                .           .           .
    43          .           .           .      StrG-S
                .           .           .           .
                .           .           .           .
    48          .           .           .           .      INT-G1

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
*               JUN   1998             *                                    *    HYDROLOGIC ENGINEERING CENTER     *
*            VERSION 4.1               *                                    *          609 SECOND STREET           *
*                                      *                                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   12MAR20  TIME  13:56:08  *                                    *           (916) 756-1104             *
*                                      *                                    *                                      *
****************************************                                    ****************************************



                          TECHNICAL DRAINAGE STUDY
                          SUMMERLIN VILLAGE 22
                          FLEET WING AVENUE (STREET G)
                          DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)


                          MARCH 2020

                          JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES

                            AREA (SQUARE MILES)           DARF

                                  0 - 0.5                 0.99
                                  Estimated 10-year       0.57


   17 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
1

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


                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN            RATIO 1  RATIO 2
                                                        .99      .57

 HYDROGRAPH AT
+                StrJ-3E       .00     1   FLOW           2.       1.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                 StrG-N       .00     1   FLOW           7.       4.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                StrJ-4E       .00     1   FLOW           2.       1.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                 StrG-S       .00     1   FLOW           4.       2.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                 INT-G1       .00     1   FLOW           7.       3.
                                           TIME         3.50     3.50


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

Appendix C. Hydraulics Appendix

C.1. Drop Inlet Calculations

C.2. Normal Depth Calculations

C.3. Interim Condition WSPG-W Model

C.4. Ultimate Condition WSPG-W Model

C.1 Drop Inlet Calculations

Worksheet for SDDI #1 12.5' Combo Inlet On Grade at 7.76% 100 yr Ultimate

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	0.078 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	10.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	12.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	92.85 %
Intercepted Flow	3.71 cfs
Bypass Flow	0.29 cfs
Spread	7.5 ft
Depth	0.2 ft
Flow Area	0.6 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	6.32 ft/s
Splash Over Velocity	10.75 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.163
Grate Flow Ratio	0.571
Equivalent Cross Slope	0.141 ft/ft
Active Grate Length	5.0 ft
Length Factor	0.387
Total Interception Length	19.4 ft

Messages

Worksheet for SDDI #1 12.5' Combo Inlet On Grade at 7.76% 100 yr Ultimate

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 SDDI #2 Ditch Inlet In Sag 2'x2' 100yr

Project Description	
Solve For	Spread

Input Data	
Discharge	7.00 cfs
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	0.00 ft
Grate Width	2.00 ft
Grate Length	2.0 ft
Local Depression	0.0 in
Local Depression Width	24.0 in
Grate Type	P-50 mm x 100 mm (P-1-7/8"-4")
Clogging	50.0 %

Results	
Spread	4.0 ft
Depth	0.7 ft
Wetted Perimeter	4.2 ft
Top Width	3.98 ft
Open Grate Area	1.6 ft²
Active Grate Weir Length	6.0 ft

Worksheet for SDDI #3 20' Combo Inlet On Grade at 7.76% 100 yr Ultimate

Project Description	
Solve For	Efficiency

Input Data	
Discharge	7.00 cfs
Slope	0.078 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	17.5 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	20.0 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	92.77 %
Intercepted Flow	6.49 cfs
Bypass Flow	0.51 cfs
Spread	9.6 ft
Depth	0.3 ft
Flow Area	1.0 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	7.08 ft/s
Splash Over Velocity	44.17 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.366
Grate Flow Ratio	0.458
Equivalent Cross Slope	0.117 ft/ft
Active Grate Length	8.8 ft
Length Factor	0.411
Total Interception Length	27.4 ft

Messages

Worksheet for SDDI #3 20' Combo Inlet On Grade at 7.76% 100 yr Ultimate

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 SDDI #4 5' Combo Inlet On Grade at 0.50% 100 yr Ultimate

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.00 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	2.5 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	5.0 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	93.19 %
Intercepted Flow	1.86 cfs
Bypass Flow	0.14 cfs
Spread	10.1 ft
Depth	0.3 ft
Flow Area	1.1 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	1.84 ft/s
Splash Over Velocity	4.61 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.069
Grate Flow Ratio	0.437
Equivalent Cross Slope	0.112 ft/ft
Active Grate Length	1.3 ft
Length Factor	0.516
Total Interception Length	7.3 ft

Messages

Worksheet for SDDI #4 5' Combo Inlet On Grade at 0.50% 100 yr Ultimate

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 SDDI #5 5' Combo Inlet On Grade at 1.10% 100 yr Ultimate

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.00 cfs
Slope	0.011 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	2.5 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	5.0 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	91.79 %
Intercepted Flow	1.84 cfs
Bypass Flow	0.16 cfs
Spread	8.5 ft
Depth	0.3 ft
Flow Area	0.8 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	2.51 ft/s
Splash Over Velocity	4.61 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.041
Grate Flow Ratio	0.511
Equivalent Cross Slope	0.128 ft/ft
Active Grate Length	1.3 ft
Length Factor	0.441
Total Interception Length	8.5 ft

Messages

Worksheet for SDDI #5 5' Combo Inlet On Grade at 1.10% 100 yr Ultimate

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 SDDI #7 20' Combo Inlet On Grade at 5.50% 100 yr Ultimate

Project Description	
Solve For	Efficiency

Input Data	
Discharge	7.00 cfs
Slope	0.055 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	17.5 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	20.0 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	93.95 %
Intercepted Flow	6.58 cfs
Bypass Flow	0.42 cfs
Spread	10.3 ft
Depth	0.3 ft
Flow Area	1.1 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	6.17 ft/s
Splash Over Velocity	44.17 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.425
Grate Flow Ratio	0.427
Equivalent Cross Slope	0.110 ft/ft
Active Grate Length	8.8 ft
Length Factor	0.441
Total Interception Length	25.5 ft

Messages

Worksheet for SDDI #7 20' Combo Inlet On Grade at 5.50% 100 yr Ultimate

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 SDDI #8 20' Combo Inlet On Grade at 5.50% 100 yr Ultimate

Project Description	
Solve For	Efficiency

Input Data	
Discharge	6.00 cfs
Slope	0.055 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	17.5 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	20.0 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	96.04 %
Intercepted Flow	5.76 cfs
Bypass Flow	0.24 cfs
Spread	9.7 ft
Depth	0.3 ft
Flow Area	1.0 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	5.97 ft/s
Splash Over Velocity	44.17 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.440
Grate Flow Ratio	0.455
Equivalent Cross Slope	0.116 ft/ft
Active Grate Length	8.8 ft
Length Factor	0.485
Total Interception Length	23.2 ft

Messages

Worksheet for SDDI #8 20' Combo Inlet On Grade at 5.50% 100 yr Ultimate

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

Worksheet for Fleet Wing - STG-1 - 100 yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.078 ft/ft
Discharge	11.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+01	0.50
0+01	0.00
0+02	0.08
0+02	0.10
0+19	0.40
0+35	0.10
0+35	0.08
0+36	0.00
0+37	0.50
0+37	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+02, 0.08)	0.013
(0+02, 0.08)	(0+35, 0.08)	0.015
(0+35, 0.08)	(0+37, 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

Results	
Normal Depth	0.3 ft
Elevation Range	0.0 to 0.5 ft
Flow Area	1.9 ft²
Wetted Perimeter	20.3 ft
Hydraulic Radius	0.1 ft
Top Width	19.97 ft
Normal Depth	0.3 ft
Critical Depth	0.4 ft
Critical Slope	0.006 ft/ft

Worksheet for Fleet Wing - STG-1 - 100 yr

Results	
Velocity	5.80 ft/s
Velocity Head	0.52 ft
Specific Energy	0.78 ft
Froude Number	3.314
Flow Type	Supercritical

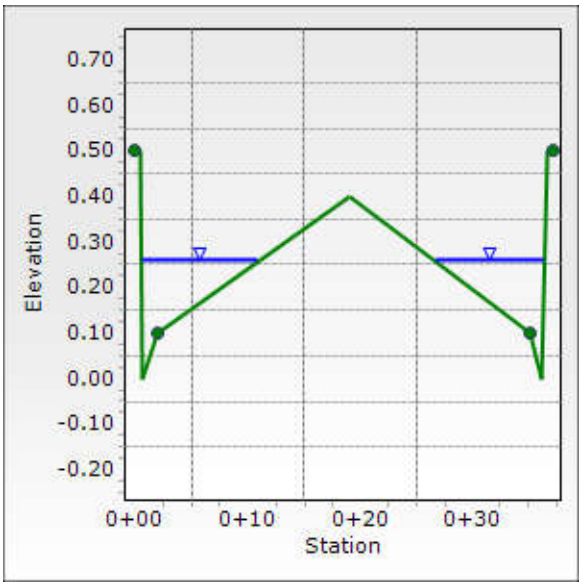
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.3 ft
Critical Depth	0.4 ft
Channel Slope	0.078 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for Fleet Wing - STG-1 - 100 yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.078 ft/ft
Normal Depth	0.3 ft
Discharge	11.00 cfs



Worksheet for Fleet Wing - STG-2 - 100 yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.011 ft/ft
Discharge	4.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+01	0.50
0+01	0.00
0+02	0.08
0+02	0.10
0+19	0.40
0+35	0.10
0+35	0.08
0+36	0.00
0+37	0.50
0+37	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+02, 0.08)	0.013
(0+02, 0.08)	(0+35, 0.08)	0.015
(0+35, 0.08)	(0+37, 0.50)	0.013

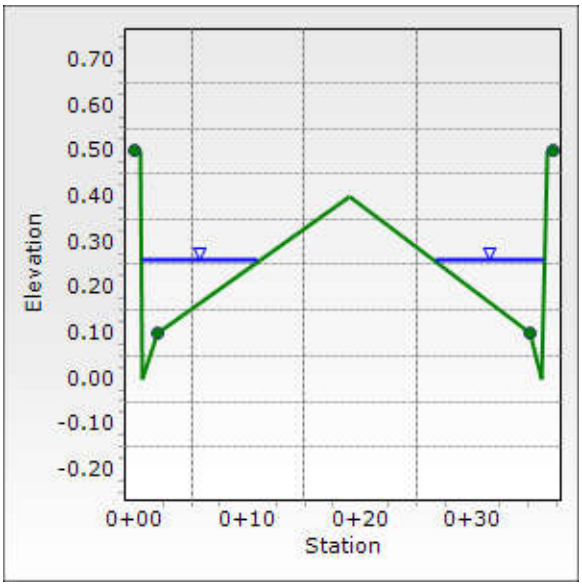
Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.3 ft
Elevation Range	0.0 to 0.5 ft
Flow Area	1.9 ft²
Wetted Perimeter	20.1 ft
Hydraulic Radius	0.1 ft
Top Width	19.71 ft
Normal Depth	0.3 ft
Critical Depth	0.3 ft
Critical Slope	0.007 ft/ft

Cross Section for Fleet Wing - STG-2 - 100 yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.011 ft/ft
Normal Depth	0.3 ft
Discharge	4.00 cfs



Worksheet for Fleet Wing - STG-2 - 100 yr

Results	
Velocity	2.16 ft/s
Velocity Head	0.07 ft
Specific Energy	0.33 ft
Froude Number	1.242
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.3 ft
Critical Depth	0.3 ft
Channel Slope	0.011 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for StrG-N - 100 yr Ultimate

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.078 ft/ft
Discharge	7.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+01	0.50
0+01	0.00
0+02	0.08
0+02	0.10
0+19	0.43
0+35	0.10
0+35	0.08
0+36	0.00
0+37	0.50
0+37	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+02, 0.08)	0.013
(0+02, 0.08)	(0+35, 0.08)	0.015
(0+35, 0.08)	(0+37, 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

Results	
Normal Depth	0.2 ft
Elevation Range	0.0 to 0.5 ft
Flow Area	1.3 ft²
Wetted Perimeter	15.7 ft
Hydraulic Radius	0.1 ft
Top Width	15.24 ft
Normal Depth	0.2 ft
Critical Depth	0.3 ft
Critical Slope	0.006 ft/ft

Worksheet for StrG-N - 100 yr Ultimate

Results	
Velocity	5.40 ft/s
Velocity Head	0.45 ft
Specific Energy	0.68 ft
Froude Number	3.267
Flow Type	Supercritical

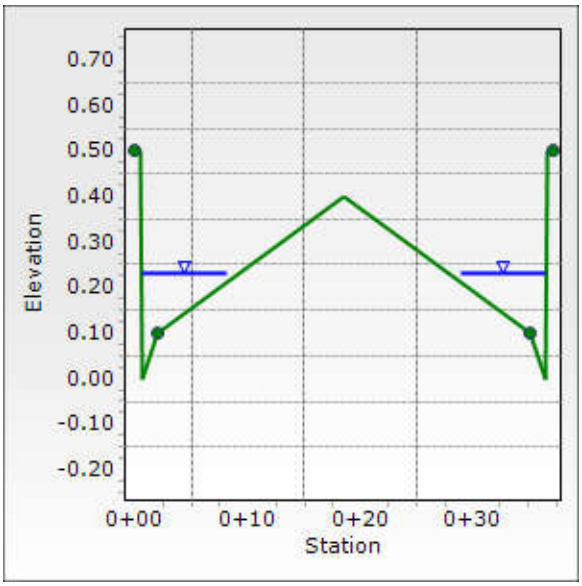
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.2 ft
Critical Depth	0.3 ft
Channel Slope	0.078 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for StrG-N - 100 yr Ultimate

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.078 ft/ft
Normal Depth	0.2 ft
Discharge	7.00 cfs



Worksheet for StrG-S - 100 yr Ultimate

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.078 ft/ft
Discharge	4.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+01	0.50
0+01	0.00
0+02	0.08
0+02	0.10
0+22	0.50
0+42	0.10
0+42	0.08
0+43	0.00
0+44	0.50
0+44	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+02, 0.08)	0.013
(0+02, 0.08)	(0+42, 0.08)	0.015
(0+42, 0.08)	(0+44, 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

Results	
Normal Depth	0.2 ft
Elevation Range	0.00 to 0.50 ft
Flow Area	0.8 ft²
Wetted Perimeter	12.2 ft
Hydraulic Radius	0.1 ft
Top Width	11.81 ft
Normal Depth	0.2 ft
Critical Depth	0.3 ft

Worksheet for StrG-S - 100 yr Ultimate

Results	
Critical Slope	0.007 ft/ft
Velocity	4.80 ft/s
Velocity Head	0.36 ft
Specific Energy	0.55 ft
Froude Number	3.190
Flow Type	Supercritical

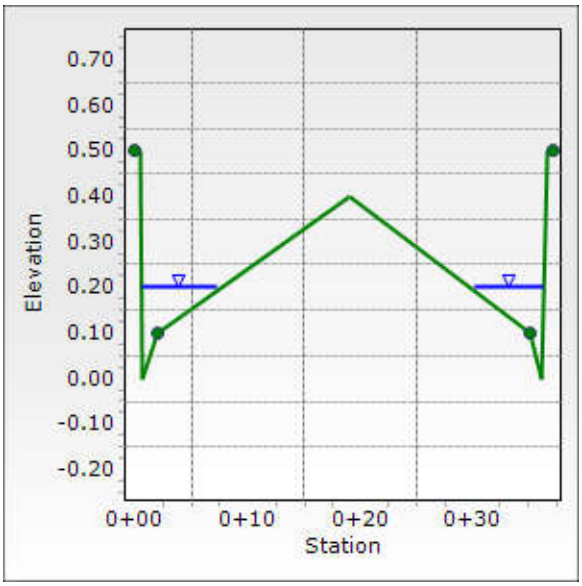
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.2 ft
Critical Depth	0.3 ft
Channel Slope	0.078 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for StrG-S - 100 yr Ultimate

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.078 ft/ft
Normal Depth	0.2 ft
Discharge	4.00 cfs



Worksheet for StrJ-3E - 100 yr Ultimate

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010 ft/ft
Discharge	2.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+01	0.50
0+01	0.00
0+02	0.08
0+02	0.10
0+22	0.50
0+42	0.10
0+42	0.08
0+43	0.00
0+44	0.50
0+44	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+02, 0.08)	0.013
(0+02, 0.08)	(0+42, 0.08)	0.015
(0+42, 0.08)	(0+44, 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

Results	
Normal Depth	0.2 ft
Elevation Range	0.0 to 0.5 ft
Flow Area	1.1 ft²
Wetted Perimeter	14.2 ft
Hydraulic Radius	0.1 ft
Top Width	13.78 ft
Normal Depth	0.2 ft
Critical Depth	0.2 ft
Critical Slope	0.007 ft/ft

Worksheet for StrJ-3E - 100 yr Ultimate

Results	
Velocity	1.84 ft/s
Velocity Head	0.05 ft
Specific Energy	0.27 ft
Froude Number	1.156
Flow Type	Supercritical

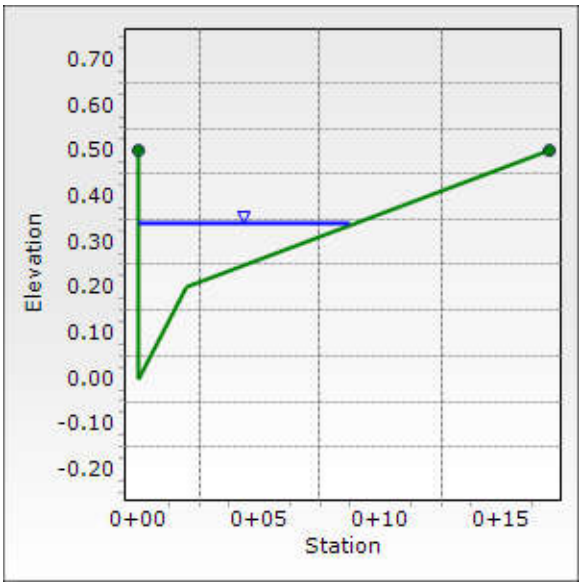
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.2 ft
Critical Depth	0.2 ft
Channel Slope	0.010 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for StrJ-3E - 100 yr Ultimate

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010 ft/ft
Normal Depth	0.3 ft
Discharge	2.00 cfs



Worksheet for StrJ-4E - 100 yr Ultimate

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.011 ft/ft
Discharge	2.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	2.00
0+06	0.00
0+56	1.00
0+59	2.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2.00)	(0+59, 2.00)	0.025

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

Results	
Normal Depth	0.2 ft
Elevation Range	0.0 to 2.0 ft
Flow Area	1.4 ft²
Wetted Perimeter	12.1 ft
Hydraulic Radius	0.1 ft
Top Width	12.04 ft
Normal Depth	0.2 ft
Critical Depth	0.2 ft
Critical Slope	0.020 ft/ft
Velocity	1.46 ft/s
Velocity Head	0.03 ft
Specific Energy	0.26 ft
Froude Number	0.765
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft

Worksheet for StrJ-4E - 100 yr Ultimate

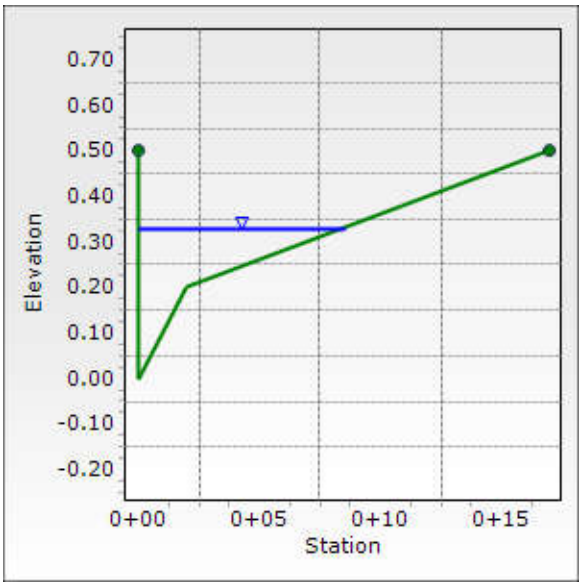
GVF Input Data	
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.2 ft
Critical Depth	0.2 ft
Channel Slope	0.011 ft/ft
Critical Slope	0.020 ft/ft

Cross Section for StrJ-4E - 100 yr Ultimate

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.011 ft/ft
Normal Depth	0.3 ft
Discharge	2.00 cfs



