

DS #: 5171.1

APN: 137-14-401-006 & 137-23-101-002

PROJECT: Summitlin West V22 - Kestrel Creek Avenue (Street 1)

SUBMITTAL: 3rd Submittal & Supplement

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: August 4, 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 – Kestrel Creek Avenue (Street I) (from Desert Foothills Drive to Kettle Ridge Drive <Street J>)		COPIES TO: Atkins
Cross Streets:	Desert Foothill Drive & Kestrel Creek Ave.	Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5171D.doc	Bart Anderson, P.E., DevCo
Parcel Number:	137-14-401-006 & 137-23-101-002	
Zoning Action:	N/A	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	8/5/2019	9/4/2019	Not Approved	\$400.00	3518203: \$400
2 nd Submittal	10/16/2019	11/6/2019	Not Approved	\$400.00	3612957: \$400
Supplement	11/14/2019	12/2/2019	Approved	N/C	N/C
3 rd Submittal & Supplement	6/2/2020 & 7/22/2020	8/4/2020	See Comments Below	\$100.00	3869189: \$100
			TOTAL FEES (LDDRS):	\$900.00	----

REMARKS:

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

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

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

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

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

ays

T/R/S: T20S/R59E/14
AREA K-14

Albert Sung

From: Albert Sung
Sent: Tuesday, June 16, 2020 3:59 PM
To: Anderson, Molly
Subject: Summerlin V22 Desert Foothills Drive & Summerlin V22 Kestrel Creek Avenue - Updates

Hi Molly,

You'd submitted two Updates for the above stated studies couple weeks ago. As I was looking at the updates, I found out that the updates were misplaced with the original studies or I am missing something?!

When you have a chance, please call my office at (702) 229-2001 to discuss the issue. I am putting the review on hold for both projects in the meantime.

Albert Y. Sung

Project Engineer
Public Works Dept. / Flood Control
(702) 229-6541
333 N. Rancho Dr. 7th Floor
Las Vegas, NV 89106



lasvegasnevada.gov



Your opinion is important! Click [here](#) to take a short survey.

Summerlin Village West 22

Kestrel Creek Avenue

Desert Foothills Drive to Kettle Ridge Drive

May 2020

Update #1

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Update #1: Kestrel Creek Avenue: Desert Foothills Drive to Kettle Ridge Drive Date: May 2020

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

East/West: Desert Foothills Drive

b) Section: 23 and 14 Township: 20S Range: 59E

c) APN : 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	☒	Roadway Improvements

1. Total Owned Land Area: At Site: +/- 446 acres Being Developed/Disturbed: 11.7 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

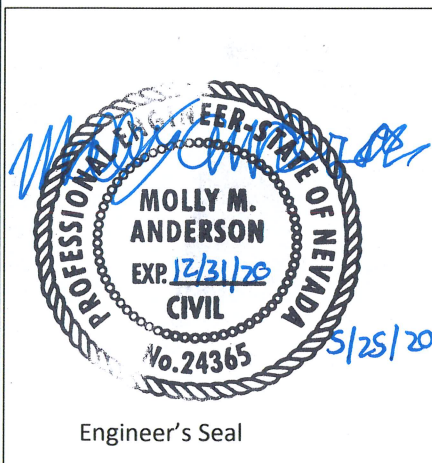
4. Proposed type of development (Residential, Commercial, Etc.): Public - Roadway Improvements

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



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.**

DS #5171 Local Entity File No.	Revision	Date

REFERENCE:

STANDARD FORM 1

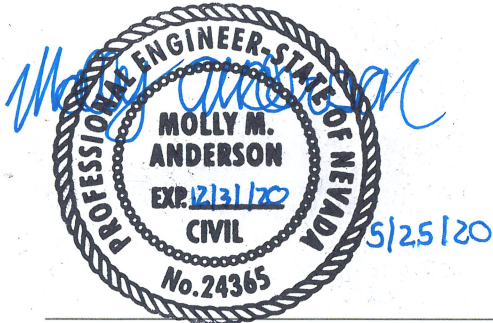
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A.2. Final Approval Letter for Kettle Ridge Drive	
A.3. Approval for Summerlin West Village 22 Master Conceptual Drainage Study – Update #2 (by others)	
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Appendix C. CD-ROM	

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 Kestrel Creek Avenue: Desert Foothills Drive to Kettle Ridge Drive** electronic submittal matches the paper version bound into the study.



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

Your reference: DS #5171

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

May 2020

**RE: UPDATE #1 TO THE TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 22
KESTREL CREEK AVENUE: DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE
(STREET J)**

Dear Albert,

This letter and the attached documents have been prepared as an *Update #1 to the Technical Drainage Study (TDS) for Summerlin West Village 22 Desert Foothills Drive: Fleet Wing Avenue (Street G) to Lake Mead Boulevard*.

In response to the comments on the Conditional Approval Letter:

Comment #1: The subject street improvement of *Kestrel Creek Avenue* is premised on the existence of *Kettle Ridge Drive* on the west for flood cut-off protection. The subject drainage study will not be approved prior to the final approval of the technical drainage study of “*Summerlin West V22 – Kettle Ridge Drive (Street J) and Scurry Bend Drive (Street N) Street Improvements (Lake Mead Blvd. to Fleet Wing Ave.)*”.

Comment response: The drainage study final approval letter can be found in Appendix A.

Comment #2: The project proposes to build temporary drainage facilities, i.e., berms/swales along the north and south sides of *Kestrel Creek Avenue* for interim flood protection. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements (berms or channels) and post minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to *City of Las Vegas Flood Control* for approval. Once the drainage study is conditionally approved, the engineer should contact the *City’s Land Development Section (229-6371)* to begin the agreement process.

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

Comment response: The report was submitted to the Land Development section to begin the agreement process.

1. Update #1 Revisions

1.1. Hydrology

1.1.1. Interim Condition

The interim condition flows have been revised due to the removal of parcel grading and the berm and swale between parcels C&D. The stub for Parcel G to the south has also been removed. The stub is now located on the Desert Foothills Drive alignment and plan set, which is reflected in the TDS Update #1 to Desert Foothills Drive, under review concurrently with this one.

Table 1 – Revised Interim Condition Flows

Basin ID	Tributary Area (sq mi)	Tributary Area (ac)	100-year Flow (cfs)
Int-I1	0.00186	1.19	4
Int-I2*	0.00151	0.96	3
Int-I3*	0.01384	8.86	27
STI-1	0.00232	1.48	6
STI-2	0.00209	1.34	5

*Flow drains only to roadside interim swale. Flow does not enter KCA storm drain

1.1.2. Ultimate Condition

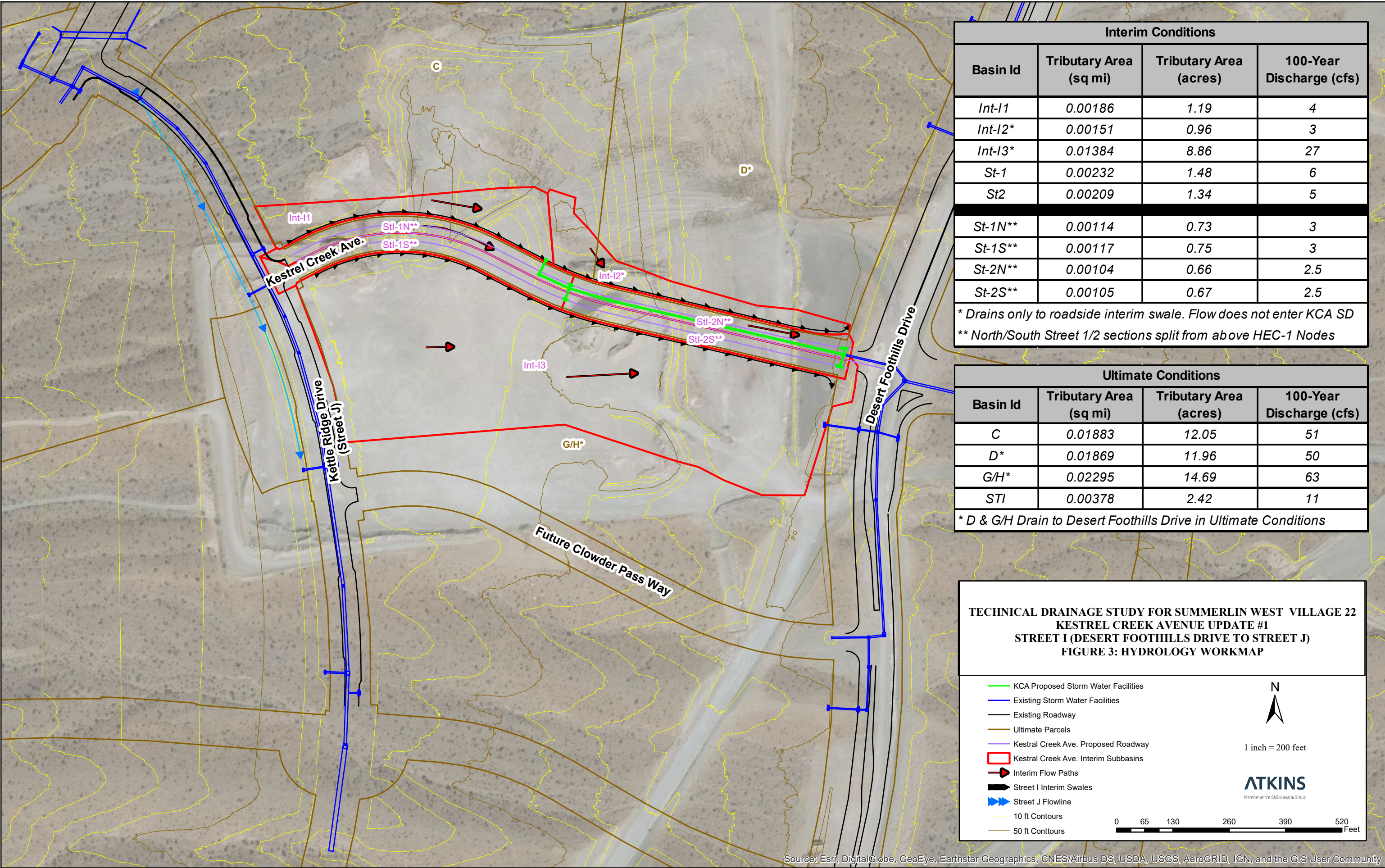
Ultimate condition flows have been revised due to the changes at the upstream end of the project site from the Summerlin West Village 22 Master Conceptual Drainage Study – Update #2. In addition to referencing the MCDS hydrology, the proposed Desert Foothills Drive update combines parcels G&H and J&K, now referred to as GH and JK, respectively. These parcel combinations were conservatively mathematically added together from the MCDS hydrology results.

