DS #: 4501

APN: 126-13-110-016

PROJECT: CLIFF'S EDGE PODS 201 & 203 - UNIT 5 (AKA CAMBRIDGE VILLAS / CAMBRIDGE CROSSING)

SUBMITTAL: 2ND

SCANNED BY/DATE:

CHECKED BY/DATE:

ADDENDUM # 1
TO UPDATE #3 TO
TECHNICAL DRAINAGE STUDY

FOR

CLIFF'S EDGE
PODS 201 & 203 – UNIT 5
(aka Cambridge Villas/Cambridge Crossing)

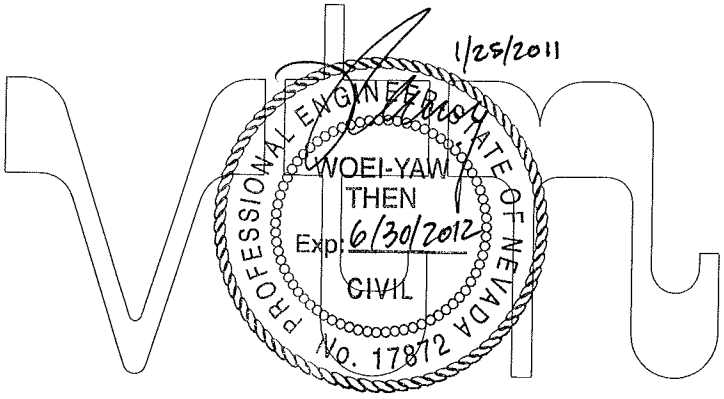
CITY OF LAS VEGAS

W.O. # 6335-5

Prepared for:
KB HOME

Submitted to:
CITY OF LAS VEGAS

DEPARTMENT OF PUBLIC WORKS



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HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Cliffs Edge PODS 201 and 203 - Unit 5 Date: 1/25/2011

Location of Development: a) Descriptive (Cross Streets) North/South: Puli Road

East/West: Grand Teton

b) Section: 13 Township: 19S Range: 59E

c) APN : 126-13-110-016

Name of Owner: KB Home

Telephone No.: 702-266-8400 Fax No.: 702-266-8623 E-Mail Address: jlove@kbhome.com

Address: 5655 Badura Ave., Las Vegas NV 89118

Contact Person-Name: Woei Y. Then, P.E. **Telephone No.:** 873-7550

* **E-Mail Address:** woeit@vtnnv.com **Fax No.:** 362-2597

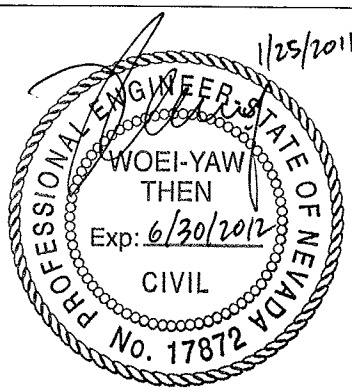
Firm: VTN Nevada

Address: 2727 S. 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		

1. Total Owned Land Area: At Site: 40-acres Being Developed/Disturbed: 6 +/- 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.): Residential
5. Approximate upstream land area which drains to the subject site: 50 +/- acres
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: TDS For POD 201 and 203, Cliffs Edge Master Drainage Study
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Shaumber Road storm drain
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.

Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

vtn nevada
CONSULTING ENGINEERS • PLANNERS • SURVEYORS
PROVIDING QUALITY PROFESSIONAL
SERVICES SINCE 1960

Date 1/25/2011
W.O. # 6335-5

City of Las Vegas
Department of Public Services
731 South Fourth Street
Las Vegas, Nevada 89101

Attention: Mr. Albert Sung, P.E.