C.3 Interim Condition WSPG-W Model

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO      0.00 3329.77  36                          3331.621
REM  Tailwater from VTN Fleet Wing TDS
R      28.77 3330.43  36      .013                                  .000  00.0   0
REM  Downstream of SDMH #1 (Junction with SDMH#6)
JX     30.77 3330.53  36 36   .013    14.0           3330.63         44.0         .000
R      35.77 3330.63  36      .013                                  .000  00.0   1
REM  Upstream of SDMH #1 (Junction with SDMH#6)
REM  48.34 foot Reach
R      79.11 3331.67  36      .013                                  .000  00.0   0
REM  Downstream of SDMH #2
R      81.61 3331.77  36      .013                                  .000  00.0   1
R      84.11 3331.87  36      .013                                  .000  00.0   0
REM  Upstream of SDMH #2
REM  81.80 foot Reach
R     160.91 3341.45  36      .013                                  .000  00.0   0
REM  Downstream of SDMH #3 (JUNCTION WITH LATERAL SDDI#1 & SDDI#3)
JX    163.41 3341.55  36 24 24.013    7.0      4.0  3342.65 3342.65 -61.0 45.0    .000
R     165.91 3341.65  36      .013                                  .000  00.0   1
REM  Upstream of SDMH #3 (JUNCTION WITH LATERAL SDDI#1 & SDDI#3)
REM  172.54 foot Reach
R     189.53 3342.841 36      .013                                  .000  00.0   0
R     189.54 3342.842 36      .013                                  .000  00.0   0
R     189.55 3342.842 36      .013                                  .000  00.0   0
R     333.45 3350.10  36      .013                                  .000  00.0   0
REM  Downstream of SDMH #4
R     335.95 3350.20  36      .013                                  .000  00.0   1
R     338.45 3350.30  36      .013                                  .000  00.0   0
REM  Upstream of SDMH #4
REM  120.77 foot Reach
R     454.22 3358.89  36      .013                                  .000  03.0   0
REM  Downstream of SDMH #5
R     456.72 3358.99  36      .013                                  .000  00.0   1
R     459.22 3359.09  36      .013                                  .000  90.0   0
REM  Upstream of SDMH#5
REM  31.96 foot Reach
R     488.68 3359.73  36      .013                                  .000  00.0   0
SH    488.68 3359.73  36
CD  24  4   1    .000   2.000     .000  .000  .000   .00
CD  36  4   1    .000   3.000     .000  .000  .000   .00
Q           0.01     .0
```

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
.000	3329.770	1.181	3330.950	25.01	9.68	1.46	3332.41	.00	1.61	2.93	3.000	.000	.00	1 .0
4.405	.0229					.0127	.06	1.18	1.82	1.02	.013	.00	.00	PIPE
4.405	3329.871	1.201	3331.072	25.01	9.46	1.39	3332.46	.00	1.61	2.94	3.000	.000	.00	1 .0
7.286	.0229					.0116	.08	1.20	1.76	1.02	.013	.00	.00	PIPE
11.690	3330.038	1.245	3331.282	25.01	9.02	1.26	3332.55	.00	1.61	2.96	3.000	.000	.00	1 .0
5.422	.0229					.0102	.06	1.24	1.64	1.02	.013	.00	.00	PIPE
17.112	3330.162	1.290	3331.453	25.01	8.60	1.15	3332.60	.00	1.61	2.97	3.000	.000	.00	1 .0
4.061	.0229					.0089	.04	1.29	1.53	1.02	.013	.00	.00	PIPE
21.173	3330.255	1.338	3331.593	25.01	8.20	1.04	3332.64	.00	1.61	2.98	3.000	.000	.00	1 .0
2.987	.0229					.0079	.02	1.34	1.43	1.02	.013	.00	.00	PIPE
24.160	3330.324	1.388	3331.712	25.01	7.82	.95	3332.66	.00	1.61	2.99	3.000	.000	.00	1 .0
2.135	.0229					.0069	.01	1.39	1.33	1.02	.013	.00	.00	PIPE
26.295	3330.373	1.440	3331.813	25.01	7.46	.86	3332.68	.00	1.61	3.00	3.000	.000	.00	1 .0
1.416	.0229					.0061	.01	1.44	1.24	1.02	.013	.00	.00	PIPE
27.711	3330.406	1.495	3331.900	25.01	7.11	.78	3332.68	.00	1.61	3.00	3.000	.000	.00	1 .0
.804	.0229					.0054	.00	1.49	1.16	1.02	.013	.00	.00	PIPE
28.515	3330.424	1.552	3331.976	25.01	6.78	.71	3332.69	.00	1.61	3.00	3.000	.000	.00	1 .0
.255	.0229					.0047	.00	1.55	1.08	1.02	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
28.770	3330.430	1.613	3332.043	25.01	6.46	.65	3332.69	.00	1.61	2.99	3.000	.000	.00	1 .0
JUNCT STR	.0500					.0024	.00	1.61	1.00		.013	.00	.00	PIPE
30.770	3330.530	2.221	3332.750	11.01	1.96	.06	3332.81	.00	1.05	2.63	3.000	.000	.00	1 .0
4.662	.0200					.0004	.00	2.22	.24	.69	.013	.00	.00	PIPE
35.432	3330.623	2.123	3332.746	11.01	2.06	.07	3332.81	.00	1.05	2.73	3.000	.000	.00	1 .0
.338	.0200					.0004	.00	2.12	.26	.69	.013	.00	.00	PIPE
35.770	3330.630	2.116	3332.746	11.01	2.07	.07	3332.81	.00	1.05	2.74	3.000	.000	.00	1 .0
3.509	.0240					.0004	.00	2.12	.26	.66	.013	.00	.00	PIPE
39.279	3330.714	2.027	3332.741	11.01	2.17	.07	3332.81	.00	1.05	2.81	3.000	.000	.00	1 .0
3.228	.0240					.0005	.00	2.03	.28	.66	.013	.00	.00	PIPE
42.508	3330.792	1.943	3332.735	11.01	2.27	.08	3332.81	.00	1.05	2.87	3.000	.000	.00	1 .0
2.984	.0240					.0005	.00	1.94	.31	.66	.013	.00	.00	PIPE
45.492	3330.863	1.865	3332.728	11.01	2.38	.09	3332.82	.00	1.05	2.91	3.000	.000	.00	1 .0
1.370	.0240					.0006	.00	1.87	.33	.66	.013	.00	.00	PIPE
46.862	3330.896	1.829	3332.725	11.01	2.44	.09	3332.82	.00	1.05	2.93	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
46.862	3330.896	.552	3331.448	11.01	12.32	2.36	3333.81	.00	1.05	2.33	3.000	.000	.00	1 .0
3.612	.0240					.0512	.19	.55	3.50	.66	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
50.474	3330.983	.545	3331.527	11.01	12.57	2.45	3333.98	.00	1.05	2.31	3.000	.000	.00	1 .0
7.008	.0240					.0565	.40	.54	3.60	.66	.013	.00	.00	PIPE
57.482	3331.151	.527	3331.678	11.01	13.18	2.70	3334.38	.00	1.05	2.28	3.000	.000	.00	1 .0
6.214	.0240					.0647	.40	.53	3.84	.66	.013	.00	.00	PIPE
63.695	3331.300	.510	3331.810	11.01	13.83	2.97	3334.78	.00	1.05	2.25	3.000	.000	.00	1 .0
5.603	.0240					.0740	.41	.51	4.10	.66	.013	.00	.00	PIPE
69.298	3331.435	.493	3331.928	11.01	14.50	3.27	3335.19	.00	1.05	2.22	3.000	.000	.00	1 .0
5.109	.0240					.0848	.43	.49	4.37	.66	.013	.00	.00	PIPE
74.407	3331.557	.477	3332.034	11.01	15.21	3.59	3335.63	.00	1.05	2.19	3.000	.000	.00	1 .0
4.703	.0240					.0971	.46	.48	4.67	.66	.013	.00	.00	PIPE
79.110	3331.670	.462	3332.132	11.01	15.95	3.95	3336.08	.00	1.05	2.17	3.000	.000	.00	1 .0
2.500	.0400					.1070	.27	.46	4.98	.58	.013	.00	.00	PIPE
81.610	3331.770	.455	3332.225	11.01	16.30	4.13	3336.35	.00	1.05	2.15	3.000	.000	.00	1 .0
2.500	.0400					.1140	.29	.45	5.13	.58	.013	.00	.00	PIPE
84.110	3331.870	.448	3332.318	11.01	16.68	4.32	3336.64	.00	1.05	2.14	3.000	.000	.00	1 .0
13.384	.1247					.1153	1.54	.45	5.29	.44	.013	.00	.00	PIPE
97.494	3333.540	.452	3333.992	11.01	16.43	4.19	3338.18	.00	1.05	2.15	3.000	.000	.00	1 .0
19.140	.1247					.1056	2.02	.45	5.18	.44	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
116.633	3335.927	.468	3336.395	11.01	15.67	3.81	3340.21	.00	1.05	2.18	3.000	.000	.00	1 .0
10.172	.1247					.0922	.94	.47	4.86	.44	.013	.00	.00	PIPE
126.805	3337.196	.483	3337.679	11.01	14.94	3.46	3341.14	.00	1.05	2.21	3.000	.000	.00	1 .0
6.758	.1247					.0805	.54	.48	4.55	.44	.013	.00	.00	PIPE
133.564	3338.039	.499	3338.539	11.01	14.24	3.15	3341.69	.00	1.05	2.24	3.000	.000	.00	1 .0
4.955	.1247					.0703	.35	.50	4.27	.44	.013	.00	.00	PIPE
138.519	3338.657	.516	3339.173	11.01	13.58	2.86	3342.04	.00	1.05	2.26	3.000	.000	.00	1 .0
3.836	.1247					.0614	.24	.52	4.00	.44	.013	.00	.00	PIPE
142.355	3339.136	.534	3339.669	11.01	12.95	2.60	3342.27	.00	1.05	2.29	3.000	.000	.00	1 .0
3.076	.1247					.0537	.17	.53	3.75	.44	.013	.00	.00	PIPE
145.431	3339.519	.552	3340.071	11.01	12.34	2.37	3342.44	.00	1.05	2.32	3.000	.000	.00	1 .0
2.524	.1247					.0469	.12	.55	3.51	.44	.013	.00	.00	PIPE
147.954	3339.834	.570	3340.404	11.01	11.77	2.15	3342.56	.00	1.05	2.35	3.000	.000	.00	1 .0
2.104	.1247					.0409	.09	.57	3.29	.44	.013	.00	.00	PIPE
150.058	3340.096	.589	3340.686	11.01	11.22	1.96	3342.64	.00	1.05	2.38	3.000	.000	.00	1 .0
1.775	.1247					.0358	.06	.59	3.08	.44	.013	.00	.00	PIPE
151.833	3340.318	.609	3340.927	11.01	10.70	1.78	3342.70	.00	1.05	2.41	3.000	.000	.00	1 .0
1.508	.1247					.0313	.05	.61	2.89	.44	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
153.340	3340.506	.630	3341.136	11.01	10.20	1.62	3342.75	.00	1.05	2.44	3.000	.000	.00	1 .0
1.289	.1247					.0273	.04	.63	2.71	.44	.013	.00	.00	PIPE
154.629	3340.667	.651	3341.318	11.01	9.73	1.47	3342.79	.00	1.05	2.47	3.000	.000	.00	1 .0
1.104	.1247					.0239	.03	.65	2.53	.44	.013	.00	.00	PIPE
155.733	3340.804	.674	3341.478	11.01	9.27	1.34	3342.81	.00	1.05	2.50	3.000	.000	.00	1 .0
.948	.1247					.0209	.02	.67	2.37	.44	.013	.00	.00	PIPE
156.681	3340.922	.697	3341.619	11.01	8.84	1.21	3342.83	.00	1.05	2.53	3.000	.000	.00	1 .0
.812	.1247					.0183	.01	.70	2.22	.44	.013	.00	.00	PIPE
157.493	3341.024	.721	3341.744	11.01	8.43	1.10	3342.85	.00	1.05	2.56	3.000	.000	.00	1 .0
.695	.1247					.0160	.01	.72	2.08	.44	.013	.00	.00	PIPE
158.188	3341.110	.745	3341.855	11.01	8.04	1.00	3342.86	.00	1.05	2.59	3.000	.000	.00	1 .0
.592	.1247					.0140	.01	.75	1.95	.44	.013	.00	.00	PIPE
158.781	3341.184	.771	3341.955	11.01	7.66	.91	3342.87	.00	1.05	2.62	3.000	.000	.00	1 .0
.501	.1247					.0122	.01	.77	1.82	.44	.013	.00	.00	PIPE
159.281	3341.247	.797	3342.044	11.01	7.31	.83	3342.87	.00	1.05	2.65	3.000	.000	.00	1 .0
.419	.1247					.0107	.00	.80	1.71	.44	.013	.00	.00	PIPE
159.700	3341.299	.825	3342.124	11.01	6.97	.75	3342.88	.00	1.05	2.68	3.000	.000	.00	1 .0
.345	.1247					.0093	.00	.83	1.60	.44	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
160.046	3341.342	.854	3342.196	11.01	6.64	.69	3342.88	.00	1.05	2.71	3.000	.000	.00	1 .0
.280	.1247					.0082	.00	.85	1.50	.44	.013	.00	.00	PIPE
160.325	3341.377	.883	3342.260	11.01	6.33	.62	3342.88	.00	1.05	2.73	3.000	.000	.00	1 .0
.220	.1247					.0072	.00	.88	1.40	.44	.013	.00	.00	PIPE
160.545	3341.404	.914	3342.319	11.01	6.04	.57	3342.89	.00	1.05	2.76	3.000	.000	.00	1 .0
.164	.1247					.0063	.00	.91	1.31	.44	.013	.00	.00	PIPE
160.709	3341.425	.946	3342.371	11.01	5.76	.51	3342.89	.00	1.05	2.79	3.000	.000	.00	1 .0
.113	.1247					.0055	.00	.95	1.23	.44	.013	.00	.00	PIPE
160.822	3341.439	.980	3342.418	11.01	5.49	.47	3342.89	.00	1.05	2.81	3.000	.000	.00	1 .0
.066	.1247					.0048	.00	.98	1.15	.44	.013	.00	.00	PIPE
160.889	3341.447	1.014	3342.461	11.01	5.24	.43	3342.89	.00	1.05	2.84	3.000	.000	.00	1 .0
.021	.1247					.0042	.00	1.01	1.07	.44	.013	.00	.00	PIPE
160.910	3341.450	1.051	3342.501	11.01	4.99	.39	3342.89	.00	1.05	2.86	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0020	.00	1.05	1.00		.013	.00	.00	PIPE
163.410	3341.550	1.342	3342.892	.01	.00	.00	3342.89	.00	.03	2.98	3.000	.000	.00	1 .0
1.200	.0399					.0000	.00	1.34	.00	.02	.013	.00	.00	PIPE
164.610	3341.598	1.294	3342.892	.01	.00	.00	3342.89	.00	.03	2.97	3.000	.000	.00	1 .0
1.147	.0399					.0000	.00	1.29	.00	.02	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
165.757	3341.644	1.249	3342.892	.01	.00	.00	3342.89	.00	.03	2.96	3.000	.000	.00	1 .0
.153	.0399				.0000	.00	1.25	.00	.02	.013	.00	.00	PIPE	
165.910	3341.650	1.243	3342.892	.01	.00	.00	3342.89	.00	.03	2.96	3.000	.000	.00	1 .0
.867	.0504				.0000	.00	1.24	.00	.02	.013	.00	.00	PIPE	
166.777	3341.694	1.199	3342.892	.01	.00	.00	3342.89	.00	.03	2.94	3.000	.000	.00	1 .0
.831	.0504				.0000	.00	1.20	.00	.02	.013	.00	.00	PIPE	
167.608	3341.736	1.157	3342.893	.01	.00	.00	3342.89	.00	.03	2.92	3.000	.000	.00	1 .0
.797	.0504				.0000	.00	1.16	.00	.02	.013	.00	.00	PIPE	
168.405	3341.776	1.117	3342.893	.01	.00	.00	3342.89	.00	.03	2.90	3.000	.000	.00	1 .0
.765	.0504				.0000	.00	1.12	.00	.02	.013	.00	.00	PIPE	
169.170	3341.814	1.078	3342.893	.01	.00	.00	3342.89	.00	.03	2.88	3.000	.000	.00	1 .0
.736	.0504				.0000	.00	1.08	.00	.02	.013	.00	.00	PIPE	
169.906	3341.852	1.041	3342.893	.01	.00	.00	3342.89	.00	.03	2.86	3.000	.000	.00	1 .0
.706	.0504				.0000	.00	1.04	.00	.02	.013	.00	.00	PIPE	
170.612	3341.887	1.005	3342.893	.01	.00	.00	3342.89	.00	.03	2.83	3.000	.000	.00	1 .0
.680	.0504				.0000	.00	1.01	.00	.02	.013	.00	.00	PIPE	
171.292	3341.921	.971	3342.893	.01	.01	.00	3342.89	.00	.03	2.81	3.000	.000	.00	1 .0
.654	.0504				.0000	.00	.97	.00	.02	.013	.00	.00	PIPE	

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
171.946	3341.954	.938	3342.892	.01	.01	.00	3342.89	.00	.03	2.78	3.000	.000	.00	1 .0
.631	.0504					.0000	.00	.94	.00	.02	.013	.00	.00	PIPE
172.577	3341.986	.906	3342.892	.01	.01	.00	3342.89	.00	.03	2.76	3.000	.000	.00	1 .0
.605	.0504					.0000	.00	.91	.00	.02	.013	.00	.00	PIPE
173.182	3342.017	.876	3342.892	.01	.01	.00	3342.89	.00	.03	2.73	3.000	.000	.00	1 .0
.585	.0504					.0000	.00	.88	.00	.02	.013	.00	.00	PIPE
173.767	3342.046	.846	3342.892	.01	.01	.00	3342.89	.00	.03	2.70	3.000	.000	.00	1 .0
.563	.0504					.0000	.00	.85	.00	.02	.013	.00	.00	PIPE
174.330	3342.074	.818	3342.892	.01	.01	.00	3342.89	.00	.03	2.67	3.000	.000	.00	1 .0
.541	.0504					.0000	.00	.82	.00	.02	.013	.00	.00	PIPE
174.871	3342.102	.791	3342.892	.01	.01	.00	3342.89	.00	.03	2.64	3.000	.000	.00	1 .0
.522	.0504					.0000	.00	.79	.00	.02	.013	.00	.00	PIPE
175.393	3342.128	.764	3342.893	.01	.01	.00	3342.89	.00	.03	2.61	3.000	.000	.00	1 .0
.504	.0504					.0000	.00	.76	.00	.02	.013	.00	.00	PIPE
175.896	3342.154	.739	3342.893	.01	.01	.00	3342.89	.00	.03	2.59	3.000	.000	.00	1 .0
.486	.0504					.0000	.00	.74	.00	.02	.013	.00	.00	PIPE
176.382	3342.178	.714	3342.892	.01	.01	.00	3342.89	.00	.03	2.56	3.000	.000	.00	1 .0
.470	.0504					.0000	.00	.71	.00	.02	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
176.852	3342.202	.691	3342.892	.01	.01	.00	3342.89	.00	.03	2.53	3.000	.000	.00	1 .0
.452	.0504					.0000	.00	.69	.00	.02	.013	.00	.00	PIPE
177.304	3342.224	.668	3342.892	.01	.01	.00	3342.89	.00	.03	2.50	3.000	.000	.00	1 .0
.436	.0504					.0000	.00	.67	.00	.02	.013	.00	.00	PIPE
177.740	3342.246	.646	3342.892	.01	.01	.00	3342.89	.00	.03	2.47	3.000	.000	.00	1 .0
.420	.0504					.0000	.00	.65	.00	.02	.013	.00	.00	PIPE
178.161	3342.268	.625	3342.892	.01	.01	.00	3342.89	.00	.03	2.44	3.000	.000	.00	1 .0
.406	.0504					.0000	.00	.62	.00	.02	.013	.00	.00	PIPE
178.567	3342.288	.604	3342.892	.01	.01	.00	3342.89	.00	.03	2.41	3.000	.000	.00	1 .0
.393	.0504					.0000	.00	.60	.00	.02	.013	.00	.00	PIPE
178.960	3342.308	.584	3342.892	.01	.01	.00	3342.89	.00	.03	2.38	3.000	.000	.00	1 .0
.379	.0504					.0000	.00	.58	.00	.02	.013	.00	.00	PIPE
179.339	3342.327	.565	3342.892	.01	.01	.00	3342.89	.00	.03	2.35	3.000	.000	.00	1 .0
.365	.0504					.0000	.00	.57	.00	.02	.013	.00	.00	PIPE
179.703	3342.345	.547	3342.892	.01	.01	.00	3342.89	.00	.03	2.32	3.000	.000	.00	1 .0
.353	.0504					.0000	.00	.55	.00	.02	.013	.00	.00	PIPE
180.056	3342.363	.529	3342.892	.01	.01	.00	3342.89	.00	.03	2.29	3.000	.000	.00	1 .0
.341	.0504					.0000	.00	.53	.00	.02	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
180.397	3342.380	.512	3342.892	.01	.01	.00	3342.89	.00	.03	2.26	3.000	.000	.00	1 .0
.331	.0504					.0000	.00	.51	.00	.02	.013	.00	.00	PIPE
180.729	3342.397	.495	3342.892	.01	.01	.00	3342.89	.00	.03	2.23	3.000	.000	.00	1 .0
.317	.0504					.0000	.00	.50	.00	.02	.013	.00	.00	PIPE
181.046	3342.413	.479	3342.892	.01	.01	.00	3342.89	.00	.03	2.20	3.000	.000	.00	1 .0
.309	.0504					.0000	.00	.48	.00	.02	.013	.00	.00	PIPE
181.355	3342.428	.464	3342.892	.01	.01	.00	3342.89	.00	.03	2.17	3.000	.000	.00	1 .0
.297	.0504					.0000	.00	.46	.00	.02	.013	.00	.00	PIPE
181.653	3342.443	.449	3342.892	.01	.02	.00	3342.89	.00	.03	2.14	3.000	.000	.00	1 .0
.288	.0504					.0000	.00	.45	.00	.02	.013	.00	.00	PIPE
181.940	3342.458	.434	3342.892	.01	.02	.00	3342.89	.00	.03	2.11	3.000	.000	.00	1 .0
.278	.0504					.0000	.00	.43	.01	.02	.013	.00	.00	PIPE
182.218	3342.472	.420	3342.892	.01	.02	.00	3342.89	.00	.03	2.08	3.000	.000	.00	1 .0
.268	.0504					.0000	.00	.42	.01	.02	.013	.00	.00	PIPE
182.485	3342.485	.407	3342.892	.01	.02	.00	3342.89	.00	.03	2.05	3.000	.000	.00	1 .0
.260	.0504					.0000	.00	.41	.01	.02	.013	.00	.00	PIPE
182.745	3342.498	.394	3342.892	.01	.02	.00	3342.89	.00	.03	2.03	3.000	.000	.00	1 .0
.252	.0504					.0000	.00	.39	.01	.02	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
182.997	3342.511	.381	3342.892	.01	.02	.00	3342.89	.00	.03	2.00	3.000	.000	.00	1 .0
.242	.0504					.0000	.00	.38	.01	.02	.013	.00	.00	PIPE
183.239	3342.523	.369	3342.892	.01	.02	.00	3342.89	.00	.03	1.97	3.000	.000	.00	1 .0
.234	.0504					.0000	.00	.37	.01	.02	.013	.00	.00	PIPE
183.473	3342.535	.357	3342.892	.01	.02	.00	3342.89	.00	.03	1.94	3.000	.000	.00	1 .0
.228	.0504					.0000	.00	.36	.01	.02	.013	.00	.00	PIPE
183.701	3342.546	.345	3342.892	.01	.02	.00	3342.89	.00	.03	1.91	3.000	.000	.00	1 .0
.218	.0504					.0000	.00	.35	.01	.02	.013	.00	.00	PIPE
183.919	3342.557	.334	3342.892	.01	.02	.00	3342.89	.00	.03	1.89	3.000	.000	.00	1 .0
.212	.0504					.0000	.00	.33	.01	.02	.013	.00	.00	PIPE
184.131	3342.568	.324	3342.892	.01	.02	.00	3342.89	.00	.03	1.86	3.000	.000	.00	1 .0
.206	.0504					.0000	.00	.32	.01	.02	.013	.00	.00	PIPE
184.337	3342.579	.313	3342.892	.01	.03	.00	3342.89	.00	.03	1.83	3.000	.000	.00	1 .0
.198	.0504					.0000	.00	.31	.01	.02	.013	.00	.00	PIPE
184.536	3342.589	.303	3342.892	.01	.03	.00	3342.89	.00	.03	1.81	3.000	.000	.00	1 .0
.192	.0504					.0000	.00	.30	.01	.02	.013	.00	.00	PIPE
184.728	3342.598	.294	3342.892	.01	.03	.00	3342.89	.00	.03	1.78	3.000	.000	.00	1 .0
.186	.0504					.0000	.00	.29	.01	.02	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
184.914	3342.608	.284	3342.892	.01	.03	.00	3342.89	.00	.03	1.76	3.000	.000	.00	1 .0
.178	.0504					.0000	.00	.28	.01	.02	.013	.00	.00	PIPE
185.093	3342.617	.275	3342.892	.01	.03	.00	3342.89	.00	.03	1.73	3.000	.000	.00	1 .0
.174	.0504					.0000	.00	.28	.01	.02	.013	.00	.00	PIPE
185.267	3342.625	.266	3342.892	.01	.03	.00	3342.89	.00	.03	1.71	3.000	.000	.00	1 .0
.169	.0504					.0000	.00	.27	.01	.02	.013	.00	.00	PIPE
185.436	3342.634	.258	3342.892	.01	.03	.00	3342.89	.00	.03	1.68	3.000	.000	.00	1 .0
.163	.0504					.0000	.00	.26	.01	.02	.013	.00	.00	PIPE
185.598	3342.642	.250	3342.892	.01	.04	.00	3342.89	.00	.03	1.66	3.000	.000	.00	1 .0
.157	.0504					.0000	.00	.25	.02	.02	.013	.00	.00	PIPE
185.755	3342.650	.242	3342.892	.01	.04	.00	3342.89	.00	.03	1.63	3.000	.000	.00	1 .0
.153	.0504					.0000	.00	.24	.02	.02	.013	.00	.00	PIPE
185.908	3342.658	.234	3342.892	.01	.04	.00	3342.89	.00	.03	1.61	3.000	.000	.00	1 .0
.149	.0504					.0000	.00	.23	.02	.02	.013	.00	.00	PIPE
186.056	3342.666	.227	3342.892	.01	.04	.00	3342.89	.00	.03	1.59	3.000	.000	.00	1 .0
.141	.0504					.0000	.00	.23	.02	.02	.013	.00	.00	PIPE
186.197	3342.673	.219	3342.892	.01	.04	.00	3342.89	.00	.03	1.56	3.000	.000	.00	1 .0
.139	.0504					.0000	.00	.22	.02	.02	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
186.336	3342.680	.212	3342.892	.01	.05	.00	3342.89	.00	.03	1.54	3.000	.000	.00	1 .0
.135	.0504					.0000	.00	.21	.02	.02	.013	.00	.00	PIPE
186.471	3342.687	.206	3342.892	.01	.05	.00	3342.89	.00	.03	1.52	3.000	.000	.00	1 .0
.129	.0504					.0000	.00	.21	.02	.02	.013	.00	.00	PIPE
186.599	3342.693	.199	3342.892	.01	.05	.00	3342.89	.00	.03	1.49	3.000	.000	.00	1 .0
.125	.0504					.0000	.00	.20	.02	.02	.013	.00	.00	PIPE
186.724	3342.699	.193	3342.892	.01	.05	.00	3342.89	.00	.03	1.47	3.000	.000	.00	1 .0
.121	.0504					.0000	.00	.19	.03	.02	.013	.00	.00	PIPE
186.845	3342.706	.187	3342.892	.01	.05	.00	3342.89	.00	.03	1.45	3.000	.000	.00	1 .0
.117	.0504					.0000	.00	.19	.03	.02	.013	.00	.00	PIPE
186.962	3342.711	.181	3342.892	.01	.06	.00	3342.89	.00	.03	1.43	3.000	.000	.00	1 .0
.113	.0504					.0000	.00	.18	.03	.02	.013	.00	.00	PIPE
187.075	3342.717	.175	3342.892	.01	.06	.00	3342.89	.00	.03	1.41	3.000	.000	.00	1 .0
.111	.0504					.0000	.00	.18	.03	.02	.013	.00	.00	PIPE
187.186	3342.723	.170	3342.892	.01	.06	.00	3342.89	.00	.03	1.39	3.000	.000	.00	1 .0
.105	.0504					.0000	.00	.17	.03	.02	.013	.00	.00	PIPE
187.291	3342.728	.164	3342.892	.01	.07	.00	3342.89	.00	.03	1.36	3.000	.000	.00	1 .0
.103	.0504					.0000	.00	.16	.04	.02	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
187.394	3342.733	.159	3342.892	.01	.07	.00	3342.89	.00	.03	1.34	3.000	.000	.00	1 .0
.101	.0504					.0000	.00	.16	.04	.02	.013	.00	.00	PIPE
187.495	3342.738	.154	3342.892	.01	.07	.00	3342.89	.00	.03	1.32	3.000	.000	.00	1 .0
.095	.0504					.0000	.00	.15	.04	.02	.013	.00	.00	PIPE
187.590	3342.743	.149	3342.892	.01	.08	.00	3342.89	.00	.03	1.30	3.000	.000	.00	1 .0
.093	.0504					.0000	.00	.15	.04	.02	.013	.00	.00	PIPE
187.683	3342.748	.144	3342.892	.01	.08	.00	3342.89	.00	.03	1.28	3.000	.000	.00	1 .0
.091	.0504					.0000	.00	.14	.05	.02	.013	.00	.00	PIPE
187.774	3342.752	.140	3342.892	.01	.08	.00	3342.89	.00	.03	1.26	3.000	.000	.00	1 .0
.087	.0504					.0000	.00	.14	.05	.02	.013	.00	.00	PIPE
187.861	3342.757	.135	3342.892	.01	.09	.00	3342.89	.00	.03	1.25	3.000	.000	.00	1 .0
.085	.0504					.0000	.00	.14	.05	.02	.013	.00	.00	PIPE
187.946	3342.761	.131	3342.892	.01	.09	.00	3342.89	.00	.03	1.23	3.000	.000	.00	1 .0
.081	.0504					.0000	.00	.13	.05	.02	.013	.00	.00	PIPE
188.027	3342.765	.127	3342.892	.01	.10	.00	3342.89	.00	.03	1.21	3.000	.000	.00	1 .0
.079	.0504					.0000	.00	.13	.06	.02	.013	.00	.00	PIPE
188.106	3342.769	.123	3342.892	.01	.10	.00	3342.89	.00	.03	1.19	3.000	.000	.00	1 .0
.077	.0504					.0000	.00	.12	.06	.02	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
188.183	3342.773	.119	3342.892	.01	.11	.00	3342.89	.00	.03	1.17	3.000	.000	.00	1 .0
.075	.0504					.0000	.00	.12	.07	.02	.013	.00	.00	PIPE
188.258	3342.777	.115	3342.892	.01	.11	.00	3342.89	.00	.03	1.15	3.000	.000	.00	1 .0
.071	.0504					.0000	.00	.12	.07	.02	.013	.00	.00	PIPE
188.329	3342.781	.112	3342.893	.01	.12	.00	3342.89	.00	.03	1.14	3.000	.000	.00	1 .0
.069	.0504					.0000	.00	.11	.08	.02	.013	.00	.00	PIPE
188.398	3342.784	.108	3342.892	.01	.12	.00	3342.89	.00	.03	1.12	3.000	.000	.00	1 .0
.067	.0504					.0000	.00	.11	.08	.02	.013	.00	.00	PIPE
188.465	3342.788	.105	3342.892	.01	.13	.00	3342.89	.00	.03	1.10	3.000	.000	.00	1 .0
.065	.0504					.0000	.00	.10	.09	.02	.013	.00	.00	PIPE
188.530	3342.791	.102	3342.892	.01	.14	.00	3342.89	.00	.03	1.08	3.000	.000	.00	1 .0
.063	.0504					.0001	.00	.10	.09	.02	.013	.00	.00	PIPE
188.593	3342.794	.098	3342.892	.01	.14	.00	3342.89	.00	.03	1.07	3.000	.000	.00	1 .0
.061	.0504					.0001	.00	.10	.10	.02	.013	.00	.00	PIPE
188.654	3342.797	.095	3342.892	.01	.15	.00	3342.89	.00	.03	1.05	3.000	.000	.00	1 .0
.059	.0504					.0001	.00	.10	.10	.02	.013	.00	.00	PIPE
188.713	3342.800	.092	3342.892	.01	.16	.00	3342.89	.00	.03	1.04	3.000	.000	.00	1 .0
.057	.0504					.0001	.00	.09	.11	.02	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
188.770	3342.803	.089	3342.892	.01	.16	.00	3342.89	.00	.03	1.02	3.000	.000	.00	1 .0
.055	.0504					.0001	.00	.09	.12	.02	.013	.00	.00	PIPE
188.825	3342.806	.087	3342.892	.01	.17	.00	3342.89	.00	.03	1.00	3.000	.000	.00	1 .0
.053	.0504					.0001	.00	.09	.13	.02	.013	.00	.00	PIPE
188.878	3342.808	.084	3342.892	.01	.18	.00	3342.89	.00	.03	.99	3.000	.000	.00	1 .0
.053	.0504					.0001	.00	.08	.13	.02	.013	.00	.00	PIPE
188.930	3342.811	.081	3342.892	.01	.19	.00	3342.89	.00	.03	.97	3.000	.000	.00	1 .0
.049	.0504					.0001	.00	.08	.14	.02	.013	.00	.00	PIPE
188.979	3342.813	.079	3342.892	.01	.20	.00	3342.89	.00	.03	.96	3.000	.000	.00	1 .0
.049	.0504					.0002	.00	.08	.15	.02	.013	.00	.00	PIPE
189.027	3342.816	.076	3342.892	.01	.21	.00	3342.89	.00	.03	.94	3.000	.000	.00	1 .0
.046	.0504					.0002	.00	.08	.16	.02	.013	.00	.00	PIPE
189.074	3342.818	.074	3342.892	.01	.22	.00	3342.89	.00	.03	.93	3.000	.000	.00	1 .0
.044	.0504					.0002	.00	.07	.17	.02	.013	.00	.00	PIPE
189.118	3342.821	.071	3342.892	.01	.23	.00	3342.89	.00	.03	.91	3.000	.000	.00	1 .0
.044	.0504					.0003	.00	.07	.18	.02	.013	.00	.00	PIPE
189.162	3342.823	.069	3342.892	.01	.24	.00	3342.89	.00	.03	.90	3.000	.000	.00	1 .0
.040	.0504					.0003	.00	.07	.20	.02	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
189.203	3342.825	.067	3342.892	.01	.25	.00	3342.89	.00	.03	.89	3.000	.000	.00	1 .0
.040	.0504					.0003	.00	.07	.21	.02	.013	.00	.00	PIPE
189.243	3342.827	.065	3342.892	.01	.26	.00	3342.89	.00	.03	.87	3.000	.000	.00	1 .0
.040	.0504					.0004	.00	.06	.22	.02	.013	.00	.00	PIPE
189.282	3342.829	.063	3342.891	.01	.28	.00	3342.89	.00	.03	.86	3.000	.000	.00	1 .0
.038	.0504					.0004	.00	.06	.24	.02	.013	.00	.00	PIPE
189.320	3342.831	.061	3342.891	.01	.29	.00	3342.89	.00	.03	.85	3.000	.000	.00	1 .0
.035	.0504					.0005	.00	.06	.25	.02	.013	.00	.00	PIPE
189.355	3342.832	.059	3342.891	.01	.30	.00	3342.89	.00	.03	.83	3.000	.000	.00	1 .0
.033	.0504					.0006	.00	.06	.27	.02	.013	.00	.00	PIPE
189.389	3342.834	.057	3342.891	.01	.32	.00	3342.89	.00	.03	.82	3.000	.000	.00	1 .0
.033	.0504					.0007	.00	.06	.29	.02	.013	.00	.00	PIPE
189.422	3342.836	.055	3342.891	.01	.33	.00	3342.89	.00	.03	.81	3.000	.000	.00	1 .0
.031	.0504					.0008	.00	.06	.31	.02	.013	.00	.00	PIPE
189.452	3342.837	.054	3342.891	.01	.35	.00	3342.89	.00	.03	.79	3.000	.000	.00	1 .0
.030	.0504					.0009	.00	.05	.33	.02	.013	.00	.00	PIPE
189.483	3342.839	.052	3342.891	.01	.37	.00	3342.89	.00	.03	.78	3.000	.000	.00	1 .0
.030	.0504					.0010	.00	.05	.35	.02	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
189.513	3342.840	.050	3342.890	.01	.39	.00	3342.89	.00	.03	.77	3.000	.000	.00	1 .0
.017	.0504					.0011	.00	.05	.37	.02	.013	.00	.00	PIPE
189.540	3342.842	.048	3342.890	.01	.41	.00	3342.89	.00	.03	.76	3.000	.000	.00	1 .0
.010	.0000					.0013	.00	.05	.40	.00	.013	.00	.00	PIPE
189.550	3342.842	.049	3342.891	.01	.41	.00	3342.89	.00	.03	.76	3.000	.000	.00	1 .0
.027	.0504					.0013	.00	.05	.40	.02	.013	.00	.00	PIPE
189.577	3342.844	.047	3342.891	.01	.43	.00	3342.89	.00	.03	.75	3.000	.000	.00	1 .0
.025	.0504					.0015	.00	.05	.42	.02	.013	.00	.00	PIPE
189.602	3342.845	.046	3342.890	.01	.45	.00	3342.89	.00	.03	.73	3.000	.000	.00	1 .0
.022	.0504					.0017	.00	.05	.45	.02	.013	.00	.00	PIPE
189.624	3342.846	.044	3342.890	.01	.47	.00	3342.89	.00	.03	.72	3.000	.000	.00	1 .0
189.634	3342.846	.043	3342.889	.01	.49	.00	3342.89	.00	.03	.71	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
189.634	3342.846	.021	3342.867	.01	1.47	.03	3342.90	.00	.03	.50	3.000	.000	.00	1 .0
142.758	.0504					.0505	7.22	.02	2.21	.02	.013	.00	.00	PIPE
332.392	3350.047	.021	3350.067	.01	1.47	.03	3350.10	.00	.03	.50	3.000	.000	.00	1 .0
.776	.0504					.0482	.04	.02	2.21	.02	.013	.00	.00	PIPE
333.168	3350.086	.021	3350.107	.01	1.42	.03	3350.14	.00	.03	.50	3.000	.000	.00	1 .0
.282	.0504					.0429	.01	.02	2.11	.02	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:12: 0: 1

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
333.450	3350.100	.022	3350.122	.01	1.35	.03	3350.15	.00	.03	.51	3.000	.000	.00	1 .0
1.868	.0399					.0400	.07	.02	1.98	.02	.013	.00	.00	PIPE
335.318	3350.175	.022	3350.197	.01	1.35	.03	3350.23	.00	.03	.51	3.000	.000	.00	1 .0
.632	.0399					.0400	.03	.02	1.98	.02	.013	.00	.00	PIPE
335.950	3350.200	.022	3350.222	.01	1.36	.03	3350.25	.00	.03	.51	3.000	.000	.00	1 .0
.961	.0400					.0401	.04	.02	1.99	.02	.013	.00	.00	PIPE
336.911	3350.239	.022	3350.260	.01	1.36	.03	3350.29	.00	.03	.51	3.000	.000	.00	1 .0
.676	.0400					.0415	.03	.02	1.99	.02	.013	.00	.00	PIPE
337.587	3350.266	.021	3350.287	.01	1.39	.03	3350.32	.00	.03	.50	3.000	.000	.00	1 .0
.399	.0400					.0460	.02	.02	2.05	.02	.013	.00	.00	PIPE
337.986	3350.281	.021	3350.302	.01	1.46	.03	3350.34	.00	.03	.50	3.000	.000	.00	1 .0
.203	.0400					.0528	.01	.02	2.18	.02	.013	.00	.00	PIPE
338.188	3350.290	.020	3350.310	.01	1.53	.04	3350.35	.00	.03	.49	3.000	.000	.00	1 .0