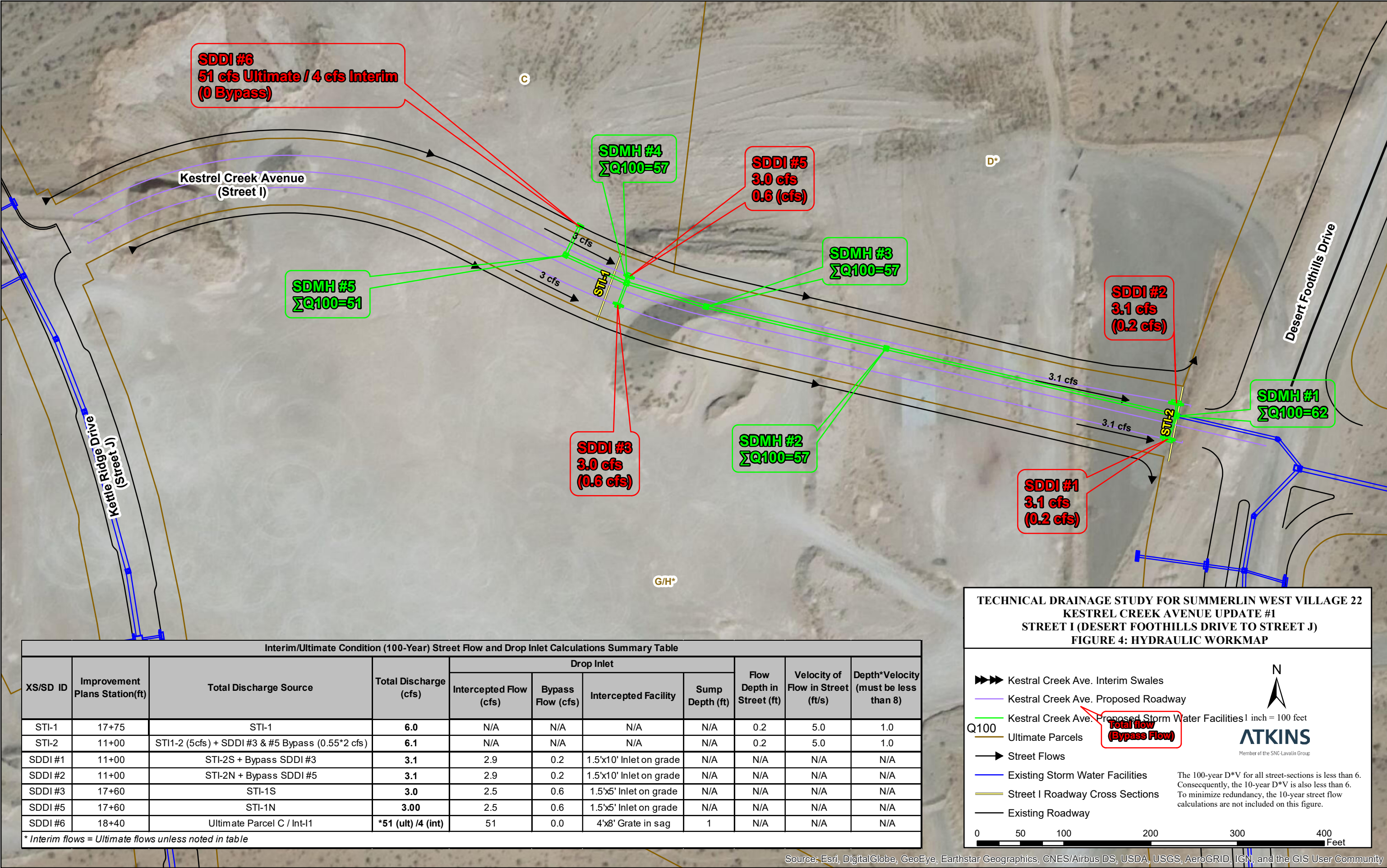
1.2. Hydraulics

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

Table 2 – WSPG-W Mainline Summary Table

SDMH#	WSPG-W Station	100-yr Ultimate Condition		
		Q ₁₀₀	ΣQ ₁₀₀	HGL (Ft)
Upstream	785.97	51	51	3381.53
SDMH #5	746.59	0.0	51	3379.87
SDMH #4	669.17	6	57	3373.95
SDMH #3	573.64	0.0	57	3367.30
SDMH #2	360.38	0.0	57	3352.58
SDMH #1	16.68	5.0	62	3329.08





Interim/Ultimate Condition (100-Year) Street Flow and Drop Inlet Calculations Summary Table										
XS/SD ID	Improvement Plans Station(ft)	Total Discharge Source	Total Discharge (cfs)	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)	Intercepted Facility	Sump Depth (ft)			
STI-1	17+75	STI-1	6.0	N/A	N/A	N/A	N/A	0.2	5.0	1.0
STI-2	11+00	STI1-2 (5cfs) + SDDI #3 & #5 Bypass (0.55*2 cfs)	6.1	N/A	N/A	N/A	N/A	0.2	5.0	1.0
SDDI #1	11+00	STI-2S + Bypass SDDI #3	3.1	2.9	0.2	1.5'x10' Inlet on grade	N/A	N/A	N/A	N/A
SDDI #2	11+00	STI-2N + Bypass SDDI #5	3.1	2.9	0.2	1.5'x10' Inlet on grade	N/A	N/A	N/A	N/A
SDDI #3	17+60	STI-1S	3.0	2.5	0.6	1.5'x5' Inlet on grade	N/A	N/A	N/A	N/A
SDDI #5	17+60	STI-1N	3.00	2.5	0.6	1.5'x5' Inlet on grade	N/A	N/A	N/A	N/A
SDDI #6	18+40	Ultimate Parcel C / Int-I1	*51 (ult) /4 (int)	51	0.0	4'x8' Grate in sag	1	N/A	N/A	N/A

* Interim flows = Ultimate flows unless noted in table

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 22
KESTREL CREEK AVENUE UPDATE #1
STREET I (DESERT FOOTHILLS DRIVE TO STREET J)
FIGURE 4: HYDRAULIC WORKMAP

▶▶▶ Kestrel Creek Ave. Interim Swales

— Kestrel Creek Ave. Proposed Roadway

— Kestrel Creek Ave. Proposed Storm Water Facilities

Q100 Ultimate Parcels

→ Street Flows

— Existing Storm Water Facilities

— Street I Roadway Cross Sections

— Existing Roadway

N

1 inch = 100 feet

ATKINS

Member of the SNC-Lavalin Group

The 100-year D*V for all street-sections is less than 6. Consequently, the 10-year D*V is also less than 6. To minimize redundancy, the 10-year street flow calculations are not included on this figure.