SUBJECT: ADDENDUM #1 TO UPDATE #3 for THE TECHNICAL DRAINAGE STUDY FOR: CLIFF'S EDGE PODS 201 & 203 UNIT – 5 (aka Cambridge Villas/Cambridge Crossing)

Mr. Sung

This Addendum #1 to the Update # 3 for Technical Drainage Study for Cliffs Edge PODS 201 & 203 UNIT – 5 is being submitted to the City of Las Vegas, Department of Public Works to address review comments to the above mentioned Technical Drainage Study that were issued on November 10/2010. A meeting was held on 11/18/2010 with City of Las Vegas Flood Control staff to discuss these comments. The responses below reflect the result of the meeting and the follow up discussions after the meeting.

COMMENT

1. 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.

Comment noted.

COMMENT

2. The site is also adjacent to the west half of Puli Road which is a *Clark County* right-of-way. The engineer must coordinate with *Clark County Public Works* and incorporate any concerns for boundary conditions. CCPW concurrence is required prior to final acceptance of the study.

Comment noted.

COMMENT

3. On the west boundary, according to the *HEC-RAS Exhibit*, the *"Min Ch El"* column show uneven bottom elevations which results in uneven flow depths along the river stations. At one point (River Station 3+50.00), the flow depth (or ponding depth) behind the flood wall is 6.7' which is not acceptable. It appears that the existing grades along the back of the proposed flood wall does not provide for positive drainage in a southerly direction. The engineer is advised to meet with Flood Control staff to resolve this issue prior to the submittal of the next addendum.

Based on the meeting with Flood Control staff on 11/18/2010, the street design on Puli Road has been revised to provide positive drainage in the southerly direction, by revising the temporary flowline on Puli Road to match the design subgrade of the approved Puli Road improvement plans. Since the schedule of the construction for Puli Road is currently unknown, the proposed wall on Puli Road will be flood protected to the ultimate condition as shown per the approved Master Drainage Study for Cliffs Edge. Riprap lining along the wall is proposed as temporary erosion protection until the construction of future Puli Road.

Please note that at River Station 3+50.00, the actual water depth is 1.43'. The depth of 6.7' was the difference of the minimum channel elevation and the water surface elevation, which is incorrect. The cross section submitted previously includes additional area to the west (to show the geometry of the existing ROW) which is much lower that the existing ground. Levee option was used to contain the water closer to the proposed wall as a conservative approach for flood protection. In order to eliminate this confusion, the revised cross sections in this submittal have been truncated to show actually conveyance channel only. The hydraulic calculation (HEC-RAS) and the HEC-RAS Exhibit have been revised accordingly to reflect the changes. Please refer to the Appendix for revised hydraulic calculations.

COMMENT

4. The improvement plan for *Puli Road* had been approved by the *City*. Show the approved design of *Puli* (TC information as future) on the grading plans. Label with *City of Las Vegas* recorded plan number and identify storm drain system with size and type (inlets) on the grading plans.

Comment noted. The approved design for Puli Road with City of Las Vegas plan number has been added to the revised plans in Appendix.

COMMENT

5. The proposed finish floor elevations of Lot 300 to Lot 307 along *Grand Teton Drive* are below the corresponding street elevations. The bottom portion of the boundary wall must provide eighteen (18") inches of freeboard and be constructed with 8"-CMU to be solid grouted. Revise the pertinent detail section accordingly.

Based on the phone conversation with Flood Control staff, it is acceptable to solid grout 2 courses of 8" CMU above the back of sidewalk since it is located just downstream of a highpoint at Grand Teton Drive and Puli Road. Due to the location of the highpoint, it is not anticipated

that there will be any significant flows adjacent to the wall. The pertinent detail section has been revised accordingly, see revised plans in Appendix.

COMMENT

6. **Sheet G1**: Extend a proposed concrete valley gutter along the east boundary northerly to meet *Brighton Beach Avenue*.

The grading for lot 345 has been revised and the need for concrete valley gutter has been eliminated. Please refer to the revised plans in Appendix for detail.

COMMENT

7. Private streets must be public drainage easements. Provide a note on the grading plans "Note: All Private streets are P.U.E., Public Sewer Easements and Public Drainage Easements to be privately maintained by the HOA".

