



RESPONSE TO COMMENTS FOR THE TECHNICAL DRAINAGE STUDY FOR

SUMMERLIN WEST VILLAGE 29 PHASE I INFRASTRUCTURE

62029-204

November 2021

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

Prepared by GCW, Inc.

1555 South Rainbow Blvd
Las Vegas, NV 89146

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HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: VILLAGE 29 PHASE I INFRASTRUCTURE Date: November 2021

Location of Development: a) Descriptive (Cross Streets) North/South: Grand Park Blvd

East/West: Far Hills Ave

b) Section: 21, 22, 27, and 28 Township: 20 Range: 59

c) APN : 137-27-101-004, 137-28-601-001, 137-21-801-004

Name of Owner: The Howard Hughes Company, LLC

Telephone No.: (702) 791-4201 Fax No.: (702)-791-4385 E-Mail Address: April.Chapman@howardhughes.com

Address: 10845 Griffith Peak Drive, Suite 160, Las Vegas, NV 89135

Contact Person-Name: Mohammad Masih Edalat Telephone No.: (702) 804-2127

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

Firm: GCW, Inc.

Address: 1555 South Rainbow Blvd, Las Vegas, Nevada 89146

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: +/- 323 Acres Being Developed/Disturbed: +/- 40 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

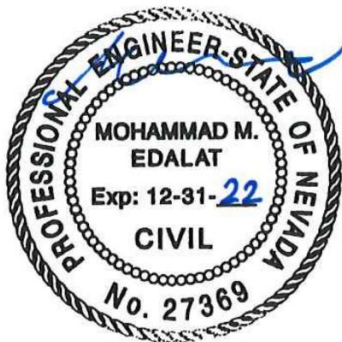
4. Proposed type of development (Residential, Commercial, Etc.): ROADWAY

5. Approximate upstream land area which drains to the subject site: 70 Acres

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Master Drainage Study for Summerlin West Village 29

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing 8'X6' RCB at Far Hills Ave and Sky Vista Dr

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



Engineer's Seal 11/02/2021

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

***New Required Field**

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

	Revision	Date
Local Entity File No. _____		

REFERENCE:

STANDARD FORM 1

62029-204

November 2, 2021

Albert Y. Sung, P.E.
City of Las Vegas, Public Works
333 N. Rancho Drive, 7th Floor, Las Vegas, NV 89106

**Re: Response to Comments for the Technical Drainage Study for Summerlin West Village
29 Phase I Infrastructure**

Dear Mr. Sung,

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

Respectfully submitted,



Masih Edalat, PhD, P.E.
Project Engineer



**RESPONSE TO COMMENTS FOR THE
TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN WEST VILLAGE 29
PHASE I INFRASTRUCTURE**

62029-204

November 2021

Authored By:

Masih Edalat, PhD, PE

Prepared By:

**GCW, Inc.
1555 S. Rainbow Blvd.
Las Vegas, NV 89146
Phone: (702) 804-2000
Fax: (702) 804-2299**

62029-204

November 2, 2021

Re: Response to City of Las Vegas Comments on the Technical Drainage Study for Summerlin West Village 29 Phase I Infrastructure (DS5501)

This report addresses the City of Las Vegas review comments dated October 14, 2021 regarding the project in its entirety. Below are individual responses to each comment included in the review letter.

Comment 1:

The subject project is based on the premise that the upstream Park Drift Drive is at a minimum rough graded to provide hydrologic cutoff and flood protection and the downstream Far Hills Avenue (east of Sky Vista Drive) and the associated storm drain facilities are in place for flood flow perpetuation. The subject drainage study will not be finally approved prior to the posting of the construction bonds of the above stated projects.

Response:

The requirements prior to the final approval of the study is acknowledged.

Comment 2:

The project proposes to build temporary drainage facilities, ie, berms/swales along the sides of *Grand Park Boulevard* and *Far Hills 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.

Response:

The requirements for maintenance and liability agreement prior to the final plan approval are acknowledged.

Comment 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>.

Response:

CCRFCD concurrence requirement is acknowledged prior to final approval of the drainage study.

Comment 4:

Structural plans for the special junction structures must be submitted for review. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *City of Las Vegas Building Department* for processing. The engineer must provide a copy of Building Department approval of the structures to Flood Control prior to the final approval of the drainage study.

Provide the pertinent detail sheets for the structures in the next submittal.

Response:

The structural approval requirement prior to the final approval of the drainage study is acknowledged. Structural detail sheets are provided in the improvement plans.

Comment 5:

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. .

Response:

The structural approval requirement for deep drop inlets prior to the final approval of the drainage study is acknowledged.

Comment 6:

FIGURE 5 should be revised to include the entirety of Basin PD0. The PD0 provided in the last submittal appears to be only a portion and is not acceptable.

Response:

FIGURE 5 has been revised and zoomed out to include the entirety of all basins.

Comment 7:

FIGURE 5: The calculations for Hydraulic Section 3 show a depth of 0.52', not 0.50' as shown on the exhibit, this exceeds the curb height of 0.5'. As a general rule in Summerlin, the 100-year flow in the streets cannot overtop the street curb. Review and revise accordingly.

Response:

Drop Inlets #7 and #8 have been upsized to 22.5 feet to capture all the runoff upstream of Section 2. As a result, depth at Section 3 has been lowered below 0.5 feet.

Comment 8:

MU2: It appears that from DI #9 and DI #10 in Grand Park Boulevard, there are no proposed inlets upstream of those inlets for over 600'. A roadway inlet is required every 600 feet when storm drain is proposed, the proposed storm drain in Grand Park Boulevard may need to be extended to the north to provide additional inlets. Address and resolve in the next submittal.

Response:

Storm drain has been extended in Grand Park Boulevard to meet the 600 feet requirement. Note that the extended storm drain is for nuisance flow and no calculation has been provided for that.

Comment 9:

MU2: This comment is a carryover condition from the related V29 Master Drainage Study which required two separate stubs to discharge runoff from Future Parcel A and Future Parcel B independently. Provide a separate stub to discharge Future Parcel A.

Response:

Future Parcels A and B will be sharing the 54-inch RCP storm drain stub. Note that both parcels are sharing single drive way. This has been mentioned in Village 29 Master Drainage Study as well. As a result, whichever parcel that would be developed first will construct separate storm drain stub for the other parcel. Separate Technical Drainage Studies will be submitted for each parcels with more details.

Comment 10:

MU2: It is not clear how Future Parcel F discharge. Address and resolve in the next submittal.

Response:

The 48-inch stub at the west side of the intersection of Grand Park Boulevard and Far Hills Avenue will be extended through Parcel F with the Grand Park Boulevard package improvements west of Far Hills Avenue. Please refer to the Storm Drain Facility Map for V29 Master Drainage Study for more information.

Comment 11:

Do a general QC on all WSPGWs to make sure that the inverts used in the model match what is shown on the plans. For example, the inverts on FHLAT4 appear to be about a foot off of what is shown on the plans.

Response:

The WSPGW models have been revised and QCed to ensure the inverts match the plans.

Comment 12:

On all pertinent Grading Plans and Plan & Profile sheets, specify the minimum clearance distance between the lip of the curb and gutter of the street and the edge of the proposed storm drain. It appears that the proposed mainline storm drains in Grand Park Boulevard and Far Hills Avenue are too close to the street curb. Review and revise accordingly.

Response:

The plans are revised to show the requested dimensions.

Comment 13:

Sheet GD2: It is proposed to connect a 6'x6' RCB to an existing 8'x6' RCB at Junction Structure #1, provide connection detail in the next submittal.

Response:

The connection details are provided on the SD sheets. Refer to the grading plans for more information.

Comment 14:

Sheet GD3: SDDI#10 and SDDI#11 call out Profile 2/LP5 which is the profile for SDDI#13 and SDDI#14. Conduct a thorough audit for all lateral callout in the next submittal.

Response:

Callout annotations have been revised.

Comment 15:

Velocities in storm drains between 25 and 35 ft/s require 2" of sacrificial concrete. Review and revise accordingly.

Response:

2-inches of sacrificial concrete are proposed for storm drain velocities between 25 and 35 ft/s.

Comment 16:

Provide riprap sizing calculation for the riprap proposed in the side ditch along Grand Park Boulevard and Far Hills Avenue in the next submittal.

Response:

Riprap sizing calculation is provided for the side ditch along Far Hills Avenue (Section 1). Note that other ditches are existing per previous studies.

Comment 17:

Label City of Las Vegas recorded drawing numbers for all existing storm drains on all pertinent plans.

Response:

The plans are revised accordingly.

Comment 18:

Provide protective fencing around the proposed stubs.

Response:

The Howard Hughes Company will be maintaining the storm drain stubs during the interim condition until they transfer the parcels to the new owners. This is the same procedure that has been applied to all the Summerlin West roadways. Therefore, no fencing is provided for storm drain stubs for the interim condition.

Comment 19:

All 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.

Response:

A note is added on the grading plans.

Please contact me via email at medalat@gcwengineering.com if you have any questions or require additional information.

Respectfully,

GCW, INC.

A handwritten signature in blue ink, appearing to read 'Masih Edalat'.

Masih Edalat, PhD, P.E.
Flood Control Division

APPENDIX

CITY OF LAS VEGAS			DATE:
INTER-OFFICE MEMORANDUM			October 14, 2021
TO: Land Development Services Department of Building & Safety			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:		COPIES TO:
Summerlin West Village 29 - Phase I Infrastructure			GCW, Inc.
Cross Streets:	Grand Park Boulevard & Far Hills Avenue		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5501A.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-27-101-004, 137-28-601-001, 137-21-801-004.		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 (Paid on 9/28/2021)	9/23/2021 & 9/28/2021	10/14/2021	See Comments Below	\$400.00	4466730: \$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 *Park Drift Drive* is at a minimum rough graded to provide hydrologic cutoff and flood protection and the downstream *Far Hills Avenue (east of Sky Vista Drive)* and the associated storm drain facilities are in place for flood flow perpetuation. The subject drainage study will not be finally approved prior to the posting of the construction bonds of the above stated projects.
2. The project proposes to build temporary drainage facilities, ie, berms/swales along the sides of *Grand Park Boulevard and Far Hills 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.

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. Structural plans for the special junction structures must be submitted for review. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *City of Las Vegas Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to *Flood Control* prior to the final approval of the drainage study.

Provide the pertinent detail sheets for the structures in the next submittal.