050100200300400

Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendices



Appendix A. Approval Letters

- A.1. Conditional Approval Letter for Kestrel Creek Avenue
- A.2. Final Approval Letter for Kettle Ridge Drive
- A.3. Approval for Summerlin West Village 22 Master Conceptual Drainage Study – Update #2 (by others)

A.1 Conditional Approval Letter for Kestrel Creek Avenue

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: December 2, 2019
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	
Summerlin West V22 – Kestrel Creek Avenue (Street I) (from Desert Foothills Drive to Kettle Ridge Drive <Street J>)		COPIES TO: Atkins
Cross Streets:	Desert Foothill Drive & Kestrel Creek Ave.	Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5171C.doc	Bart Anderson, P.E., DevCo
Parcel Number:	137-14-401-006 & 137-23-101-002	
Zoning Action:	N/A	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	8/5/2019	9/4/2019	Not Approved	\$400.00	3518203: \$400
2 nd Submittal	10/16/2019	11/6/2019	Not Approved	\$400.00	3612957: \$400
Supplement	11/14/2019	12/2/2019	See Comments Below	N/C	N/C
			TOTAL FEES (LDDRS):	\$800.00	----

REMARKS:

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

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

1. The subject street improvement of *Kestrel Creek Avenue* is premised on the existence of *Kettle Ridge Drive* on the west for flood cut-off protection. The subject drainage study will not be approved prior to the final approval of the technical drainage study of "*Summerlin West V22 - Kettle Ridge Drive (Street J) and Scurry Bend Drive (Street N) Street Improvements (Lake Mead Blvd. to Fleet Wing Ave.)*".
2. The project proposes to build temporary drainage facilities, ie, berms/swales along the north and south sides of *Kestrel Creek Avenue* for interim flood protection. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements (berms or channels) and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to *City of Las Vegas Flood Control* for approval. Once the drainage study is conditionally approved, the engineer should contact the *City's Land Development Section* (229-6371) to begin the agreement process.

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

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

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T/R/S: T20S/R59E/14

AREA K-14

A.2 Final Approval Letter for Kettle Ridge Drive

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: March 19, 2019
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT: Drainage Study for: Summerlin West V22 – Kettle Ridge Drive (Street J) and Scurry Bend Drive (Street N) Street Improvements (both from Lake Mead Blvd. to Fleet Wing Ave.)		COPIES TO: Atkins
Cross Streets:	Lake Mead Boulevard & Desert Foothill Drive	Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5156E.doc	Bart Anderson, P.E., DevCo
Parcel Number:	137-14-401-006 & 137-23-101-002	CCRFC
Zoning Action:	N/A	
FEMA Flood Zone	YES NO X	
Proposed Storm Drain	YES X NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	7/16/2019	8/8/2019	Not Approved	\$400.00	3490122: \$400
2 nd Submittal	9/11/2019	9/25/2019	Not Approved	\$400.00	3563447: \$400
3 rd Submittal	10/16/2019	10/30/2019	Conditional Approval	\$400.00	3612958: \$400
4 th Submittal & CCRFC	2/25/2020 & 3/5/2020	3/10/2020	Concurrence Recv'd	\$100.00	3755821: \$100
Supplement	3/18/2020	3/19/2020	See Comments Below	N/C	N/C
TOTAL FEES (LDDRS):				\$1,300.00	----

REMARKS:

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	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

The following conditions are repeated until they are complete:

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

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

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.

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

END OF REMARKS

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T/R/S: T20S/R59E/14

AREA K-14

A.3 Summerlin West Village 22 Master Conceptual Drainage Study – Update #2 (by others)

CITY OF LAS VEGAS			DATE:
INTER-OFFICE MEMORANDUM			January 23, 2020
TO: Land Development Services Department of Building & Safety			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT: Drainage Study for: Master Conceptual Drainage Study for – Update #2 Summerlin West Village 22			COPIES TO: VTN Nevada
Cross Streets:	I-215 Western Beltway & Summerlin Parkway		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5005H.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-14-401-006, 137-23-101-002		CCRFCFCD
Zoning Action:	MDR-73901		CCPW
FEMA Flood Zone	YES	NO	X
Proposed Storm Drain	YES	X	NO

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

REMARKS:

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

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

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

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

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

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

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

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

END OF REMARKS
WSP/AYS

T/R/S: T20S/R59E/14
AREA K-14

Appendix B. Revised WSPG-W

STREET-I-ULT.WSW

0

T1 SUMMERLIN WEST VILLAGE 22
 T2 KESTREL CREEK AVENUE (STREET I) DFD TO KETTLE RIDGE DR (STREET J)
 T3 ATKINS / ULTIMATE CONDITIONS
 SO 13.68 3327.800 2 3330.32
 REM ##### SDMH#1 Tailwater from DFD 12-16-2019 Ultimate Condition
 R 15.03 3327.850 2 .013 .000 .000 0
 JX 16.68 3327.900 2 3 3.013 2.5 2.5 3328.0 3328.0 80.0-75.0 .000
 R 19.68 3328.000 2 .013 .000 .000 0
 REM ##### SDMH#2 DS
 R 357.38 3351.300 2 .013 .000 .000 0
 R 360.38 3351.400 2 .013 .000 .000 1
 R 363.38 3351.500 2 .013 .000 .000 0
 REM ##### SDMH#2 US
 REM ##### SDMH#3 DS
 R 570.64 3365.960 2 .013 .000 .000 0
 R 573.64 3366.060 2 .013 .000 .000 1
 R 576.64 3366.160 2 .013 .000 2.00 0
 REM ##### SDMH#3 US
 REM ##### SDMH#4 DS JX SDDI 3,5
 R 666.17 3372.630 2 .013 .000 .000 0
 JX 669.17 3372.730 2 3 1.013 03.0 3.0 3372.83 3372.83 90.0-90.0 .000
 R 672.17 3372.830 2 .013 .000 8.00 1
 REM ##### SDMH#4 US JX SDDI 3,5
 REM ##### SDMH#5 DS
 R 743.59 3378.080 2 .013 .000 15.000 0
 R 744.59 3378.120 2 .013 .000 15.000 0
 R 745.59 3378.150 2 .013 .000 15.000 0
 R 746.59 3378.180 2 .013 .000 00.000 1
 R 747.59 3378.210 2 .013 .000 15.000 0
 R 748.59 3378.250 2 .013 .000 15.000 0
 R 749.59 3378.280 2 .013 .000 15.000 0
 REM ##### SDMH#5 US
 REM ##### SDMH#5 DS SDDI #6
 R 783.97 3379.230 2 .013 .000 .000 0
 SH 785.97 3379.230 2
 CD 1 4 1 .000 2.500 .000 .000 .000 .00
 CD 2 4 1 .000 3.000 .000 .000 .000 .00
 CD 3 4 1 .000 2.000 .000 .000 .000 .00
 Q 51.000 .0

STREET-I-ULT.OUT

FILE: STREET-I-ULT.WSW

W S P G W - CIVILDESIGN Version 14.08

PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 5-18-2020 Time: 9:24: 6

SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) DFD TO KETTLE RIDGE DR (STREET J)

ATKINS / ULTIMATE CONDITIONS

```

*****
Station | Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
         | Elev   | (FT)  | Elev   | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
L/Elem | Ch Slope | | | | | | | | | | | | | | |
***** |*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|
13.680 | 3327.800 | 1.361 | 3329.162 | 62.00 | 19.88 | 6.13 | 3335.30 | .00 | 2.54 | 2.99 | 3.000 | .000 | .00 | 1 .0
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
1.350 | .0371 | | | | | | | | | | | | | | |
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
15.030 | 3327.850 | 1.360 | 3329.210 | 62.00 | 19.91 | 6.15 | 3335.36 | .00 | 2.54 | 2.99 | 3.000 | .000 | .00 | 1 .0
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
JUNCT STR | .0302 | | | | | | | | | | | | | | |
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
16.680 | 3327.900 | 1.184 | 3329.084 | 57.00 | 21.98 | 7.50 | 3336.59 | .00 | 2.45 | 2.93 | 3.000 | .000 | .00 | 1 .0
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
3.000 | .0334 | | | | | | | | | | | | | | |
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
19.680 | 3328.000 | 1.177 | 3329.177 | 57.00 | 22.15 | 7.62 | 3336.80 | .00 | 2.45 | 2.93 | 3.000 | .000 | .00 | 1 .0
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
185.386 | .0690 | | | | | | | | | | | | | | |
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
205.066 | 3340.791 | 1.177 | 3341.968 | 57.00 | 22.15 | 7.62 | 3349.59 | .00 | 2.45 | 2.93 | 3.000 | .000 | .00 | 1 .0
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
152.314 | .0690 | | | | | | | | | | | | | | |
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
357.380 | 3351.300 | 1.188 | 3352.488 | 57.00 | 21.88 | 7.43 | 3359.92 | .00 | 2.45 | 2.93 | 3.000 | .000 | .00 | 1 .0
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
3.000 | .0333 | | | | | | | | | | | | | | |
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
360.380 | 3351.400 | 1.182 | 3352.582 | 57.00 | 22.04 | 7.54 | 3360.12 | .00 | 2.45 | 2.93 | 3.000 | .000 | .00 | 1 .0
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
3.000 | .0334 | | | | | | | | | | | | | | |
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
363.380 | 3351.500 | 1.175 | 3352.675 | 57.00 | 22.21 | 7.66 | 3360.33 | .00 | 2.45 | 2.93 | 3.000 | .000 | .00 | 1 .0
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
140.282 | .0698 | | | | | | | | | | | | | | |
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
503.662 | 3361.287 | 1.199 | 3362.486 | 57.00 | 21.61 | 7.25 | 3369.74 | .00 | 2.45 | 2.94 | 3.000 | .000 | .00 | 1 .0
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
66.978 | .0698 | | | | | | | | | | | | | | |
         |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

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STREET-I-ULT.OUT

FILE: STREET-I-ULT.WSW

W S P G W - CIVILDESIGN Version 14.08

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 5-18-2020 Time: 9:24: 6

SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) DFD TO KETTLE RIDGE DR (STREET J)

ATKINS / ULTIMATE CONDITIONS