.147	.0400					.0606	.01	.02	2.33	.02	.013	.00	.00	PIPE
338.335	3350.295	.019	3350.315	.01	1.60	.04	3350.35	.00	.03	.48	3.000	.000	.00	1 .0
.115	.0400					.0696	.01	.02	2.48	.02	.013	.00	.00	PIPE
338.450	3350.300	.019	3350.319	.01	1.68	.04	3350.36	.00	.03	.47	3.000	.000	.00	1 .0
114.319	.0742					.0744	8.51	.02	2.64	.02	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
452.769	3358.782	.019	3358.801	.01	1.68	.04	3358.85	.00	.03	.47	3.000	.000	.00	1 .0
.770	.0742					.0720	.06	.02	2.64	.02	.013	.00	.00	PIPE
453.539	3358.840	.019	3358.859	.01	1.64	.04	3358.90	.00	.03	.48	3.000	.000	.00	1 .0
.350	.0742					.0651	.02	.02	2.56	.02	.013	.00	.00	PIPE
453.890	3358.865	.020	3358.885	.01	1.57	.04	3358.92	.00	.03	.48	3.000	.000	.00	1 .0
.163	.0742					.0566	.01	.02	2.40	.02	.013	.00	.00	PIPE
454.052	3358.877	.020	3358.898	.01	1.49	.03	3358.93	.00	.03	.49	3.000	.000	.00	1 .0
.098	.0742					.0494	.00	.02	2.25	.02	.013	.00	.00	PIPE
454.151	3358.885	.021	3358.906	.01	1.42	.03	3358.94	.00	.03	.50	3.000	.000	.00	1 .0
.069	.0742					.0431	.00	.02	2.12	.02	.013	.00	.00	PIPE
454.220	3358.890	.022	3358.912	.01	1.36	.03	3358.94	.00	.03	.51	3.000	.000	.00	1 .0
2.500	.0400					.0401	.10	.02	1.99	.02	.013	.00	.00	PIPE
456.720	3358.990	.022	3359.011	.01	1.36	.03	3359.04	.00	.03	.51	3.000	.000	.00	1 .0
1.006	.0400					.0401	.04	.02	1.99	.02	.013	.00	.00	PIPE
457.726	3359.030	.022	3359.052	.01	1.36	.03	3359.08	.00	.03	.51	3.000	.000	.00	1 .0
.791	.0400					.0389	.03	.02	1.99	.02	.013	.00	.00	PIPE
458.517	3359.062	.022	3359.083	.01	1.33	.03	3359.11	.00	.03	.51	3.000	.000	.00	1 .0
.376	.0400					.0353	.01	.02	1.93	.02	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
458.893	3359.077	.023	3359.099	.01	1.27	.02	3359.12	.00	.03	.52	3.000	.000	.00	1 .0
.168	.0400					.0307	.01	.02	1.81	.02	.013	.00	.00	PIPE
459.061	3359.083	.023	3359.107	.01	1.21	.02	3359.13	.00	.03	.53	3.000	.000	.00	1 .0
.095	.0400					.0268	.00	.02	1.70	.02	.013	.00	.00	PIPE
459.156	3359.087	.024	3359.112	.01	1.15	.02	3359.13	.00	.03	.54	3.000	.000	.00	1 .0
.064	.0400					.0234	.00	.02	1.59	.02	.013	.00	.00	PIPE
459.220	3359.090	.025	3359.115	.01	1.10	.02	3359.13	.00	.03	.55	3.000	.000	.00	1 .0
28.026	.0217					.0218	.61	.03	1.50	.03	.013	.00	.00	PIPE
487.246	3359.699	.025	3359.724	.01	1.10	.02	3359.74	.00	.03	.55	3.000	.000	.00	1 .0
.782	.0217					.0213	.02	.03	1.50	.03	.013	.00	.00	PIPE
488.028	3359.716	.025	3359.741	.01	1.08	.02	3359.76	.00	.03	.55	3.000	.000	.00	1 .0
.389	.0217					.0195	.01	.03	1.47	.03	.013	.00	.00	PIPE
488.417	3359.725	.026	3359.751	.01	1.03	.02	3359.77	.00	.03	.56	3.000	.000	.00	1 .0
.129	.0217					.0170	.00	.03	1.38	.03	.013	.00	.00	PIPE
488.545	3359.727	.027	3359.754	.01	.98	.02	3359.77	.00	.03	.57	3.000	.000	.00	1 .0
.082	.0217					.0148	.00	.03	1.29	.03	.013	.00	.00	PIPE
488.628	3359.729	.028	3359.757	.01	.94	.01	3359.77	.00	.03	.57	3.000	.000	.00	1 .0
.039	.0217					.0129	.00	.03	1.21	.03	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
488.667	3359.730	.029	3359.758	.01	.89	.01	3359.77	.00	.03	.58	3.000	.000	.00	1 .0
.013	.0217					.0106	.00	.03	1.14	.03	.013	.00	.00	PIPE
488.680	3359.730	.031	3359.760	.01	.81	.01	3359.77	.00	.03	.60	3.000	.000	.00	1 .0

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T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO     28.77 3330.43  36                        3332.009
R      62.14 3330.63  36      .013                                .000  46.0   0
REM  Downstream of SDMH #6
R      64.64 3331.76  36      .013                                .000  00.0   0
R      67.14 3331.86  36      .013                                .000  00.0   0
REM  Upstream of SDMH #6
REM  28.79 foot Reach
R      90.93 3332.67  36      .013                                .000  00.00  0
REM  Downstream of SDMH #7 (JUNCTION WITH LATERAL SDDI# 7 & SDDI# 8)
JX     93.43 3332.68  36 24   .013     7.0           3332.88         78.0         .000
R      95.93 3332.67  36      .013                                .000  00.00  0
SH     95.93 3332.68  36
CD  24  4   0    .000   2.000     .000  .000  .000   .00
CD  36  4   0    .000   3.000     .000  .000  .000   .00
CD  48  4   0    .000   4.000     .000  .000  .000   .00
Q            7.0    .0
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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
28.770	3330.430	.753	3331.183	14.00	10.08	1.58	3332.76	.00	1.19	2.60	3.000	.000	.00	0 .0
1.989	.0060					.0236	.05	.75	2.43	1.07	.013	.00	.00	PIPE
30.759	3330.442	.746	3331.188	14.00	10.22	1.62	3332.81	.00	1.19	2.59	3.000	.000	.00	0 .0
6.948	.0060					.0258	.18	.75	2.48	1.07	.013	.00	.00	PIPE
37.707	3330.484	.721	3331.204	14.00	10.71	1.78	3332.99	.00	1.19	2.56	3.000	.000	.00	0 .0
6.577	.0060					.0295	.19	.72	2.64	1.07	.013	.00	.00	PIPE
44.284	3330.523	.697	3331.220	14.00	11.24	1.96	3333.18	.00	1.19	2.53	3.000	.000	.00	0 .0
6.248	.0060					.0337	.21	.70	2.82	1.07	.013	.00	.00	PIPE
50.532	3330.560	.674	3331.234	14.00	11.79	2.16	3333.39	.00	1.19	2.50	3.000	.000	.00	0 .0
5.944	.0060					.0385	.23	.67	3.02	1.07	.013	.00	.00	PIPE
56.475	3330.596	.652	3331.248	14.00	12.36	2.37	3333.62	.00	1.19	2.47	3.000	.000	.00	0 .0
5.665	.0060					.0441	.25	.65	3.22	1.07	.013	.00	.00	PIPE
62.140	3330.630	.630	3331.260	14.00	12.96	2.61	3333.87	.00	1.19	2.44	3.000	.000	.00	0 .0
.251	.4521					.0457	.01	.63	3.44	.36	.013	.00	.00	PIPE
62.391	3330.743	.640	3331.383	14.00	12.69	2.50	3333.88	.00	1.19	2.46	3.000	.000	.00	0 .0
.500	.4521					.0415	.02	.64	3.34	.36	.013	.00	.00	PIPE
62.891	3330.969	.662	3331.631	14.00	12.09	2.27	3333.90	.00	1.19	2.49	3.000	.000	.00	0 .0
.443	.4521					.0362	.02	.66	3.12	.36	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
63.334	3331.169	.684	3331.854	14.00	11.53	2.06	3333.92	.00	1.19	2.52	3.000	.000	.00	0 .0
.391	.4521					.0317	.01	.68	2.93	.36	.013	.00	.00	PIPE
63.724	3331.346	.708	3332.054	14.00	11.00	1.88	3333.93	.00	1.19	2.55	3.000	.000	.00	0 .0
.345	.4521					.0277	.01	.71	2.74	.36	.013	.00	.00	PIPE
64.069	3331.502	.732	3332.234	14.00	10.48	1.71	3333.94	.00	1.19	2.58	3.000	.000	.00	0 .0
.304	.4521					.0242	.01	.73	2.57	.36	.013	.00	.00	PIPE
64.373	3331.639	.757	3332.396	14.00	10.00	1.55	3333.95	.00	1.19	2.61	3.000	.000	.00	0 .0
.267	.4521					.0212	.01	.76	2.40	.36	.013	.00	.00	PIPE
64.640	3331.760	.783	3332.543	14.00	9.53	1.41	3333.95	.00	1.19	2.64	3.000	.000	.00	0 .0
2.500	.0400					.0191	.05	.78	2.25	.66	.013	.00	.00	PIPE
67.140	3331.860	.797	3332.656	14.00	9.31	1.35	3334.00	.00	1.19	2.65	3.000	.000	.00	0 .0
3.448	.0340					.0178	.06	.80	2.18	.68	.013	.00	.00	PIPE
70.588	3331.977	.812	3332.790	14.00	9.06	1.27	3334.06	.00	1.19	2.67	3.000	.000	.00	0 .0
4.880	.0340					.0161	.08	.81	2.10	.68	.013	.00	.00	PIPE
75.468	3332.143	.840	3332.984	14.00	8.64	1.16	3334.14	.00	1.19	2.69	3.000	.000	.00	0 .0
3.803	.0340					.0141	.05	.84	1.96	.68	.013	.00	.00	PIPE
79.271	3332.273	.870	3333.142	14.00	8.23	1.05	3334.20	.00	1.19	2.72	3.000	.000	.00	0 .0
3.009	.0340					.0123	.04	.87	1.84	.68	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
82.280	3332.375	.900	3333.275	14.00	7.85	.96	3334.23	.00	1.19	2.75	3.000	.000	.00	0 .0
2.386	.0340					.0108	.03	.90	1.72	.68	.013	.00	.00	PIPE
84.666	3332.457	.931	3333.388	14.00	7.49	.87	3334.26	.00	1.19	2.78	3.000	.000	.00	0 .0
1.885	.0340					.0094	.02	.93	1.61	.68	.013	.00	.00	PIPE
86.551	3332.521	.964	3333.485	14.00	7.14	.79	3334.28	.00	1.19	2.80	3.000	.000	.00	0 .0
1.470	.0340					.0083	.01	.96	1.50	.68	.013	.00	.00	PIPE
88.022	3332.571	.998	3333.569	14.00	6.80	.72	3334.29	.00	1.19	2.83	3.000	.000	.00	0 .0
1.118	.0340					.0072	.01	1.00	1.41	.68	.013	.00	.00	PIPE
89.140	3332.609	1.034	3333.642	14.00	6.49	.65	3334.30	.00	1.19	2.85	3.000	.000	.00	0 .0
.817	.0340					.0063	.01	1.03	1.31	.68	.013	.00	.00	PIPE
89.957	3332.637	1.070	3333.707	14.00	6.19	.59	3334.30	.00	1.19	2.87	3.000	.000	.00	0 .0
.552	.0340					.0056	.00	1.07	1.23	.68	.013	.00	.00	PIPE
90.509	3332.656	1.109	3333.764	14.00	5.90	.54	3334.30	.00	1.19	2.90	3.000	.000	.00	0 .0
.319	.0340					.0049	.00	1.11	1.15	.68	.013	.00	.00	PIPE
90.828	3332.667	1.148	3333.815	14.00	5.62	.49	3334.31	.00	1.19	2.92	3.000	.000	.00	0 .0
.102	.0340					.0043	.00	1.15	1.07	.68	.013	.00	.00	PIPE
90.930	3332.670	1.191	3333.861	14.00	5.36	.45	3334.31	.00	1.19	2.94	3.000	.000	.00	0 .0
JUNCT STR	.0040					.0021	.01	1.19	1.00		.013	.00	.00	PIPE

FILE: IntLatSDMH6.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 4

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11: 3:27

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
93.430	3332.680	1.719	3334.399	7.00	1.67	.04	3334.44	.00	.83	2.97	3.000	.000	.00	0 .0
2.500	-.0040				.0003	.00	1.72	.25	.00	.013		.00	.00	PIPE
95.930	3332.670	1.730	3334.400	7.00	1.66	.04	3334.44	.00	.83	2.96	3.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / INTERIM CONDITIONS
SO     93.43 3332.68  36                        3334.399
R      99.86 3333.46  36      .013                              .000  00.0   0
REM  Downstream of SDMH #7
R     102.36 3333.56  36      .013                              .000  00.0   0
R     104.86 3333.66  36      .013                              .000  25.0   0
REM  Upstream of SDDI #8
REM  69.50 foot Reach
R     169.36 3339.91  36      .013                              .000  00.0   0
SH    169.36 3339.91  36
CD  24  4   1    .000   2.000     .000  .000  .000   .00
CD  36  4   1    .000   3.000     .000  .000  .000   .00
Q            7.00    .0
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FILE: IntLatSDDI2.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:29:35

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / INTERIM CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
93.430	3332.680	1.719	3334.399	7.00	1.67	.04	3334.44	.00	.83	2.97	3.000	.000	.00	1 .0
.505	.1213					.0003	.00	1.72	.25	.36	.013	.00	.00	PIPE
93.935	3332.741	1.654	3334.395	7.00	1.75	.05	3334.44	.00	.83	2.98	3.000	.000	.00	1 .0
.475	.1213					.0003	.00	1.65	.27	.36	.013	.00	.00	PIPE
94.410	3332.799	1.591	3334.390	7.00	1.84	.05	3334.44	.00	.83	2.99	3.000	.000	.00	1 .0
.066	.1213					.0004	.00	1.59	.29	.36	.013	.00	.00	PIPE
94.476	3332.807	1.591	3334.398	7.00	1.84	.05	3334.45	.00	.83	2.99	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
94.476	3332.807	.383	3333.190	7.00	13.31	2.75	3335.94	.00	.83	2.00	3.000	.000	.00	1 .0
5.384	.1213					.0855	.46	.38	4.58	.36	.013	.00	.00	PIPE
99.860	3333.460	.395	3333.855	7.00	12.72	2.51	3336.37	.00	.83	2.03	3.000	.000	.00	1 .0
2.500	.0400					.0827	.21	.40	4.31	.47	.013	.00	.00	PIPE
102.360	3333.560	.389	3333.949	7.00	13.02	2.63	3336.58	.00	.83	2.02	3.000	.000	.00	1 .0
2.500	.0399					.0887	.22	.39	4.44	.47	.013	.00	.00	PIPE
104.860	3333.660	.382	3334.042	7.00	13.36	2.77	3336.81	.00	.83	2.00	3.000	.000	.00	1 .0
14.693	.0969					.0897	1.32	.38	4.60	.38	.013	.00	.00	PIPE
119.553	3335.084	.387	3335.470	7.00	13.12	2.67	3338.14	.00	.83	2.01	3.000	.000	.00	1 .0
15.232	.0969					.0818	1.25	.39	4.49	.38	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:29:35

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / INTERIM CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
134.785	3336.560	.400	3336.959	7.00	12.51	2.43	3339.39	.00	.83	2.04	3.000	.000	.00	1 .0
8.142	.0969					.0714	.58	.40	4.21	.38	.013	.00	.00	PIPE
142.927	3337.349	.413	3337.761	7.00	11.93	2.21	3339.97	.00	.83	2.07	3.000	.000	.00	1 .0
5.413	.0969					.0623	.34	.41	3.95	.38	.013	.00	.00	PIPE
148.340	3337.873	.427	3338.300	7.00	11.37	2.01	3340.31	.00	.83	2.10	3.000	.000	.00	1 .0
3.961	.0969					.0544	.22	.43	3.70	.38	.013	.00	.00	PIPE
152.301	3338.257	.441	3338.698	7.00	10.84	1.83	3340.52	.00	.83	2.12	3.000	.000	.00	1 .0
3.063	.0969					.0475	.15	.44	3.47	.38	.013	.00	.00	PIPE
155.364	3338.554	.456	3339.009	7.00	10.34	1.66	3340.67	.00	.83	2.15	3.000	.000	.00	1 .0
2.449	.0969					.0415	.10	.46	3.25	.38	.013	.00	.00	PIPE
157.813	3338.791	.471	3339.262	7.00	9.86	1.51	3340.77	.00	.83	2.18	3.000	.000	.00	1 .0
2.001	.0969					.0362	.07	.47	3.05	.38	.013	.00	.00	PIPE
159.814	3338.985	.487	3339.471	7.00	9.40	1.37	3340.84	.00	.83	2.21	3.000	.000	.00	1 .0
1.661	.0969					.0316	.05	.49	2.85	.38	.013	.00	.00	PIPE
161.475	3339.146	.503	3339.649	7.00	8.96	1.25	3340.90	.00	.83	2.24	3.000	.000	.00	1 .0
1.393	.0969					.0276	.04	.50	2.68	.38	.013	.00	.00	PIPE
162.868	3339.281	.520	3339.801	7.00	8.55	1.13	3340.93	.00	.83	2.27	3.000	.000	.00	1 .0
1.176	.0969					.0241	.03	.52	2.51	.38	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:29:35

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / INTERIM CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
164.044	3339.395	.537	3339.932	7.00	8.15	1.03	3340.96	.00	.83	2.30	3.000	.000	.00	1 .0
.997	.0969					.0211	.02	.54	2.35	.38	.013	.00	.00	PIPE
165.041	3339.491	.555	3340.047	7.00	7.77	.94	3340.98	.00	.83	2.33	3.000	.000	.00	1 .0
.846	.0969					.0184	.02	.56	2.20	.38	.013	.00	.00	PIPE
165.887	3339.573	.574	3340.148	7.00	7.41	.85	3341.00	.00	.83	2.36	3.000	.000	.00	1 .0
.718	.0969					.0161	.01	.57	2.06	.38	.013	.00	.00	PIPE
166.605	3339.643	.594	3340.237	7.00	7.06	.77	3341.01	.00	.83	2.39	3.000	.000	.00	1 .0
.607	.0969					.0141	.01	.59	1.93	.38	.013	.00	.00	PIPE
167.212	3339.702	.614	3340.316	7.00	6.73	.70	3341.02	.00	.83	2.42	3.000	.000	.00	1 .0
.511	.0969					.0123	.01	.61	1.81	.38	.013	.00	.00	PIPE
167.723	3339.751	.635	3340.386	7.00	6.42	.64	3341.03	.00	.83	2.45	3.000	.000	.00	1 .0
.425	.0969					.0107	.00	.63	1.70	.38	.013	.00	.00	PIPE
168.148	3339.793	.656	3340.449	7.00	6.12	.58	3341.03	.00	.83	2.48	3.000	.000	.00	1 .0
.348	.0969					.0094	.00	.66	1.59	.38	.013	.00	.00	PIPE
168.496	3339.826	.679	3340.505	7.00	5.84	.53	3341.03	.00	.83	2.51	3.000	.000	.00	1 .0
.281	.0969					.0082	.00	.68	1.49	.38	.013	.00	.00	PIPE
168.777	3339.854	.702	3340.555	7.00	5.57	.48	3341.04	.00	.83	2.54	3.000	.000	.00	1 .0
.220	.0969					.0072	.00	.70	1.39	.38	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:29:35

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / INTERIM CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
168.996	3339.875	.726	3340.601	7.00	5.31	.44	3341.04	.00	.83	2.57	3.000	.000	.00	1 .0
.164	.0969					.0063	.00	.73	1.30	.38	.013	.00	.00	PIPE
169.160	3339.891	.751	3340.641	7.00	5.06	.40	3341.04	.00	.83	2.60	3.000	.000	.00	1 .0
.113	.0969					.0055	.00	.75	1.22	.38	.013	.00	.00	PIPE
169.273	3339.902	.776	3340.678	7.00	4.82	.36	3341.04	.00	.83	2.63	3.000	.000	.00	1 .0
.066	.0969					.0048	.00	.78	1.14	.38	.013	.00	.00	PIPE
169.339	3339.908	.803	3340.711	7.00	4.60	.33	3341.04	.00	.83	2.66	3.000	.000	.00	1 .0
.021	.0969					.0042	.00	.80	1.07	.38	.013	.00	.00	PIPE
169.360	3339.910	.832	3340.742	7.00	4.38	.30	3341.04	.00	.83	2.69	3.000	.000	.00	1 .0

C.4 Ultimate Condition WSPG-W Model

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO      0.00 3404.32  10
R     190.77 3405.22  10      .015                                  .000  00.0   0
JX    191.77 3405.33  10 24   .015     3.0          3412.78         90.0         .000
REM  Downstream of SDMH #1 (Direct Connection)
REM  37.09 foot Reach
R     228.86 3405.52  10      .015                                  .000  00.0   0
REM  Upstream of SDMH #1 (Direct Connection)
REM  17.26 foot Reach
JX    246.12 3405.60  10 48   .015   260.0          3405.72         46.0         .000
REM  Upstream of SDMH #9 (Direct Connection to Existing Lateral)
REM  34.53 foot Reach
JX    280.65 3409.60  66 24   .015     2.0          3409.97        -90.0         .000
REM  Upstream of Junction with 24" RCP (Transition Structure)
REM  15.77 foot Reach
R     296.42 3409.85  66      .015                                  .000  00.0   0
SH    296.42 3409.85  66
CD  24  4   0    .000   2.000     .000  .000  .000   .00
CD  48  4   0    .000   4.000     .000  .000  .000   .00
CD  66  3   0   0.000   6.000    6.000
CD  10  3   0   0.000   6.000   10.000
Q           242.0    .0
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FILE: UltKRD.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 6:34:59

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
.000	3404.320	3.652	3407.973	507.00	13.88	2.99	3410.96	.00	4.31	10.00	6.000	10.000	.00	0 .0
40.571	.0047					.0077	.31	3.65	1.28	4.27	.015	.00	.00	BOX
40.571	3404.511	3.490	3408.001	507.00	14.53	3.28	3411.28	.00	4.31	10.00	6.000	10.000	.00	0 .0
40.340	.0047					.0088	.36	3.49	1.37	4.27	.015	.00	.00	BOX
80.911	3404.702	3.327	3408.029	507.00	15.24	3.61	3411.63	.00	4.31	10.00	6.000	10.000	.00	0 .0
38.389	.0047					.0101	.39	3.33	1.47	4.27	.015	.00	.00	BOX
119.300	3404.883	3.173	3408.055	507.00	15.98	3.97	3412.02	.00	4.31	10.00	6.000	10.000	.00	0 .0
36.583	.0047					.0115	.42	3.17	1.58	4.27	.015	.00	.00	BOX
155.883	3405.055	3.025	3408.080	507.00	16.76	4.36	3412.44	.00	4.31	10.00	6.000	10.000	.00	0 .0
34.887	.0047					.0132	.46	3.02	1.70	4.27	.015	.00	.00	BOX
190.770	3405.220	2.884	3408.104	507.00	17.58	4.80	3412.90	.00	4.31	10.00	6.000	10.000	.00	0 .0
JUNCT STR	.1101					.0140	.01	2.88	1.82		.015	.00	.00	BOX
191.770	3405.330	2.877	3408.207	504.00	17.52	4.77	3412.97	.00	4.29	10.00	6.000	10.000	.00	0 .0
2.650	.0051					.0141	.04	2.88	1.82	4.13	.015	.00	.00	BOX
194.420	3405.344	2.867	3408.210	504.00	17.58	4.80	3413.01	.00	4.29	10.00	6.000	10.000	.00	0 .0
34.440	.0051					.0152	.52	2.87	1.83	4.13	.015	.00	.00	BOX
228.860	3405.520	2.733	3408.253	504.00	18.44	5.28	3413.53	.00	4.29	10.00	6.000	10.000	.00	0 .0
JUNCT STR	.0046					.0357	.62	2.73	1.97		.015	.00	.00	BOX

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 6:34:59

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
				WARNING - Junction Analysis - Large Lateral Flow(s)										
246.120	3405.600	1.115	3406.715	244.00	21.88	7.43	3414.15	.00	2.64	10.00	6.000	10.000	.00	0 .0
JUNCT STR	.1158				.0321	1.11	1.12	3.65		.015	.00	.00	BOX	
280.650	3409.600	3.197	3412.797	242.00	12.61	2.47	3415.27	.00	3.70	6.00	6.000	6.000	.00	0 .0
.464	.0159				.0090	.00	3.20	1.24	2.59	.015	.00	.00	BOX	
281.114	3409.607	3.203	3412.810	242.00	12.59	2.46	3415.27	.00	3.70	6.00	6.000	6.000	.00	0 .0
9.166	.0159				.0085	.08	3.20	1.24	2.59	.015	.00	.00	BOX	
290.279	3409.753	3.359	3413.112	242.00	12.01	2.24	3415.35	.00	3.70	6.00	6.000	6.000	.00	0 .0
4.728	.0159				.0075	.04	3.36	1.15	2.59	.015	.00	.00	BOX	
295.007	3409.828	3.523	3413.351	242.00	11.45	2.04	3415.39	.00	3.70	6.00	6.000	6.000	.00	0 .0
1.413	.0159				.0066	.01	3.52	1.07	2.59	.015	.00	.00	BOX	
296.420	3409.850	3.696	3413.546	242.00	10.91	1.85	3415.40	.00	3.70	6.00	6.000	6.000	.00	0 .0

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T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO      0.00 3329.77  36                          3331.621
REM  Tailwater from VTN Fleet Wing TDS
R      28.77 3330.43  36      .013                                  .000  00.0   0
REM  Downstream of SDMH #1 (Junction with SDMH#6)
JX     30.77 3330.53  36 36   .013    13.0           3330.63         44.0         .000
R      35.77 3330.63  36      .013                                  .000  00.0   0
REM  Upstream of SDMH #1 (Junction with SDMH#6)
REM  48.34 foot Reach
R      79.11 3331.67  36      .013                                  .000  00.0   0
REM  Downstream of SDMH #2
R      81.61 3331.77  36      .013                                  .000  00.0   0
R      84.11 3331.87  36      .013                                  .000  00.0   0
REM  Upstream of SDMH #2
REM  81.80 foot Reach
R     160.91 3341.45  36      .013                                  .000  00.0   0
REM  Downstream of SDMH #3 (JUNCTION WITH LATERAL SDDI#1 & SDDI#3)
JX    163.41 3341.55  36 24 24.013    7.0      4.0  3342.65 3342.65 -61.0 45.0    .000
R     165.91 3341.65  36      .013                                  .000  00.0   0
REM  Upstream of SDMH #3 (JUNCTION WITH LATERAL SDDI#1 & SDDI#3)
REM  172.54 foot Reach
R     333.45 3350.10  36      .013                                  .000  00.0   0
REM  Downstream of SDMH #4
R     335.95 3350.20  36      .013                                  .000  00.0   0
R     338.45 3350.30  36      .013                                  .000  00.0   0
REM  Upstream of SDMH #4
REM  120.77 foot Reach
R     454.22 3358.89  36      .013                                  .000  03.0   0
REM  Downstream of SDMH #5
R     456.72 3358.99  36      .013                                  .000  00.0   0
R     459.22 3359.09  36      .013                                  .000  90.0   0
REM  Upstream of SDMH#5
REM  31.96 foot Reach
R     488.68 3359.73  36      .013                                  .000  00.0   0
SH    488.68 3359.73  36
CD  24  4   1    .000   2.000     .000  .000  .000   .00
CD  36  4   1    .000   3.000     .000  .000  .000   .00
Q            53.0     .0
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FILE: UltDFD.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 6:35:13

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
.000	3329.770	1.807	3331.577	77.00	17.31	4.65	3336.23	.00	2.74	2.94	3.000	.000	.00	1 .0
28.770	.0229					.0302	.87	1.81	2.48	1.96	.013	.00	.00	PIPE
28.770	3330.430	1.768	3332.198	77.00	17.76	4.90	3337.10	.00	2.74	2.95	3.000	.000	.00	1 .0
JUNCT STR	.0500					.0452	.09	1.77	2.58		.013	.00	.00	PIPE
30.770	3330.530	1.309	3331.839	64.00	21.60	7.25	3339.08	.00	2.57	2.98	3.000	.000	.00	1 .0
5.000	.0200					.0605	.30	1.31	3.81	1.81	.013	.00	.00	PIPE
35.770	3330.630	1.294	3331.924	64.00	21.93	7.47	3339.39	.00	2.57	2.97	3.000	.000	.00	1 .0
13.695	.0240					.0652	.89	1.29	3.90	1.71	.013	.00	.00	PIPE
49.465	3330.958	1.256	3332.215	64.00	22.80	8.07	3340.29	.00	2.57	2.96	3.000	.000	.00	1 .0
15.454	.0240					.0734	1.13	1.26	4.13	1.71	.013	.00	.00	PIPE
64.919	3331.329	1.212	3332.542	64.00	23.92	8.88	3341.42	.00	2.57	2.94	3.000	.000	.00	1 .0
14.191	.0240					.0836	1.19	1.21	4.42	1.71	.013	.00	.00	PIPE
79.110	3331.670	1.170	3332.840	64.00	25.08	9.77	3342.61	.00	2.57	2.93	3.000	.000	.00	1 .0
2.500	.0400					.0899	.22	1.17	4.73	1.46	.013	.00	.00	PIPE
81.610	3331.770	1.164	3332.934	64.00	25.26	9.91	3342.84	.00	2.57	2.92	3.000	.000	.00	1 .0
2.500	.0400					.0916	.23	1.16	4.78	1.46	.013	.00	.00	PIPE
84.110	3331.870	1.158	3333.028	64.00	25.44	10.05	3343.07	.00	2.57	2.92	3.000	.000	.00	1 .0
3.742	.1247					.0918	.34	1.16	4.83	1.07	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 6:35:13

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
87.852	3332.337	1.162	3333.499	64.00	25.30	9.94	3343.44	.00	2.57	2.92	3.000	.000	.00	1 .0
21.990	.1247					.0856	1.88	1.16	4.79	1.07	.013	.00	.00	PIPE
109.842	3335.080	1.204	3336.284	64.00	24.12	9.03	3345.32	.00	2.57	2.94	3.000	.000	.00	1 .0
15.662	.1247					.0751	1.18	1.20	4.48	1.07	.013	.00	.00	PIPE
125.504	3337.033	1.248	3338.282	64.00	23.00	8.21	3346.49	.00	2.57	2.96	3.000	.000	.00	1 .0
11.920	.1247					.0659	.79	1.25	4.18	1.07	.013	.00	.00	PIPE
137.424	3338.520	1.294	3339.814	64.00	21.93	7.47	3347.28	.00	2.57	2.97	3.000	.000	.00	1 .0
9.443	.1247					.0579	.55	1.29	3.90	1.07	.013	.00	.00	PIPE
146.867	3339.698	1.342	3341.040	64.00	20.91	6.79	3347.83	.00	2.57	2.98	3.000	.000	.00	1 .0
7.682	.1247					.0509	.39	1.34	3.64	1.07	.013	.00	.00	PIPE
154.549	3340.656	1.392	3342.049	64.00	19.93	6.17	3348.22	.00	2.57	2.99	3.000	.000	.00	1 .0
6.361	.1247					.0448	.28	1.39	3.39	1.07	.013	.00	.00	PIPE
160.910	3341.450	1.444	3342.894	64.00	19.01	5.61	3348.50	.00	2.57	3.00	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0463	.12	1.44	3.16		.013	.00	.00	PIPE
163.410	3341.550	1.231	3342.781	53.00	19.40	5.84	3348.62	.00	2.37	2.95	3.000	.000	.00	1 .0
2.500	.0399					.0508	.13	1.23	3.55	1.32	.013	.00	.00	PIPE
165.910	3341.650	1.229	3342.879	53.00	19.45	5.87	3348.75	.00	2.37	2.95	3.000	.000	.00	1 .0
51.532	.0504					.0513	2.64	1.23	3.57	1.23	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 6:35:13

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
217.442	3344.249	1.225	3345.474	53.00	19.53	5.92	3351.40	.00	2.37	2.95	3.000	.000	.00	1 .0
116.008	.0504					.0552	6.40	1.22	3.59	1.23	.013	.00	.00	PIPE
333.450	3350.100	1.182	3351.282	53.00	20.48	6.51	3357.80	.00	2.37	2.93	3.000	.000	.00	1 .0
2.500	.0399					.0591	.15	1.18	3.84	1.32	.013	.00	.00	PIPE
335.950	3350.200	1.178	3351.378	53.00	20.57	6.57	3357.95	.00	2.37	2.93	3.000	.000	.00	1 .0
2.500	.0400					.0598	.15	1.18	3.86	1.31	.013	.00	.00	PIPE
338.450	3350.300	1.175	3351.475	53.00	20.65	6.62	3358.10	.00	2.37	2.93	3.000	.000	.00	1 .0
10.545	.0742					.0590	.62	1.17	3.89	1.11	.013	.00	.00	PIPE
348.995	3351.082	1.186	3352.269	53.00	20.38	6.45	3358.72	.00	2.37	2.93	3.000	.000	.00	1 .0
27.504	.0742					.0544	1.50	1.19	3.82	1.11	.013	.00	.00	PIPE
376.499	3353.123	1.229	3354.353	53.00	19.43	5.87	3360.22	.00	2.37	2.95	3.000	.000	.00	1 .0
18.489	.0742					.0478	.88	1.23	3.56	1.11	.013	.00	.00	PIPE
394.988	3354.495	1.274	3355.769	53.00	18.53	5.33	3361.10	.00	2.37	2.97	3.000	.000	.00	1 .0
13.585	.0742					.0420	.57	1.27	3.33	1.11	.013	.00	.00	PIPE
408.573	3355.503	1.321	3356.824	53.00	17.67	4.85	3361.67	.00	2.37	2.98	3.000	.000	.00	1 .0
10.497	.0742					.0369	.39	1.32	3.10	1.11	.013	.00	.00	PIPE
419.070	3356.282	1.370	3357.652	53.00	16.85	4.41	3362.06	.00	2.37	2.99	3.000	.000	.00	1 .0
8.363	.0742					.0324	.27	1.37	2.89	1.11	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 6:35:13

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
427.434	3356.902	1.422	3358.324	53.00	16.06	4.01	3362.33	.00	2.37	3.00	3.000	.000	.00	1 .0
6.797	.0742					.0285	.19	1.42	2.70	1.11	.013	.00	.00	PIPE
434.230	3357.407	1.476	3358.882	53.00	15.31	3.64	3362.52	.00	2.37	3.00	3.000	.000	.00	1 .0
5.599	.0742					.0251	.14	1.48	2.51	1.11	.013	.00	.00	PIPE
439.829	3357.822	1.532	3359.354	53.00	14.60	3.31	3362.66	.00	2.37	3.00	3.000	.000	.00	1 .0
4.645	.0742					.0221	.10	1.53	2.34	1.11	.013	.00	.00	PIPE
444.474	3358.167	1.591	3359.758	53.00	13.92	3.01	3362.77	.00	2.37	2.99	3.000	.000	.00	1 .0
3.868	.0742					.0195	.08	1.59	2.18	1.11	.013	.00	.00	PIPE
448.342	3358.454	1.653	3360.107	53.00	13.27	2.74	3362.84	.00	2.37	2.98	3.000	.000	.00	1 .0
3.216	.0742					.0172	.06	1.65	2.02	1.11	.013	.00	.00	PIPE
451.559	3358.692	1.719	3360.411	53.00	12.66	2.49	3362.90	.00	2.37	2.97	3.000	.000	.00	1 .0
2.661	.0742					.0152	.04	1.72	1.88	1.11	.013	.00	.00	PIPE
454.220	3358.890	1.788	3360.677	53.00	12.07	2.26	3362.94	.00	2.37	2.94	3.000	.000	.00	1 .0
2.500	.0400					.0139	.03	1.79	1.74	1.31	.013	.00	.00	PIPE
456.720	3358.990	1.821	3360.811	53.00	11.80	2.16	3362.97	.00	2.37	2.93	3.000	.000	.00	1 .0
2.500	.0400					.0131	.03	1.82	1.68	1.31	.013	.00	.00	PIPE
459.220	3359.090	1.860	3360.950	53.00	11.51	2.06	3363.01	.00	2.37	2.91	3.000	.000	.00	1 .0
5.795	.0217					.0123	.07	1.86	1.61	1.57	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 6:35:13

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
465.015	3359.216	1.897	3361.112	53.00	11.25	1.97	3363.08	.00	2.37	2.89	3.000	.000	.00	1 .0
9.456	.0217					.0113	.11	1.90	1.55	1.57	.013	.00	.00	PIPE
474.471	3359.421	1.977	3361.398	53.00	10.73	1.79	3363.19	.00	2.37	2.84	3.000	.000	.00	1 .0
6.571	.0217					.0100	.07	1.98	1.43	1.57	.013	.00	.00	PIPE
481.042	3359.564	2.062	3361.626	53.00	10.23	1.62	3363.25	.00	2.37	2.78	3.000	.000	.00	1 .0
4.337	.0217					.0089	.04	2.06	1.32	1.57	.013	.00	.00	PIPE