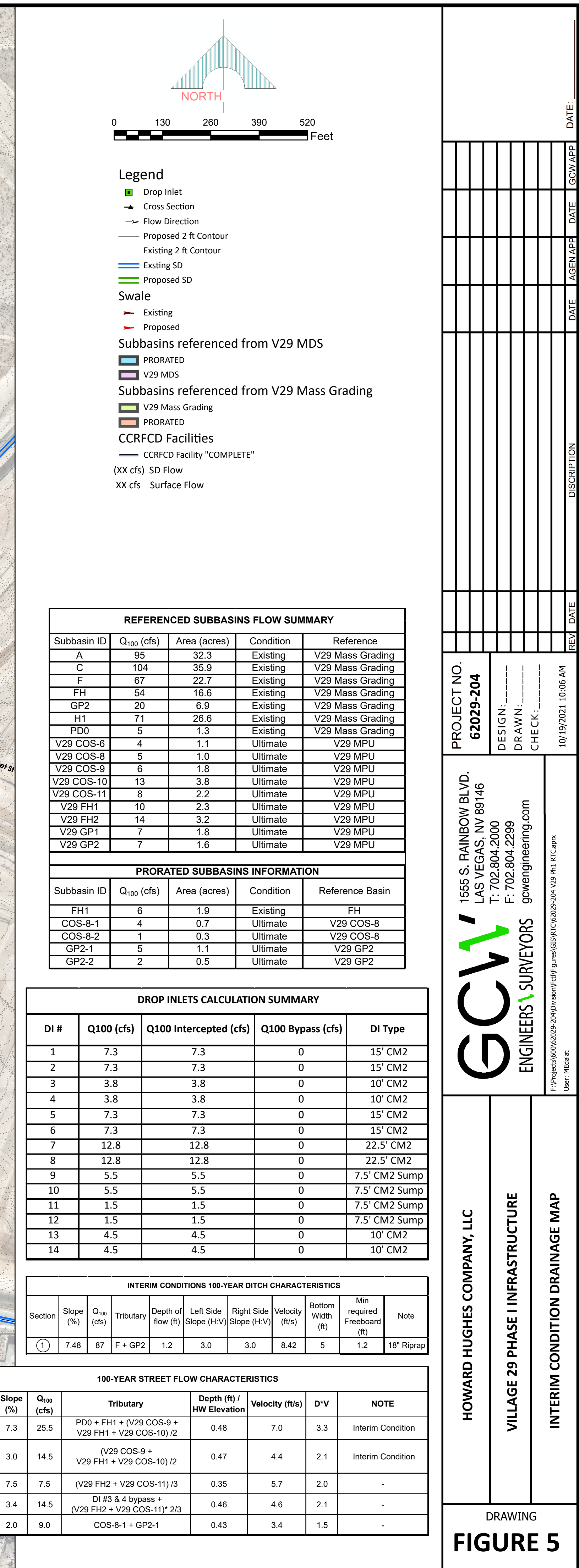
5. All storm drain inlets that are more than 10' deep require a special structural detail and calculations. Submit structural design and calculations to *City Building & Safety Department* for review and approval prior to the final approval of the drainage study.
6. **FIGURE 5** should be revised to include the entirety of Basin PD0. The PD0 provided in the last submittal appears to be only a portion and is not acceptable.
7. **FIGURE 5:** The calculations for *Hydraulic Section 3* show a depth of 0.52', not 0.50' as shown on the exhibit, this exceeds the curb height of 0.5'. As a general rule in Summerlin, the 100-year flow in the streets cannot overtop the street curb. Review and revise accordingly.
8. **MU2:** It appears that from DI #9 and DI #10 in *Grand Park Boulevard*, there are no proposed inlets upstream of those inlets for over 600'. A roadway inlet is required every 600 feet when storm drain is proposed, the proposed storm drain in *Grand Park Boulevard* may need to be extended to the north to provide additional inlets. Address and resolve in the next submittal.
9. **MU2:** This comment is a carryover condition from the related **V29 Master Drainage Study** which required two separate stubs to discharge runoff from *Future Parcel A* and *Future Parcel B* independently. Provide a separate stub to discharge *Future Parcel A*.
10. **MU2:** It is not clear how *Future Parcel F* discharge. Address and resolve in the next submittal.
11. Do a general QC on all WSPGWs to make sure that the inverts used in the model match what is shown on the plans. For example, the inverts on FHLAT4 appear to be about a foot off of what is shown on the plans.
12. On all pertinent *Grading Plans* and *Plan & Profile* sheets, specify the minimum clearance distance between the lip of the curb and gutter of the street and the edge of the proposed storm drain. It appears that the proposed mainline storm drains in *Grand Park Boulevard* and *Far Hills Avenue* are too close to the street curb. Review and revise accordingly.
13. **Sheet GD2:** It is proposed to connect a 6'x6' RCB to an existing 8'x6' RCB at *Junction Structure #1*, provide connection detail in the next submittal.
14. **Sheet GD3:** SDDI#10 and SDDI#11 call out *Profile 2/LP5* which is the profile for SDDI#13 and SDDI#14. Conduct a thorough audit for all lateral callout in the next submittal.
15. Velocities in storm drains between 25 and 35 ft/s require 2" of sacrificial concrete. Review and revise accordingly.
16. Provide riprap sizing calculation for the riprap proposed in the side ditch along *Grand Park Boulevard* and *Far Hills Avenue* in the next submittal.

17. Label *City of Las Vegas* recorded drawing numbers for all existing storm drains on all pertinent plans.
18. Provide protective fencing around the proposed stubs.
19. All 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.

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

END OF REMARKS
HDR/AYS

T/R/S: T20S/R59E/21,22,27&28
AREA K-27



Worksheet for Section 2 Int - 100yr

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	7.28 %
Discharge	25.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.70
0+00.50	0.70
0+00.50	0.20
0+02.00	0.33
0+02.00	0.37
0+25.17	0.83
0+25.17	1.33
0+34.83	1.33
0+34.83	0.83
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.50
0+70.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.70)	(0+70.00, 0.50)	0.016

Options

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

Results

Normal Depth	0.48 ft
Roughness Coefficient	0.016
Elevation	0.48 ft
Elevation Range	0.00 to 1.33 ft
Flow Area	3.7 ft ²
Wetted Perimeter	24.95 ft
Hydraulic Radius	0.15 ft

Worksheet for Section 2 Int - 100yr

Results

Top Width	24.10 ft
Normal Depth	0.48 ft
Critical Depth	0.65 ft
Critical Slope	0.64 %
Velocity	6.97 ft/s
Velocity Head	0.75 ft
Specific Energy	1.23 ft
Froude Number	3.152
Flow Type	Supercritical

GVF Input Data

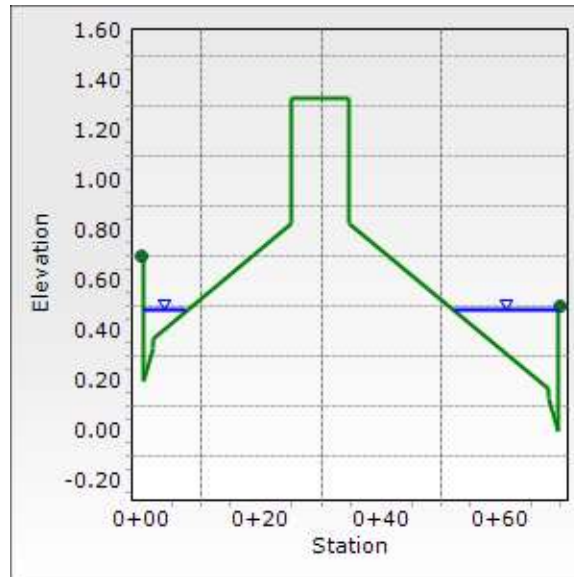
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.48 ft
Critical Depth	0.65 ft
Channel Slope	7.28 %
Critical Slope	0.64 %

Cross Section for Section 2 Int - 100yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	7.28 %
Normal Depth	0.48 ft
Discharge	25.5 cfs



Worksheet for Section 3 Int - 100yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.00 %
Discharge	14.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.70
0+00.50	0.70
0+00.50	0.20
0+02.00	0.33
0+02.00	0.37
0+25.17	0.83
0+25.17	1.33
0+34.83	1.33
0+34.83	0.83
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.50
0+70.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.70)	(0+70.00, 0.50)	0.016

Options

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

Results

Normal Depth	0.47 ft
Roughness Coefficient	0.016
Elevation	0.47 ft
Elevation Range	0.00 to 1.33 ft
Flow Area	3.3 ft ²
Wetted Perimeter	23.44 ft
Hydraulic Radius	0.14 ft

Worksheet for Section 3 Int - 100yr

Results

Top Width	22.61 ft
Normal Depth	0.47 ft
Critical Depth	0.56 ft
Critical Slope	0.69 %
Velocity	4.38 ft/s
Velocity Head	0.30 ft
Specific Energy	0.76 ft
Froude Number	2.015
Flow Type	Supercritical

GVF Input Data

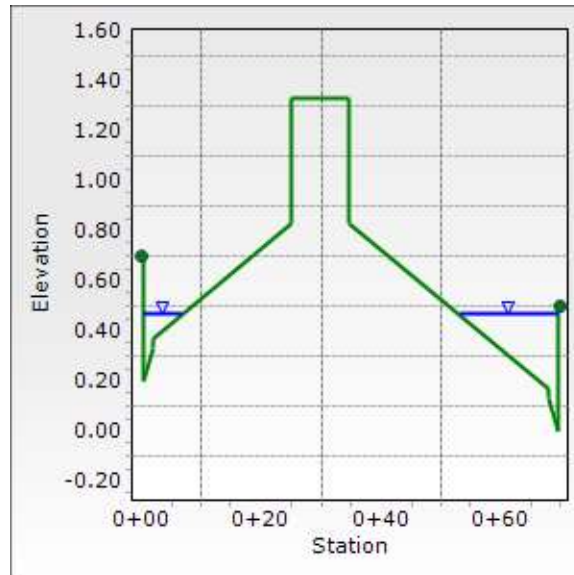
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.47 ft
Critical Depth	0.56 ft
Channel Slope	3.00 %
Critical Slope	0.69 %

Cross Section for Section 3 Int - 100yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.00 %
Normal Depth	0.47 ft
Discharge	14.5 cfs



GCV

ENGINEERS & SURVEYORS

Drop Inlet Sizing Calculation

Project Name: Village 29 Phase I Infrastructure

By: Masih Edalat

Date: 10/18/2021

Drop Inlet Sizing on a Continuous Grade

15' Type CM2

DI #5 & 6

Known:

Q_s = Street Flow	7.3	cfs
S_o = Longitudinal Slope	0.03	ft/ft
n = Manning's Roughness Coefficient	0.016	
V_s = Flow Velocity	4.38	fps
D = Flow Depth	0.47	ft
S_x = Street Transverse Slope	0.02	ft/ft
W = Grate Width	1.5	ft
a = Gutter Depression	2.5	in
L_g = Length of Grate	12.5	ft
L_c = Length of Curb Opening	15.0	ft
C_{fg} = Clogging Factor for Grate	50	%
C_{fc} = Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f = Frontal flow factor = $1 - 0.09 \cdot (V_s - V_o)$ if $V_s > V_o$; else $R_f = 1$	1.00
V_o = Splash over velocity = $p + q \cdot (L_g \cdot (1 - (C_{fg}/100))) - r \cdot (L_g \cdot (1 - (C_{fg}/100)))^2 + s \cdot (L_g \cdot (1 - (C_{fg}/100)))^3$	11.01 fps
E_o = Grate flow ratio = Q_w/Q_s	0.39
Q_w = Frontal flow = $A_w \cdot V_s$	2.81 cfs
Q_x = Side flow = $Q_s - Q_w$	4.44 cfs
R_s = Side flow factor = $1 / (1 + (0.15 \cdot V_s^{1.8}) / (S_x \cdot (L_g \cdot (1 - (C_{fg}/100)))^{2.3}))$	0.39
Q_{ig} = Flow intercepted = $[R_f \cdot E_o + R_s \cdot (1 - E_o)] \cdot Q_s$	4.5 cfs
$\dagger p = 1.76; q = 3.12; r = 0.45; s = 0.03$ (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e = Equivalent cross slope = $S_x + S_w \cdot E_o$	0.077 ft/ft
S_w = Gutter cross slope = $(0.137 + a \cdot \text{feet}) / W$	0.146 ft/ft
L_t = Total interception $L = 0.60 \cdot Q_s^{0.42} \cdot S_o^{0.30} \cdot (1/n \cdot S_e)^{0.6}$	26.84 ft
Q_{ic} = Flow intercepted = $(1 - (1 - (L_c \cdot (1 - (C_{fc}/100))) / L_t)^{1.8}) \cdot Q_s$	3.2 cfs

Total Inlet Calculations

Q_{ti} = Total flow intercepted = $Q_{ig} + Q_{ic}$	7.3 cfs
Q_{tq} = Flow bypass = $Q_s - Q_{ti}$	0.0 cfs

GCV

ENGINEERS & SURVEYORS

Drop Inlet Sizing Calculation

Project Name: Village 29 Phase I Infrastructure

By: Masih Edalat

Date: 10/18/2021

Drop Inlet Sizing on a Continuous Grade

22.5' Type CM2

DI #7 & 8

Known:

Q_s = Street Flow	12.8	cfs
S_o = Longitudinal Slope	0.073	ft/ft
n = Manning's Roughness Coefficient	0.016	
V_s = Flow Velocity	6.97	fps
D = Flow Depth	0.48	ft
S_x = Street Transverse Slope	0.02	ft/ft
W = Grate Width	1.5	ft
a = Gutter Depression	2.5	in
L_g = Length of Grate	20.0	ft
L_c = Length of Curb Opening	22.5	ft
C_{fg} = Clogging Factor for Grate	50	%
C_{fc} = Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f = Frontal flow factor = $1 - 0.09 \cdot (V_s - V_o)$ if $V_s > V_o$; else $R_f = 1$	1.00
V_o = Splash over velocity = $p + q \cdot (L_g \cdot (1 - (C_{fg}/100))) - r \cdot (L_g \cdot (1 - (C_{fg}/100)))^2 + s \cdot (L_g \cdot (1 - (C_{fg}/100)))^3$	17.96 fps
E_o = Grate flow ratio = Q_w/Q_s	0.36
Q_w = Frontal flow = $A_w \cdot V_s$	4.58 cfs
Q_x = Side flow = $Q_s - Q_w$	8.17 cfs
R_s = Side flow factor = $1 / (1 + (0.15 \cdot V_s^{1.8}) / (S_x \cdot (L_g \cdot (1 - (C_{fg}/100)))^{2.3}))$	0.45
Q_{ig} = Flow intercepted = $[R_f \cdot E_o + R_s \cdot (1 - E_o)] \cdot Q_s$	8.2 cfs
$\dagger p = 1.76; q = 3.12; r = 0.45; s = 0.03$ (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e = Equivalent cross slope = $S_x + S_w \cdot E_o$	0.073 ft/ft
S_w = Gutter cross slope = $(0.137 + a \cdot \text{feet}) / W$	0.146 ft/ft
L_t = Total interception $L = 0.60 \cdot Q_s^{0.42} \cdot S_o^{0.30} \cdot (1/n \cdot S_e)^{0.6}$	45.95 ft
Q_{ic} = Flow intercepted = $(1 - (1 - (L_c \cdot (1 - (C_{fc}/100))) / L_t)^{1.8}) \cdot Q_s$	5.1 cfs

Total Inlet Calculations

Q_{ti} = Total flow intercepted = $Q_{ig} + Q_{ic}$	12.8 cfs
Q_{tq} = Flow bypass = $Q_s - Q_{ti}$	0.0 cfs

RIPRAP SIZING CALCULATIONS FOR SECTION 1

	Channel Protection Sizing Using Equation 718	
	Known:	
	V= Velocity (fps)	8.4
	Sg= Specific Gravity of Rock (typ=2.5)	2.5
	s= Longitudinal Channel Slope (ft/ft)	0.075
	$d_{50} = ((vel * S^{0.17}) / (3 * (Sg - 1)))^2$	
	Solve For:	
	d ₅₀ =	17 inches
	thickness=	35 inches

	Channel Protection Sizing Using Equation 718	
	Known:	
	d50= Riprap size (in)	18
	Sg= Specific Gravity of Rock (typ=2.5)	2.5
	s= Longitudinal Channel Slope (ft/ft)	0.075
	$Vel = 3 * (d_{50}^{0.5}) * (Sg - 1) / (S^{0.17})$	
	Solve For:	
	Max Allowable Velocity=	8.56 fps

T1	VILLAGE 29	PHASE 1	INFRASTRUCTURE						0
T2	FHMAIN								
T3	MAIN LINE								
SO	1000.0003545.780	2				3554.36			
R	1153.6803550.260	2		.013			.000	.000	1
JX	1153.6903550.271	2	1	.013	68.000	3550.700	70.0		.000
R	1153.7003550.272	2		.013			.000	.000	1
WX	.000 .000	3		.000					
R	1260.4903553.520	3		.013			.000	.000	1
R	1487.5503565.830	3		.013			.000	.000	1
R	1789.2803582.350	3		.013			5.800	.000	1
JX	1789.2903582.351	3	4	5.013	69.000	4.0003583.3503583.350-60.0	75.0		.000
R	1975.3703592.538	3		.013			3.600	.000	1
R	2279.7703609.230	3		.013			5.800	.000	1
JX	2279.7803609.231	7	6	4.013	106.000	67.0003609.2313609.231-45.0	.0		.000
R	2279.7903609.232	7		.013			.00	45.000	1
R	2291.6503609.310	7		.013			.000	45.000	1
R	2401.7503610.060	7		.013			.000	.000	1
JX	2401.7603610.061	7	5	5.013	1.50	1.5003611.5603611.560-40.0	80.0		.000
R	2570.0503611.080	7		.013			.000	.000	1
R	2845.0503612.460	7		.013			.000	.000	1
R	3054.0503613.510	7		.013			.000	.000	1
JX	3054.0603613.511	7	5	5.013	5.00	4.0003613.5113613.511-40.0	85.0		.000
R	3107.4503613.780	7		.013			.000	.000	1
JX	3107.4513613.781	1	8	.013	11.00	3613.781	0.0		.000
R	3107.4523613.782	1		.013			.000	-45.000	1
R	3135.7303613.950	1		.013			.00	-45.000	1
R	3237.1503614.620	1		.013			.000	.000	1
SH	3237.1503614.620	1				3619.120			
CD	1 4 1 .000	4.500	.000	.000	.000	.00			
CD	2 3 0 .000	6.000	8.000	.000	.000	.00			
CD	3 3 0 .000	6.000	6.000	.000	.000	.00			
CD	4 4 1 .000	3.500	.000	.000	.000	.00			
CD	5 4 1 .000	2.000	.000	.000	.000	.00			
CD	6 4 1 .000	4.000	.000	.000	.000	.00			
CD	7 4 1 .000	5.000	.000	.000	.000	.00			
CD	8 4 1 .000	2.500	.000	.000	.000	.00			
Q		123.000	.0						

Date:10-18-2021 Time: 3:53:10

PAGE 1

W S P G W

PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

VILLAGE 29 PHASE 1 INFRASTRUCTURE

HEADING LINE NO 2 IS -

FHMAIN

W S P G W

PAGE NO. 2

W S F G W
WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS A SYSTEM OUTLET	STATION	INVERT	SECT										
		U/S DATA	1000.000	3545.780	2										
W S ELEV 3554.360															
ELEMENT NO	2	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	1153.680	3550.260	2	N									
						.013									
ELEMENT NO	3	IS A JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
		U/S DATA	1153.690	3550.271	2	1	0	.013	68.000	.000	3550.700	.000	70.000	.000	
											RADIUS	ANGLE			
											.000	.000			
ELEMENT NO	4	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	1153.700	3550.272	2	N									
						.013									
ELEMENT NO	5	IS A WALL EXIT	STATION	INVERT	SECT										
		U/S DATA	1153.700	3550.272	3										
ELEMENT NO	6	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	1260.490	3553.520	3	N									
						.013									
ELEMENT NO	7	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	1487.550	3565.830	3	N									
						.013									
ELEMENT NO	8	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	1789.280	3582.350	3	N									
						.013									
ELEMENT NO	9	IS A JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
		U/S DATA	1789.290	3582.351	3	4	5	.013	69.000	4.000	3583.350	3583.350	-60.000	75.000	
											RADIUS	ANGLE			
											.000	.000			
ELEMENT NO	10	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	1975.370	3592.538	3	N									
						.013									
W S P G W															
WATER SURFACE PROFILE - ELEMENT CARD LISTING															
ELEMENT NO	11	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	2279.770	3609.230	3	N									
						.013									
ELEMENT NO	12	IS A JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
		U/S DATA	2279.780	3609.231	7	6	4	.013	106.000	67.000	3609.231	3609.231	-45.000	.000	
											RADIUS	ANGLE			
											.000	.000			
ELEMENT NO	13	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	2279.790	3609.232	7	N									
						.013									
ELEMENT NO	14	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	2291.650	3609.310	7	N									
						.013									
ELEMENT NO	15	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	2401.750	3610.060	7	N									
						.013									
ELEMENT NO	16	IS A JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
		U/S DATA	2401.760	3610.061	7	5	5	.013	1.500	1.500	3611.560	3611.560	-40.000	80.000	
											RADIUS	ANGLE			
											.000	.000			
ELEMENT NO	17	IS A REACH	STATION	INVERT	SECT										
		U/S DATA	2570.050	3611.080	7	N									
						.013									