```

*****
Station | Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
      | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|
570.640 | 3365.960 | 1.243 | 3367.203 | 57.00 | 20.61 | 6.59 | 3373.80 | .00 | 2.45 | 2.96 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
3.000 | .0334 | | | | | .0571 | .17 | 1.24 | 3.75 | 1.44 | .013 | .00 | .00 | PIPE
573.640 | 3366.060 | 1.237 | 3367.297 | 57.00 | 20.73 | 6.67 | 3373.97 | .00 | 2.45 | 2.95 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
3.000 | .0333 | | | | | .0580 | .17 | 1.24 | 3.79 | 1.44 | .013 | .00 | .00 | PIPE
576.640 | 3366.160 | 1.232 | 3367.391 | 57.00 | 20.85 | 6.75 | 3374.14 | .00 | 2.45 | 2.95 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
29.725 | .0723 | | | | | .0554 | 1.65 | 1.23 | 3.82 | 1.16 | .013 | .00 | .00 | PIPE
606.365 | 3368.308 | 1.271 | 3369.579 | 57.00 | 20.00 | 6.21 | 3375.79 | .00 | 2.45 | 2.96 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
22.288 | .0723 | | | | | .0490 | 1.09 | 1.27 | 3.60 | 1.16 | .013 | .00 | .00 | PIPE
628.653 | 3369.919 | 1.318 | 3371.236 | 57.00 | 19.07 | 5.65 | 3376.88 | .00 | 2.45 | 2.98 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
15.915 | .0723 | | | | | .0431 | .69 | 1.32 | 3.35 | 1.16 | .013 | .00 | .00 | PIPE
644.568 | 3371.069 | 1.367 | 3372.436 | 57.00 | 18.18 | 5.13 | 3377.57 | .00 | 2.45 | 2.99 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
12.083 | .0723 | | | | | .0379 | .46 | 1.37 | 3.13 | 1.16 | .013 | .00 | .00 | PIPE
656.650 | 3371.942 | 1.418 | 3373.360 | 57.00 | 17.34 | 4.67 | 3378.03 | .00 | 2.45 | 3.00 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
9.520 | .0723 | | | | | .0333 | .32 | 1.42 | 2.92 | 1.16 | .013 | .00 | .00 | PIPE
666.170 | 3372.630 | 1.471 | 3374.101 | 57.00 | 16.53 | 4.24 | 3378.34 | .00 | 2.45 | 3.00 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
JUNCT STR | .0334 | | | | | .0402 | .12 | 1.47 | 2.72 | | | .013 | .00 | .00 | PIPE
669.170 | 3372.730 | 1.215 | 3373.945 | 51.00 | 19.01 | 5.61 | 3379.55 | .00 | 2.32 | 2.95 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
3.000 | .0334 | | | | | .0496 | .15 | 1.21 | 3.51 | 1.35 | .013 | .00 | .00 | PIPE

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STREET-I-ULT.OUT

FILE: STREET-I-ULT.WSW

W S P G W - CIVILDESIGN Version 14.08

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 5-18-2020 Time: 9:24: 6

SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) DFD TO KETTLE RIDGE DR (STREET J)

ATKINS / ULTIMATE CONDITIONS

```

*****
Station | Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
      | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
L/Elem | Ch Slope | | | | | | | | | | | | | | |
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|
672.170 | 3372.830 | 1.210 | 3374.040 | 51.00 | 19.10 | 5.66 | 3379.70 | .00 | 2.32 | 2.94 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
13.221 | .0735 | | | | | | | | | | | | | | |
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
685.391 | 3373.802 | 1.241 | 3375.043 | 51.00 | 18.46 | 5.29 | 3380.34 | .00 | 2.32 | 2.96 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
14.150 | .0735 | | | | | | | | | | | | | | |
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
699.541 | 3374.842 | 1.287 | 3376.129 | 51.00 | 17.60 | 4.81 | 3380.94 | .00 | 2.32 | 2.97 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
10.836 | .0735 | | | | | | | | | | | | | | |
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
710.378 | 3375.638 | 1.334 | 3376.973 | 51.00 | 16.78 | 4.37 | 3381.35 | .00 | 2.32 | 2.98 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
8.585 | .0735 | | | | | | | | | | | | | | |
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
718.963 | 3376.270 | 1.384 | 3377.654 | 51.00 | 16.00 | 3.98 | 3381.63 | .00 | 2.32 | 2.99 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
6.956 | .0735 | | | | | | | | | | | | | | |
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
725.919 | 3376.781 | 1.436 | 3378.217 | 51.00 | 15.26 | 3.61 | 3381.83 | .00 | 2.32 | 3.00 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
5.714 | .0735 | | | | | | | | | | | | | | |
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
731.633 | 3377.201 | 1.490 | 3378.691 | 51.00 | 14.55 | 3.29 | 3381.98 | .00 | 2.32 | 3.00 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
4.735 | .0735 | | | | | | | | | | | | | | |
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
736.368 | 3377.549 | 1.548 | 3379.097 | 51.00 | 13.87 | 2.99 | 3382.08 | .00 | 2.32 | 3.00 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
3.942 | .0735 | | | | | | | | | | | | | | |
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
740.310 | 3377.839 | 1.607 | 3379.446 | 51.00 | 13.22 | 2.72 | 3382.16 | .00 | 2.32 | 2.99 | 3.000 | .000 | .00 | 1 .0
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
3.280 | .0735 | | | | | | | | | | | | | | |
      |-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0.175 | .06 | 1.61 | 2.05 | 1.09 | .013 | .00 | .00 | PIPE

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STREET-I-ULT.OUT

FILE: STREET-I-ULT.WSW

W S P G W - CIVILDESIGN Version 14.08

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 5-18-2020 Time: 9:24: 6

SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) DFD TO KETTLE RIDGE DR (STREET J)

ATKINS / ULTIMATE CONDITIONS

```

*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth | |
| Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip |
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
*****
743.590 | 3378.080 | 1.670 | 3379.750 | 51.00 | 12.61 | 2.47 | 3382.22 | .00 | 2.32 | 2.98 | 3.000 | .000 | .00 | 1 .0
| | | | | | | | | | | | | | | |
1.000 | .0400 | | | | | .0162 | .02 | 1.67 | 1.91 | 1.29 | .013 | .00 | .00 | PIPE
744.590 | 3378.120 | 1.680 | 3379.800 | 51.00 | 12.53 | 2.44 | 3382.24 | .00 | 2.32 | 2.98 | 3.000 | .000 | .00 | 1 .0
| | | | | | | | | | | | | | | |
1.000 | .0298 | | | | | .0160 | .02 | 1.68 | 1.89 | 1.40 | .013 | .00 | .00 | PIPE
745.590 | 3378.150 | 1.685 | 3379.834 | 51.00 | 12.48 | 2.42 | 3382.25 | .00 | 2.32 | 2.98 | 3.000 | .000 | .00 | 1 .0
| | | | | | | | | | | | | | | |
1.000 | .0300 | | | | | .0159 | .02 | 1.68 | 1.88 | 1.40 | .013 | .00 | .00 | PIPE
746.590 | 3378.180 | 1.690 | 3379.870 | 51.00 | 12.43 | 2.40 | 3382.27 | .00 | 2.32 | 2.98 | 3.000 | .000 | .00 | 1 .0
| | | | | | | | | | | | | | | |
1.000 | .0300 | | | | | .0157 | .02 | 1.69 | 1.87 | 1.40 | .013 | .00 | .00 | PIPE
747.590 | 3378.210 | 1.696 | 3379.906 | 51.00 | 12.38 | 2.38 | 3382.28 | .00 | 2.32 | 2.97 | 3.000 | .000 | .00 | 1 .0
| | | | | | | | | | | | | | | |
1.000 | .0400 | | | | | .0155 | .02 | 1.70 | 1.85 | 1.29 | .013 | .00 | .00 | PIPE
748.590 | 3378.250 | 1.706 | 3379.956 | 51.00 | 12.29 | 2.34 | 3382.30 | .00 | 2.32 | 2.97 | 3.000 | .000 | .00 | 1 .0
| | | | | | | | | | | | | | | |
1.000 | .0300 | | | | | .0152 | .02 | 1.71 | 1.83 | 1.40 | .013 | .00 | .00 | PIPE
749.590 | 3378.280 | 1.712 | 3379.992 | 51.00 | 12.23 | 2.32 | 3382.32 | .00 | 2.32 | 2.97 | 3.000 | .000 | .00 | 1 .0
| | | | | | | | | | | | | | | |
2.185 | .0276 | | | | | .0150 | .03 | 1.71 | 1.82 | 1.43 | .013 | .00 | .00 | PIPE
751.776 | 3378.340 | 1.724 | 3380.064 | 51.00 | 12.13 | 2.28 | 3382.35 | .00 | 2.32 | 2.97 | 3.000 | .000 | .00 | 1 .0
| | | | | | | | | | | | | | | |
10.101 | .0276 | | | | | .0139 | .14 | 1.72 | 1.80 | 1.43 | .013 | .00 | .00 | PIPE
761.876 | 3378.619 | 1.794 | 3380.413 | 51.00 | 11.57 | 2.08 | 3382.49 | .00 | 2.32 | 2.94 | 3.000 | .000 | .00 | 1 .0
| | | | | | | | | | | | | | | |
7.543 | .0276 | | | | | .0123 | .09 | 1.79 | 1.66 | 1.43 | .013 | .00 | .00 | PIPE