485.379	3359.658	2.155	3361.813	53.00	9.75	1.48	3363.29	.00	2.37	2.70	3.000	.000	.00	1 .0
2.484	.0217					.0080	.02	2.15	1.21	1.57	.013	.00	.00	PIPE
487.863	3359.712	2.255	3361.967	53.00	9.30	1.34	3363.31	.00	2.37	2.59	3.000	.000	.00	1 .0
.817	.0217					.0072	.01	2.25	1.11	1.57	.013	.00	.00	PIPE
488.680	3359.730	2.366	3362.096	53.00	8.86	1.22	3363.32	.00	2.37	2.45	3.000	.000	.00	1 .0

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T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO     28.77 3330.43  36                        3332.198
R      62.14 3330.63  36      .013                              .000  46.0   0
REM  Downstream of SDMH #6
R      64.64 3331.76  36      .013                              .000  00.0   0
R      67.14 3331.86  36      .013                              .000  00.0   0
REM  Upstream of SDMH #6
REM  28.79 foot Reach
R      90.93 3332.67  36      .013                              .000  00.00  0
REM  Downstream of SDMH #7 (JUNCTION WITH LATERAL SDDI# 7 & SDDI# 8)
JX     93.43 3332.68  36 24   .013     6.0           3332.88         78.0         .000
R      95.93 3332.67  36      .013                              .000  00.00  0
SH     95.93 3332.68  36
CD  24  4   0    .000   2.000     .000  .000  .000   .00
CD  36  4   0    .000   3.000     .000  .000  .000   .00
CD  48  4   0    .000   4.000     .000  .000  .000   .00
Q            7.0    .0
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FILE: LatSDMH6.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11: 3: 9

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
28.770	3330.430	1.768	3332.198	13.00	3.00	.14	3332.34	.00	1.15	2.95	3.000	.000	.00	0 .0
3.146	.0060					.0009	.00	1.77	.44	1.03	.013	.00	.00	PIPE
31.916	3330.449	1.748	3332.197	13.00	3.04	.14	3332.34	.00	1.15	2.96	3.000	.000	.00	0 .0
HYDRAULIC JUMP														
31.916	3330.449	.712	3331.161	13.00	10.13	1.59	3332.75	.00	1.15	2.55	3.000	.000	.00	0 .0
.599	.0060					.0249	.01	.71	2.52	1.03	.013	.00	.00	PIPE
32.515	3330.452	.712	3331.164	13.00	10.13	1.59	3332.76	.00	1.15	2.55	3.000	.000	.00	0 .0
6.554	.0060					.0267	.18	.71	2.52	1.03	.013	.00	.00	PIPE
39.068	3330.492	.688	3331.180	13.00	10.62	1.75	3332.93	.00	1.15	2.52	3.000	.000	.00	0 .0
6.209	.0060					.0305	.19	.69	2.69	1.03	.013	.00	.00	PIPE
45.278	3330.529	.666	3331.194	13.00	11.14	1.93	3333.12	.00	1.15	2.49	3.000	.000	.00	0 .0
5.896	.0060					.0349	.21	.67	2.87	1.03	.013	.00	.00	PIPE
51.173	3330.564	.644	3331.208	13.00	11.68	2.12	3333.33	.00	1.15	2.46	3.000	.000	.00	0 .0
5.615	.0060					.0400	.22	.64	3.06	1.03	.013	.00	.00	PIPE
56.789	3330.598	.623	3331.220	13.00	12.25	2.33	3333.55	.00	1.15	2.43	3.000	.000	.00	0 .0
5.351	.0060					.0458	.24	.62	3.27	1.03	.013	.00	.00	PIPE
62.140	3330.630	.602	3331.232	13.00	12.85	2.56	3333.80	.00	1.15	2.40	3.000	.000	.00	0 .0
.302	.4521					.0471	.01	.60	3.49	.35	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11: 3: 9

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
62.442	3330.766	.613	3331.380	13.00	12.51	2.43	3333.81	.00	1.15	2.42	3.000	.000	.00	0 .0
.489	.4521					.0424	.02	.61	3.37	.35	.013	.00	.00	PIPE
62.931	3330.987	.634	3331.622	13.00	11.93	2.21	3333.83	.00	1.15	2.45	3.000	.000	.00	0 .0
.432	.4521					.0371	.02	.63	3.15	.35	.013	.00	.00	PIPE
63.363	3331.183	.656	3331.839	13.00	11.38	2.01	3333.85	.00	1.15	2.48	3.000	.000	.00	0 .0
.382	.4521					.0324	.01	.66	2.95	.35	.013	.00	.00	PIPE
63.745	3331.355	.678	3332.034	13.00	10.85	1.83	3333.86	.00	1.15	2.51	3.000	.000	.00	0 .0
.337	.4521					.0283	.01	.68	2.77	.35	.013	.00	.00	PIPE
64.082	3331.508	.701	3332.209	13.00	10.34	1.66	3333.87	.00	1.15	2.54	3.000	.000	.00	0 .0
.297	.4521					.0248	.01	.70	2.59	.35	.013	.00	.00	PIPE
64.379	3331.642	.725	3332.367	13.00	9.86	1.51	3333.88	.00	1.15	2.57	3.000	.000	.00	0 .0
.261	.4521					.0217	.01	.73	2.43	.35	.013	.00	.00	PIPE
64.640	3331.760	.750	3332.510	13.00	9.40	1.37	3333.88	.00	1.15	2.60	3.000	.000	.00	0 .0
2.500	.0400					.0196	.05	.75	2.27	.63	.013	.00	.00	PIPE
67.140	3331.860	.763	3332.623	13.00	9.18	1.31	3333.93	.00	1.15	2.61	3.000	.000	.00	0 .0
4.418	.0340					.0180	.08	.76	2.20	.66	.013	.00	.00	PIPE
71.558	3332.010	.783	3332.793	13.00	8.86	1.22	3334.01	.00	1.15	2.63	3.000	.000	.00	0 .0
4.646	.0340					.0160	.07	.78	2.09	.66	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11: 3: 9

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
76.204	3332.168	.810	3332.978	13.00	8.44	1.11	3334.09	.00	1.15	2.66	3.000	.000	.00	0 .0
3.624	.0340					.0140	.05	.81	1.96	.66	.013	.00	.00	PIPE
79.828	3332.292	.838	3333.130	13.00	8.05	1.01	3334.14	.00	1.15	2.69	3.000	.000	.00	0 .0
2.866	.0340					.0123	.04	.84	1.83	.66	.013	.00	.00	PIPE
82.694	3332.389	.867	3333.256	13.00	7.68	.92	3334.17	.00	1.15	2.72	3.000	.000	.00	0 .0
2.274	.0340					.0107	.02	.87	1.71	.66	.013	.00	.00	PIPE
84.967	3332.467	.897	3333.364	13.00	7.32	.83	3334.20	.00	1.15	2.75	3.000	.000	.00	0 .0
1.795	.0340					.0094	.02	.90	1.60	.66	.013	.00	.00	PIPE
86.762	3332.528	.929	3333.457	13.00	6.98	.76	3334.21	.00	1.15	2.77	3.000	.000	.00	0 .0
1.397	.0340					.0082	.01	.93	1.50	.66	.013	.00	.00	PIPE
88.159	3332.575	.961	3333.537	13.00	6.65	.69	3334.22	.00	1.15	2.80	3.000	.000	.00	0 .0
1.066	.0340					.0072	.01	.96	1.40	.66	.013	.00	.00	PIPE
89.225	3332.612	.995	3333.607	13.00	6.34	.63	3334.23	.00	1.15	2.83	3.000	.000	.00	0 .0
.780	.0340					.0063	.00	1.00	1.31	.66	.013	.00	.00	PIPE
90.005	3332.638	1.030	3333.669	13.00	6.05	.57	3334.24	.00	1.15	2.85	3.000	.000	.00	0 .0
.525	.0340					.0055	.00	1.03	1.23	.66	.013	.00	.00	PIPE
90.529	3332.656	1.067	3333.723	13.00	5.77	.52	3334.24	.00	1.15	2.87	3.000	.000	.00	0 .0
.304	.0340					.0049	.00	1.07	1.15	.66	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11: 3: 9

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
90.833	3332.667	1.105	3333.772	13.00	5.50	.47	3334.24	.00	1.15	2.89	3.000	.000	.00	0 .0
.097	.0340					.0042	.00	1.11	1.07	.66	.013	.00	.00	PIPE
90.930	3332.670	1.146	3333.816	13.00	5.24	.43	3334.24	.00	1.15	2.92	3.000	.000	.00	0 .0
JUNCT STR	.0040					.0021	.01	1.15	1.00		.013	.00	.00	PIPE
93.430	3332.680	1.641	3334.321	7.00	1.77	.05	3334.37	.00	.83	2.99	3.000	.000	.00	0 .0
2.500	-.0040					.0003	.00	1.64	.27	.00	.013	.00	.00	PIPE
95.930	3332.670	1.653	3334.323	7.00	1.75	.05	3334.37	.00	.83	2.98	3.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO    163.41 3342.65  24                        3342.781
R     163.41 3342.65  24      .013                              .000  00.0   0
R     172.25 3343.16  24      .013                              .000  00.0   0
SH    172.25 3343.16  24
CD  24  4   0    .000   2.000     .000  .000  .000   .00
Q           4.00    .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:46:31

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
163.410	3342.650	.454	3343.104	4.00	7.47	.87	3343.97	.00	.70	1.68	2.000	.000	.00	0 .0
1.436	.0577					.0234	.03	.45	2.33	.37	.013	.00	.00	PIPE
164.846	3342.733	.465	3343.197	4.00	7.23	.81	3344.01	.00	.70	1.69	2.000	.000	.00	0 .0
1.572	.0577					.0209	.03	.46	2.22	.37	.013	.00	.00	PIPE
166.418	3342.823	.480	3343.304	4.00	6.89	.74	3344.04	.00	.70	1.71	2.000	.000	.00	0 .0
1.282	.0577					.0183	.02	.48	2.08	.37	.013	.00	.00	PIPE
167.700	3342.897	.497	3343.394	4.00	6.57	.67	3344.06	.00	.70	1.73	2.000	.000	.00	0 .0
1.051	.0577					.0160	.02	.50	1.95	.37	.013	.00	.00	PIPE
168.750	3342.958	.514	3343.472	4.00	6.26	.61	3344.08	.00	.70	1.75	2.000	.000	.00	0 .0
.862	.0577					.0140	.01	.51	1.83	.37	.013	.00	.00	PIPE
169.612	3343.008	.532	3343.539	4.00	5.97	.55	3344.09	.00	.70	1.77	2.000	.000	.00	0 .0
.703	.0577					.0122	.01	.53	1.71	.37	.013	.00	.00	PIPE
170.315	3343.048	.550	3343.598	4.00	5.69	.50	3344.10	.00	.70	1.79	2.000	.000	.00	0 .0
.568	.0577					.0107	.01	.55	1.60	.37	.013	.00	.00	PIPE
170.883	3343.081	.569	3343.650	4.00	5.43	.46	3344.11	.00	.70	1.80	2.000	.000	.00	0 .0
.449	.0577					.0094	.00	.57	1.50	.37	.013	.00	.00	PIPE
171.332	3343.107	.589	3343.696	4.00	5.18	.42	3344.11	.00	.70	1.82	2.000	.000	.00	0 .0
.350	.0577					.0082	.00	.59	1.40	.37	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:46:31

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
171.682	3343.127	.610	3343.737	4.00	4.94	.38	3344.11	.00	.70	1.84	2.000	.000	.00	0 .0
.257	.0577					.0072	.00	.61	1.31	.37	.013	.00	.00	PIPE
171.939	3343.142	.631	3343.773	4.00	4.71	.34	3344.12	.00	.70	1.86	2.000	.000	.00	0 .0
.176	.0577					.0063	.00	.63	1.23	.37	.013	.00	.00	PIPE
172.115	3343.152	.653	3343.805	4.00	4.49	.31	3344.12	.00	.70	1.88	2.000	.000	.00	0 .0
.102	.0577					.0055	.00	.65	1.15	.37	.013	.00	.00	PIPE
172.217	3343.158	.676	3343.834	4.00	4.28	.28	3344.12	.00	.70	1.89	2.000	.000	.00	0 .0
.033	.0577					.0048	.00	.68	1.07	.37	.013	.00	.00	PIPE
172.250	3343.160	.701	3343.861	4.00	4.07	.26	3344.12	.00	.70	1.91	2.000	.000	.00	0 .0

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T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO    163.41 3342.65  24                        3342.781
R     163.41 3342.65  24      .013                              .000  00.0   0
R     194.32 3343.44  24      .013                              .000  00.0   0
SH    194.32 3343.44  24
CD  24  4   0    .000   2.000     .000  .000  .000   .00
Q            7.00    .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:46: 7

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
163.410	3342.650	.641	3343.291	7.00	8.06	1.01	3344.30	.00	.94	1.87	2.000	.000	.00	0 .0
7.176	.0256					.0185	.13	.64	2.08	.60	.013	.00	.00	PIPE
170.586	3342.833	.657	3343.490	7.00	7.80	.94	3344.43	.00	.94	1.88	2.000	.000	.00	0 .0
6.938	.0256					.0166	.11	.66	1.99	.60	.013	.00	.00	PIPE
177.524	3343.011	.680	3343.691	7.00	7.43	.86	3344.55	.00	.94	1.89	2.000	.000	.00	0 .0
4.875	.0256					.0145	.07	.68	1.86	.60	.013	.00	.00	PIPE
182.399	3343.135	.704	3343.839	7.00	7.09	.78	3344.62	.00	.94	1.91	2.000	.000	.00	0 .0
3.558	.0256					.0127	.05	.70	1.74	.60	.013	.00	.00	PIPE
185.956	3343.226	.729	3343.955	7.00	6.76	.71	3344.66	.00	.94	1.93	2.000	.000	.00	0 .0
2.661	.0256					.0111	.03	.73	1.62	.60	.013	.00	.00	PIPE
188.618	3343.294	.755	3344.050	7.00	6.44	.64	3344.69	.00	.94	1.94	2.000	.000	.00	0 .0
1.983	.0256					.0098	.02	.76	1.52	.60	.013	.00	.00	PIPE
190.601	3343.345	.783	3344.128	7.00	6.14	.59	3344.71	.00	.94	1.95	2.000	.000	.00	0 .0
1.465	.0256					.0086	.01	.78	1.42	.60	.013	.00	.00	PIPE
192.066	3343.382	.811	3344.193	7.00	5.86	.53	3344.73	.00	.94	1.96	2.000	.000	.00	0 .0
1.044	.0256					.0075	.01	.81	1.32	.60	.013	.00	.00	PIPE
193.110	3343.409	.841	3344.250	7.00	5.58	.48	3344.73	.00	.94	1.97	2.000	.000	.00	0 .0
.693	.0256					.0066	.00	.84	1.24	.60	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:46: 7

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
193.803	3343.427	.872	3344.298	7.00	5.32	.44	3344.74	.00	.94	1.98	2.000	.000	.00	0 .0
.391	.0256					.0058	.00	.87	1.15	.60	.013	.00	.00	PIPE
194.194	3343.437	.904	3344.341	7.00	5.08	.40	3344.74	.00	.94	1.99	2.000	.000	.00	0 .0
.126	.0256					.0051	.00	.90	1.08	.60	.013	.00	.00	PIPE
194.320	3343.440	.939	3344.379	7.00	4.83	.36	3344.74	.00	.94	2.00	2.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO     93.43 3332.68  36                         3334.321
R      99.86 3333.46  36      .013                                .000  00.0   0
REM  Downstream of SDMH #7
R     102.36 3333.56  36      .013                                .000  00.0   0
R     104.86 3333.66  36      .013                                .000  25.0   0
REM  Upstream of SDDI #8
REM  69.50 foot Reach
R     169.36 3339.91  36      .013                                .000  00.0   0
SH    169.36 3339.91  36
CD  24  4   1    .000   2.000     .000  .000  .000   .00
CD  36  4   1    .000   3.000     .000  .000  .000   .00
Q           6.00    .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:30:12

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
93.430	3332.680	1.641	3334.321	6.00	1.52	.04	3334.36	.00	.77	2.99	3.000	.000	.00	1 .0
.479	.1213					.0003	.00	1.64	.23	.33	.013	.00	.00	PIPE
93.909	3332.738	1.580	3334.318	6.00	1.59	.04	3334.36	.00	.77	3.00	3.000	.000	.00	1 .0
.452	.1213					.0003	.00	1.58	.25	.33	.013	.00	.00	PIPE
94.361	3332.793	1.521	3334.314	6.00	1.67	.04	3334.36	.00	.77	3.00	3.000	.000	.00	1 .0
.426	.1213					.0003	.00	1.52	.27	.33	.013	.00	.00	PIPE
94.787	3332.844	1.465	3334.309	6.00	1.75	.05	3334.36	.00	.77	3.00	3.000	.000	.00	1 .0
.084	.1213					.0004	.00	1.47	.29	.33	.013	.00	.00	PIPE
94.870	3332.854	1.465	3334.320	6.00	1.75	.05	3334.37	.00	.77	3.00	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
94.870	3332.854	.355	3333.210	6.00	12.72	2.51	3335.72	.00	.77	1.94	3.000	.000	.00	1 .0
4.990	.1213					.0854	.43	.36	4.55	.33	.013	.00	.00	PIPE
99.860	3333.460	.367	3333.827	6.00	12.13	2.28	3336.11	.00	.77	1.97	3.000	.000	.00	1 .0
2.500	.0400					.0827	.21	.37	4.26	.43	.013	.00	.00	PIPE
102.360	3333.560	.361	3333.921	6.00	12.45	2.41	3336.33	.00	.77	1.95	3.000	.000	.00	1 .0
2.500	.0399					.0895	.22	.36	4.42	.43	.013	.00	.00	PIPE
104.860	3333.660	.354	3334.013	6.00	12.82	2.55	3336.57	.00	.77	1.93	3.000	.000	.00	1 .0
17.652	.0969					.0907	1.60	.35	4.59	.35	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:30:12

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
122.512	3335.370	.358	3335.729	6.00	12.57	2.45	3338.18	.00	.77	1.95	3.000	.000	.00	1 .0
14.739	.0969					.0826	1.22	.36	4.47	.35	.013	.00	.00	PIPE
137.251	3336.798	.370	3337.168	6.00	11.99	2.23	3339.40	.00	.77	1.97	3.000	.000	.00	1 .0
7.672	.0969					.0721	.55	.37	4.19	.35	.013	.00	.00	PIPE
144.923	3337.542	.383	3337.924	6.00	11.43	2.03	3339.95	.00	.77	2.00	3.000	.000	.00	1 .0
5.050	.0969					.0629	.32	.38	3.93	.35	.013	.00	.00	PIPE
149.972	3338.031	.395	3338.426	6.00	10.90	1.84	3340.27	.00	.77	2.03	3.000	.000	.00	1 .0
3.679	.0969					.0549	.20	.40	3.69	.35	.013	.00	.00	PIPE
153.651	3338.387	.408	3338.796	6.00	10.39	1.68	3340.47	.00	.77	2.06	3.000	.000	.00	1 .0
2.834	.0969					.0479	.14	.41	3.46	.35	.013	.00	.00	PIPE
156.485	3338.662	.422	3339.084	6.00	9.91	1.52	3340.61	.00	.77	2.09	3.000	.000	.00	1 .0
2.260	.0969					.0418	.09	.42	3.24	.35	.013	.00	.00	PIPE
158.745	3338.881	.436	3339.317	6.00	9.45	1.39	3340.70	.00	.77	2.11	3.000	.000	.00	1 .0
1.844	.0969					.0365	.07	.44	3.04	.35	.013	.00	.00	PIPE
160.589	3339.060	.451	3339.510	6.00	9.01	1.26	3340.77	.00	.77	2.14	3.000	.000	.00	1 .0
1.530	.0969					.0319	.05	.45	2.85	.35	.013	.00	.00	PIPE
162.119	3339.208	.466	3339.674	6.00	8.59	1.14	3340.82	.00	.77	2.17	3.000	.000	.00	1 .0
1.281	.0969					.0278	.04	.47	2.67	.35	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:30:12

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
163.401	3339.332	.481	3339.813	6.00	8.19	1.04	3340.85	.00	.77	2.20	3.000	.000	.00	1 .0
1.080	.0969					.0243	.03	.48	2.50	.35	.013	.00	.00	PIPE
164.481	3339.437	.497	3339.934	6.00	7.81	.95	3340.88	.00	.77	2.23	3.000	.000	.00	1 .0
.916	.0969					.0212	.02	.50	2.34	.35	.013	.00	.00	PIPE
165.397	3339.526	.514	3340.040	6.00	7.44	.86	3340.90	.00	.77	2.26	3.000	.000	.00	1 .0
.777	.0969					.0185	.01	.51	2.20	.35	.013	.00	.00	PIPE
166.175	3339.601	.531	3340.133	6.00	7.10	.78	3340.91	.00	.77	2.29	3.000	.000	.00	1 .0
.659	.0969					.0162	.01	.53	2.06	.35	.013	.00	.00	PIPE
166.834	3339.665	.549	3340.214	6.00	6.77	.71	3340.93	.00	.77	2.32	3.000	.000	.00	1 .0
.557	.0969					.0142	.01	.55	1.93	.35	.013	.00	.00	PIPE
167.391	3339.719	.568	3340.287	6.00	6.45	.65	3340.93	.00	.77	2.35	3.000	.000	.00	1 .0
.468	.0969					.0124	.01	.57	1.81	.35	.013	.00	.00	PIPE
167.859	3339.764	.587	3340.351	6.00	6.15	.59	3340.94	.00	.77	2.38	3.000	.000	.00	1 .0
.389	.0969					.0108	.00	.59	1.69	.35	.013	.00	.00	PIPE
168.248	3339.802	.607	3340.409	6.00	5.86	.53	3340.94	.00	.77	2.41	3.000	.000	.00	1 .0
.321	.0969					.0094	.00	.61	1.59	.35	.013	.00	.00	PIPE
168.569	3339.833	.627	3340.460	6.00	5.59	.49	3340.95	.00	.77	2.44	3.000	.000	.00	1 .0
.257	.0969					.0082	.00	.63	1.49	.35	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:30:12

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
168.826	3339.858	.649	3340.507	6.00	5.33	.44	3340.95	.00	.77	2.47	3.000	.000	.00	1 .0
.201	.0969					.0072	.00	.65	1.39	.35	.013	.00	.00	PIPE
169.027	3339.877	.671	3340.548	6.00	5.08	.40	3340.95	.00	.77	2.50	3.000	.000	.00	1 .0
.150	.0969					.0063	.00	.67	1.30	.35	.013	.00	.00	PIPE
169.177	3339.892	.694	3340.586	6.00	4.85	.36	3340.95	.00	.77	2.53	3.000	.000	.00	1 .0
.104	.0969					.0055	.00	.69	1.22	.35	.013	.00	.00	PIPE
169.280	3339.902	.718	3340.620	6.00	4.62	.33	3340.95	.00	.77	2.56	3.000	.000	.00	1 .0
.060	.0969					.0048	.00	.72	1.14	.35	.013	.00	.00	PIPE
169.340	3339.908	.742	3340.650	6.00	4.41	.30	3340.95	.00	.77	2.59	3.000	.000	.00	1 .0
.020	.0969					.0042	.00	.74	1.07	.35	.013	.00	.00	PIPE
169.360	3339.910	.769	3340.679	6.00	4.19	.27	3340.95	.00	.77	2.62	3.000	.000	.00	1 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO     93.43 3332.88  24                        3334.321
R      93.43 3332.88  24      .013                              .000  00.0   0
R     124.68 3333.20  24      .013                              .000  00.0   0
SH    124.68 3333.20  24
CD  24  4   0    .000   2.000     .000  .000  .000   .00
Q            7.00    .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:29:54

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
93.430	3332.880	1.442	3334.322	7.00	2.89	.13	3334.45	.00	.94	1.79	2.000	.000	.00	0 .0
5.503	.0102					.0013	.01	1.44	.44	.76	.013	.00	.00	PIPE
98.933	3332.936	1.380	3334.316	7.00	3.03	.14	3334.46	.00	.94	1.85	2.000	.000	.00	0 .0
4.953	.0102					.0015	.01	1.38	.48	.76	.013	.00	.00	PIPE
103.885	3332.987	1.322	3334.309	7.00	3.18	.16	3334.47	.00	.94	1.89	2.000	.000	.00	0 .0
4.450	.0102					.0017	.01	1.32	.52	.76	.013	.00	.00	PIPE
108.336	3333.033	1.269	3334.301	7.00	3.33	.17	3334.47	.00	.94	1.93	2.000	.000	.00	0 .0
3.982	.0102					.0019	.01	1.27	.56	.76	.013	.00	.00	PIPE
112.317	3333.073	1.218	3334.292	7.00	3.49	.19	3334.48	.00	.94	1.95	2.000	.000	.00	0 .0
3.532	.0102					.0022	.01	1.22	.61	.76	.013	.00	.00	PIPE
115.849	3333.110	1.171	3334.280	7.00	3.66	.21	3334.49	.00	.94	1.97	2.000	.000	.00	0 .0
3.096	.0102					.0024	.01	1.17	.66	.76	.013	.00	.00	PIPE
118.945	3333.141	1.126	3334.267	7.00	3.84	.23	3334.50	.00	.94	1.98	2.000	.000	.00	0 .0
2.630	.0102					.0028	.01	1.13	.71	.76	.013	.00	.00	PIPE
121.575	3333.168	1.083	3334.251	7.00	4.03	.25	3334.50	.00	.94	1.99	2.000	.000	.00	0 .0
2.149	.0102					.0031	.01	1.08	.76	.76	.013	.00	.00	PIPE
123.724	3333.190	1.043	3334.233	7.00	4.23	.28	3334.51	.00	.94	2.00	2.000	.000	.00	0 .0
.956	.0102					.0034	.00	1.04	.82	.76	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 5- 6-2020 Time:11:29:54

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
124.680	3333.200	1.021	3334.221	7.00	4.34	.29	3334.51	.00	.94	2.00	2.000	.000	.00	0 .0

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T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO    280.65 3409.97  24                        3412.797
R     310.69 3411.04  24     .013                                .000  00.0   0
REM  Upstream Direct Connection to Existing (POC)
REM  38.44 foot Reach
R     344.13 3412.40  24     .013                                .000  00.0   0
REM  Downstream of SDDI #5
R     346.63 3412.50  24     .013                                .000  00.0   0
R     349.13 3412.60  24     .013                                .000  65.0   0
REM  Upstream of SDDI #5
REM  33.85 foot Reach
R     380.48 3412.77  24     .013                                .000  00.0   0
SH    380.48 3412.77  24
CD  24  4   0    .000   2.000     .000  .000  .000   .00
Q            2.00    .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:48: 9

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
280.650	3409.970	2.827	3412.797	2.00	.64	.01	3412.80	.00	.49	.00	2.000	.000	.00	0 .0
23.272	.0356					.0001	.00	2.83	.00	.29	.013	.00	.00	PIPE
303.922	3410.799	2.000	3412.799	2.00	.64	.01	3412.81	.00	.49	.00	2.000	.000	.00	0 .0
5.169	.0356					.0001	.00	2.00	.00	.29	.013	.00	.00	PIPE
309.091	3410.983	1.815	3412.798	2.00	.67	.01	3412.80	.00	.49	1.16	2.000	.000	.00	0 .0
1.599	.0356					.0001	.00	1.81	.07	.29	.013	.00	.00	PIPE
310.690	3411.040	1.758	3412.798	2.00	.68	.01	3412.80	.00	.49	1.31	2.000	.000	.00	0 .0
2.365	.0407					.0001	.00	1.76	.08	.29	.013	.00	.00	PIPE
313.055	3411.136	1.661	3412.797	2.00	.72	.01	3412.80	.00	.49	1.50	2.000	.000	.00	0 .0
2.018	.0407					.0001	.00	1.66	.09	.29	.013	.00	.00	PIPE
315.073	3411.218	1.578	3412.796	2.00	.75	.01	3412.81	.00	.49	1.63	2.000	.000	.00	0 .0
1.792	.0407					.0001	.00	1.58	.10	.29	.013	.00	.00	PIPE
316.865	3411.291	1.505	3412.796	2.00	.79	.01	3412.81	.00	.49	1.73	2.000	.000	.00	0 .0
1.625	.0407					.0001	.00	1.50	.11	.29	.013	.00	.00	PIPE
318.491	3411.357	1.438	3412.795	2.00	.83	.01	3412.81	.00	.49	1.80	2.000	.000	.00	0 .0
1.493	.0407					.0001	.00	1.44	.13	.29	.013	.00	.00	PIPE
319.983	3411.418	1.376	3412.794	2.00	.87	.01	3412.81	.00	.49	1.85	2.000	.000	.00	0 .0
1.382	.0407					.0001	.00	1.38	.14	.29	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:48: 9

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
321.365	3411.474	1.319	3412.793	2.00	.91	.01	3412.81	.00	.49	1.90	2.000	.000	.00	0 .0
1.288	.0407					.0001	.00	1.32	.15	.29	.013	.00	.00	PIPE
322.654	3411.527	1.265	3412.792	2.00	.95	.01	3412.81	.00	.49	1.93	2.000	.000	.00	0 .0
1.204	.0407					.0002	.00	1.27	.16	.29	.013	.00	.00	PIPE
323.858	3411.576	1.215	3412.791	2.00	1.00	.02	3412.81	.00	.49	1.95	2.000	.000	.00	0 .0
1.132	.0407					.0002	.00	1.22	.17	.29	.013	.00	.00	PIPE
324.990	3411.622	1.168	3412.790	2.00	1.05	.02	3412.81	.00	.49	1.97	2.000	.000	.00	0 .0
1.065	.0407					.0002	.00	1.17	.19	.29	.013	.00	.00	PIPE
326.055	3411.665	1.123	3412.788	2.00	1.10	.02	3412.81	.00	.49	1.98	2.000	.000	.00	0 .0
1.004	.0407					.0002	.00	1.12	.20	.29	.013	.00	.00	PIPE
327.060	3411.706	1.080	3412.786	2.00	1.16	.02	3412.81	.00	.49	1.99	2.000	.000	.00	0 .0
.946	.0407					.0003	.00	1.08	.22	.29	.013	.00	.00	PIPE
328.006	3411.745	1.040	3412.785	2.00	1.21	.02	3412.81	.00	.49	2.00	2.000	.000	.00	0 .0
.897	.0407					.0003	.00	1.04	.23	.29	.013	.00	.00	PIPE
328.903	3411.781	1.002	3412.783	2.00	1.27	.03	3412.81	.00	.49	2.00	2.000	.000	.00	0 .0
.845	.0407					.0003	.00	1.00	.25	.29	.013	.00	.00	PIPE
329.748	3411.815	.965	3412.781	2.00	1.33	.03	3412.81	.00	.49	2.00	2.000	.000	.00	0 .0
.800	.0407					.0004	.00	.97	.27	.29	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:48: 9

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
330.548	3411.848	.930	3412.778	2.00	1.40	.03	3412.81	.00	.49	2.00	2.000	.000	.00	0 .0
.755	.0407					.0004	.00	.93	.29	.29	.013	.00	.00	PIPE
331.303	3411.879	.897	3412.775	2.00	1.47	.03	3412.81	.00	.49	1.99	2.000	.000	.00	0 .0
.713	.0407					.0005	.00	.90	.31	.29	.013	.00	.00	PIPE
332.017	3411.908	.865	3412.772	2.00	1.54	.04	3412.81	.00	.49	1.98	2.000	.000	.00	0 .0
.671	.0407					.0006	.00	.86	.33	.29	.013	.00	.00	PIPE
332.688	3411.935	.834	3412.769	2.00	1.61	.04	3412.81	.00	.49	1.97	2.000	.000	.00	0 .0
.631	.0407					.0006	.00	.83	.36	.29	.013	.00	.00	PIPE
333.319	3411.961	.805	3412.765	2.00	1.69	.04	3412.81	.00	.49	1.96	2.000	.000	.00	0 .0
.595	.0407					.0007	.00	.80	.38	.29	.013	.00	.00	PIPE
333.914	3411.985	.777	3412.761	2.00	1.77	.05	3412.81	.00	.49	1.95	2.000	.000	.00	0 .0
.555	.0407					.0008	.00	.78	.41	.29	.013	.00	.00	PIPE
334.469	3412.007	.750	3412.757	2.00	1.86	.05	3412.81	.00	.49	1.94	2.000	.000	.00	0 .0
.250	.0407					.0009	.00	.75	.44	.29	.013	.00	.00	PIPE
334.719	3412.018	.724	3412.741	2.00	1.95	.06	3412.80	.00	.49	1.92	2.000	.000	.00	0 .0
HYDRAULIC JUMP														
334.719	3412.018	.308	3412.325	2.00	6.52	.66	3412.99	.00	.49	1.44	2.000	.000	.00	0 .0
3.229	.0407					.0279	.09	.31	2.49	.29	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:48: 9

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
337.947	3412.148	.318	3412.467	2.00	6.22	.60	3413.07	.00	.49	1.46	2.000	.000	.00	0 .0
2.680	.0407					.0243	.07	.32	2.34	.29	.013	.00	.00	PIPE
340.627	3412.257	.329	3412.586	2.00	5.93	.55	3413.13	.00	.49	1.48	2.000	.000	.00	0 .0
1.985	.0407					.0212	.04	.33	2.19	.29	.013	.00	.00	PIPE
342.612	3412.338	.340	3412.678	2.00	5.65	.50	3413.17	.00	.49	1.50	2.000	.000	.00	0 .0
1.518	.0407					.0185	.03	.34	2.05	.29	.013	.00	.00	PIPE
344.130	3412.400	.351	3412.751	2.00	5.39	.45	3413.20	.00	.49	1.52	2.000	.000	.00	0 .0
.459	.0400					.0170	.01	.35	1.92	.29	.013	.00	.00	PIPE
344.589	3412.418	.355	3412.773	2.00	5.31	.44	3413.21	.00	.49	1.53	2.000	.000	.00	0 .0
1.142	.0400					.0156	.02	.35	1.89	.29	.013	.00	.00	PIPE
345.731	3412.464	.367	3412.831	2.00	5.07	.40	3413.23	.00	.49	1.55	2.000	.000	.00	0 .0
.899	.0400					.0136	.01	.37	1.77	.29	.013	.00	.00	PIPE
346.630	3412.500	.379	3412.879	2.00	4.83	.36	3413.24	.00	.49	1.57	2.000	.000	.00	0 .0
.285	.0400					.0124	.00	.38	1.66	.29	.013	.00	.00	PIPE
346.915	3412.511	.383	3412.894	2.00	4.76	.35	3413.25	.00	.49	1.57	2.000	.000	.00	0 .0
.662	.0400					.0114	.01	.38	1.62	.29	.013	.00	.00	PIPE
347.577	3412.538	.396	3412.934	2.00	4.54	.32	3413.25	.00	.49	1.59	2.000	.000	.00	0 .0
.521	.0400					.0100	.01	.40	1.52	.29	.013	.00	.00	PIPE

FILE: LatSta28+26.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 5

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:48: 9

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
348.098	3412.559	.409	3412.968	2.00	4.33	.29	3413.26	.00	.49	1.61	2.000	.000	.00	0 .0
.400	.0400					.0087	.00	.41	1.42	.29	.013	.00	.00	PIPE
348.498	3412.575	.423	3412.998	2.00	4.13	.26	3413.26	.00	.49	1.63	2.000	.000	.00	0 .0
.297	.0400					.0076	.00	.42	1.33	.29	.013	.00	.00	PIPE
348.794	3412.587	.438	3413.024	2.00	3.93	.24	3413.26	.00	.49	1.65	2.000	.000	.00	0 .0
.208	.0400					.0066	.00	.44	1.25	.29	.013	.00	.00	PIPE
349.002	3412.595	.453	3413.047	2.00	3.75	.22	3413.27	.00	.49	1.67	2.000	.000	.00	0 .0
.128	.0400					.0058	.00	.45	1.17	.29	.013	.00	.00	PIPE
349.130	3412.600	.468	3413.068	2.00	3.58	.20	3413.27	.00	.49	1.69	2.000	.000	.00	0 .0
20.852	.0054					.0054	.11	.47	1.10	.47	.013	.00	.00	PIPE
369.982	3412.713	.468	3413.181	2.00	3.58	.20	3413.38	.00	.49	1.69	2.000	.000	.00	0 .0
8.442	.0054					.0053	.04	.47	1.10	.47	.013	.00	.00	PIPE
378.424	3412.759	.473	3413.232	2.00	3.52	.19	3413.42	.00	.49	1.70	2.000	.000	.00	0 .0
2.056	.0054					.0048	.01	.47	1.07	.47	.013	.00	.00	PIPE
380.480	3412.770	.491	3413.261	2.00	3.34	.17	3413.43	.00	.49	1.72	2.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J)
T3 ATKINS / ULTIMATE CONDITIONS
SO    246.12 3405.72  48                        3406.715
REM  Upstream of Exsiting SDMH #1
REM  29.40 foot Reach
R     270.52 3410.63  48     .013                                  .000  46.0   0
REM  Downstream of SDMH #8
R     273.02 3410.73  48     .013                                  .000  00.0   0
R     275.52 3410.92  48     .013                                  .000  45.0   0
REM  Upstream of SDMH #8
REM  19.10 foot Reach
R     294.62 3411.84  48     .013                                  .000  00.0   0
SH    294.62 3411.84  48
CD  48  4   0    .000   4.000     .000  .000  .000   .00
Q            260.0    .0
```