		U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
		3054.060	3613.511	7	5	5	.013	5.000	4.000	3613.511	3613.511	-40.000	85.000	
											RADIUS	ANGLE		
											.000	.000		
W S P G W														
WATER SURFACE PROFILE - ELEMENT CARD LISTING														
ELEMENT NO	21	IS A REACH	*	*	*									
		U/S DATA	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
			3107.450	3613.780	7			.013			.000	.000	.000	1
ELEMENT NO	22	IS A JUNCTION	*	*	*				*		*			
		U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
			3107.451	3613.781	1	8	0	.013	11.000	.000	3613.781	.000	.000	.000
											RADIUS	ANGLE		
											.000	.000		
ELEMENT NO	23	IS A REACH	*	*	*									
		U/S DATA	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
			3107.452	3613.782	1			.013			.000	.000	-45.000	1
ELEMENT NO	24	IS A REACH	*	*	*									
		U/S DATA	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
			3135.730	3613.950	1			.013			.000	.000	-45.000	1
ELEMENT NO	25	IS A REACH	*	*	*									
		U/S DATA	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
			3237.150	3614.620	1			.013			.000	.000	.000	1
ELEMENT NO	26	IS A SYSTEM HEADWORKS			*				*					
		U/S DATA	STATION	INVERT	SECT						W S ELEV			
			3237.150	3614.620	1						3619.120			

VILLAGE 29 PHASE 1 INFRASTRUCTURE

FHMAIN

MAIN LINE

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	3545.780	8.580	3554.360	460.00	9.58	1.43	3555.79	.00	4.68	8.00	6.000	8.000	.00	0 .0
25.014	.0292					.0034	.09	8.58	.69	2.29	.013	.00	.00	BOX
1025.014	3546.509	7.948	3554.458	460.00	9.58	1.43	3555.88	.00	4.68	8.00	6.000	8.000	.00	0 .0
HYDRAULIC JUMP														
1025.014	3546.509	2.327	3548.836	460.00	24.71	9.48	3558.32	.00	4.68	8.00	6.000	8.000	.00	0 .0
128.666	.0292					.0274	3.52	2.33	2.85	2.29	.013	.00	.00	BOX
1153.680	3550.260	2.359	3552.619	460.00	24.37	9.22	3561.84	.00	4.68	8.00	6.000	8.000	.00	0 .0
JUNCT STR	1.1111					.0381	.00	2.36	2.80		.013	.00	.00	BOX
1153.690	3550.271	1.710	3551.981	392.00	28.65	12.75	3564.73	.00	4.21	8.00	6.000	8.000	.00	0 .0
.010	.0976					.0494	.00	1.71	3.86	1.36	.013	.00	.00	BOX
1153.700	3550.272	1.710	3551.982	392.00	28.65	12.75	3564.73	.00	4.21	8.00	6.000	8.000	.00	0 .0
WALL EXIT														
1153.700	3550.272	2.306	3552.578	392.00	28.33	12.46	3565.04	.00	5.10	6.00	6.000	6.000	.00	0 .0
44.211	.0304					.0448	1.98	2.31	3.29	2.62	.013	.00	.00	BOX
1197.911	3551.617	2.244	3553.861	392.00	29.11	13.16	3567.02	.00	5.10	6.00	6.000	6.000	.00	0 .0
62.579	.0304					.0498	3.12	2.24	3.43	2.62	.013	.00	.00	BOX
1260.490	3553.520	2.140	3555.660	392.00	30.54	14.48	3570.14	.00	5.10	6.00	6.000	6.000	.00	0 .0
227.060	.0542					.0512	11.64	2.14	3.68	2.12	.013	.00	.00	BOX

WSE for FHLAT2

VILLAGE 29 PHASE 1 INFRASTRUCTURE

FHMAIN

MAIN LINE

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
1487.550	3565.830	2.195	3568.025	392.00	29.77	13.76	3581.78	.06	5.10	6.00	6.000	6.000	.00	0 .0
42.692	.0548					.0487	2.08	2.25	3.54	2.12	.013	.00	.00	BOX
1530.242	3568.167	2.217	3570.385	392.00	29.46	13.48	3583.87	.05	5.10	6.00	6.000	6.000	.00	0 .0
115.749	.0548					.0451	5.22	2.27	3.49	2.12	.013	.00	.00	BOX
1645.990	3574.505	2.326	3576.830	392.00	28.09	12.26	3589.09	.05	5.10	6.00	6.000	6.000	.00	0 .0
65.850	.0548					.0396	2.60	2.37	3.25	2.12	.013	.00	.00	BOX
1711.841	3578.110	2.439	3580.549	392.00	26.79	11.14	3591.69	.04	5.10	6.00	6.000	6.000	.00	0 .0
44.621	.0548					.0347	1.55	2.48	3.02	2.12	.013	.00	.00	BOX
1756.462	3580.553	2.558	3583.111	392.00	25.54	10.13	3593.24	.04	5.10	6.00	6.000	6.000	.00	0 .0
32.818	.0548					.0305	1.00	2.60	2.81	2.12	.013	.00	.00	BOX
1789.280	3582.350	2.683	3585.033	392.00	24.35	9.21	3594.24	.00	5.10	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0976					.0405	.00	2.72	2.62		.013	.00	.00	BOX
1789.290	3582.351	1.854	3584.205	319.00	28.68	12.78	3596.98	.05	4.44	6.00	6.000	6.000	.00	0 .0
186.080	.0547					.0495	9.22	1.91	3.71	1.83	.013	.00	.00	BOX
1975.370	3592.538	1.935	3594.473	319.00	27.48	11.73	3606.20	.05	4.44	6.00	6.000	6.000	.00	0 .0

WSE for FHLAT3

46.546 .0548 .0452 2.10 1.98 3.48 1.83 .013 .00 .00 BOX
2021.916 3595.091 1.976 3597.067 319.00 26.90 11.24 3608.31 .04 4.44 6.00 6.000 6.000 .00 0 .0
67.465 .0548 .0411 2.77 2.02 3.37 1.83 .013 .00 .00 BOX
▲ FILE: FHMAIN.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING

Date:10-18-2021 Time: 3:53:17

VILLAGE 29 PHASE 1 INFRASTRUCTURE

FHMAIN

MAIN LINE

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*****
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 |
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
2089.381 | 3598.790 | 2.073 | 3600.863 | 319.00 | 25.65 | 10.22 | 3611.08 | .04 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
43.949 | .0548 | | | | | | | | | | | | | | |
2133.330 | 3601.200 | 2.174 | 3603.374 | 319.00 | 24.46 | 9.29 | 3612.66 | .04 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
31.699 | .0548 | | | | | | | | | | | | | | |
2165.029 | 3602.938 | 2.280 | 3605.218 | 319.00 | 23.32 | 8.44 | 3613.66 | .03 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
24.152 | .0548 | | | | | | | | | | | | | | |
2189.181 | 3604.263 | 2.391 | 3606.654 | 319.00 | 22.23 | 7.68 | 3614.33 | .03 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
19.013 | .0548 | | | | | | | | | | | | | | |
2208.194 | 3605.305 | 2.508 | 3607.813 | 319.00 | 21.20 | 6.98 | 3614.79 | .03 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
15.273 | .0548 | | | | | | | | | | | | | | |
2223.467 | 3606.143 | 2.630 | 3608.773 | 319.00 | 20.21 | 6.34 | 3615.12 | .03 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
12.418 | .0548 | | | | | | | | | | | | | | |
2235.885 | 3606.823 | 2.759 | 3609.582 | 319.00 | 19.27 | 5.77 | 3615.35 | .02 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
10.157 | .0548 | | | | | | | | | | | | | | |
2246.042 | 3607.380 | 2.893 | 3610.274 | 319.00 | 18.38 | 5.24 | 3615.52 | .02 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
8.315 | .0548 | | | | | | | | | | | | | | |
2254.357 | 3607.836 | 3.035 | 3610.871 | 319.00 | 17.52 | 4.77 | 3615.64 | .02 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
6.780 | .0548 | | | | | | | | | | | | | | |
▲ FILE: FHMAIN.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 4
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Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING

Date:10-18-2021 Time: 3:53:17

VILLAGE 29 PHASE 1 INFRASTRUCTURE

FHMAIN

MAIN LINE

```
*****
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 |
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
2261.136 | 3608.208 | 3.183 | 3611.391 | 319.00 | 16.70 | 4.33 | 3615.72 | .02 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
5.474 | .0548 | | | | | | | | | | | | | | |
2266.611 | 3608.509 | 3.338 | 3611.847 | 319.00 | 15.93 | 3.94 | 3615.79 | .02 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
4.346 | .0548 | | | | | | | | | | | | | | |
2270.957 | 3608.747 | 3.501 | 3612.248 | 319.00 | 15.19 | 3.58 | 3615.83 | .01 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
3.357 | .0548 | | | | | | | | | | | | | | |
2274.314 | 3608.931 | 3.672 | 3612.603 | 319.00 | 14.48 | 3.26 | 3615.86 | .01 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
2.479 | .0548 | | | | | | | | | | | | | | |
2276.793 | 3609.067 | 3.851 | 3612.918 | 319.00 | 13.81 | 2.96 | 3615.88 | .01 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
1.689 | .0548 | | | | | | | | | | | | | | |
2278.482 | 3609.159 | 4.039 | 3613.198 | 319.00 | 13.16 | 2.69 | 3615.89 | .01 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
.973 | .0548 | | | | | | | | | | | | | | |
2279.455 | 3609.213 | 4.236 | 3613.449 | 319.00 | 12.55 | 2.45 | 3615.89 | .01 | 4.44 | 6.00 | 6.000 | 6.000 | .00 | 0 .0
```

----- WARNING - Junction Analysis - Change in Channel Type -----
W S P G W - CIVILDESIGN Version 14.08
FILE: FHMAIN.WSW
Program Package Serial Number: 3074
WATER SURFACE PROFILE LISTING
VILLAGE 29 PHASE 1 INFRASTRUCTURE
FHMAIN
MAIN LINE

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
2279.780	3609.231	6.632	3615.863	146.00	7.44	.86	3616.72	.00	3.46	.00	5.000	.000	.00	1 .0
.010	.0976					.0031	.00	6.63	.00	1.43	.013	.00	.00	PIPE
2279.790	3609.232	6.802	3616.034	146.00	7.44	.86	3616.89	.00	3.46	.00	5.000	.000	.00	1 .0
11.860	.0066					.0031	.04	6.80	.00	3.06	.013	.00	.00	PIPE
2291.650	3609.310	6.931	3616.241	146.00	7.44	.86	3617.10	.00	3.46	.00	5.000	.000	.00	1 .0
110.100	.0068					.0031	.35	6.93	.00	3.02	.013	.00	.00	PIPE
2401.750	3610.060	6.570	3616.630	146.00	7.44	.86	3617.49	.00	3.46	.00	5.000	.000	.00	1 .0
JUNCT STR	.0976					.0031	.00	6.57	.00		.013	.00	.00	PIPE
2401.760	3610.061	6.638	3616.699	143.00	7.28	.82	3617.52	.00	3.43	.00	5.000	.000	.00	1 .0
168.290	.0061					.0030	.51	6.64	.00	3.10	.013	.00	.00	PIPE
2570.050	3611.080	6.168	3617.248	143.00	7.28	.82	3618.07	.00	3.43	.00	5.000	.000	.00	1 .0
275.000	.0050					.0030	.83	6.17	.00	3.31	.013	.00	.00	PIPE
2845.050	3612.460	5.658	3618.118	143.00	7.28	.82	3618.94	.00	3.43	.00	5.000	.000	.00	1 .0
209.000	.0050					.0030	.63	5.66	.00	3.31	.013	.00	.00	PIPE
3054.050	3613.510	5.279	3618.789	143.00	7.28	.82	3619.61	.00	3.43	.00	5.000	.000	.00	1 .0
JUNCT STR	.0976					.0028	.00	5.28	.00		.013	.00	.00	PIPE
3054.060	3613.511	5.469	3618.980	134.00	6.82	.72	3619.70	.00	3.31	.00	5.000	.000	.00	1 .0
53.390	.0050					.0026	.14	5.47	.00	3.16	.013	.00	.00	PIPE