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STREET-I-ULT.OUT

FILE: STREET-I-ULT.WSW

W S P G W - CIVILDESIGN Version 14.08

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 5-18-2020 Time: 9:24: 6

SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) DFD TO KETTLE RIDGE DR (STREET J)

ATKINS / ULTIMATE CONDITIONS

```

*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth | |
| Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip |
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
*****
| 769.420 | 3378.828 | 1.867 | 3380.695 | 51.00 | 11.03 | 1.89 | 3382.58 | .00 | 2.32 | 2.91 | 3.000 | .000 | .00 | 1 | .0 |
| 5.599 | .0276 | | | | | .0109 | .06 | 1.87 | 1.54 | 1.43 | .013 | .00 | .00 | PIPE |
| 775.019 | 3378.983 | 1.945 | 3380.928 | 51.00 | 10.51 | 1.72 | 3382.64 | .00 | 2.32 | 2.86 | 3.000 | .000 | .00 | 1 | .0 |
| 4.050 | .0276 | | | | | .0097 | .04 | 1.95 | 1.42 | 1.43 | .013 | .00 | .00 | PIPE |
| 779.068 | 3379.094 | 2.029 | 3381.123 | 51.00 | 10.02 | 1.56 | 3382.68 | .00 | 2.32 | 2.81 | 3.000 | .000 | .00 | 1 | .0 |
| 2.753 | .0276 | | | | | .0086 | .02 | 2.03 | 1.31 | 1.43 | .013 | .00 | .00 | PIPE |
| 781.822 | 3379.171 | 2.119 | 3381.289 | 51.00 | 9.56 | 1.42 | 3382.71 | .00 | 2.32 | 2.73 | 3.000 | .000 | .00 | 1 | .0 |
| 1.611 | .0276 | | | | | .0077 | .01 | 2.12 | 1.21 | 1.43 | .013 | .00 | .00 | PIPE |
| 783.432 | 3379.215 | 2.215 | 3381.430 | 51.00 | 9.11 | 1.29 | 3382.72 | .00 | 2.32 | 2.64 | 3.000 | .000 | .00 | 1 | .0 |
| .538 | .0276 | | | | | .0069 | .00 | 2.22 | 1.10 | 1.43 | .013 | .00 | .00 | PIPE |
| 783.970 | 3379.230 | 2.323 | 3381.552 | 51.00 | 8.69 | 1.17 | 3382.72 | .00 | 2.32 | 2.51 | 3.000 | .000 | .00 | 1 | .0 |
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SI_Lateral-MH1N_ULT.WSW

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T1 SUMMERLIN WEST VILLAGE 22
T2 KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 NORTH, SDDI #2
T3 ATKINS / ULTIMATE CONDITIONS
SO 16.68 3327.900 1 3329.08
R 19.68 3328.000 2 .013 .000 0.000 1
R 31.65 3330.940 2 .013 .000 0.000 0
SH 34.65 3330.940 2
CD 1 4 1 .000 3.000 .000 .000 .000 .00
CD 2 4 1 .000 2.000 .000 .000 .000 .00
CD 3 4 1 .000 1.500 .000 .000 .000 .00
Q 2.500 .0

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 NORTH, SDDI #2

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/ 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
16.680	3327.900	1.180	3329.080	2.50	1.30	.03	3329.11	.00	.55	1.97	2.000	.000	.00	1 .0
1.296	.0334					.0003	.00	1.18	.23	.33	.013	.00	.00	PIPE
17.976	3327.943	1.135	3329.078	2.50	1.36	.03	3329.11	.00	.55	1.98	2.000	.000	.00	1 .0
.691	.0334					.0003	.00	1.13	.25	.33	.013	.00	.00	PIPE
18.667	3327.966	1.092	3329.058	2.50	1.43	.03	3329.09	.00	.55	1.99	2.000	.000	.00	1 .0
HYDRAULIC JUMP														
18.667	3327.966	.230	3328.196	2.50	12.44	2.40	3330.60	.00	.55	1.28	2.000	.000	.00	1 .0
1.013	.0334					.1552	.16	.23	5.52	.33	.013	.00	.00	PIPE
19.680	3328.000	.230	3328.231	2.50	12.44	2.40	3330.63	.00	.55	1.28	2.000	.000	.00	1 .0
.535	.2456					.1530	.08	.23	5.52	.21	.013	.00	.00	PIPE
20.215	3328.132	.232	3328.364	2.50	12.32	2.36	3330.72	.00	.55	1.28	2.000	.000	.00	1 .0
1.979	.2456					.1413	.28	.23	5.45	.21	.013	.00	.00	PIPE
22.194	3328.618	.240	3328.857	2.50	11.74	2.14	3331.00	.00	.55	1.30	2.000	.000	.00	1 .0
1.527	.2456					.1233	.19	.24	5.11	.21	.013	.00	.00	PIPE
23.721	3328.993	.247	3329.240	2.50	11.20	1.95	3331.19	.00	.55	1.32	2.000	.000	.00	1 .0
1.223	.2456					.1076	.13	.25	4.79	.21	.013	.00	.00	PIPE
24.944	3329.293	.256	3329.549	2.50	10.68	1.77	3331.32	.00	.55	1.34	2.000	.000	.00	1 .0
1.005	.2456					.0939	.09	.26	4.49	.21	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 NORTH, SDDI #2

ATKINS / ULTIMATE CONDITIONS

*****																	*****	
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.-FT	Height/ I.D.	Base Wt	ZL	No Wth	Prs/Pip		
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch				
*****																	*****	
25.949	3329.540	.264	3329.804	2.50	10.18	1.61	3331.41	.00	.55	1.35	2.000	.000	.00	1	.0			
	.840	.2456				.0820	.07	.26	4.21	.21	.013	.00	.00	PIPE				
26.789	3329.746	.273	3330.019	2.50	9.70	1.46	3331.48	.00	.55	1.37	2.000	.000	.00	1	.0			
	.712	.2456				.0716	.05	.27	3.95	.21	.013	.00	.00	PIPE				
27.500	3329.921	.282	3330.203	2.50	9.25	1.33	3331.53	.00	.55	1.39	2.000	.000	.00	1	.0			
	.609	.2456				.0625	.04	.28	3.70	.21	.013	.00	.00	PIPE				
28.109	3330.071	.291	3330.362	2.50	8.82	1.21	3331.57	.00	.55	1.41	2.000	.000	.00	1	.0			
	.524	.2456				.0545	.03	.29	3.47	.21	.013	.00	.00	PIPE				
28.633	3330.199	.301	3330.500	2.50	8.41	1.10	3331.60	.00	.55	1.43	2.000	.000	.00	1	.0			
	.454	.2456				.0476	.02	.30	3.25	.21	.013	.00	.00	PIPE				
29.087	3330.311	.311	3330.622	2.50	8.02	1.00	3331.62	.00	.55	1.45	2.000	.000	.00	1	.0			
	.394	.2456				.0416	.02	.31	3.05	.21	.013	.00	.00	PIPE				
29.481	3330.407	.322	3330.729	2.50	7.65	.91	3331.64	.00	.55	1.47	2.000	.000	.00	1	.0			
	.343	.2456				.0363	.01	.32	2.86	.21	.013	.00	.00	PIPE				
29.824	3330.491	.332	3330.824	2.50	7.29	.83	3331.65	.00	.55	1.49	2.000	.000	.00	1	.0			
	.299	.2456				.0317	.01	.33	2.68	.21	.013	.00	.00	PIPE				
30.122	3330.565	.344	3330.908	2.50	6.95	.75	3331.66	.00	.55	1.51	2.000	.000	.00	1	.0			
	.260	.2456				.0277	.01	.34	2.51	.21	.013	.00	.00	PIPE				

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 NORTH, SDDI #2

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/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		

30.383	3330.629	.355	3330.984	2.50	6.63	.68	3331.67	.00	.55	1.53	2.000	.000	.00	1	.0	
	.226	.2456				.0242	.01	.36	2.35	.21	.013	.00	.00	PIPE		
30.609	3330.684	.367	3331.051	2.50	6.32	.62	3331.67	.00	.55	1.55	2.000	.000	.00	1	.0	
	.196	.2456				.0211	.00	.37	2.20	.21	.013	.00	.00	PIPE		
30.805	3330.732	.380	3331.112	2.50	6.03	.56	3331.68	.00	.55	1.57	2.000	.000	.00	1	.0	
	.169	.2456				.0185	.00	.38	2.06	.21	.013	.00	.00	PIPE		
30.974	3330.774	.392	3331.166	2.50	5.75	.51	3331.68	.00	.55	1.59	2.000	.000	.00	1	.0	
	.145	.2456				.0161	.00	.39	1.93	.21	.013	.00	.00	PIPE		
31.119	3330.809	.406	3331.215	2.50	5.48	.47	3331.68	.00	.55	1.61	2.000	.000	.00	1	.0	
	.123	.2456				.0141	.00	.41	1.81	.21	.013	.00	.00	PIPE		
31.242	3330.840	.419	3331.259	2.50	5.22	.42	3331.68	.00	.55	1.63	2.000	.000	.00	1	.0	