FILE: LatSDMH1.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:50:56

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
246.120	3405.720	2.754	3408.474	260.00	28.18	12.33	3420.81	.00	3.94	3.70	4.000	.000	.00	0 .0
.619	.2012					.0486	.03	2.75	3.15	1.77	.013	.00	.00	PIPE
246.739	3405.844	2.764	3408.608	260.00	28.07	12.23	3420.84	.00	3.94	3.70	4.000	.000	.00	0 .0
6.356	.2012					.0458	.29	2.76	3.12	1.77	.013	.00	.00	PIPE
253.095	3407.124	2.888	3410.011	260.00	26.76	11.12	3421.13	.00	3.94	3.58	4.000	.000	.00	0 .0
5.466	.2012					.0409	.22	2.89	2.86	1.77	.013	.00	.00	PIPE
258.561	3408.223	3.023	3411.246	260.00	25.52	10.11	3421.36	.00	3.94	3.44	4.000	.000	.00	0 .0
4.685	.2012					.0368	.17	3.02	2.61	1.77	.013	.00	.00	PIPE
263.246	3409.166	3.172	3412.338	260.00	24.33	9.19	3421.53	.00	3.94	3.24	4.000	.000	.00	0 .0
3.978	.2012					.0333	.13	3.17	2.36	1.77	.013	.00	.00	PIPE
267.225	3409.967	3.339	3413.306	260.00	23.20	8.36	3421.66	.00	3.94	2.97	4.000	.000	.00	0 .0
3.295	.2012					.0305	.10	3.34	2.10	1.77	.013	.00	.00	PIPE
270.520	3410.630	3.537	3414.167	260.00	22.12	7.60	3421.76	.00	3.94	2.56	4.000	.000	.00	0 .0
2.500	.0400					.0293	.07	3.54	1.82	2.98	.013	.00	.00	PIPE
273.020	3410.730	3.548	3414.278	260.00	22.06	7.56	3421.84	.00	3.94	2.53	4.000	.000	.00	0 .0
2.500	.0760					.0290	.07	3.55	1.80	2.36	.013	.00	.00	PIPE
275.520	3410.920	3.604	3414.523	260.00	21.81	7.39	3421.91	.00	3.94	2.39	4.000	.000	.00	0 .0
1.126	.0482					.0288	.03	3.60	1.72	2.77	.013	.00	.00	PIPE

FILE: LatSDMH1.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 4-28-2020 Time: 8:50:56

SUMMERLIN WEST VILLAGE 22
FLEET WING AVE (STREET G) DESERT FOOTHILLS DR TO KETTLE RIDGE DR (STREET
J ATKINS / ULTIMATE CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
276.646	3410.974	3.615	3414.589	260.00	21.76	7.35	3421.94	.00	3.94	2.36	4.000	.000	.00	0 .0
17.974														

Appendix D. Proposed Improvement Plans

SUMMERLIN VILLAGE 22
IMPROVEMENT PLANS FOR:

FLEET WING AVENUE (STREET G)

DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)
FUTURE SID PROJECT
A PORTION OF VILLAGE 22 ONE-WAY COUPLET

SUMMERLIN®

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 1	STA 25+50 TO END
9	ROADWAY PLAN AND PROFILE 1	STA 25+50 TO END
10	ROADWAY GRADING PLAN 2	STA 22+00 TO STA 25+50
11	ROADWAY PLAN AND PROFILE 2	STA 22+00 TO STA 25+50
12	ROADWAY GRADING PLAN 3	STA 18+50 TO STA 22+00
13	ROADWAY PLAN AND PROFILE 3	STA 18+50 TO STA 22+00
14	ROADWAY GRADING PLAN 4	BEGIN TO STA 18+50
15	ROADWAY PLAN AND PROFILE 4	BEGIN TO STA 18+50
16	STORM DRAIN LATERAL PROFILES	
17	WATER LATERAL PROFILES	
18	SANITARY SEWER LATERAL PROFILES	
19	STREETLIGHT PLAN	
20	SIGNAGE AND STRIPING PLAN	
21	TYPICAL SECTIONS	
22	STORM DRAIN DETAILS	
23	WATER DETAILS	
24	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 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.

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
2.09 AC.

PROPOSED DISTURBED AREA ACREAGE
5.26 AC.

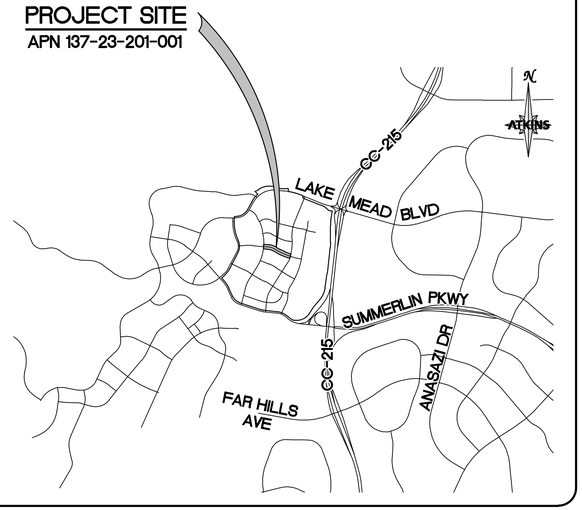
GEOTECHNICAL ENGINEER
PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES
4480 W. HACIENDA AVENUE, SUITE 104, LAS VEGAS, NV 89118
PHONE: 702-873-3478
PROJECT NO.: G-18-176
DATED: DECEMBER 3, 2018 AND SUBSEQUENT LETTER DATED ON DECEMBER 30, 2019

OWNER /DEVELOPER

OWNER

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

LOCATION MAP

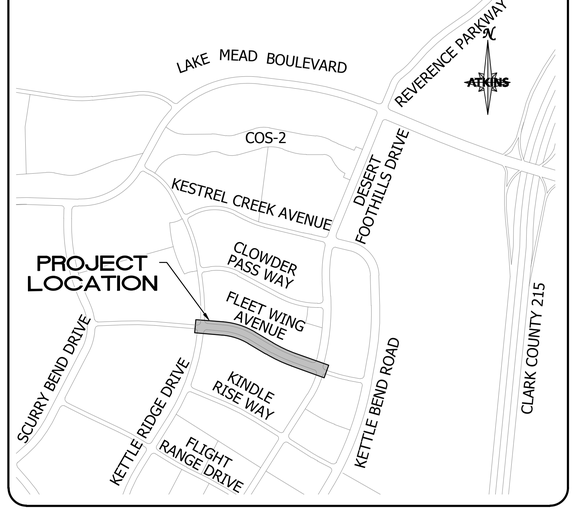


ENGINEER / CONSULTANT

CIVIL

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

VICINITY MAP



APPROVALS

HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY

KEVIN T. ORROCK, VICE PRESIDENT — DATE

STEVEN FORD, P.E. #012175 — DATE
CITY ENGINEER

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 ENGINEERING SERVICES

PROJECT NO. 0000 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 125 OF PLATS, PAGE 15, OFFICIAL RECORDS, CITY OF LAS VEGAS CLARK COUNTY, NEVADA

FAST Call before you UnderGround 1-702-432-5300 (HOTLINE AND NOTIFICATION SYSTEM OF UNDERGROUND FACILITIES)

Call before you Dig AVOID CUTTING, UNDERGROUND UTILITIES ARE POSSIBLE. Call 811 OR 1-800-642-2444

AVOID VICTIMS OVERHEAD POWER LINES ARE CLOSE. CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

PROFESSIONAL ENGINEER-STATE OF NEVADA NICOLAS A. BARGOS EXP. 12-31-20 CIVIL No. 25673 5/6/2020

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

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

SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

COVER SHEET

DESIGNED BY: J. BANTA
DRAWN BY: C. DANIELS
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE

XXXVXXXX
L20-XXXXX
DATE: MAY, 2020
DRAWING NO. 1/24

JOB NO. 100066776

C:\Users\bant3652\OneDrive - Corp\OneDrive - Atkins Ltd\Desktop\SummWest\Village 22\100066776 - V22 Fleet Wing (Desert Foothills to Kettle Ridge)_Sheets\66776-01-TITL-C1.dwg LAYOUT: C-1 May 06, 2020 - 4:32PM

@	AT
#	NUMBER
AB	ABANDONED
AC	ASPHALTIC CONCRETE
ACP	ASBESTOS CEMENT PIPE
AGG	AGGREGATE
AIP	ABANDON IN PLACE
ALT	ALTERNATE
AP	ANGLE POINT
APPROX	APPROXIMATE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS INTERNATIONAL
AV/AR	AIR VACUUM AIR RELIEF VALVE
BC	BACK OF CURB
BCR	BACK OF CURB RETURN
BLK	BLOCK
BLVD	BOULEVARD
BM	BENCHMARK
BO	BLOW OFF
BP	BOTTOM OF PIPE
BSW	BACK OF SIDEWALK
BVC	BEGIN VERTICAL CURVE
BVCE	BEGINNING OF VERTICAL CURVE ELEVATION
BVCS	BEGINNING OF VERTICAL CURVE STATION
BW	BOTTOM WIDTH
C&G	CURB AND GUTTER
C–C	CENTER TO CENTER
CATV	CABLE TELEVISION
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWING
CCRFCD	CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT
CF	CUBIC FOOT
CIP	CAST IRON PIPE OR CAST IN PLACE
CL	CENTERLINE
CLR	CLEAR
CLV	CITY OF LAS VEGAS
CM	CONSTRUCTION MANAGER
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CNDT	CONDUIT
CNLV	CITY OF NORTH LAS VEGAS
CO	CLEANOUT
COH	CITY OF HENDERSON
COL	COLUMN
CON'T	CONTINUATION
CONC	CONCRETE
CONST	CONSTRUCT OR CONSTRUCTION
COR	CORNER
COS	COMMUNITY OPEN SPACE
CPP	CORRUGATED PLASTIC PIPE
CSP	CORRUGATED STEEL PIPE
CU	CUBIC
CULV	CULVERT
CY	CUBIC YARD
D	DEPTH
DCSWCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS
DET, DTL	DETAIL
DEPT	DEPARTMENT
DG	DESIGN GRADE
DI	DROP INLET
DIA	DIAMETER
DIAG	DIAGONAL
DIP	DUCTILE IRON PIPE
DOC	DOCUMENT
DW	DRIVEWAY
DWG	DRAWING
E	EAST
EA	EACH
EB	EASTBOUND
EC	END OF CURVE
ECR	END CURB RETURN
EF	EACH FACE
EG	EXISTING GROUND
ELEC	ELECTRICAL
ELEV	ELEVATION
EMBK	EMBANKMENT
EOP	EDGE OF PAVEMENT
EP	EDGE OF PAVEMENT ALIGNMENT END
EQ	EQUAL
ESMT	EASEMENT
EVC	END VERTICAL CURVE
EVCS	END VERTICAL CURVE STATION
EW	EACH WAY
EX, EXST	EXISTING
EXP, JT	EXPANSION JOINT
FA	FIRE ALARM
FC	FACE OF CURB

FF	FINISHED FLOOR ELEVATION
FH	FIRE HYDRANT
FL	FLOW LINE
FO	FIBER OPTIC
FT	FOOT OR FEET
G	GAS LINE
GALV	GALVANIZED
GB	GRADE BREAK
GL	GRATE LENGTH
GM	GAS METER
GUT	GUTTER
GV	GATE VALVE
H	HEIGHT
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HDWL	HEADWALL
HE	HORIZONTAL ELLIPTICAL
HGL	HYDRAULIC GRADE LINE
HOA	HOMEOWNER'S ASSOCIATION
HOR	HORIZONTAL
HP	HIGH POINT
ID	INSIDE DIAMETER
IN	INCH(ES)
INT	INTERSECTION
INV	INVERT
IQAC	INTERAGENCY QUALITY ASSURANCE COMMITTEE
IRR	IRRIGATION
ISL	ISLAND
JB	JUNCTION BOX
JCT	JUNCTION
JT	JOINT
K	VERTICAL CURVE K VALUE
L	LENGTH
LB	POUND(S)
LF	LINEAR FEET
LIN	LINEAR
LIN #	CCWRD MANHOLE NUMBER
LOC	LENGTH OF CURVE
LOL	LAYOUT LINE
LP	LOW POINT
LS	LANDSCAPE
LT	LEFT
LVC	LENGTH OF VERTICAL CURVE
LVVWD	LAS VEGAS VALLEY WATER DISTRICT
MAS	MASONRY
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MON	MONOLITHIC, MONUMENT
MTL	MATERIAL
ME	MATCH EXISTING
MUE	MUNICIPAL UTILITY EASEMENT
N	NORTH
NAP	NOT A PART
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
NF	NEAR FACE
NG	NUMBER OF GRATES, NATURAL GRADE
NIC	NOT IN CONTRACT
No.	NUMBER
NTS	NOT TO SCALE
NVE	NV ENERGY
OC	ON CENTER
OD	OUTSIDE DIAMETER
OG	OPEN GRADE
OH	OVERHEAD
OHP	OVERHEAD POWER
OS	OFFSET
P	POWER
PB	PULL BOX
PBS	PLANTMIX BITUMINOUS SURFACE
PC	POINT OF CURVATURE
PCC	PORTLAND CEMENT CONCRETE OR POINT OF COMPOUND CURVATURE
PE	POLYETHYLENE
PG	PROPOSED GRADE
PGL	PROFILE GRADE LINE
PH	POT HOLE
PI	POINT OF INTERSECTION
PIP	PROTECT IN PLACE
PL	PROPERTY LINE
PLCS	PLACES
PMF	PAVEMENT MARKING FILM
POC	POINT OF CONNECTION
PP	POWER POLE
PRC	POINT OF REVERSE CURVATURE
PROP	PROPOSED
PSI	POUNDS PER SQUARE INCH
PT	POINT, POINT OF TANGENCY
PUE	PUBLIC UTILITY EASEMENT

PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
QTY	QUANTITY
(R)	RADIAL
R/W,ROW	RIGHT OF WAY
R	RADIUS
RC	REINFORCED CONCRETE
RCB	REINFORCED CONCRETE BOX
RCC	ROLLER COMPACTED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
REINF	REINFORCED OR REINFORCEMENT
RELOC	RELOCATE
REV	REVISION
RG	ROUGH GRADE
RP	RADIUS POINT
RPM	RAISED PAVEMENT MARKER
RR	RAILROAD
RT	RIGHT
SCHED	SCHEDULE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SF	SQUARE FOOT/SQUARE FEET
SHLD	SHOULDER
SHT	SHEET
SHP	STEEL HIGH PRESSURE PIPE
SMFO	SINGLE MODE FIBER OPTIC
SNWA	SOUTHERN NEVADA WATER AUTHORITY
SQ	SQUARE
SS	SANITARY SEWER OR SIDE SLOPE
SSD	SUMMERLIN STANDARD DRAWING
SST	STAINLESS STEEL
ST	STREET
STA	STATION
STD	STANDARD
STL	STEEL
STLT	STREETLIGHT
SDHW	STORM DRAIN HEADWALL
STRUCT	STRUCTURAL OR STRUCTURE
SUM #	CCWRD MANHOLE NUMBER
SURV	SURVEY
SVZ	SIGHT VISIBILITY ZONE
SW	SIDEWALK
SY	SQUARE YARD
T	TELEPHONE LINE
TAN	TANGENT
TB	TOP OF BOX
TBA	TO BE ADJUSTED
TBC	TOP OF BACK OF CURB
TBR	TO BE REMOVED
TC	TOP OF CURB
TCD	TRAFFIC CONTROL DEVICE
TDS	TECHNICAL DRAINAGE STUDY
TEL	TELEPHONE
TEMP	TEMPORARY
TF	TOP OF FOOTING
THK	THICK
THR	THRUST
THW	TOP OF HEADWALL
TOF	TOP OF FACE
TOP	TOP OF BANK
TW/TOW	TOP OF WALL
TP	TOP OF PIPE
TRANS	TRANSITION
TS	TRAFFIC SIGNAL
TSI	TRAFFIC SIGNAL INTERCONNECT
TW	TOP OF WALL
TYP	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS
UG	UNDERGROUND
UGP	UNDERGROUND POWER
UIE	UPPER INVERT ELEVATION
UNO	UNLESS NOTED OTHERWISE
UPRR	UNION PACIFIC RAILROAD
USD	UNIFORM STANDARD DRAWNG
UTACS	ULTRA THIN ASPHALT CONCRETE SURFACE
USTCDE	UTILITY, STREETLIGHT, TRAFFIC CONTROL DEVICE EASEMENT
V	VOLT
VAR	VARIABLE
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VG	VALLEY GUTTER
W	WEST, WATER

W/	WITH
WB	WEST BOUND
WL	WATER LINE
WM	WATER METER
W/O	WITHOUT
WPJ	WEAKENED PLANE JOINT
WV	WATER VALVE
WW	WING WALL
YD	YARD(S)

	EXISTING	PROPOSED
DAYLIGHT LINE		
FLOWLINE		
CENTERLINE		
PARCEL LINE		
RIGHT OF WAY		
PAVEMENT STRIPING		
OVERHEAD POWER	—OHP—	
UNDERGROUND POWER	—UGP—	
SANITARY SEWER	—S—	15" SS
WATER		24"W (3550)
STORM DRAIN		
GAS	—G—	
CABLE T.V.	—CATV—	
TELEPHONE	—T—	
STREETLIGHT CONDUIT	—STLT—	STLT
STOP BAR		
CONCRETE ENCASEMENT		
FENCE		
BLOCK WALL		
RETAINING WALL		
SAWCUT PAVEMENT		
CONTOUR	(3000)	3005
SPOT ELEVATION	x 3011.6	x 3011.67
CURB AND GUTTER		
EDGE OF PAVEMENT		
EASEMENT		
MATCHLINE		
SIGN		
DOUBLE POST SIGN		
STORM DRAIN MANHOLE	SD	
STORM DRAIN STRUCTURE		
DROP INLET		
BEEHIVE INLET		OR
SEWER MANHOLE	S	S
FIRE HYDRANT		
CAP AND BLOWOFF		
GATE VALVE		
REDUCER		
STREETLIGHT	OR	
PULLBOX		
SIGNAL POLE		
ELEVATION	(0000.0) EG	0000.00 FG
WATER PRESSURE ZONE BOUNDARY		
WATER PRESSURE ZONE		3550
		FUTURE
HARDSCAPE		

NOTE TO CONTRACTOR

- QUANTITIES SHOWN ARE ESTIMATES ONLY AND ARE INTENDED TO ILLUSTRATE SCOPE OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT QUANTITIES INVOLVED.

ROADWAY ALIGNMENT DESIGNATIONS

"FWA" = FLEET WING AVENUE
"DFD" = DESERT FOOTHILLS DRIVE
"KRD" = KETTLE RIDGE DRIVE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 0000 FIRST APPROVED 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.

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

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

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. ITS QUICK! Call 811 OR 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES. ITS QUICK! CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

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.

PROFESSIONAL ENGINEER · STATE OF NEVADA · NICOLAS A. BARGOS · EXP. 12-31-20 · CIVIL · No. 29870 · 5/6/2020

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

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

SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

LEGEND AND ABBREVIATIONS

DESIGNED BY:	J. BANTA
DRAWN BY:	C. DANIELS
CHECKED BY:	C. DANIELS
HORIZ.:	NONE
VERT.:	NONE
XXVVXXXX	
L20–XXXXX	
DATE:	MAY, 2020
DRAWING NO.	2 /24
JOB NO.	100066776

C:\Users\bant36652\OneDrive Corp\OneDrive – Atkins Ltd\Desktop\SummWest\Village 22\100066776 – V22 Fleet Wing (Desert Foothills to Kettle Ridge)_Sheets\66776–02–LGND–C2.dwg LAYOUT: C–2 May 06, 2020 – 4:32PM

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; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF–SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT–OF–WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300´ IN EXTRUDED–TYPE CURB.
8. AC PAVEMENT TO BE ONE–HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE (NOVA, G–18–176, 12/03/18) 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 STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC, THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. 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 STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE SEWER LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT–OF–WAY. SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF ± 0.09 METERS (± 0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

REVISED 06/04/2018

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

COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.

7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT–OF–WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

REVISED 04/15/10

CONSTRUCTION CONCURRENCY NOTE

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

1. KETTLE RIDGE DRIVE (FLEET WING AVENUE TO LAKE MEAD BLVD)
2. DESERT FOOTHILLS DRIVE (FLEET WING AVENUE TO LAKE MEAD BLVD)
3. FLEET WING AVENUE (KETTLE BEND ROAD TO DESERT FOOTHILLS DRIVE) by VTN NEVADA
4. KINDLE RISE WAY (DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE) &
   KETTLE RIDGE DRIVE (KINDLE RISE WAY TO FLEET WING AVENUE)
5. DESERT FOOTHILLS DRIVE (SUNSET RUN DRIVE TO FLEET WING AVENUE)
6. KETTLE RIDGE DRIVE (FLEET WING AVENUE TO SUNSET RUN DRIVE)

DEVIATIONS FROM STANDARDS

NONE.

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 #6325 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON–SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. IFC § 105.7.12
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. IFC § 3310, § 3312
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. IFC § 507.5.7.3
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. IFC § 106.3
7. ALL ON–SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. IFC § 507.2.1, NFPA 24
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. IFC § 507
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. IFC § 507.5.7.1
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. IFC § 507
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: IFC § C102
    - RESIDENTIAL – 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    - COMMERCIAL – 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. IFC § C102.8
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL–DE–SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL–DE–SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. IFC § C102.12
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE–TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. IFC § 102.4
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. IFC § C102.7
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD–END STREET SHALL NOT EXCEED 200 FT. IFC § C102.6
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD–INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. IFC § C104
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL–WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. IFC § 503.2.3
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 8% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6% IFC § 503.2.7; 503.2.8
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. IFC § 503.2.4
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. IFC § 503.2.1
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW LINE TO FLOW LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24FT WIDE, FLOW LINE TO FLOW LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. IFC § 503.2.1.1
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. IFC § 503.1.1
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD–ENDS BY WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. IFC § 503.1.2
26. ALL DEAD–END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. IFC § 503.2.5
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. IFC § 503.3
28. ALL ELECTRONICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE IFC § 503.6 AND IFC APPENDIX M.

REVISED MARCH 1, 2016

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 SCURRY BEND DRIVEAMES 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 SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SUGGESTED ROUTE TO SCHOOL" IS ENCROACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE 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 XI RETROREFLECTIVE SHEETING IN ACCORDANCE WITH CGAUSS 627 AND 716 AND SHALL HAVE AN ANTI–GRAFFITI PROTECTIVE OVERLAY FILM THAT IS A MATCHING COMPONENT TO, AND OF THE SAME MANUFACTURER AS THE RETROREFLECTIVE SHEETING TO WHICH IT IS APPLIED. SCURRY BEND DRIVEAME SIGNS SHALL CONFORM TO THE CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS 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 HEREUNDER, 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 SCURRY BEND DRIVEAME SIGNS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND 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 (RTC). 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 PROJECT'S OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS. THE CONTRACTOR SHALL PROVIDE A DRAWING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNAGE, WHICH MAY INCLUDE OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

REVISED JUNE 4, 2018

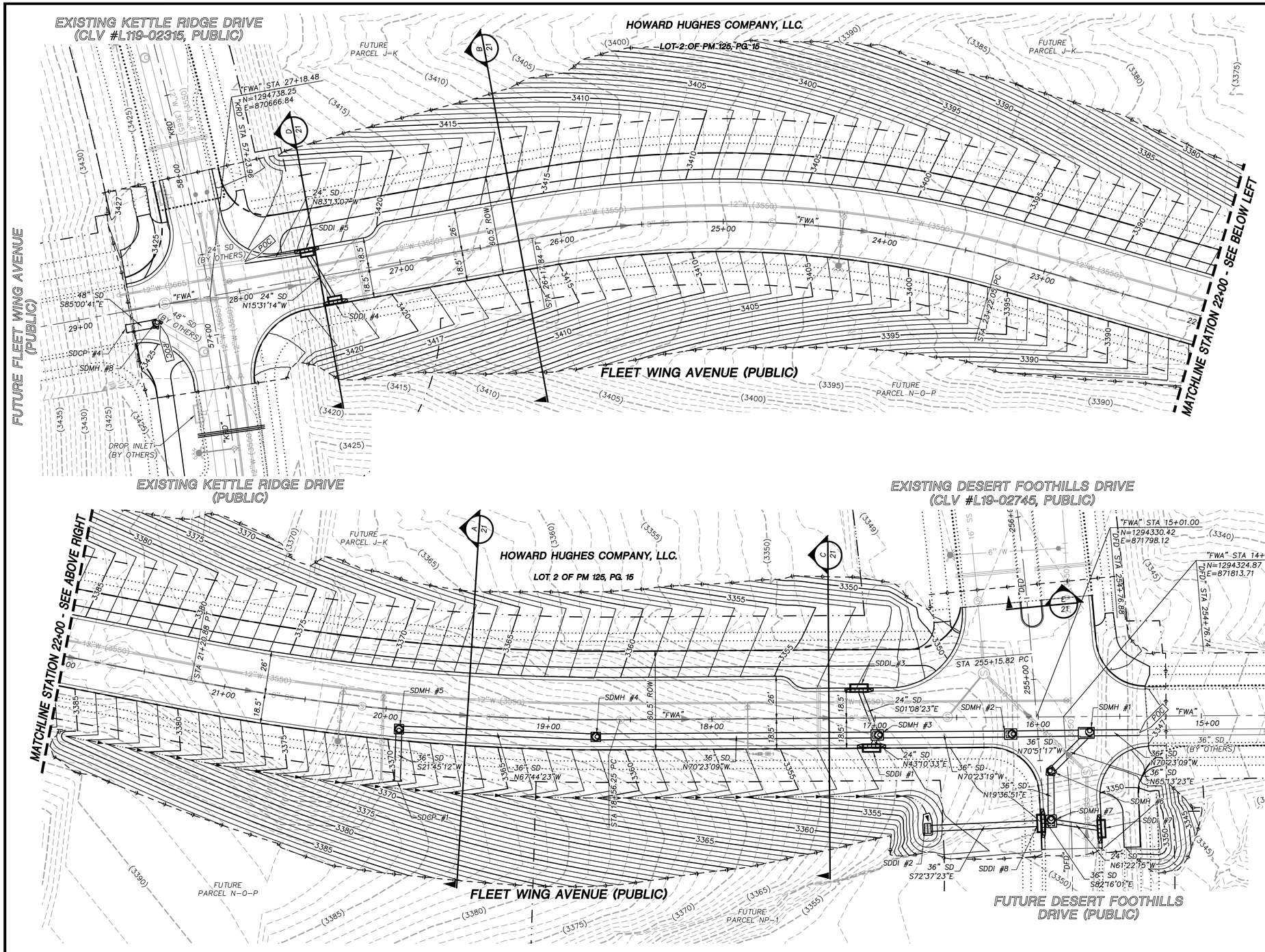
CITY OF LAS VEGAS SEWER NOTES

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 PUBLIC WORKS' CONSTRUCTION OFF–SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D–3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y"'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C–900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

REVISED 04/15/10

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 (USS), 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



SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
DRAINAGE		
48" RCP CLASS III	20	LF
36" RCP CLASS III	630	LF
24" RCP CLASS III	150	LF
10' TYPE CM2 SDDI	2	EA
10' TYPE CM2 SDDI (D>10')	2	EA
7.5' TYPE CM SDDI	2	EA
4' X 8' NDOT TYPE 2 DROP INLET	1	EA
TYPE II SDMH	4	EA
TYPE III SDMH	4	EA
CAP	2	EA
RIP-RAP (D50=8" THICKNESS=16")	280	CY

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.

STORM DRAIN NOTES

1. SEE ROADWAY PLAN AND PROFILE SHEETS FOR CONSTRUCTION DETAILS.
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.

GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1"= 30'

SOILS REPORT

BY NOVA
PROJECT NO. G-18-176
DATED 12/03/18 AND
SUBSEQUENT UPDATE LETTER
DATED 12/30/19
EARTHWORK QUANTITIES (RAW):
CUT= 15,400 CU YDS
FILL= 30,700 CU YDS

GRADING PLAN CERTIFICATION

NICOLAS A. BARCOS PE#25673 — 5/6/2020 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-0000

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

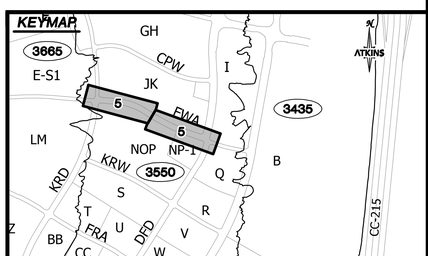
CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. Call 811 OR 1-800-642-2444

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

KEYMAP



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.

PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A BARCOS - EXP. 12-31-20 - CIVIL - No. 25673 - 5/6/2020

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

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

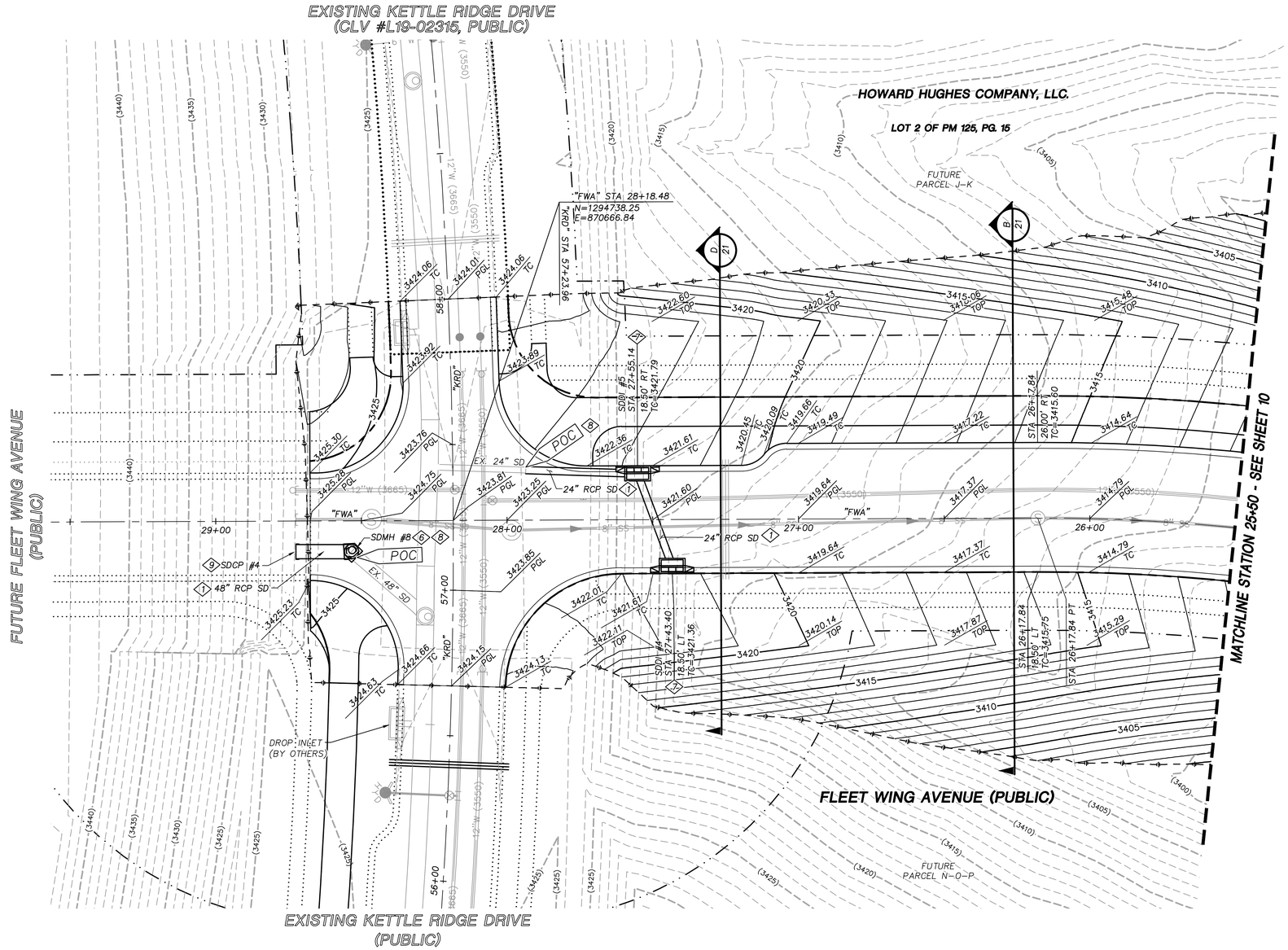
SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

MASTER DRAINAGE PLAN

DESIGNED BY:	J. BANTA
DRAWN BY:	C. DANIELS
CHECKED BY:	P. BATES
HORIZ.:	1"=30'
VERT.:	NONE
XXXVXXXX	
L20-XXXXX	
DATE:	MAY, 2020
DRAWING NO.	5 /24
JOB NO.	100066776

C:\Users\bon13652\OneDrive Corp\OneDrive - Atkins Ltd\Desktop\SummitWest\Village 22\100066776 - V22 Fleet Wing (Desert Foothills to Kettle Ridge)_Sheets\66776-06-STRM-SD1.dwg LAYOUT: MASTER DRAINAGE PLAN May 06, 2020 - 4:34PM



STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL NDOT TYPE II DROP INLET PER NDOT R-4.2.1 (SEE SHEET 22)
4. INSTALL TYPE I SD MANHOLE PER CCAUSD #403
5. INSTALL TYPE II SD MANHOLE PER CCAUSD #405
6. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
7. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
8. REMOVE CAP AND CONNECT TO EXISTING STORM DRAIN STUB
9. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 22)
10. INSTALL RIP-RAP (D50=8", THICKNESS=16")
11. INSTALL TYPE II SD MANHOLE W/SINGLE SIDE DRAIN PER CCAUSD #405.2 (SHEET 2 OF 3)
12. INSTALL TYPE II SD MANHOLE W/DOUBLE SIDE DRAIN PER CCAUSD #405.2 (SHEET 3 OF 3)
13. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421, AND DETAIL C SHEET 22

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

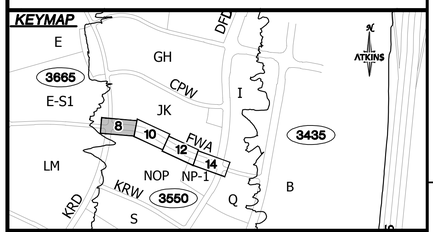
ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

ROADWAY GRADING PLAN
STA 25+60 TO END

KEYMAP



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

GRADING PLAN CERTIFICATION

NICOLAS A. BARCOS PE#25673
5/6/2020
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-0000

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BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
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FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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AVOID VICTORY OVERHEAD POWER LINES. ITS COSTLY. CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

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PROFESSIONAL ENGINEER, STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
5/6/2020

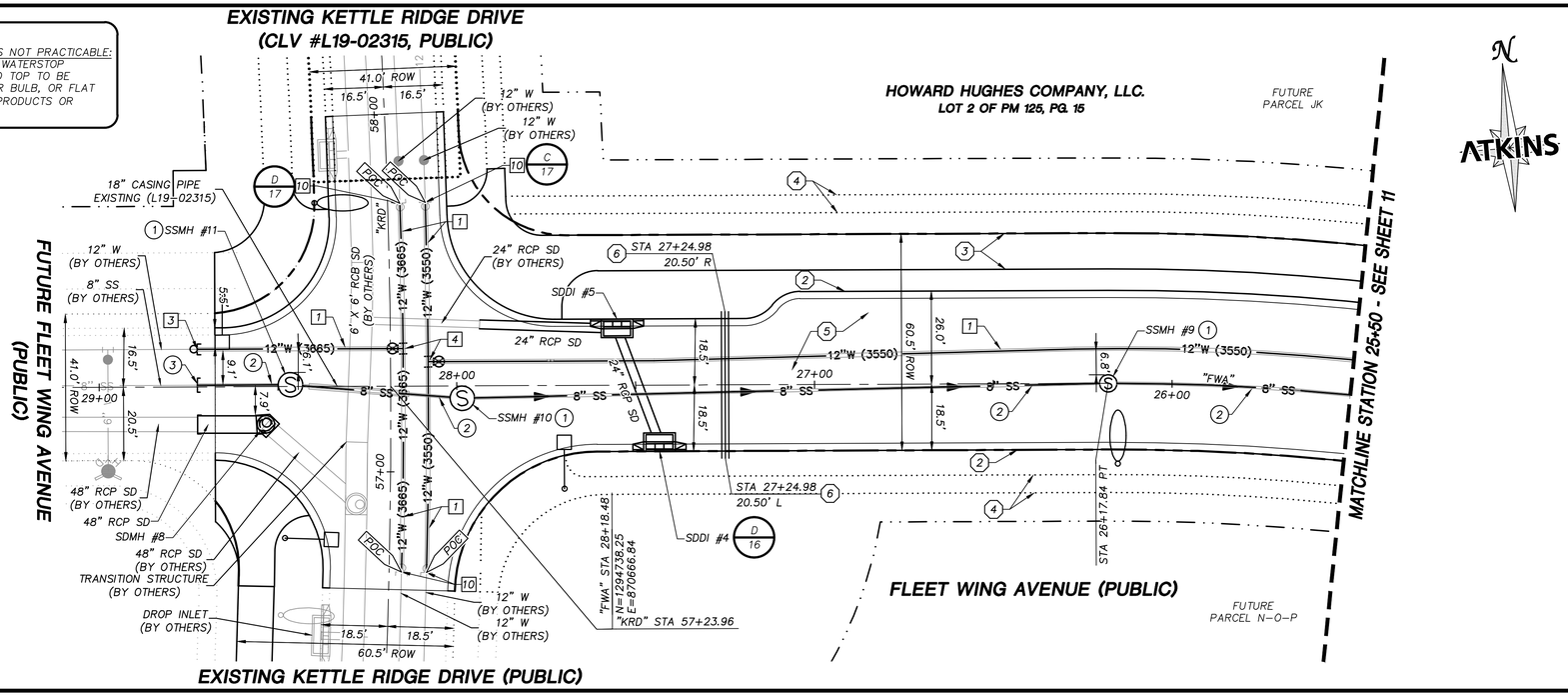
XXXVXXXX	DESIGNED BY: J. BIANTA		
L20-XXXXX	DRAWN BY: C. DANIELS		
DATE: MAY. 2020	CHECKED BY: P. BATES		
DRAWING NO. 8 /24	HORIZ.: 1"=20'	VERT.: NONE	

JOB NO. 100066776

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DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE: CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB WALLS. BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS. CENTER BULB, OR FLAT STRIP (VINYLEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).



STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL NDOT TYPE II DROP INLET PER NDOT R-4.2.1 (SEE SHEET 22)
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SEWER CONSTRUCTION NOTES

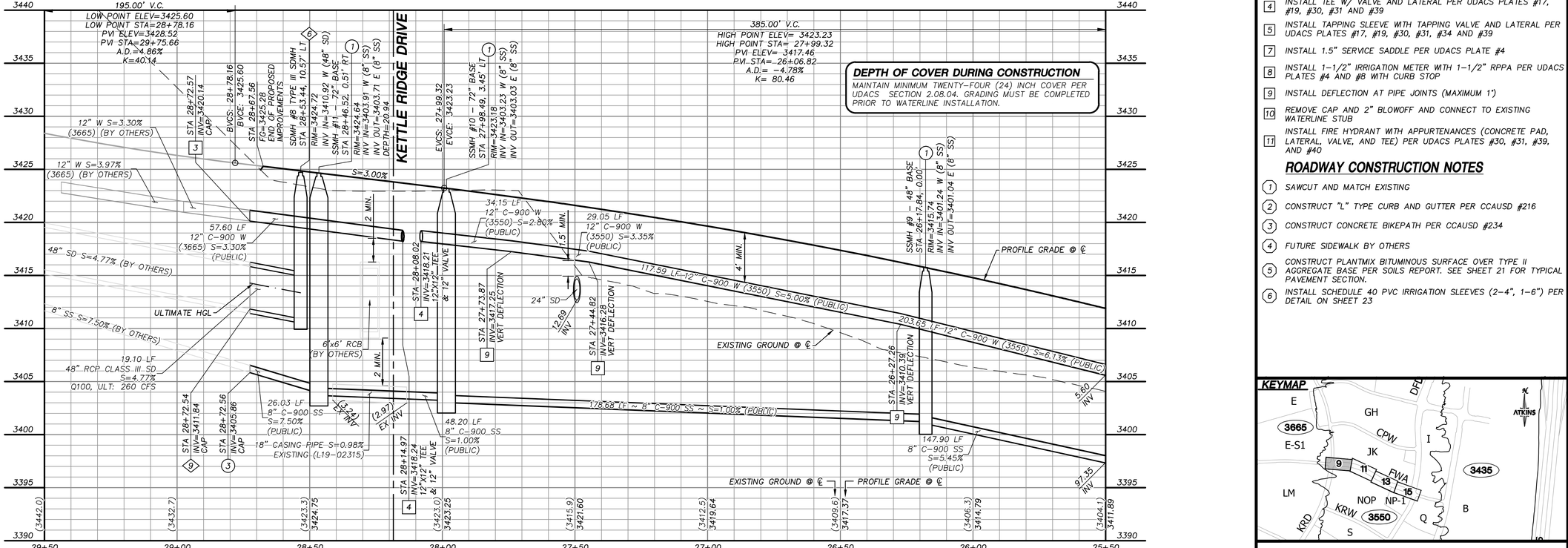
1. INSTALL SEWER MANHOLE PER DCSWCS SD-1 AND SD-4
2. INSTALL SEWER MAIN PER DCSWCS SD-17
3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"X4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM).
4. REMOVE CAP AND CONNECT TO EXISTING SEWER STUB
5. ADJUST EXISTING MANHOLE 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 CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
5. INSTALL TAPPING SLEEVE WITH TAPPING VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31, #34 AND #39
7. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
8. INSTALL 1-1/2" IRRIGATION METER WITH 1-1/2" RPPA PER UDACS PLATES #4 AND #8 WITH CURB STOP
9. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM 1°)
10. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
11. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40

ROADWAY CONSTRUCTION NOTES

1. SAWCUT AND MATCH EXISTING
2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
3. CONSTRUCT CONCRETE BIKEPATH PER CCAUSD #234
4. FUTURE SIDEWALK BY OTHERS
5. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 21 FOR TYPICAL PAVEMENT SECTION.
6. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4", 1-6") PER DETAIL ON SHEET 23



GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 0000 FIRST APPROVED 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.