WSE for FHAT4 & FHAT5

W S P G W - CIVILDESIGN Version 14.08
FILE: FHMAIN.WSW
Program Package Serial Number: 3074
WATER SURFACE PROFILE LISTING
VILLAGE 29 PHASE 1 INFRASTRUCTURE
FHMAIN
MAIN LINE

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
3107.450	3613.780	5.377	3619.157	134.00	6.82	.72	3619.88	.00	3.31	.00	5.000	.000	.00	1 .0
JUNCT STR	1.0000					.0033	.00	5.38	.00		.013	.00	.00	PIPE
3107.451	3613.781	5.269	3619.050	123.00	7.73	.93	3619.98	.00	3.26	.00	4.500	.000	.00	1 .0
3107.452	3613.782	5.452	3619.234	123.00	7.73	.93	3620.16	.00	3.26	.00	4.500	.000	.00	1 .0
28.278	.0059					.0039	.11	5.45	.00	3.08	.013	.00	.00	PIPE
3135.730	3613.950	5.579	3619.529	123.00	7.73	.93	3620.46	.00	3.26	.00	4.500	.000	.00	1 .0
101.420	.0066					.0039	.40	5.58	.00	2.96	.013	.00	.00	PIPE
3237.150	3614.620	5.352	3619.972	123.00	7.73	.93	3620.90	.00	3.26	.00	4.500	.000	.00	1 .0

WSE for GPBLAT6

T1 VILLAGE 29 PHASE 1 INFRASTRUCTURE										0
T2 FHLLAT2										
T3										
SO	1000.0003550.650	1						3552.619		
R	1082.8403554.810	1		.013					.000	.000 1
JX	1082.8503554.811	1	1	.013	7.0			3554.811	-90.0	.000
R	1082.8603554.812	1		.013					.00	25.000 1
R	1153.6503556.120	1		.013					.000	.000 1
SH	1153.6503556.120	1						3561.070		
CD	1 4 1	.000	4.500	.000	.000	.000	.00			
Q		104.000	.0							

FILE: FHLLAT2.WSW W S P G W - EDIT LISTING - Version 14.10 Date:10-18-2021 Time: 4: 9:23
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1
CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10)
CODE NO TYPE PIER/PIP WIDTH DIAMETER WIDTH DROP

CD 1 4 1 4.500 W S P G W PAGE NO 1
WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -
VILLAGE 29 PHASE 1 INFRASTRUCTURE
HEADING LINE NO 2 IS -
FHLLAT2
HEADING LINE NO 3 IS -

W S P G W PAGE NO 2
WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO 1 IS A SYSTEM OUTLET * * *
U/S DATA STATION INVERT SECT W S ELEV
1000.000 3550.650 1 3552.619
ELEMENT NO 2 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1082.840 3554.810 1 .013 .000 .000 .000 1
ELEMENT NO 3 IS A JUNCTION * * * * *
U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
1082.850 3554.811 1 1 0 .013 7.000 .000 3554.811 .000 -90.000 .000
RADIUS ANGLE
.000 .000
ELEMENT NO 4 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1082.860 3554.812 1 .013 .000 .000 25.000 1
ELEMENT NO 5 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1153.650 3556.120 1 .013 .000 .000 .000 1
ELEMENT NO 6 IS A SYSTEM HEADWORKS *
U/S DATA STATION INVERT SECT W S ELEV
1153.650 3556.120 1 3561.070

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	3550.649	1.797	3552.446	111.00	18.73	5.45	3557.89	.00	3.10	4.41	4.500	.000	.00	1 .0
7.487	.0502					.0276	.21	1.80	2.85	1.54	.013	.00	.00	PIPE
1007.487	3551.025	1.821	3552.846	111.00	18.40	5.25	3558.10	.00	3.10	4.42	4.500	.000	.00	1 .0
16.481	.0502					.0252	.42	1.82	2.77	1.54	.013	.00	.00	PIPE
1023.968	3551.853	1.887	3553.740	111.00	17.54	4.78	3558.52	.00	3.10	4.44	4.500	.000	.00	1 .0
12.984	.0502					.0222	.29	1.89	2.59	1.54	.013	.00	.00	PIPE
1036.953	3552.505	1.957	3554.462	111.00	16.72	4.34	3558.80	.00	3.10	4.46	4.500	.000	.00	1 .0
10.499	.0502					.0195	.20	1.96	2.42	1.54	.013	.00	.00	PIPE
1047.452	3553.032	2.029	3555.062	111.00	15.94	3.95	3559.01	.00	3.10	4.48	4.500	.000	.00	1 .0
8.547	.0502					.0171	.15	2.03	2.25	1.54	.013	.00	.00	PIPE
1055.998	3553.462	2.105	3555.567	111.00	15.20	3.59	3559.16	.00	3.10	4.49	4.500	.000	.00	1 .0
7.032	.0502					.0151	.11	2.11	2.10	1.54	.013	.00	.00	PIPE
1063.030	3553.815	2.184	3555.999	111.00	14.50	3.26	3559.26	.00	3.10	4.50	4.500	.000	.00	1 .0
5.778	.0502					.0133	.08	2.18	1.96	1.54	.013	.00	.00	PIPE
1068.808	3554.105	2.267	3556.372	111.00	13.82	2.97	3559.34	.00	3.10	4.50	4.500	.000	.00	1 .0
4.738	.0502					.0117	.06	2.27	1.82	1.54	.013	.00	.00	PIPE
1073.547	3554.343	2.354	3556.697	111.00	13.18	2.70	3559.39	.00	3.10	4.50	4.500	.000	.00	1 .0
3.835	.0502					.0103	.04	2.35	1.70	1.54	.013	.00	.00	PIPE

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
1077.381	3554.536	2.446	3556.982	111.00	12.56	2.45	3559.43	.00	3.10	4.48	4.500	.000	.00	1 .0
3.083	.0502					.0091	.03	2.45	1.58	1.54	.013	.00	.00	PIPE
1080.465	3554.691	2.542	3557.233	111.00	11.98	2.23	3559.46	.00	3.10	4.46	4.500	.000	.00	1 .0
2.375	.0502					.0080	.02	2.54	1.46	1.54	.013	.00	.00	PIPE
1082.840	3554.810	2.644	3557.455	111.00	11.42	2.03	3559.48	.00	3.10	4.43	4.500	.000	.00	1 .0
JUNCT STR	.0976					.0097	.00	2.64	1.36		.013	.00	.00	PIPE
1082.850	3554.811	2.213	3557.024	104.00	13.36	2.77	3559.79	.00	3.00	4.50	4.500	.000	.00	1 .0
.010	.0976					.0118	.00	2.21	1.79	1.25	.013	.00	.00	PIPE
1082.860	3554.813	2.213	3557.026	104.00	13.36	2.77	3559.80	.00	3.00	4.50	4.500	.000	.00	1 .0
17.179	.0185					.0113	.19	2.21	1.79	1.95	.013	.00	.00	PIPE
1100.039	3555.130	2.273	3557.403	104.00	12.90	2.59	3559.99	.00	3.00	4.50	4.500	.000	.00	1 .0
17.670	.0185					.0102	.18	2.27	1.70	1.95	.013	.00	.00	PIPE
1117.709	3555.456	2.361	3557.817	104.00	12.30	2.35	3560.17	.00	3.00	4.49	4.500	.000	.00	1 .0
12.778	.0185					.0090	.11	2.36	1.58	1.95	.013	.00	.00	PIPE
1130.487	3555.692	2.453	3558.146	104.00	11.73	2.14	3560.28	.00	3.00	4.48	4.500	.000	.00	1 .0

9.291	.0185						.0079	.07	2.45	1.47	1.95	.013	.00	.00	PIPE
1139.777	3555.864	2.549	3558.413	104.00	11.19	1.94	3560.36	.00	3.00	4.46	4.500	.000	.00	1	.0
6.488	.0185						.0070	.05	2.55	1.37	1.95	.013	.00	.00	PIPE

FILE: FHLAT2.WSW
 W S P G W - CIVILDESIGN Version 14.08
 Program Package Serial Number: 3074
 WATER SURFACE PROFILE LISTING
 VILLAGE 29 PHASE 1 INFRASTRUCTURE
 FHLAT2

Date: 10-18-2021 Time: 4: 9:28
PAGE 3

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

1146.265	3555.984	2.651	3558.635	104.00	10.67	1.77	3560.40	.00	3.00	4.43	4.500	.000	.00	1	.0
4.271	.0185					.0062	.03	2.65	1.27	1.95	.013	.00	.00	PIPE	
1150.537	3556.063	2.759	3558.822	104.00	10.17	1.61	3560.43	.00	3.00	4.38	4.500	.000	.00	1	.0
2.380	.0185					.0055	.01	2.76	1.17	1.95	.013	.00	.00	PIPE	
1152.917	3556.107	2.874	3558.981	104.00	9.70	1.46	3560.44	.00	3.00	4.32	4.500	.000	.00	1	.0
.733	.0185					.0048	.00	2.87	1.08	1.95	.013	.00	.00	PIPE	
1153.650	3556.120	2.998	3559.118	104.00	9.24	1.33	3560.44	.00	3.00	4.24	4.500	.000	.00	1	.0

[illegible]

FILE: FHAT3.WSW

W S P G W - EDIT LISTING - Version 14.10

Date:10-18-2021 Time: 4:17:40

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE WIDTH	PIER	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	1			3.500														
CD	2	4	1			2.000														

W S P G W

PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

VILLAGE 29 PHASE 1 INFRASTRUCTURE

HEADING LINE NO 2 IS -

FHAT3

HEADING LINE NO 3 IS -

W S P G W

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A	SYSTEM OUTLET	U/S DATA	STATION	INVERT	SECT	W S ELEV								
				1000.000	3584.060	1	3585.033								
ELEMENT NO	2 IS A	REACH	U/S DATA	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H					
				1010.470	3585.430	1	.013	.000	.000	1					
ELEMENT NO	3 IS A	JUNCTION	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
				1010.480	3585.431	1	2	0	.013	4.000	.000	3585.431	.000	90.000	.000
												RADIUS	ANGLE		
												.000	.000		
ELEMENT NO	4 IS A	REACH	U/S DATA	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H					
				1010.490	3585.432	1	.013	.000	.000	1					
ELEMENT NO	5 IS A	REACH	U/S DATA	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H					
				1096.590	3586.290	1	.013	.000	.000	1					
ELEMENT NO	6 IS A	SYSTEM HEADWORKS	U/S DATA	STATION	INVERT	SECT	W S ELEV								
				1096.590	3586.290	1	3586.290								