	.104	.2456				.0123	.00	.42	1.70	.21	.013	.00	.00	PIPE		
31.347	3330.865	.434	3331.299	2.50	4.98	.39	3331.68	.00	.55	1.65	2.000	.000	.00	1	.0	
	.086	.2456				.0108	.00	.43	1.59	.21	.013	.00	.00	PIPE		
31.433	3330.886	.448	3331.335	2.50	4.75	.35	3331.69	.00	.55	1.67	2.000	.000	.00	1	.0	
	.070	.2456				.0094	.00	.45	1.49	.21	.013	.00	.00	PIPE		
31.503	3330.904	.464	3331.367	2.50	4.53	.32	3331.69	.00	.55	1.69	2.000	.000	.00	1	.0	
	.055	.2456				.0082	.00	.46	1.40	.21	.013	.00	.00	PIPE		

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 NORTH, SDDI #2

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/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		
*****															*****	
31.558	3330.917	.480	3331.396	2.50	4.32	.29	3331.69	.00	.55	1.71	2.000	.000	.00	1 .0		
	.042	.2456				.0072	.00	.48	1.31	.21	.013	.00	.00	PIPE		
31.599	3330.927	.496	3331.423	2.50	4.12	.26	3331.69	.00	.55	1.73	2.000	.000	.00	1 .0		
	.028	.2456				.0063	.00	.50	1.22	.21	.013	.00	.00	PIPE		
31.628	3330.934	.513	3331.448	2.50	3.92	.24	3331.69	.00	.55	1.75	2.000	.000	.00	1 .0		
	.017	.2456				.0055	.00	.51	1.15	.21	.013	.00	.00	PIPE		
31.644	3330.938	.531	3331.469	2.50	3.74	.22	3331.69	.00	.55	1.77	2.000	.000	.00	1 .0		
	.006	.2456				.0048	.00	.53	1.07	.21	.013	.00	.00	PIPE		
31.650	3330.940	.550	3331.490	2.50	3.56	.20	3331.69	.00	.55	1.79	2.000	.000	.00	1 .0		
34.650	3330.940	.550	3331.490	2.50	3.56	.20	3331.69	.00	.55	1.79	2.000	.000	.00	1 .0		

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T1 SUMMERLIN WEST VILLAGE 22
T2 KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 SOUTH, SDDI #1
T3 ATKINS / ULTIMATE CONDITIONS
SO 16.68 3327.900 1 3329.08
R 19.68 3328.000 2 .013 .000 0.000 1
R 46.19 3329.750 2 .013 .000 0.000 0
SH 49.19 3329.750 2
CD 1 4 1 .000 3.000 .000 .000 .000 .00
CD 2 4 1 .000 2.000 .000 .000 .000 .00
CD 3 4 1 .000 1.500 .000 .000 .000 .00
Q 2.500 .0

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 SOUTH, SDDI #1

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/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
16.680	3327.900	1.180	3329.080	2.50	1.30	.03	3329.11	.00	.55	1.97	2.000	.000	.00	1 .0
1.296	.0334					.0003	.00	1.18	.23	.33	.013	.00	.00	PIPE
17.976	3327.943	1.135	3329.078	2.50	1.36	.03	3329.11	.00	.55	1.98	2.000	.000	.00	1 .0
1.218	.0334					.0003	.00	1.13	.25	.33	.013	.00	.00	PIPE
19.195	3327.984	1.092	3329.075	2.50	1.43	.03	3329.11	.00	.55	1.99	2.000	.000	.00	1 .0
.485	.0334					.0004	.00	1.09	.27	.33	.013	.00	.00	PIPE
19.680	3328.000	1.075	3329.075	2.50	1.45	.03	3329.11	.00	.55	1.99	2.000	.000	.00	1 .0
.562	.0660					.0004	.00	1.07	.28	.28	.013	.00	.00	PIPE
20.242	3328.037	1.035	3329.072	2.50	1.52	.04	3329.11	.00	.55	2.00	2.000	.000	.00	1 .0
.528	.0660					.0005	.00	1.03	.30	.28	.013	.00	.00	PIPE
20.769	3328.072	.997	3329.069	2.50	1.60	.04	3329.11	.00	.55	2.00	2.000	.000	.00	1 .0
.495	.0660					.0005	.00	1.00	.32	.28	.013	.00	.00	PIPE
21.265	3328.105	.960	3329.065	2.50	1.68	.04	3329.11	.00	.55	2.00	2.000	.000	.00	1 .0
.309	.0660					.0006	.00	.96	.34	.28	.013	.00	.00	PIPE
21.573	3328.125	.925	3329.050	2.50	1.76	.05	3329.10	.00	.55	1.99	2.000	.000	.00	1 .0
HYDRAULIC JUMP														
21.573	3328.125	.293	3328.418	2.50	8.75	1.19	3329.61	.00	.55	1.41	2.000	.000	.00	1 .0
4.775	.0660					.0538	.26	.29	3.43	.28	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 SOUTH, SDDI #1

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/ 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
26.349	3328.440	.301	3328.741	2.50	8.41	1.10	3329.84	.00	.55	1.43	2.000	.000	.00	1 .0
4.882	.0660					.0476	.23	.30	3.25	.28	.013	.00	.00	PIPE
31.230	3328.762	.311	3329.074	2.50	8.02	1.00	3330.07	.00	.55	1.45	2.000	.000	.00	1 .0
3.291	.0660					.0416	.14	.31	3.05	.28	.013	.00	.00	PIPE
34.522	3328.980	.322	3329.301	2.50	7.65	.91	3330.21	.00	.55	1.47	2.000	.000	.00	1 .0
2.416	.0660					.0363	.09	.32	2.86	.28	.013	.00	.00	PIPE
36.937	3329.139	.332	3329.472	2.50	7.29	.83	3330.30	.00	.55	1.49	2.000	.000	.00	1 .0
1.861	.0660					.0317	.06	.33	2.68	.28	.013	.00	.00	PIPE
38.799	3329.262	.344	3329.605	2.50	6.95	.75	3330.36	.00	.55	1.51	2.000	.000	.00	1 .0
1.481	.0660					.0277	.04	.34	2.51	.28	.013	.00	.00	PIPE
40.279	3329.360	.355	3329.715	2.50	6.63	.68	3330.40	.00	.55	1.53	2.000	.000	.00	1 .0
1.196	.0660					.0242	.03	.36	2.35	.28	.013	.00	.00	PIPE
41.475	3329.438	.367	3329.806	2.50	6.32	.62	3330.43	.00	.55	1.55	2.000	.000	.00	1 .0
.980	.0660					.0211	.02	.37	2.20	.28	.013	.00	.00	PIPE
42.456	3329.503	.380	3329.883	2.50	6.03	.56	3330.45	.00	.55	1.57	2.000	.000	.00	1 .0
.809	.0660					.0185	.01	.38	2.06	.28	.013	.00	.00	PIPE
43.264	3329.557	.392	3329.949	2.50	5.75	.51	3330.46	.00	.55	1.59	2.000	.000	.00	1 .0
.668	.0660					.0161	.01	.39	1.93	.28	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 SOUTH, SDDI #1

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/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
43.932	3329.601	.406	3330.006	2.50	5.48	.47	3330.47	.00	.55	1.61	2.000	.000	.00	1 .0
	.550	.0660				.0141	.01	.41	1.81	.28	.013	.00	.00	PIPE
44.482	3329.637	.419	3330.057	2.50	5.22	.42	3330.48	.00	.55	1.63	2.000	.000	.00	1 .0
	.453	.0660				.0123	.01	.42	1.70	.28	.013	.00	.00	PIPE
44.935	3329.667	.434	3330.101	2.50	4.98	.39	3330.49	.00	.55	1.65	2.000	.000	.00	1 .0
	.366	.0660				.0108	.00	.43	1.59	.28	.013	.00	.00	PIPE
45.301	3329.691	.448	3330.140	2.50	4.75	.35	3330.49	.00	.55	1.67	2.000	.000	.00	1 .0
	.292	.0660				.0094	.00	.45	1.49	.28	.013	.00	.00	PIPE
45.593	3329.710	.464	3330.174	2.50	4.53	.32	3330.49	.00	.55	1.69	2.000	.000	.00	1 .0
	.226	.0660				.0082	.00	.46	1.40	.28	.013	.00	.00	PIPE
45.818	3329.725	.480	3330.205	2.50	4.32	.29	3330.49	.00	.55	1.71	2.000	.000	.00	1 .0
	.168	.0660				.0072	.00	.48	1.31	.28	.013	.00	.00	PIPE
45.987	3329.737	.496	3330.233	2.50	4.12	.26	3330.50	.00	.55	1.73	2.000	.000	.00	1 .0
	.114	.0660				.0063	.00	.50	1.22	.28	.013	.00	.00	PIPE
46.101	3329.744	.513	3330.257	2.50	3.92	.24	3330.50	.00	.55	1.75	2.000	.000	.00	1 .0
	.067	.0660				.0055	.00	.51	1.15	.28	.013	.00	.00	PIPE
46.168	3329.749	.531	3330.279	2.50	3.74	.22	3330.50	.00	.55	1.77	2.000	.000	.00	1 .0
	.022	.0660				.0048	.00	.53	1.07	.28	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 1 SOUTH, SDDI #1

ATKINS / ULTIMATE CONDITIONS