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KEYMAP

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PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A. BARGAS - EXP. 12-31-20 - CIVIL - No. 26679 - 5/6/2020

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

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

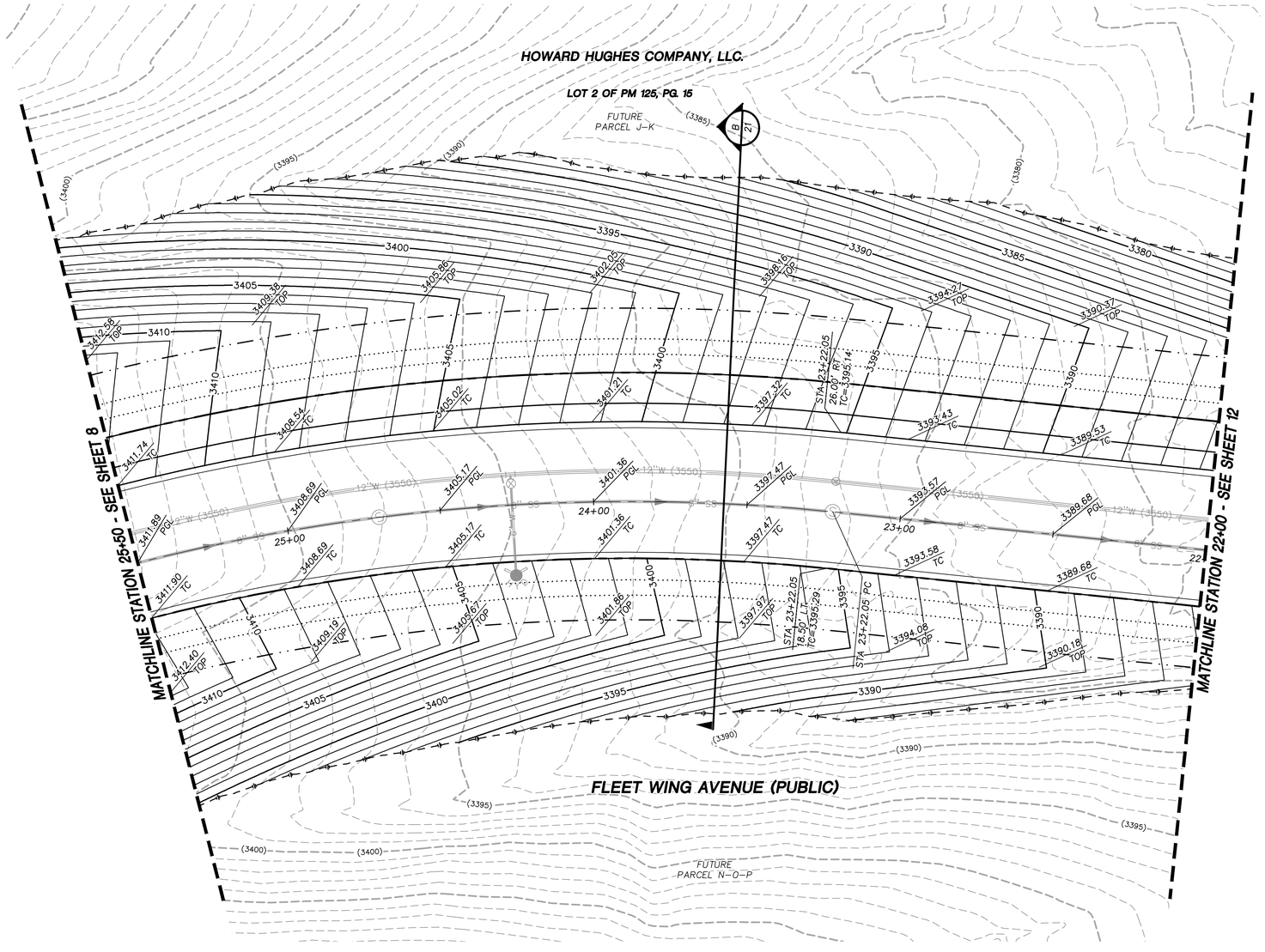
SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

ROADWAY PLAN AND PROFILE
STA 25+50 TO END

DESIGNED BY:	J. BANTA
DRAWN BY:	C. DANIELS
CHECKED BY:	P. BATES
HORIZ.:	1"=20'
VERT.:	1"=5'
XXXVXXXX	
L20-XXXXX	
DATE:	MAY, 2020
DRAWING NO.	9 /24
JOB NO.	100066776

C:\Users\bant3652\OneDrive Corp\OneDrive - Atkins Ltd\Desktop\SummitWest\Village 22\100066776 - Y22 Fleet Wing (Desert Foothills to Kettle Ridge)_Sheets\66776-09-PLAN-P1.dwg LAYOUT: ROADWAY PLAN AND PROFILE 1 May 06, 2020 - 4:50PM



STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL NDOT TYPE II DROP INLET PER NDOT R-4.2.1 (SEE SHEET 22)
4. INSTALL TYPE I SD MANHOLE PER CCAUSD #403
5. INSTALL TYPE II SD MANHOLE PER CCAUSD #405
6. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
7. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
8. REMOVE CAP AND CONNECT TO EXISTING STORM DRAIN STUB
9. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 22)
10. INSTALL RIP-RAP (D50=8", THICKNESS=16")
11. INSTALL TYPE II SD MANHOLE W/SINGLE SIDE DRAIN PER CCAUSD #405.2 (SHEET 2 OF 3)
12. INSTALL TYPE II SD MANHOLE W/DOUBLE SIDE DRAIN PER CCAUSD #405.2 (SHEET 3 OF 3)
13. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421, AND DETAIL C SHEET 22

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

GRADING PLAN CERTIFICATION

NICOLAS A. BARCOS PE#25673 — 5/6/2020
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-0000

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

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

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

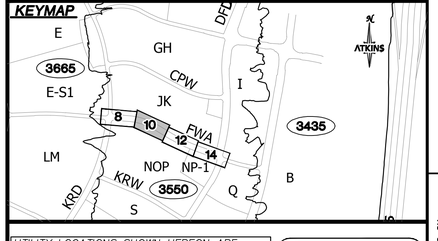
Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. ITS COSTLY. Call 811 OR 1-800-642-2444

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

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.

NICOLAS A. BARCOS — PROFESSIONAL ENGINEER - STATE OF NEVADA — EXP. 12-31-20 — CIVIL — No. 25673 — 5/6/2020

KEYMAP



REV.	DESCRIPTION	BY	DATE	APPROVAL

REVISIONS

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

SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

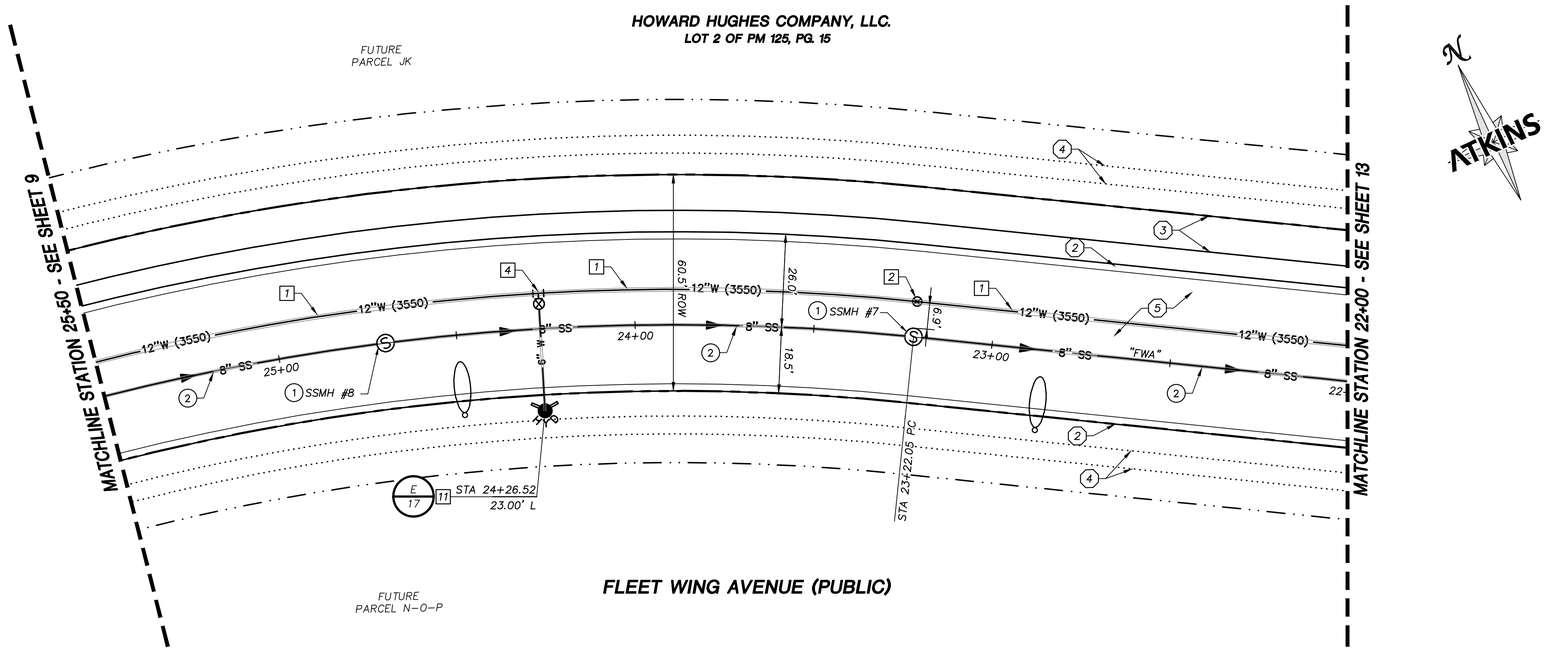
ROADWAY GRADING PLAN
STA 22+00 TO STA 25+50

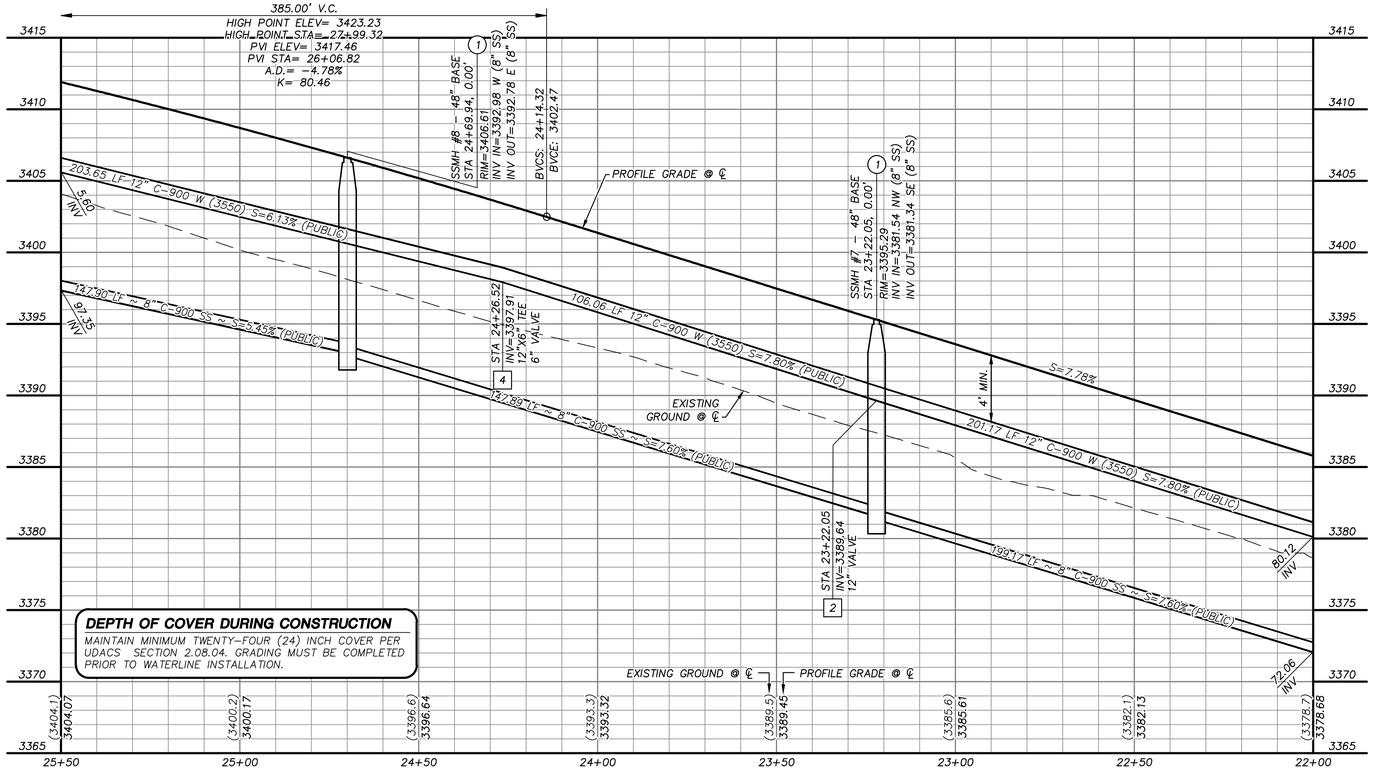
DESIGNED BY: J.J. BARTA
DRAWN BY: C. DANIELS
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

XXXVXXXX
L20-XXXXX
DATE: MAY, 2020
DRAWING NO. 10/24

JOB NO. 100066776

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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.

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 0000 FIRST APPROVED 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.

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

FAST Call before you UnderGround 1-702-432-5300 REGIONAL AND ARTERIAL SYSTEMS OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. DIAL CORRECTLY. Call 811 OR 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES. ITS DOWNTO... CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL NDOT TYPE II DROP INLET PER NDOT R-4.2.1 (SEE SHEET 22)
4. INSTALL TYPE I SD MANHOLE PER CCAUSD #403
5. INSTALL TYPE II SD MANHOLE PER CCAUSD #405
6. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
7. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
8. REMOVE CAP AND CONNECT TO EXISTING STORM DRAIN STUB
9. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 22)
10. INSTALL RIP-RAP (D50=8", THICKNESS=16")
11. INSTALL TYPE II SD MANHOLE W/SINGLE SIDE DRAIN PER CCAUSD #405.2 (SHEET 2 OF 3)
12. INSTALL TYPE II SD MANHOLE W/DOUBLE SIDE DRAIN PER CCAUSD #405.2 (SHEET 3 OF 3)
13. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421, AND DETAIL C SHEET 22

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

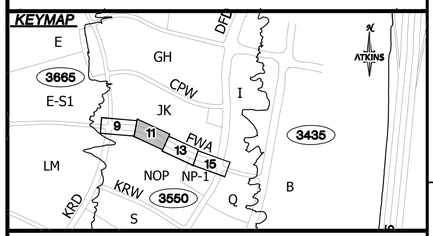
WATERLINE CONSTRUCTION NOTES

1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
5. INSTALL TAPPING SLEEVE WITH TAPPING VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31, #34 AND #39
7. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
8. INSTALL 1-1/2" IRRIGATION METER WITH 1-1/2" RPPA PER UDACS PLATES #4 AND #8 WITH CURB STOP
9. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM 1')
10. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
11. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40

ROADWAY CONSTRUCTION NOTES

1. SAWCUT AND MATCH EXISTING
2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
3. CONSTRUCT CONCRETE BIKEPATH PER CCAUSD #234
4. FUTURE SIDEWALK BY OTHERS
5. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 21 FOR TYPICAL PAVEMENT SECTION.
6. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4", 1-6") PER DETAIL ON SHEET 23

KEYMAP



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.

PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A BARCOS - EXP. 12-31-20 - CIVIL - No. 25673 - 5/6/2020

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

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

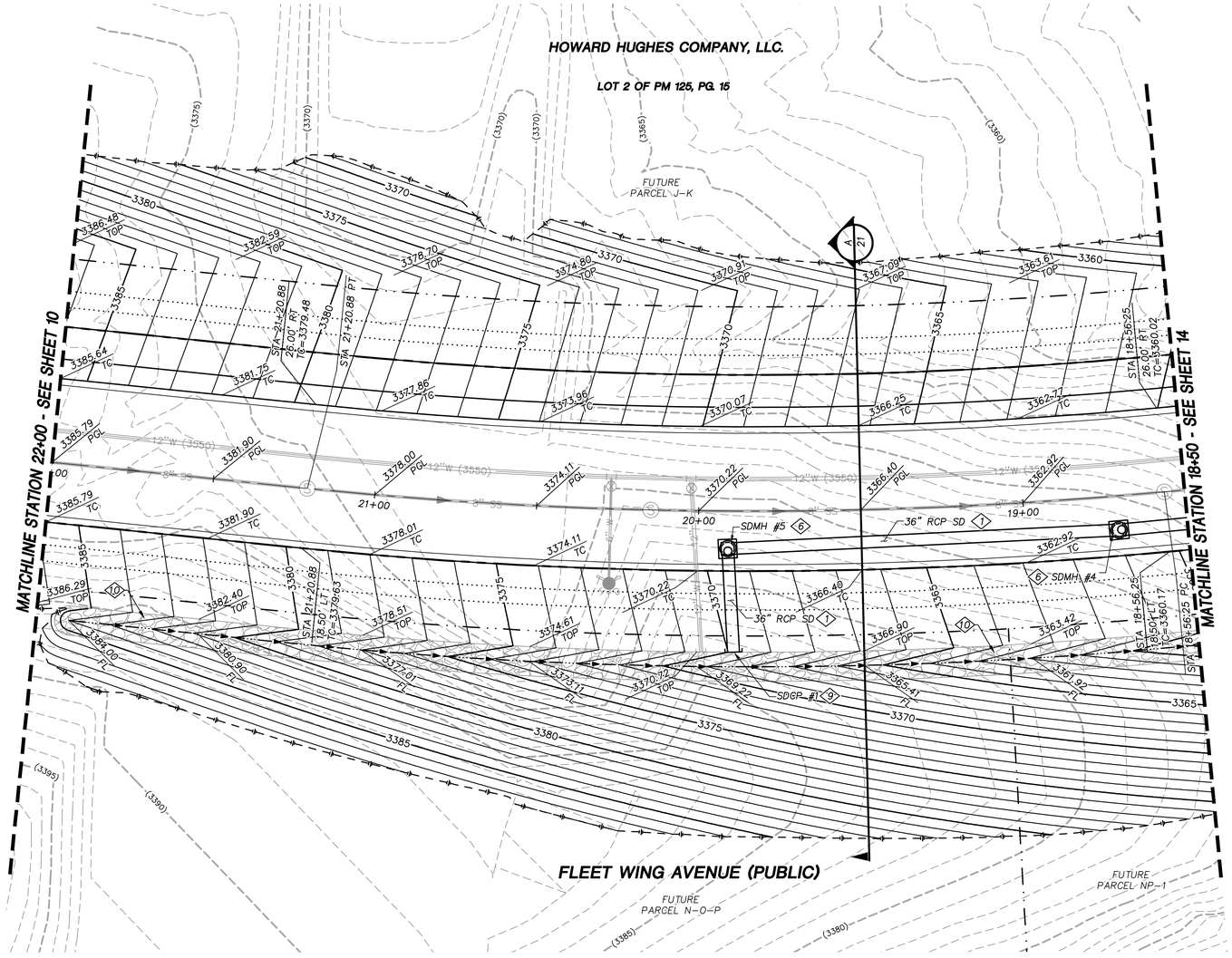
SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

ROADWAY PLAN AND PROFILE STA 22+00 TO STA 25+50

DESIGNED BY:	N. BARCOS
DRAWN BY:	L. MAMACLAY
CHECKED BY:	P. BATES
HORIZ.:	1"=20'
VERT.:	1"=5'
XXXVXXXX L20-XXXXX	
DATE:	MAY, 2020
DRAWING NO.	11/24
JOB NO.	100066776

C:\Users\bon13652\OneDrive Corp\OneDrive - Atkins Ltd\Desktop\SummWest\Village 22\100066776 - V22 Fleet Wing (Desert Foothills to Kettle Ridge)_Sheets\66776-09-PLAN-P1.dwg LAYOUT: ROADWAY PLAN AND PROFILE 2 May 06, 2020 - 4:49PM



STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
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13. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421, AND DETAIL C SHEET 22

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

GRADING PLAN CERTIFICATION

NICOLAS A. BARCOS PE#25673 — 5/6/2020
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-0000

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

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

FAST Call before you UnderGround 1-702-432-5300 — NEVADA'S AUTOMATED SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES IN CLARK COUNTY. Call 811 or 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES. ITS SAFETY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

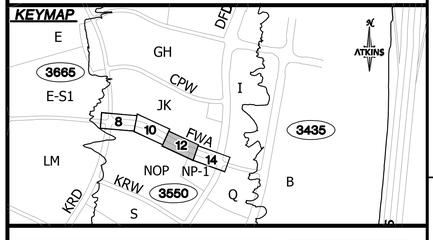
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PROFESSIONAL ENGINEER - STATE OF NEVADA — NICOLAS A. BARCOS — EXP. 12-31-20 — CIVIL — No. 25673 — 5/6/2020

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

KEYMAP



ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

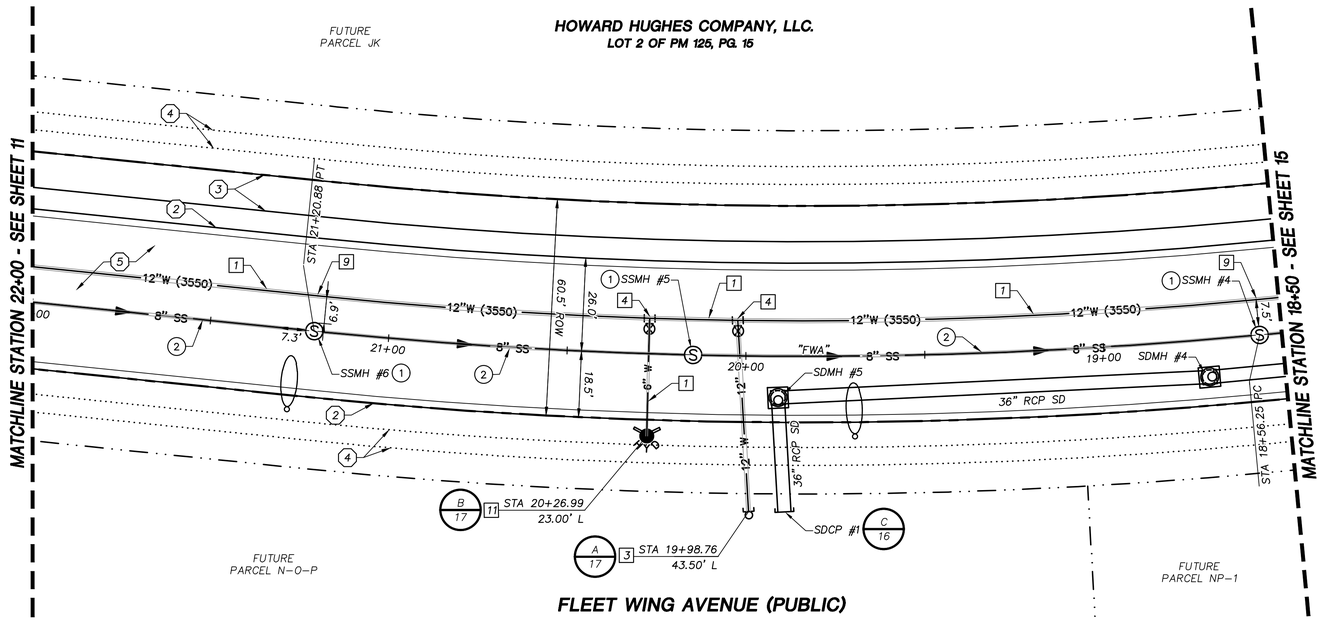
ROADWAY GRADING PLAN
STA 18+50 TO STA 22+00

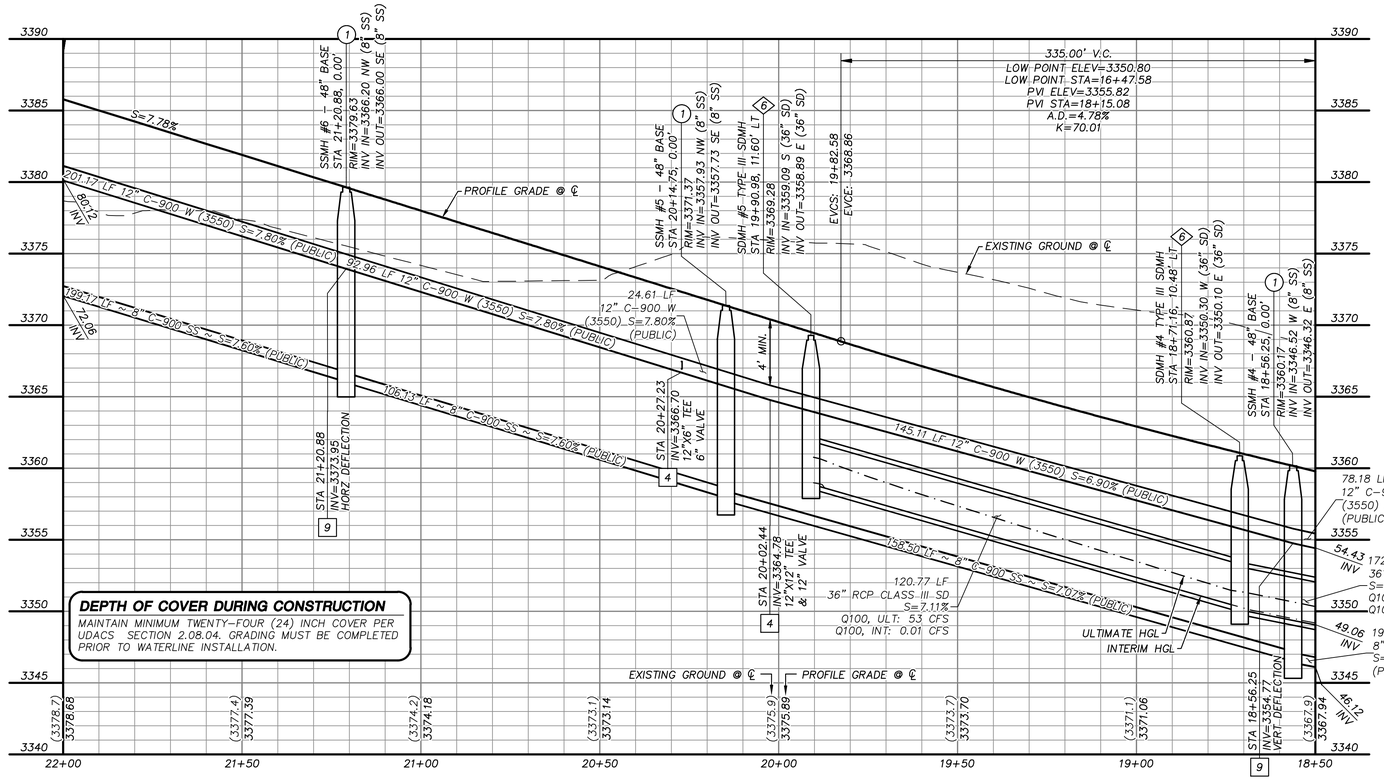
DESIGNED BY: S. BANTA
DRAWN BY: C. DANIELS
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

XXXVXXXX
L20-XXXXX
DATE: MAY, 2020
DRAWING NO. 12/24

JOB NO. 100066776

C:\Users\bant3652\OneDrive Corp\OneDrive - Atkins Ltd\Desktop\SummWest\Village 22\100066776 - V22 Fleet Wing (Desert Foothills to Kettle Ridge)_Sheets\66776-08-GRAD-01.dwg LAYOUT: 14 May 06, 2020 - 4:54PM





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.

GRAPHIC SCALE

HORIZONTAL: 1"=20'

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 0000 FIRST APPROVED 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.

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T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 (EMERGENCY AND ARTERIAL SYSTEMS OF TRANSPORTATION)

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. Call 811 OR 1-800-642-2444

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STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
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SEWER CONSTRUCTION NOTES

1. INSTALL SEWER MANHOLE PER DCSWCS SD-1 AND SD-4
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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).
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5. ADJUST EXISTING MANHOLE TO GRADE PER DCSWCS SD-5.
6. PROTECT SEWER AT UTILITY CROSSING PER DCSWCS SD-19

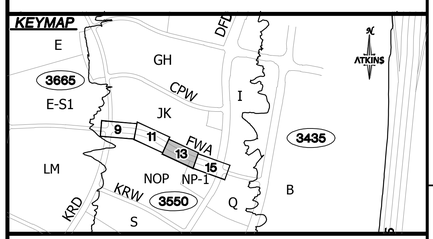
WATERLINE CONSTRUCTION NOTES

1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
5. INSTALL TAPPING SLEEVE WITH TAPPING VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31, #34 AND #39
7. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
8. INSTALL 1-1/2" IRRIGATION METER WITH 1-1/2" RPPA PER UDACS PLATES #4 AND #8 WITH CURB STOP
9. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM 1°)
10. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
11. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40

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1. SAWCUT AND MATCH EXISTING
2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
3. CONSTRUCT CONCRETE BIKEPATH PER CCAUSD #234
4. FUTURE SIDEWALK BY OTHERS
5. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 21 FOR TYPICAL PAVEMENT SECTION.
6. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4", 1-6") PER DETAIL ON SHEET 23

KEYMAP



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.

PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A. BARROS - EXP. 12-31-20 - CIVIL - No. 25673 - 5/6/2020

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

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

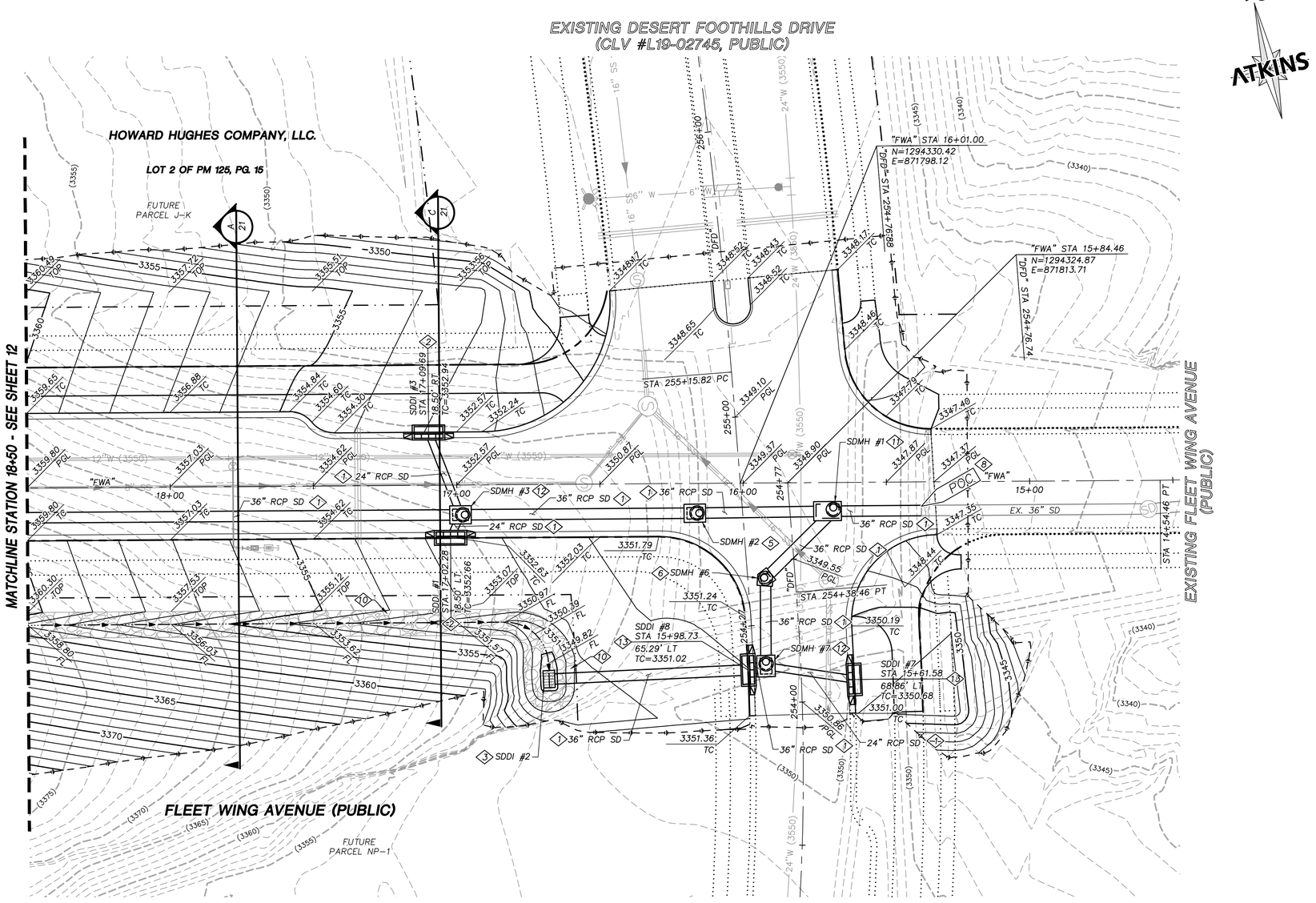
SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

ROADWAY PLAN AND PROFILE
STA 18+50 TO STA 22+00

DESIGNED BY:	J. BANTA
DRAWN BY:	C. DANIELS
CHECKED BY:	P. BATES
HORIZ.:	1"=20'
VERT.:	1"=5'
XXXVXXXX	
L20-XXXXX	
DATE:	MAY, 2020
DRAWING NO.	13/24
JOB NO.	100066776

C:\Users\bant3652\OneDrive - Corp\OneDrive - Atkins Ltd\Desktop\SummWest\Village 22\100066776 - V22 Fleet Wing (Desert Foothills to Kettle Ridge)_Sheets\66776-09-PLAN-P1.dwg LAYOUT: ROADWAY PLAN AND PROFILE 3 May 06, 2020 - 4:36PM



STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL NDOT TYPE II DROP INLET PER NDOT R-4.2.1 (SEE SHEET 22)
4. INSTALL TYPE I SD MANHOLE PER CCAUSD #403
5. INSTALL TYPE II SD MANHOLE PER CCAUSD #405
6. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
7. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
8. REMOVE CAP AND CONNECT TO EXISTING STORM DRAIN STUB
9. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 22)
10. INSTALL RIP-RAP (D50=8", THICKNESS=16")
11. INSTALL TYPE II SD MANHOLE W/SINGLE SIDE DRAIN PER CCAUSD #405.2 (SHEET 2 OF 3)
12. INSTALL TYPE II SD MANHOLE W/DOUBLE SIDE DRAIN PER CCAUSD #405.2 (SHEET 3 OF 3)
13. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421, AND DETAIL C SHEET 22

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

GRADING PLAN CERTIFICATION

NICOLAS A. BARCOS PE#25673 — 5/6/2020
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-0000

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

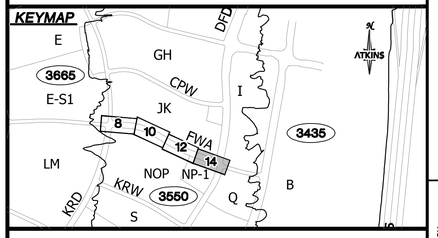
CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS
(3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 PRIORITY AND INTERNAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING, ENDANGERING UTILITY LINES, ITS COSTLY. Call 811 OR 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES, ITS COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

KEYMAP



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.

PROFESSIONAL ENGINEER, STATE OF NEVADA — NICOLAS A BARCOS — EXP. 12-31-20 — CIVIL — No. 25673 — 5/6/2020

REVISIONS			
REV.	DESCRIPTION	BY	DATE	APPROVAL

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

SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

ROADWAY GRADING PLAN
BEGIN TO STA 18+50

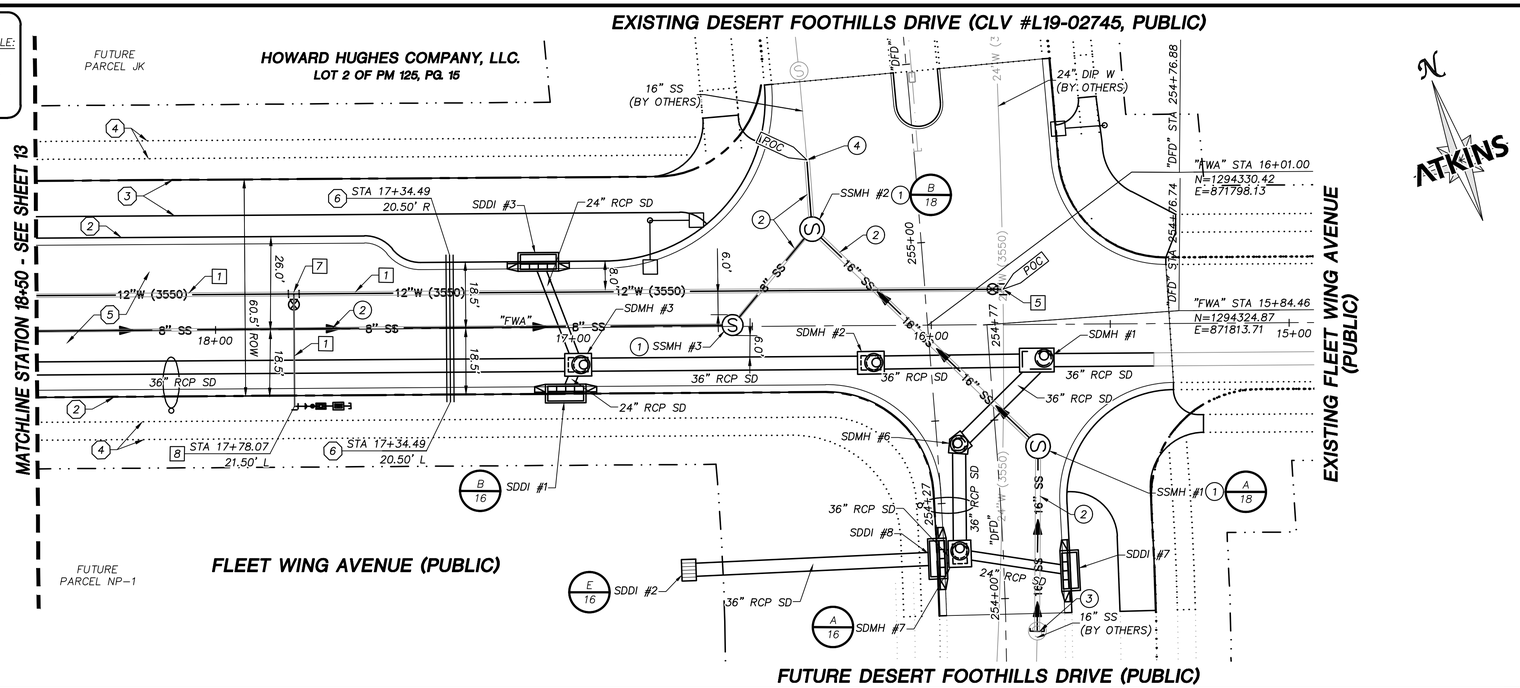
DESIGNED BY:	J. BANTA
DRAWN BY:	C. DANIELS
CHECKED BY:	P. BATES
HORIZ.:	1"=20'
VERT.:	NONE
XXXVXXXX.	
L20-XXXXX	
DATE:	MAY, 2020
DRAWING NO.	14/24

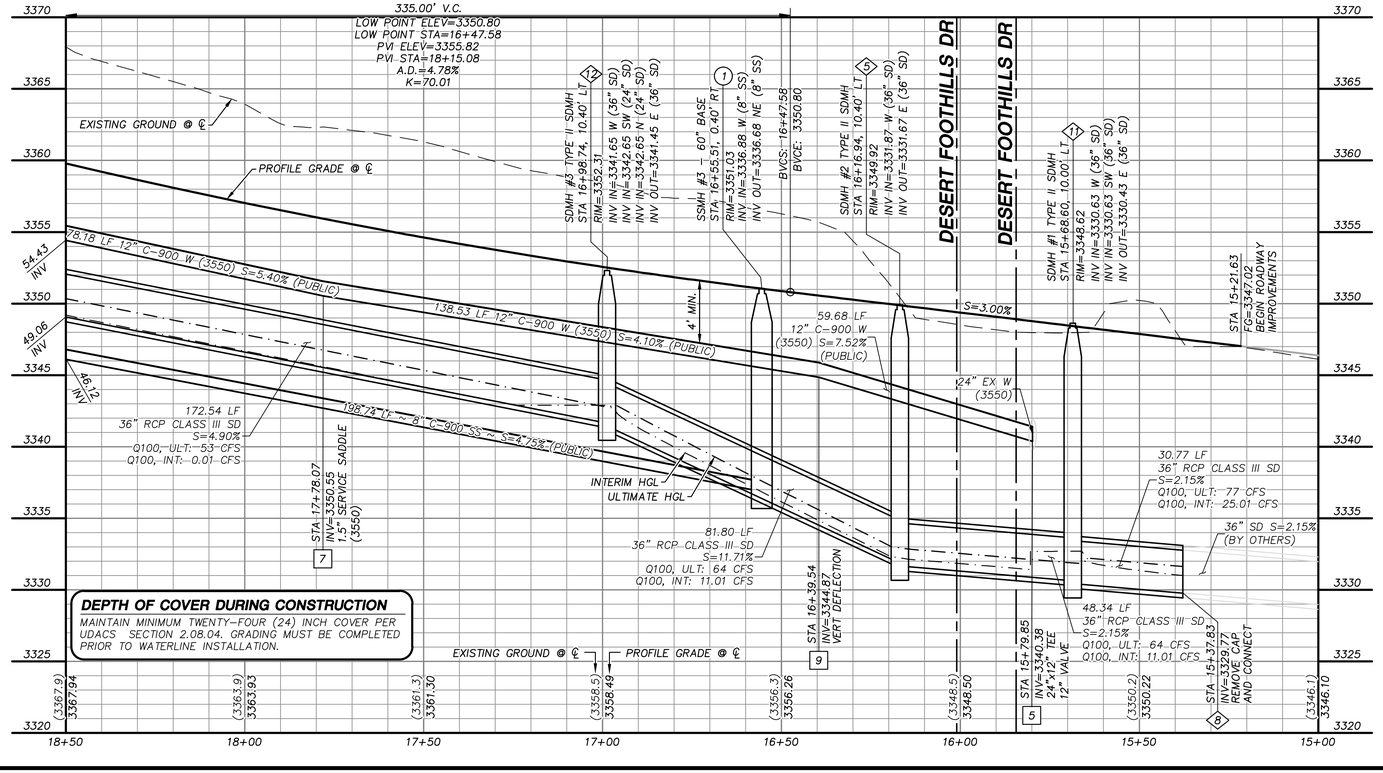
JOB NO. 100066776

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DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE: CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB WALLS. BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS. CENTER BULB, OR FLAT STRIP (VINYLEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).





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.

GRAPHIC SCALE

HORIZONTAL: 1"=20'

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 0000 FIRST APPROVED 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.

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. 1215,859E,503

FAST Call before you UnderGround 1-702-432-5300 REGIONAL AND ARTERIAL SYSTEMS OF TRANSPORTATION

Call before you Dig AVOID CUTTING INTO BURIED UTILITY LINES. BE SAFE. BE COURTEOUS. Call 811 or 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES. BE SAFE. BE COURTEOUS. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL NDOT TYPE II DROP INLET PER NDOT R-4.2.1 (SEE SHEET 22)
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13. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421, AND DETAIL C SHEET 22

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

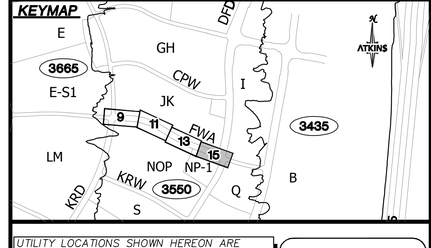
WATERLINE CONSTRUCTION NOTES

1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
5. INSTALL TAPPING SLEEVE WITH TAPPING VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31, #34 AND #39
7. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
8. INSTALL 1-1/2" IRRIGATION METER WITH 1-1/2" RPPA PER UDACS PLATES #4 AND #8 WITH CURB STOP
9. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM 1°)
10. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
11. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40

ROADWAY CONSTRUCTION NOTES

1. SAWCUT AND MATCH EXISTING
2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
3. CONSTRUCT CONCRETE BIKEPATH PER CCAUSD #234
4. FUTURE SIDEWALK BY OTHERS
5. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 21 FOR TYPICAL PAVEMENT SECTION.
6. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4", 1-6") PER DETAIL ON SHEET 23

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A. BARGOS - EXP. 12-31-20 - CIVIL - No. 25673

5/6/2020

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVAL

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

SUMMERLIN

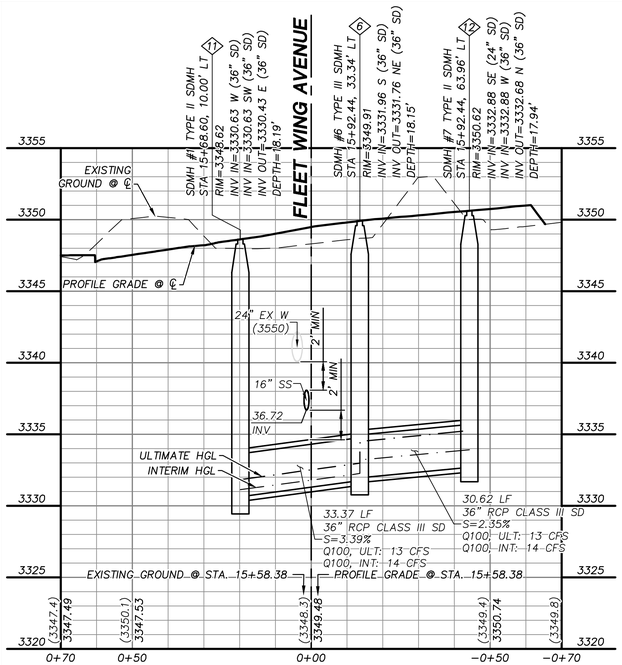
SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

ROADWAY PLAN AND PROFILE BEGIN TO STA 18+50

DESIGNED BY: J. BANTA
DRAWN BY: C. DANIELS
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

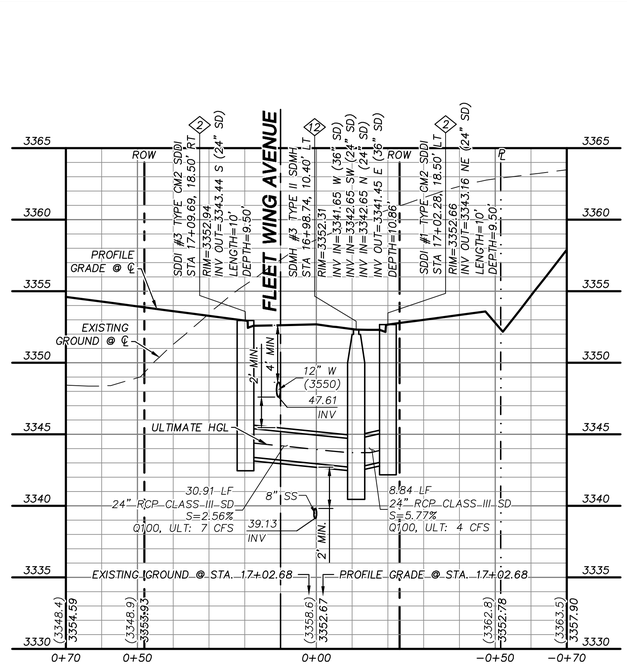
XXVVXXXX
L20-XXXXX
DATE: MAY, 2020
DRAWING NO. 15/24
JOB NO. 100066776

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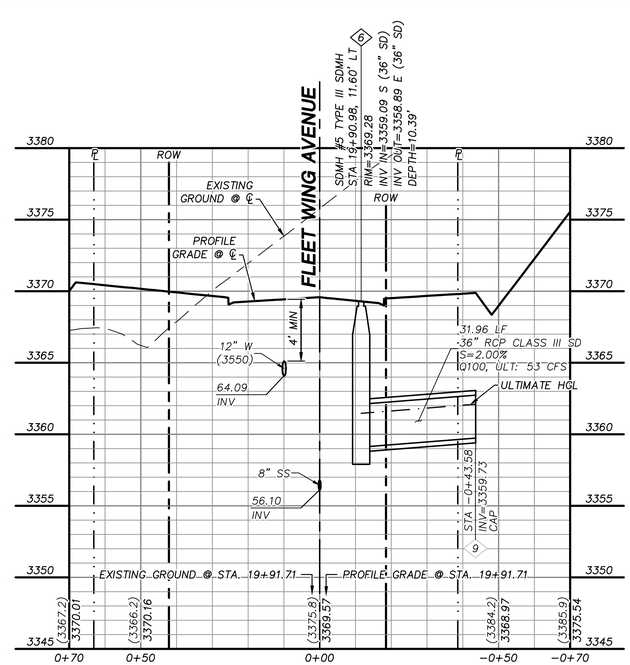
STORM DRAIN 1

"FWA" STA. 15+58.38 SEE SHEET 15



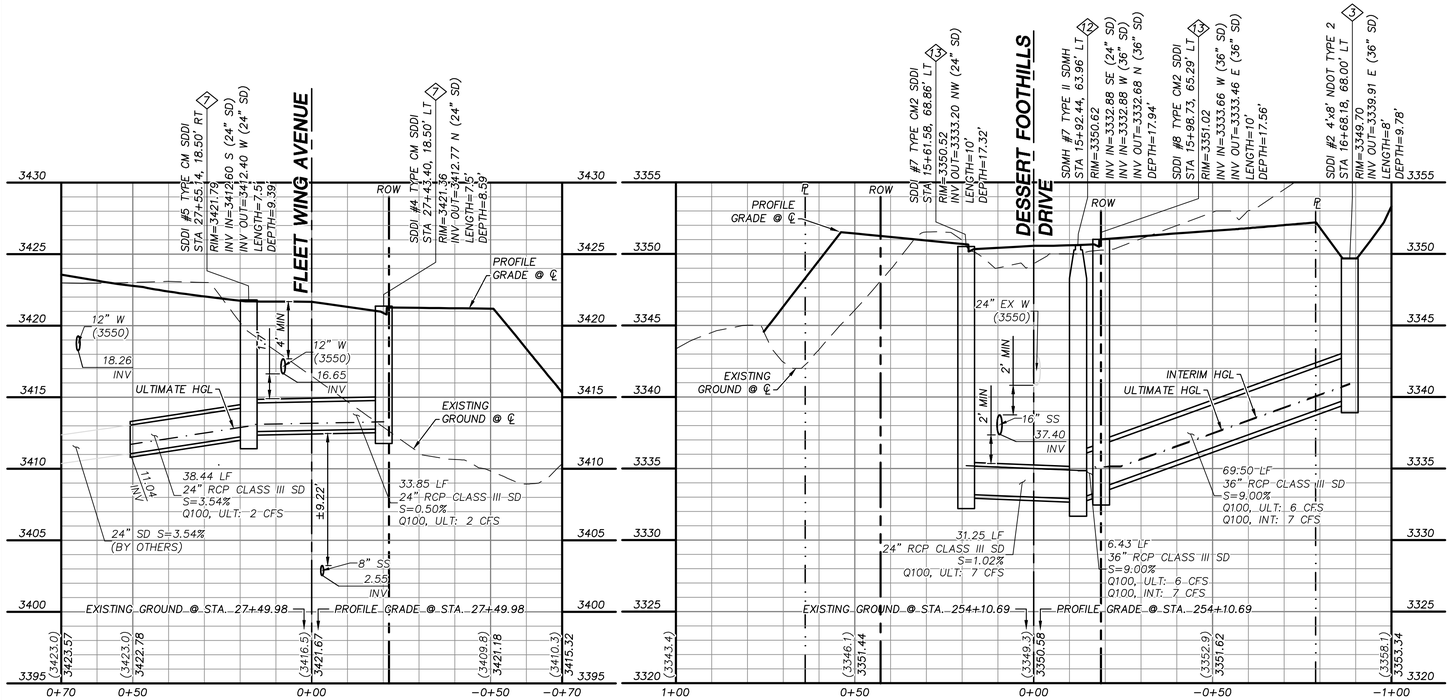
STORM DRAIN 2

"FWA" STA. 17+02.68 SEE SHEET 15



STORM DRAIN 3

"FWA" STA. 19+91.71 SEE SHEET 13



STORM DRAIN 4

"FWA" STA. 27+49.98 SEE SHEET 9

STORM DRAIN 5

"DFD" STA. 254+10.69 SEE SHEET 15

STORM DRAIN CONSTRUCTION NOTES

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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

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7. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
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GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'
5 0 2.5 5 10
VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 0000 FIRST APPROVED 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.

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CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
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T21S,R59E,S03

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PROFESSIONAL ENGINEER STATE OF NEVADA NICOLAS A. BABROS EXP. 12-31-20 CIVIL No. 26679 5/6/2020

REVISIONS			
REV.	DESCRIPTION	BY	DATE	APPROVAL

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

SUMMERLIN

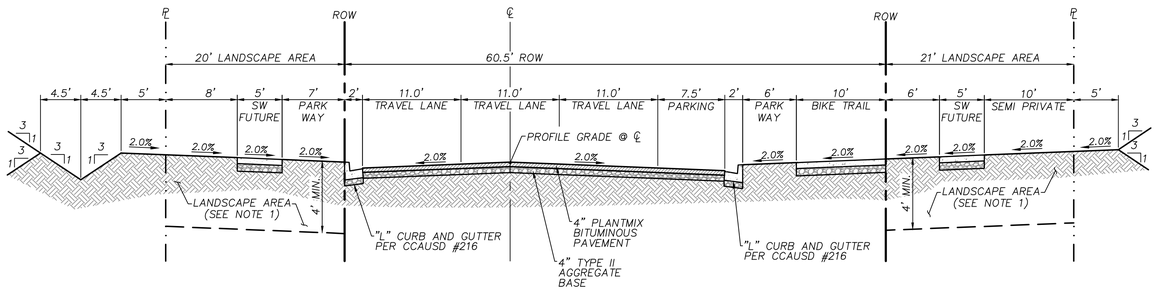
SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

STORM DRAIN LATERAL PROFILES

DESIGNED BY: L. BANTA
DRAWN BY: C. DANIELS
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

XXXVXXXX
L20−YXXXX
DATE: MAY, 2020
DRAWING NO. 16/24
JOB NO. 100066776

C:\Users\bam13652\OneDrive Corp\OneDrive − Atkins Ltd\Desktop\SummitWest\Village 22\100066776 − V22 Fleet Wing (Desert Foothills to Kettle Ridge)_Sheets\66776−10−LATL−SD1.dwg LAYOUT: 16 May 06, 2020 − 4:57PM



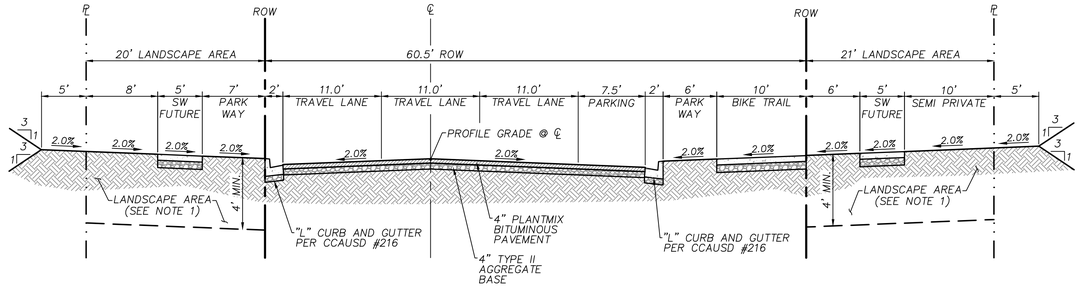
NOTES:

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 AVE - TYPICAL SECTION WITH DITCH & PARKING

N.T.S.

A / 21



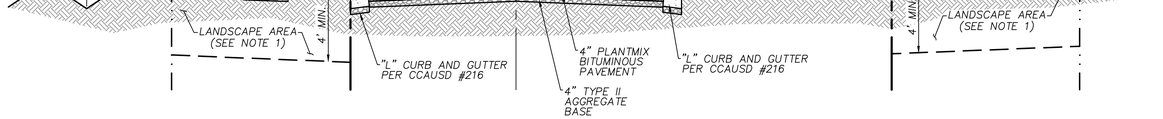
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FLEET WING AVE - TYPICAL SECTION WITH PARKING

N.T.S.

B / 21



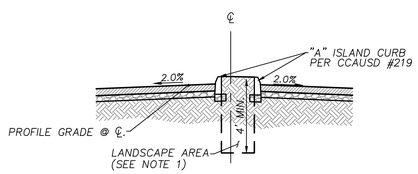
NOTES:

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 AVE - TYPICAL SECTION WITH DITCH

N.T.S.

C / 21



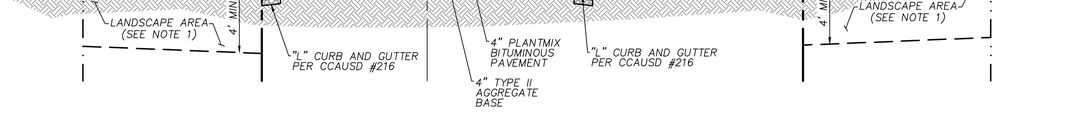
NOTES:

1. EXCAVATE MEDIAN 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.

DESSERT FOOTHILLS DRIVE - MEDIAN

N.T.S.

E / 21



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 AVE - TYPICAL SECTION

N.T.S.

D / 21

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

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

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

Call before you Dig AVOID CUTTING, BLASTING AND UTILITY CONFLICTS. IT'S COSTLY. Call 811 OR 1-800-642-2444

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

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.

PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARGOS
EXP. 12-31-20
CIVIL
No. 25673
5/6/2020

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
FLEET WING AVENUE (STREET G)
DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J)

TYPICAL SECTIONS

DESIGNED BY:	DRAWN BY:	CHECKED BY:	HORIZ.: NONE
L. BANTA	C. DANIELS	P. BATES	VERT.: NONE

XXXVXXXX	DATE:	DRAWING NO.
L20-XXXXX	MAY. 2020	21/24

JOB NO. 100066776

C:\Users\bant3652\OneDrive Corp\OneDrive - Atkins Ltd\Desktop\SummitWest\Village 22\100066776 - V22 Fleet Wing (Desert Foothills to Kettle Ridge)_Sheets\66776-12-DETL-D1.dwg LAYOUT: TYPICAL SECTIONS May 06, 2020 - 4:34PM

Appendix E. CD-ROM

2270 Corporate Circle
Suite 200
Henderson NV 89074-7755
Tel: 702.263.7275
www.atkinsglobal.com/northamerica

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