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	3584.061	1.714	3585.775	69.00	14.73	3.37	3589.14	.00	2.60	3.50	3.500	.000	.00	1 .0
.781	.1308					.0198	.02	1.71	2.24	1.03	.013	.00	.00	PIPE
1000.781	3584.163	1.736	3585.899	69.00	14.49	3.26	3589.16	.00	2.60	3.50	3.500	.000	.00	1 .0
2.044	.1308					.0182	.04	1.74	2.19	1.03	.013	.00	.00	PIPE
1002.825	3584.430	1.802	3586.232	69.00	13.81	2.96	3589.20	.00	2.60	3.50	3.500	.000	.00	1 .0
1.736	.1308					.0160	.03	1.80	2.04	1.03	.013	.00	.00	PIPE
1004.561	3584.657	1.872	3586.529	69.00	13.17	2.69	3589.22	.00	2.60	3.49	3.500	.000	.00	1 .0
1.473	.1308					.0141	.02	1.87	1.89	1.03	.013	.00	.00	PIPE
1006.034	3584.850	1.945	3586.795	69.00	12.56	2.45	3589.24	.00	2.60	3.48	3.500	.000	.00	1 .0
1.222	.1308					.0125	.02	1.95	1.76	1.03	.013	.00	.00	PIPE
1007.255	3585.010	2.023	3587.033	69.00	11.97	2.23	3589.26	.00	2.60	3.46	3.500	.000	.00	1 .0
1.013	.1308					.0110	.01	2.02	1.63	1.03	.013	.00	.00	PIPE
1008.268	3585.142	2.104	3587.246	69.00	11.42	2.02	3589.27	.00	2.60	3.43	3.500	.000	.00	1 .0
.801	.1308					.0098	.01	2.10	1.52	1.03	.013	.00	.00	PIPE
1009.069	3585.247	2.191	3587.438	69.00	10.88	1.84	3589.28	.00	2.60	3.39	3.500	.000	.00	1 .0
.616	.1308					.0086	.01	2.19	1.40	1.03	.013	.00	.00	PIPE
1009.685	3585.327	2.283	3587.611	69.00	10.38	1.67	3589.28	.00	2.60	3.33	3.500	.000	.00	1 .0
.439	.1308					.0077	.00	2.28	1.30	1.03	.013	.00	.00	PIPE

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
1010.124	3585.385	2.381	3587.766	69.00	9.90	1.52	3589.29	.00	2.60	3.26	3.500	.000	.00	1 .0
.260	.1308					.0068	.00	2.38	1.19	1.03	.013	.00	.00	PIPE
1010.384	3585.419	2.487	3587.906	69.00	9.43	1.38	3589.29	.00	2.60	3.17	3.500	.000	.00	1 .0
.086	.1308					.0061	.00	2.49	1.10	1.03	.013	.00	.00	PIPE
1010.470	3585.430	2.603	3588.033	69.00	8.99	1.26	3589.29	.00	2.60	3.06	3.500	.000	.00	1 .0
JUNCT STR	.0976					.0047	.00	2.60	1.00		.013	.00	.00	PIPE
1010.480	3585.431	3.198	3588.629	65.00	7.05	.77	3589.40	.00	2.53	1.96	3.500	.000	.00	1 .0
.010	.0976					.0036	.00	3.20	.57	1.08	.013	.00	.00	PIPE
1010.490	3585.432	3.197	3588.629	65.00	7.05	.77	3589.40	.00	2.53	1.97	3.500	.000	.00	1 .0
18.773	.0100					.0038	.07	3.20	.57	2.05	.013	.00	.00	PIPE
1029.263	3585.619	3.003	3588.622	65.00	7.40	.85	3589.47	.00	2.53	2.44	3.500	.000	.00	1 .0
4.158	.0100					.0039	.02	3.00	.69	2.05	.013	.00	.00	PIPE
1033.422	3585.660	2.954	3588.615	65.00	7.50	.87	3589.49	.00	2.53	2.54	3.500	.000	.00	1 .0
HYDRAULIC JUMP														
1033.422	3585.660	2.143	3587.803	65.00	10.53	1.72	3589.52	.00	2.53	3.41	3.500	.000	.00	1 .0

FILE: FHLAT3.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

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Date:10-18-2021 Time: 4:24:40

PAGE 1

CD	1	4	1	4.000
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W S P G W

PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

VILLAGE 29 PHASE 1 INFRASTRUCTURE

HEADING LINE NO 2 IS -

FHLAT4

HEADING LINE NO 3 IS -

W S P G W

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT
----------	---------	--------	------

W S ELEV

1000.000	3609.230	1
----------	----------	---

3616.034

REACH * * *

N
-013

RADIUS	ANGLE	ANG PT	MAN H
.000	.000	45.000	1

ELEMENT NO	3	IS A REACH	*	*	*
------------	---	------------	---	---	---

U/S DATA	STATION	INVERT	SECT
----------	---------	--------	------

N
013

RADIUS	ANGLE	ANG PT	MAN H
.000	.000	45.000	1

ELEMENT NO 4 IS A SYSTEM HEADWORKS *

U/S DATA	STATION	INVERT	SECT
----------	---------	--------	------

W S ELEV

1057.410 3612.720 1

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
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	3609.230	6.804	3616.034	105.00	8.36	1.08	3617.12	.00	3.10	.00	4.000	.000	.00	1 .0
13.650	.0103					.0053	.07	6.80	.00	2.52	.013	.00	.00	PIPE
1013.650	3609.370	6.952	3616.322	105.00	8.36	1.08	3617.41	.00	3.10	.00	4.000	.000	.00	1 .0
43.760	.0766					.0053	.23	6.95	.00	1.40	.013	.00	.00	PIPE
1057.410	3612.720	4.051	3616.771	105.00	8.36	1.08	3617.86	.00	3.10	.00	4.000	.000	.00	1 .0

T1	VILLAGE 29	PHASE 1	INFRASTRUCTURE							0
T2	FHLAT5									
T3										
SO	1000.0003609.230	1					3616.034			
R	1059.4503620.470	1		.013				.000	.000	1
JX	1059.4603620.471	1	2	2.013	7.250		7.2503620.4713620.471	80.0-45.0		.000
R	1211.9603628.100	1		.013				.000	.000	1
R	1440.3603644.090	1		.013				.000	.000	1
R	1736.2603664.800	1		.013				.000	.000	1
JX	1736.2703664.801	1	2	.013	7.250		3664.801	80.0		.000
R	1747.9903665.630	1		.013				.000	-55.000	1
R	1748.0003665.631	1		.013				.000	.000	1
JX	1748.0103665.632	1	1	.013	7.250		3665.632	-90.0		.000
R	1748.0203665.633	1		.013				.000	-35.000	1
R	1908.7503667.220	1		.013				.000	.000	1
SH	1908.7503667.220	1					3667.220			
CD	1	4	1	.000	3.500	.000	.000	.000	.00	
CD	2	4	1	.000	2.000	.000	.000	.000	.00	
Q				38.000	.0					

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INVERT DROP	CHANNEL DEFINITION LISTING										PAGE Y(10)
										Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)		

CD	1	4	1	3.500
CD	2	4	1	2.000

W S P G W

PAGE NO 1

W S F G W
WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

VILLAGE 29 PHASE 1 INFRASTRUCTURE

HEADING LINE NO 2 IS -

FHLAT5

HEADING LINE NO 3 IS -

W S P G W

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS A SYSTEM OUTLET	STATION	INVERT	SECT	W S ELEV									
		U/S DATA	1000.000	3609.230	1	3616.034									
ELEMENT NO	2	IS A REACH	STATION	INVERT	SECT	N					RADIUS	ANGLE	ANG PT	MAN H	
		U/S DATA	1059.450	3620.470	1	.013					.000	.000	.000	1	
ELEMENT NO	3	IS A JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
		U/S DATA	1059.460	3620.471	1	2	2	.013	7.250	7.250	3620.471	3620.471	80.000	-45.000	
											RADIUS	ANGLE			
											.000	.000			
ELEMENT NO	4	IS A REACH	STATION	INVERT	SECT	N					RADIUS	ANGLE	ANG PT	MAN H	
		U/S DATA	1211.960	3628.100	1	.013					.000	.000	.000	1	
ELEMENT NO	5	IS A REACH	STATION	INVERT	SECT	N					RADIUS	ANGLE	ANG PT	MAN H	
		U/S DATA	1440.360	3644.090	1	.013					.000	.000	.000	1	
ELEMENT NO	6	IS A REACH	STATION	INVERT	SECT	N					RADIUS	ANGLE	ANG PT	MAN H	
		U/S DATA	1736.260	3664.800	1	.013					.000	.000	.000	1	
ELEMENT NO	7	IS A JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
		U/S DATA	1736.270	3664.801	1	2	0	.013	7.250	.000	3664.801	.000	80.000	.000	
											RADIUS	ANGLE			
											.000	.000			
ELEMENT NO	8	IS A REACH	STATION	INVERT	SECT	N					RADIUS	ANGLE	ANG PT	MAN H	
		U/S DATA	1747.990	3665.630	1	.013					.000	.000	-55.000	1	
ELEMENT NO	9	IS A REACH	STATION	INVERT	SECT	N					RADIUS	ANGLE	ANG PT	MAN H	
		U/S DATA	1748.000	3665.631	1	.013					.000	.000	.000	1	
ELEMENT NO	10	IS A JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
		U/S DATA	1748.010	3665.632	1	1	0	.013	7.250	.000	3665.632	.000	-90.000	.000	
											RADIUS	ANGLE			
											.000	.000			
W S P G W															
WATER SURFACE PROFILE - ELEMENT CARD LISTING													PAGE NO	3	
ELEMENT NO	11	IS A REACH	STATION	INVERT	SECT	N					RADIUS	ANGLE	ANG PT	MAN H	
		U/S DATA	1748.020	3665.633	1	.013					.000	.000	-35.000	1	
ELEMENT NO	12	IS A REACH	STATION	INVERT	SECT	N					RADIUS	ANGLE	ANG PT	MAN H	
		U/S DATA	1908.750	3667.220	1	.013					.000	.000	.000	1	
ELEMENT NO	13	IS A SYSTEM HEADWORKS	STATION	INVERT	SECT										
		U/S DATA	1908.750	3667.220	1					W S ELEV 3667.220					