```

*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
| | | | | | | | | | | | | | | |
46.190 3329.750 .550 3330.300 2.50 3.56 .20 3330.50 .00 .55 1.79 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
| | | | | | | | | | | | | | | |
49.190 3329.750 .550 3330.300 2.50 3.56 .20 3330.50 .00 .55 1.79 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-

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SI_Lateral-MH4N_ULT.WSW

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T1 SUMMERLIN WEST VILLAGE 22
T2 KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 4 NORTH, SDDI #5
T3 ATKINS / ULTIMATE CONDITIONS
SO 669.17 3372.73 1 3373.95
R 672.17 3372.83 2 .013 .000 0.000 1
R 678.22 3373.94 2 .013 .000 0.000 0
SH 681.22 3373.94 2
CD 1 4 1 .000 3.000 .000 .000 .000 .00
CD 2 4 1 .000 2.000 .000 .000 .000 .00
Q 3.000 .0

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 4 NORTH, SDDI #5

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/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
669.170	3372.730	1.220	3373.950	3.00	1.49	.03	3373.98	.00	.60	1.95	2.000	.000	.00	1 .0
1.340	.0334					.0004	.00	1.22	.26	.36	.013	.00	.00	PIPE
670.510	3372.775	1.172	3373.947	3.00	1.57	.04	3373.99	.00	.60	1.97	2.000	.000	.00	1 .0
1.254	.0334					.0004	.00	1.17	.28	.36	.013	.00	.00	PIPE
671.764	3372.816	1.127	3373.944	3.00	1.64	.04	3373.99	.00	.60	1.98	2.000	.000	.00	1 .0
.406	.0334					.0005	.00	1.13	.30	.36	.013	.00	.00	PIPE
672.170	3372.830	1.113	3373.943	3.00	1.67	.04	3373.99	.00	.60	1.99	2.000	.000	.00	1 .0
.206	.1834					.0005	.00	1.11	.31	.24	.013	.00	.00	PIPE
672.376	3372.868	1.071	3373.938	3.00	1.75	.05	3373.99	.00	.60	2.00	2.000	.000	.00	1 .0
.105	.1834					.0006	.00	1.07	.33	.24	.013	.00	.00	PIPE
672.480	3372.887	1.031	3373.918	3.00	1.84	.05	3373.97	.00	.60	2.00	2.000	.000	.00	1 .0
HYDRAULIC JUMP														
672.480	3372.887	.314	3373.201	3.00	9.49	1.40	3374.60	.00	.60	1.46	2.000	.000	.00	1 .0
.180	.1834					.0596	.01	.31	3.59	.24	.013	.00	.00	PIPE
672.660	3372.920	.319	3373.239	3.00	9.29	1.34	3374.58	.00	.60	1.46	2.000	.000	.00	1 .0
.859	.1834					.0541	.05	.32	3.49	.24	.013	.00	.00	PIPE
673.519	3373.078	.330	3373.407	3.00	8.86	1.22	3374.63	.00	.60	1.48	2.000	.000	.00	1 .0
.731	.1834					.0473	.03	.33	3.27	.24	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 4 NORTH, SDDI #5

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/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
674.250	3373.212	.341	3373.553	3.00	8.44	1.11	3374.66	.00	.60	1.50	2.000	.000	.00	1 .0
	.627	.1834				.0413	.03	.34	3.06	.24	.013	.00	.00	PIPE
674.878	3373.327	.352	3373.679	3.00	8.05	1.01	3374.69	.00	.60	1.52	2.000	.000	.00	1 .0
	.541	.1834				.0361	.02	.35	2.87	.24	.013	.00	.00	PIPE
675.418	3373.426	.364	3373.790	3.00	7.68	.92	3374.71	.00	.60	1.54	2.000	.000	.00	1 .0
	.466	.1834				.0315	.01	.36	2.69	.24	.013	.00	.00	PIPE
675.885	3373.512	.376	3373.888	3.00	7.32	.83	3374.72	.00	.60	1.56	2.000	.000	.00	1 .0
	.404	.1834				.0275	.01	.38	2.52	.24	.013	.00	.00	PIPE
676.288	3373.586	.389	3373.975	3.00	6.98	.76	3374.73	.00	.60	1.58	2.000	.000	.00	1 .0
	.348	.1834				.0240	.01	.39	2.36	.24	.013	.00	.00	PIPE
676.637	3373.650	.402	3374.052	3.00	6.65	.69	3374.74	.00	.60	1.60	2.000	.000	.00	1 .0
	.301	.1834				.0210	.01	.40	2.21	.24	.013	.00	.00	PIPE
676.938	3373.705	.416	3374.121	3.00	6.34	.62	3374.75	.00	.60	1.62	2.000	.000	.00	1 .0
	.258	.1834				.0184	.00	.42	2.07	.24	.013	.00	.00	PIPE
677.196	3373.752	.430	3374.182	3.00	6.05	.57	3374.75	.00	.60	1.64	2.000	.000	.00	1 .0
	.221	.1834				.0160	.00	.43	1.94	.24	.013	.00	.00	PIPE
677.417	3373.793	.445	3374.238	3.00	5.77	.52	3374.75	.00	.60	1.66	2.000	.000	.00	1 .0
	.187	.1834				.0140	.00	.44	1.82	.24	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 4 NORTH, SDDI #5

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/ 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				
*****																	*****	
677.605	3373.827	.460	3374.287	3.00	5.50	.47	3374.76	.00	.60	1.68	2.000	.000	.00	1	.0			
	.158	.1834				.0123	.00	.46	1.70	.24	.013	.00	.00	PIPE				
677.762	3373.856	.476	3374.332	3.00	5.24	.43	3374.76	.00	.60	1.70	2.000	.000	.00	1	.0			
	.130	.1834				.0107	.00	.48	1.59	.24	.013	.00	.00	PIPE				
677.893	3373.880	.492	3374.372	3.00	5.00	.39	3374.76	.00	.60	1.72	2.000	.000	.00	1	.0			
	.106	.1834				.0094	.00	.49	1.49	.24	.013	.00	.00	PIPE				
677.998	3373.899	.509	3374.408	3.00	4.77	.35	3374.76	.00	.60	1.74	2.000	.000	.00	1	.0			
	.083	.1834				.0082	.00	.51	1.40	.24	.013	.00	.00	PIPE				
678.081	3373.915	.526	3374.441	3.00	4.54	.32	3374.76	.00	.60	1.76	2.000	.000	.00	1	.0			
	.062	.1834				.0072	.00	.53	1.31	.24	.013	.00	.00	PIPE				
678.143	3373.926	.544	3374.470	3.00	4.33	.29	3374.76	.00	.60	1.78	2.000	.000	.00	1	.0			
	.043	.1834				.0063	.00	.54	1.22	.24	.013	.00	.00	PIPE				
678.186	3373.934	.563	3374.497	3.00	4.13	.27	3374.76	.00	.60	1.80	2.000	.000	.00	1	.0			
	.025	.1834				.0055	.00	.56	1.15	.24	.013	.00	.00	PIPE				
678.212	3373.938	.583	3374.521	3.00	3.94	.24	3374.76	.00	.60	1.82	2.000	.000	.00	1	.0			
	.008	.1834				.0048	.00	.58	1.07	.24	.013	.00	.00	PIPE				
678.220	3373.940	.604	3374.544	3.00	3.75	.22	3374.76	.00	.60	1.84	2.000	.000	.00	1	.0			
681.220	3373.940	.604	3374.544	3.00	3.75	.22	3374.76	.00	.60	1.84	2.000	.000	.00	1	.0			