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	3609.230	6.804	3616.034	67.00	6.96	.75	3616.79	.00	2.57	.00	3.500	.000	.00	1 .0
3.990	.1891					.0044	.02	6.80	.00	.93	.013	.00	.00	PIPE
1003.990	3609.984	6.068	3616.052	67.00	6.96	.75	3616.80	.00	2.57	.00	3.500	.000	.00	1 .0
HYDRAULIC JUMP														
1003.990	3609.984	1.082	3611.067	67.00	26.46	10.87	3621.94	.00	2.57	3.24	3.500	.000	.00	1 .0
6.610	.1891					.0985	.65	1.08	5.27	.93	.013	.00	.00	PIPE
1010.600	3611.234	1.107	3612.341	67.00	25.65	10.21	3622.55	.00	2.57	3.26	3.500	.000	.00	1 .0
8.834	.1891					.0884	.78	1.11	5.04	.93	.013	.00	.00	PIPE
1019.434	3612.904	1.146	3614.050	67.00	24.45	9.28	3623.33	.00	2.57	3.28	3.500	.000	.00	1 .0
7.201	.1891					.0774	.56	1.15	4.72	.93	.013	.00	.00	PIPE
1026.635	3614.266	1.186	3615.452	67.00	23.31	8.44	3623.89	.00	2.57	3.31	3.500	.000	.00	1 .0
5.982	.1891					.0678	.41	1.19	4.41	.93	.013	.00	.00	PIPE
1032.616	3615.396	1.228	3616.625	67.00	22.23	7.67	3624.30	.00	2.57	3.34	3.500	.000	.00	1 .0
5.042	.1891					.0594	.30	1.23	4.12	.93	.013	.00	.00	PIPE
1037.658	3616.350	1.272	3617.622	67.00	21.19	6.98	3624.60	.00	2.57	3.37	3.500	.000	.00	1 .0
4.295	.1891					.0521	.22	1.27	3.85	.93	.013	.00	.00	PIPE
1041.953	3617.162	1.318	3618.480	67.00	20.21	6.34	3624.82	.00	2.57	3.39	3.500	.000	.00	1 .0
3.694	.1891					.0457	.17	1.32	3.60	.93	.013	.00	.00	PIPE

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
1045.647	3617.860	1.365	3619.225	67.00	19.27	5.76	3624.99	.00	2.57	3.41	3.500	.000	.00	1 .0
3.183	.1891					.0401	.13	1.37	3.36	.93	.013	.00	.00	PIPE
1048.829	3618.462	1.415	3619.877	67.00	18.37	5.24	3625.12	.00	2.57	3.44	3.500	.000	.00	1 .0
2.759	.1891					.0352	.10	1.42	3.14	.93	.013	.00	.00	PIPE
1051.588	3618.983	1.467	3620.450	67.00	17.52	4.76	3625.21	.00	2.57	3.45	3.500	.000	.00	1 .0
2.397	.1891					.0309	.07	1.47	2.93	.93	.013	.00	.00	PIPE
1053.985	3619.437	1.521	3620.958	67.00	16.70	4.33	3625.29	.00	2.57	3.47	3.500	.000	.00	1 .0
2.086	.1891					.0272	.06	1.52	2.74	.93	.013	.00	.00	PIPE
1056.072	3619.831	1.577	3621.408	67.00	15.92	3.94	3625.35	.00	2.57	3.48	3.500	.000	.00	1 .0
1.810	.1891					.0239	.04	1.58	2.55	.93	.013	.00	.00	PIPE
1057.881	3620.173	1.636	3621.809	67.00	15.18	3.58	3625.39	.00	2.57	3.49	3.500	.000	.00	1 .0
1.568	.1891					.0210	.03	1.64	2.38	.93	.013	.00	.00	PIPE
1059.450	3620.470	1.698	3622.168	67.00	14.48	3.25	3625.42	.00	2.57	3.50	3.500	.000	.00	1 .0
JUNCT STR	.0976					.0359	.00	1.70	2.22		.013	.00	.00	PIPE
1059.460	3620.471	1.138	3621.608	52.50	19.36	5.82	3627.43	.00	2.27	3.28	3.500	.000	.00	1 .0

38.468 .0500 .0529 2.04 1.14 3.75 1.15 .013 .00 .00 PIPE
1097.927 3622.395 1.129 3623.524 52.50 19.56 5.94 3629.47 .00 2.27 3.27 3.500 .000 .00 1 .0
74.494 .0500 .0575 4.28 1.13 3.81 1.15 .013 .00 .00 PIPE
▲ FILE: FHLAT5.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 3074
WATER SURFACE PROFILE LISTING Date:10-18-2021 Time: 5: 9: 7
VILLAGE 29 PHASE 1 INFRASTRUCTURE
FHLAT5

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 *****

1172.422 3626.122 1.090 3627.212 52.50 20.52 6.54 3633.75 .00 2.27 3.24 3.500 .000 .00 1 .0
39.538 .0500 .0656 2.60 1.09 4.07 1.15 .013 .00 .00 PIPE
1211.960 3628.100 1.054 3629.154 52.50 21.52 7.19 3636.34 .00 2.27 3.21 3.500 .000 .00 1 .0
88.664 .0700 .0700 6.21 1.05 4.35 1.05 .013 .00 .00 PIPE
1300.624 3634.307 1.054 3635.361 52.50 21.52 7.19 3642.55 .00 2.27 3.21 3.500 .000 .00 1 .0
139.736 .0700 .0699 9.76 1.05 4.35 1.05 .013 .00 .00 PIPE
1440.360 3644.091 1.055 3645.146 52.50 21.48 7.17 3652.31 .00 2.27 3.21 3.500 .000 .00 1 .0
132.460 .0700 .0661 8.76 1.06 4.34 1.05 .013 .00 .00 PIPE
1572.820 3653.361 1.084 3654.445 52.50 20.67 6.64 3661.08 .00 2.27 3.24 3.500 .000 .00 1 .0
50.130 .0700 .0587 2.94 1.08 4.11 1.05 .013 .00 .00 PIPE
1622.949 3656.870 1.122 3657.992 52.50 19.71 6.03 3664.03 .00 2.27 3.27 3.500 .000 .00 1 .0
27.398 .0700 .0514 1.41 1.12 3.85 1.05 .013 .00 .00 PIPE
1650.347 3658.787 1.162 3659.949 52.50 18.80 5.49 3665.43 .00 2.27 3.30 3.500 .000 .00 1 .0
18.359 .0700 .0451 .83 1.16 3.60 1.05 .013 .00 .00 PIPE
1668.707 3660.072 1.203 3661.275 52.50 17.92 4.99 3666.26 .00 2.27 3.32 3.500 .000 .00 1 .0
13.453 .0700 .0395 .53 1.20 3.36 1.05 .013 .00 .00 PIPE
1682.160 3661.014 1.246 3662.260 52.50 17.09 4.53 3666.79 .00 2.27 3.35 3.500 .000 .00 1 .0
10.406 .0700 .0346 .36 1.25 3.14 1.05 .013 .00 .00 PIPE
▲ FILE: FHLAT5.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 4

Program Package Serial Number: 3074
WATER SURFACE PROFILE LISTING Date:10-18-2021 Time: 5: 9: 7
VILLAGE 29 PHASE 1 INFRASTRUCTURE
FHLAT5

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 *****

1692.566 3661.742 1.290 3663.032 52.50 16.29 4.12 3667.15 .00 2.27 3.38 3.500 .000 .00 1 .0
8.266 .0700 .0304 .25 1.29 2.94 1.05 .013 .00 .00 PIPE
1700.833 3662.321 1.337 3663.658 52.50 15.53 3.75 3667.40 .00 2.27 3.40 3.500 .000 .00 1 .0
6.748 .0700 .0266 .18 1.34 2.75 1.05 .013 .00 .00 PIPE
1707.581 3662.793 1.385 3664.178 52.50 14.81 3.41 3667.58 .00 2.27 3.42 3.500 .000 .00 1 .0
5.548 .0700 .0234 .13 1.39 2.56 1.05 .013 .00 .00 PIPE
1713.129 3663.181 1.436 3664.617 52.50 14.12 3.10 3667.71 .00 2.27 3.44 3.500 .000 .00 1 .0
4.639 .0700 .0205 .10 1.44 2.39 1.05 .013 .00 .00 PIPE
1717.767 3663.506 1.488 3664.994 52.50 13.46 2.81 3667.81 .00 2.27 3.46 3.500 .000 .00 1 .0
3.866 .0700 .0180 .07 1.49 2.24 1.05 .013 .00 .00 PIPE
1721.633 3663.776 1.543 3665.320 52.50 12.84 2.56 3667.88 .00 2.27 3.48 3.500 .000 .00 1 .0
3.243 .0700 .0158 .05 1.54 2.09 1.05 .013 .00 .00 PIPE
1724.876 3664.003 1.600 3665.604 52.50 12.24 2.33 3667.93 .00 2.27 3.49 3.500 .000 .00 1 .0

2.702	.0700						.0139	.04	1.60	1.94	1.05	.013	.00	.00	PIPE
1727.578	3664.193	1.660	3665.853	52.50	11.67	2.11	3667.97	.00	2.27	3.50	3.500	.000	.00	1	.0
2.239	.0700						.0122	.03	1.66	1.81	1.05	.013	.00	.00	PIPE
1729.816	3664.349	1.723	3666.073	52.50	11.13	1.92	3668.00	.00	2.27	3.50	3.500	.000	.00	1	.0
1.837	.0700						.0108	.02	1.72	1.69	1.05	.013	.00	.00	PIPE

FILE: FHLAT5.WSW
 W S P G W - CIVILDESIGN Version 14.08
 Program Package Serial Number: 3074
 WATER SURFACE PROFILE LISTING
 VILLAGE 29 PHASE 1 INFRASTRUCTURE
 FHLAT5
 Date:10-18-2021 Time: 5: 9: 7
 PAGE 5

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
1731.654	3664.478	1.789	3666.267	52.50	10.61	1.75	3668.01	.00	2.27	3.50	3.500	.000	.00	1 .0
1.486	.0700					.0095	.01	1.79	1.57	1.05	.013	.00	.00	PIPE
1733.140	3664.582	1.858	3666.440	52.50	10.12	1.59	3668.03	.00	2.27	3.49	3.500	.000	.00	1 .0
1.160	.0700					.0084	.01	1.86	1.46	1.05	.013	.00	.00	PIPE
1734.299	3664.663	1.931	3666.594	52.50	9.64	1.44	3668.04	.00	2.27	3.48	3.500	.000	.00	1 .0
.884	.0700					.0074	.01	1.93	1.36	1.05	.013	.00	.00	PIPE
1735.183	3664.725	2.007	3666.732	52.50	9.20	1.31	3668.05	.00	2.27	3.46	3.500	.000	.00	1 .0
.605	.0700					.0065	.00	2.01	1.26	1.05	.013	.00	.00	PIPE
1735.788	3664.767	2.088	3666.855	52.50	8.77	1.19	3668.05	.00	2.27	3.43	3.500	.000	.00	1 .0
.366	.0700					.0058	.00	2.09	1.17	1.05	.013	.00	.00	PIPE
1736.154	3664.793	2.173	3666.966	52.50	8.36	1.09	3668.05	.00	2.27	3.40	3.500	.000	.00	1 .0
.106	.0700					.0051	.00	2.17	1.08	1.05	.013	.00	.00	PIPE
1736.260	3664.800	2.266	3667.066	52.50	7.97	.99	3668.05	.00	2.27	3.34	3.500	.000	.00	1 .0
JUNCT STR	.0976					.0033	.00	2.27	1.00		.013	.00	.00	PIPE
1736.270	3664.801	3.001	3667.802	45.25	5.15	.41	3668.21	.00	2.10	2.45	3.500	.000	.00	1 .0
.854	.0707					.0019	.00	3.00	.48	.97	.013	.00	.00	PIPE
1737.124	3664.861	2.924	3667.785	45.25	5.27	.43	3668.22	.00	2.10	2.60	3.500	.000	.00	1 .0

HYDRAULIC JUMP
 FILE: FHLAT5.WSW
 W S P G W - CIVILDESIGN Version 14.08
 Program Package Serial Number: 3074
 WATER SURFACE PROFILE LISTING
 VILLAGE 29 PHASE 1 INFRASTRUCTURE
 FHLAT5
 Date:10-18-2021 Time: 5: 9: 7
 PAGE 6

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
1737.124	3664.861	1.471	3666.333	45.25	11.79	2.16	3668.49	.00	2.10	3.46	3.500	.000	.00	1 .0
.060	.0707					.0149	.00	1.47	1.97	.97	.013	.00	.00	PIPE
1737.184	3664.865	1.471	3666.337	45.25	11.78	2.16	3668.49	.00	2.10	3.46	3.500	.000	.00	1 .0
2.500	.0707					.0139	.03	1.47	1.97	.97	.013	.00	.00	PIPE
1739.683	3665.042	1.525	3666.567	45.25	11.23	1.96	3668.53	.00	2.10	3.47	3.500	.000	.00	1 .0
2.071	.0707					.0123	.03	1.53	1.84	.97	.013	.00	.00	PIPE
1741.754	3665.189	1.582	3666.771	45.25	10.71	1.78	3668.55	.00	2.10	3.48	3.500	.000	.00	1 .0
1.717	.0707					.0108	.02	1.58	1.71	.97	.013	.00	.00	PIPE
1743.471	3665.310	1.641	3666.951	45.25	10.21	1.62	3668.57	.00	2.10	3.49	3.500	.000	.00	1 .0
1.391	.0707					.0095	.01	1.64	1.60	.97	.013	.00	.00	PIPE

1744.862	3665.408	1.703	3667.112	45.25	9.74	1.47	3668.58	.00	2.10	3.50	3.500	.000	.00	1	.0
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1.103	.0707					.0083	.01	1.70	1.49	.97	.013	.00	.00	PIPE	
1745.965	3665.487	1.768	3667.255	45.25	9.28	1.34	3668.59	.00	2.10	3.50	3.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
.847	.0707					.0073	.01	1.77	1.39	.97	.013	.00	.00	PIPE	
1746.812	3665.546	1.836	3667.383	45.25	8.85	1.22	3668.60	.00	2.10	3.50	3.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
.616	.0707					.0065	.00	1.84	1.29	.97	.013	.00	.00	PIPE	
1747.428	3665.590	1.907	3667.497	45.25	8.44	1.11	3668.60	.00	2.10	3.49	3.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
.393	.0707					.0057	.00	1.91	1.20	.97	.013	.00	.00	PIPE	

FILE: FHLAT5.WSW
 W S P G W - CIVILDESIGN Version 14.08
 Program Package Serial Number: 3074
 WATER SURFACE PROFILE LISTING
 VILLAGE 29 PHASE 1 INFRASTRUCTURE
 FHLAT5
 Date:10-18-2021 Time: 5: 9: 7
 PAGE 7

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
1747.821	3665.618	1.982	3667.600	45.25	8.05	1.01	3668.61	.00	2.10	3.47	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
.169	.0707					.0050	.00	1.98	1.11	.97	.013	.00	.00	PIPE
1747.990	3665.630	2.062	3667.692	45.25	7.67	.91	3668.61	.00	2.10	3.44	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
.010	.1220					.0046	.00	2.06	1.03	.85	.013	.00	.00	PIPE
1748.000	3665.631	2.098	3667.729	45.25	7.52	.88	3668.61	.00	2.10	3.43	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
JUNCT STR	.0976					.0030	.00	2.10	1.00		.013	.00	.00	PIPE
1748.010	3665.632	2.818	3668.449	38.00	4.58	.33	3668.78	.00	1.92	2.77	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
.010	.0976					.0015	.00	2.82	.47	.82	.013	.00	.00	PIPE
1748.020	3665.633	2.817	3668.450	38.00	4.58	.33	3668.78	.00	1.92	2.77	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
12.254	.0099					.0016	.02	2.82	.47	1.50	.013	.00	.00	PIPE
1760.274	3665.754	2.682	3668.436	38.00	4.80	.36	3668.79	.00	1.92	2.96	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
10.578	.0099					.0017	.02	2.68	.52	1.50	.013	.00	.00	PIPE
1770.852	3665.859	2.560	3668.419	38.00	5.04	.39	3668.81	.00	1.92	3.10	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
9.010	.0099					.0019	.02	2.56	.57	1.50	.013	.00	.00	PIPE
1779.863	3665.948	2.449	3668.397	38.00	5.28	.43	3668.83	.00	1.92	3.21	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
5.018	.0099					.0021	.01	2.45	.62	1.50	.013	.00	.00	PIPE
1784.881	3665.997	2.384	3668.381	38.00	5.44	.46	3668.84	.00	1.92	3.26	3.500	.000	.00	1 .0
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HYDRAULIC JUMP
 FILE: FHLAT5.WSW
 W S P G W - CIVILDESIGN Version 14.08
 Program Package Serial Number: 3074
 WATER SURFACE PROFILE LISTING
 VILLAGE 29 PHASE 1 INFRASTRUCTURE
 FHLAT5
 Date:10-18-2021 Time: 5: 9: 7
 PAGE 8

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
1784.881	3665.997	1.519	3667.516	38.00	9.49	1.40	3668.91	.00	1.92	3.47	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
25.914	.0099					.0092	.24	1.52	1.56	1.50	.013	.00	.00	PIPE
1810.795	3666.253	1.530	3667.783	38.00	9.39	1.37	3669.15	.00	1.92	3.47	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
50.951	.0099					.0085	.44	1.53	1.53	1.50	.013	.00	.00	PIPE
1861.745	3666.756	1.587	3668.343	38.00	8.96	1.25	3669.59	.00	1.92	3.48	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
22.996	.0099					.0075	.17	1.59	1.43	1.50	.013	.00	.00	PIPE
1884.742	3666.983	1.646	3668.629	38.00	8.54	1.13	3669.76	.00	1.92	3.49	3.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
12.549	.0099					.0066	.08	1.65	1.33	1.50	.013	.00	.00	PIPE

1897.290	3667.107	1.708	3668.815	38.00	8.14	1.03	3669.84	.00	1.92	3.50	3.500	.000	.00	1	.0
7.052	.0099					.0058	.04	1.71	1.24	1.50	.013	.00	.00	PIPE	
1904.343	3667.177	1.773	3668.950	38.00	7.76	.94	3669.89	.00	1.92	3.50	3.500	.000	.00	1	.0
3.390	.0099					.0051	.02	1.77	1.16	1.50	.013	.00	.00	PIPE	
1907.732	3667.210	1.842	3669.052	38.00	7.40	.85	3669.90	.00	1.92	3.50	3.500	.000	.00	1	.0
1.018	.0099					.0045	.00	1.84	1.08	1.50	.013	.00	.00	PIPE	
1908.750	3667.220	1.915	3669.135	38.00	7.05	.77	3669.91	.00	1.92	3.48	3.500	.000	.00	1	.0

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T1	VILLAGE 29 PHASE 1 INFRASTRUCTURE										0
T2	GPBLAT6										
T3											
SO	1000.000	3613.780	1						3619.234		
R	1110.510	3614.330	1	.013						.000	.000 1
JX	1110.520	3614.331	2 2	.013	5.500			3614.331		-45.0	.000
R	1110.530	3614.332	2	.013						.000	85.000 1
R	1172.910	3615.578	2	.013						.000	.000 1
SH	1172.910	3615.578	2					3615.578			
CD	1 4 1	.000	2.500	.000	.000	.000	.00				
CD	2 4 1	.000	2.000	.000	.000	.000	.00				
Q		5.500	.0								

FILE: GPBLAT6.WSW

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Date:10-19-2021 Time: 8:10:53

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

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

W S P G W

PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

VILLAGE 29 PHASE 1 INFRASTRUCTURE

HEADING LINE NO 2 IS -

GPBLAT6

HEADING LINE NO 3 IS -

W S P G W

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	IS A	SYSTEM OUTLET	STATION	INVERT	SECT	W S ELEV	RADIUS	ANGLE	ANG PT	MAN H
1	IS A	SYSTEM OUTLET	1000.000	3613.780	1	3619.234				
2	IS A	REACH	1110.510	3614.330	1		.000	.000	.000	1
3	IS A	JUNCTION	1110.520	3614.331	2		.000	.000	.000	1
4	IS A	REACH	1110.530	3614.332	2		.000	.000	85.000	1
5	IS A	REACH	1172.910	3615.578	2		.000	.000	.000	1
6	IS A	SYSTEM HEADWORKS	1172.910	3615.578	2	3615.578				

VILLAGE 29 PHASE 1 INFRASTRUCTURE
GPBLAT6

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt or I.D.	ZL	No Wth	Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type	Ch
1000.000	3613.780	5.454	3619.234	11.00	2.24	.08	3619.31	.00	1.11	.00	2.500	.000	.00	1	.0
110.510	.0050					.0007	.08	5.45	.00	1.07	.013	.00	.00	PIPE	
1110.510	3614.330	4.987	3619.317	11.00	2.24	.08	3619.40	.00	1.11	.00	2.500	.000	.00	1	.0
JUNCT STR	.0976					.0007	.00	4.99	.00		.013	.00	.00	PIPE	
1110.520	3614.331	5.050	3619.381	5.50	1.75	.05	3619.43	.00	.83	.00	2.000	.000	.00	1	.0
.010	.0976					.0006	.00	5.05	.00	.38	.013	.00	.00	PIPE	
1110.530	3614.332	5.064	3619.396	5.50	1.75	.05	3619.44	.00	.83	.00	2.000	.000	.00	1	.0
62.380	.0200					.0006	.04	5.06	.00	.56	.013	.00	.00	PIPE	
1172.910	3615.578	3.858	3619.436	5.50	1.75	.05	3619.48	.00	.83	.00	2.000	.000	.00	1	.0

References



UPDATE #2 TO THE MASTER DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 29

62029-300

September 2021

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