SI_Lateral-MH4S_ULT.WSW

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T1 SUMMERLIN WEST VILLAGE 22
T2 KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 4 SOUTH, SDDI #4
T3 ATKINS / ULTIMATE CONDITIONS
SO 669.17 3372.73 1 3373.95
R 672.17 3372.83 3 .013 .000 0.000 1
REM ##### SDDI #3
R 694.12 3373.94 3 .013 .000 0.000 0
R 697.12 3373.94 3 .013 .000 0.000 0
SH 700.12 3373.94 3
CD 1 4 1 .000 3.000 .000 .000 .000 .00
CD 2 4 1 .000 2.000 .000 .000 .000 .00
CD 3 4 1 .000 2.500 .000 .000 .000 .00
Q 03.000 .0

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 4 SOUTH, SDDI #4

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/ 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
669.170	3372.730	1.220	3373.950	3.00	1.26	.02	3373.97	.00	.57	2.50	2.500	.000	.00	1 .0
	1.265	.0334				.0002	.00	1.22	.23	.34	.013	.00	.00	PIPE
670.435	3372.772	1.176	3373.948	3.00	1.32	.03	3373.98	.00	.57	2.50	2.500	.000	.00	1 .0
	1.200	.0334				.0003	.00	1.18	.24	.34	.013	.00	.00	PIPE
671.634	3372.812	1.133	3373.946	3.00	1.39	.03	3373.98	.00	.57	2.49	2.500	.000	.00	1 .0
	.536	.0334				.0003	.00	1.13	.26	.34	.013	.00	.00	PIPE
672.170	3372.830	1.115	3373.945	3.00	1.42	.03	3373.98	.00	.57	2.49	2.500	.000	.00	1 .0
	.729	.0506				.0003	.00	1.11	.27	.31	.013	.00	.00	PIPE
672.899	3372.867	1.075	3373.942	3.00	1.49	.03	3373.98	.00	.57	2.48	2.500	.000	.00	1 .0
	.689	.0506				.0004	.00	1.07	.29	.31	.013	.00	.00	PIPE
673.588	3372.902	1.037	3373.939	3.00	1.56	.04	3373.98	.00	.57	2.46	2.500	.000	.00	1 .0
	.653	.0506				.0004	.00	1.04	.31	.31	.013	.00	.00	PIPE
674.241	3372.935	1.000	3373.935	3.00	1.64	.04	3373.98	.00	.57	2.45	2.500	.000	.00	1 .0
	.616	.0506				.0005	.00	1.00	.33	.31	.013	.00	.00	PIPE
674.857	3372.966	.965	3373.931	3.00	1.72	.05	3373.98	.00	.57	2.43	2.500	.000	.00	1 .0
	.579	.0506				.0006	.00	.97	.36	.31	.013	.00	.00	PIPE
675.436	3372.995	.932	3373.927	3.00	1.80	.05	3373.98	.00	.57	2.42	2.500	.000	.00	1 .0
	.544	.0506				.0007	.00	.93	.38	.31	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 4 SOUTH, SDDI #4

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/ 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				
*****																	*****	
675.980	3373.023	.900	3373.923	3.00	1.89	.06	3373.98	.00	.57	2.40	2.500	.000	.00	1	.0			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
.036	.0506					.0007	.00	.90	.41	.31	.013	.00	.00	PIPE				
676.017	3373.025	.869	3373.894	3.00	1.98	.06	3373.95	.00	.57	2.38	2.500	.000	.00	1	.0			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HYDRAULIC JUMP																		
676.017	3373.025	.333	3373.358	3.00	7.71	.92	3374.28	.00	.57	1.70	2.500	.000	.00	1	.0			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4.029	.0506					.0345	.14	.33	2.84	.31	.013	.00	.00	PIPE				
680.046	3373.229	.345	3373.573	3.00	7.35	.84	3374.41	.00	.57	1.72	2.500	.000	.00	1	.0			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3.162	.0506					.0301	.10	.34	2.66	.31	.013	.00	.00	PIPE				
683.208	3373.388	.356	3373.744	3.00	7.01	.76	3374.51	.00	.57	1.75	2.500	.000	.00	1	.0			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2.363	.0506					.0263	.06	.36	2.49	.31	.013	.00	.00	PIPE				
685.572	3373.508	.368	3373.876	3.00	6.68	.69	3374.57	.00	.57	1.77	2.500	.000	.00	1	.0			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1.835	.0506					.0229	.04	.37	2.34	.31	.013	.00	.00	PIPE				
687.407	3373.601	.380	3373.981	3.00	6.37	.63	3374.61	.00	.57	1.80	2.500	.000	.00	1	.0			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1.460	.0506					.0200	.03	.38	2.19	.31	.013	.00	.00	PIPE				
688.866	3373.674	.393	3374.067	3.00	6.07	.57	3374.64	.00	.57	1.82	2.500	.000	.00	1	.0			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1.178	.0506					.0175	.02	.39	2.05	.31	.013	.00	.00	PIPE				
690.044	3373.734	.406	3374.140	3.00	5.79	.52	3374.66	.00	.57	1.84	2.500	.000	.00	1	.0			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
.953	.0506					.0153	.01	.41	1.92	.31	.013	.00	.00	PIPE				

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SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 4 SOUTH, SDDI #4

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/ 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
690.997	3373.782	.420	3374.202	3.00	5.52	.47	3374.68	.00	.57	1.87	2.500	.000	.00	1 .0
	.777	.0506				.0133	.01	.42	1.80	.31	.013	.00	.00	PIPE
691.774	3373.821	.434	3374.255	3.00	5.26	.43	3374.69	.00	.57	1.89	2.500	.000	.00	1 .0
	.632	.0506				.0117	.01	.43	1.69	.31	.013	.00	.00	PIPE
692.406	3373.853	.448	3374.302	3.00	5.02	.39	3374.69	.00	.57	1.92	2.500	.000	.00	1 .0
	.504	.0506				.0102	.01	.45	1.58	.31	.013	.00	.00	PIPE
692.910	3373.879	.464	3374.342	3.00	4.79	.36	3374.70	.00	.57	1.94	2.500	.000	.00	1 .0
	.401	.0506				.0089	.00	.46	1.48	.31	.013	.00	.00	PIPE
693.312	3373.899	.479	3374.378	3.00	4.56	.32	3374.70	.00	.57	1.97	2.500	.000	.00	1 .0
	.308	.0506				.0078	.00	.48	1.39	.31	.013	.00	.00	PIPE
693.620	3373.915	.495	3374.410	3.00	4.35	.29	3374.70	.00	.57	1.99	2.500	.000	.00	1 .0
	.226	.0506				.0068	.00	.50	1.30	.31	.013	.00	.00	PIPE
693.846	3373.926	.512	3374.438	3.00	4.15	.27	3374.71	.00	.57	2.02	2.500	.000	.00	1 .0
	.154	.0506				.0059	.00	.51	1.22	.31	.013	.00	.00	PIPE
694.000	3373.934	.530	3374.463	3.00	3.95	.24	3374.71	.00	.57	2.04	2.500	.000	.00	1 .0
	.090	.0506				.0052	.00	.53	1.14	.31	.013	.00	.00	PIPE
694.090	3373.938	.548	3374.486	3.00	3.77	.22	3374.71	.00	.57	2.07	2.500	.000	.00	1 .0
	.030	.0506				.0045	.00	.55	1.07	.31	.013	.00	.00	PIPE

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W S P G W - CIVILDESIGN Version 14.08

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 5-18-2020 Time: 9:54:13

SUMMERLIN WEST VILLAGE 22

KESTREL CREEK AVENUE (STREET I) / LATERAL AT MH 4 SOUTH, SDDI #4

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 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				
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****				
694.120	3373.940	.567	3374.507	3.00	3.59	.20	3374.71	.00	.57	2.09	2.500	.000	.00	1	.0			
	.670	.0000				.0038	.00	.57	1.00	.00	.013	.00	.00	PIPE				
694.790	3373.940	.596	3374.535	3.00	3.35	.17	3374.71	.00	.57	2.13	2.500	.000	.00	1	.0			
	2.330	.0000				.0031	.01	.60	.91	.00	.013	.00	.00	PIPE				
697.120	3373.940	.625	3374.565	3.00	3.12	.15	3374.72	.00	.57	2.17	2.500	.000	.00	1	.0			
	3.000	.0000				.0014	.99	.63	.83	.00	.013	.00	.00	PIPE				
700.120	3373.940	.625	3374.565	3.00	3.12	.15	3374.72	.00	.57	2.17	2.500	.000	.00	1	.0			

Appendix C. CD-ROM



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