Comment noted. A note has been added to show "Note: All Private streets are P.U.E., Public Drainage Easements to be privately maintained by the HOA." in the revised grading plans.

COMMENT

8. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.

Quantity estimate table for all drainage improvements within Public Drainage Easements has been added to the revised plans in Appendix.

COMMENT

9. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map. The minimum width for a public drainage easement is 10' if the 100-year flow is less than 20 CFS.

Comment noted. Please note that after the meeting with Flood Control staff, it has been decided that the Type B drainage for lot 340 and 341 be replaced with Type A drainage to eliminate the need of drainage easements. Due to the minor grading revision, the drainage basin was revised accordingly to reflect the changes. Please refer to the Appendix for the revised hydrology and hydraulic calculations.

COMMENT

10. All flood wall must be "8"-CMU to be solid grouted". Revise all pertinent details to show as such.

Comment noted.

Responsibility for the all design, plans, information, etc. provided by other engineers for submission within this document remains with that engineer. VTN does not accept responsibility for any item prepared by others included in this document

I hope this addresses your concerns regarding this project. If there are any questions or any additional information is required, please contact this office.

Respectfully Submitted,

VTN Nevada

Woei Y. Then, P.E.

APPENDIX

REVISED DRAINAGE BASIN MAP
AND
FLOW CALCULATIONS

Flow Caluclation by Area Ratio

Pod 201 and 203 - Unit 5 (AD1)

WO# 6335-5

		Basin From Approved TDS						
Basin Name	**Basin Area (ac.)**	**TDS Basin Name**	**Flow 10-YR (cfs)**	**Flow 100-YR (cfs)**	**Basin Area (ac)**	**Ratio[1]**	**Calculated Flow 10-YR[2] (cfs)**	**Calculated Flow 100-YR[3] (cfs)**
A	2.88	ON1D	20	42	13.13	0.22	4.4	9.2
B	0.99	ON2D	3	7	1.91	0.52	1.6	3.6
C	1.24	ON3D	15	32	10.19	0.12	1.8	3.9
D	0.35	ON4D	16	33	9.86	0.04	0.6	1.2
E	0.70	ON4D	16	33	9.86	0.07	1.1	2.4
F	0.06	OND1	20	42	13.13	0.00	0.1	0.2
G	0.12	OND2	3	7	1.91	0.06	0.2	0.4
H	0.03	OND3	15	32	10.19	0.00	0.0	0.1

NOTE: Ratio[1] = (Basin Area)/(Basin Area from Approved Study)

Calculated Flow 10-YR[2] = (Flow 10-YR from Approved TDS) x (Ratio[1])

Calculated Flow 100-YR[3] = (Flow 100-YR from Approved TDS) x (Ratio[1])

REVISED HYDRAULIC CALCULATIONS (FLOWMASTER)

Worksheet for FM1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.65	%
Discharge	12.80	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	2.00
0+00	0.38
0+02	0.00
0+03	0.13
0+03	0.17
0+20	0.51
0+37	0.17
0+37	0.13
0+38	0.00
0+39	0.38
0+39	2.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2.00)	(0+03, 0.17)	0.013
(0+03, 0.17)	(0+37, 0.17)	0.016
(0+37, 0.17)	(0+39, 2.00)	0.013

Options

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

Worksheet for FM1

Results

Normal Depth		0.45	ft
Elevation Range	0.00 to 2.00 ft		
Flow Area		5.52	ft²
Wetted Perimeter		33.51	ft
Hydraulic Radius		0.16	ft
Top Width		33.16	ft
Normal Depth		0.45	ft
Critical Depth		0.45	ft
Critical Slope		0.00650	ft/ft
Velocity		2.32	ft/s
Velocity Head		0.08	ft
Specific Energy		0.54	ft
Froude Number		1.00	
Flow Type	Critical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.45	ft
Critical Depth	0.45	ft
Channel Slope	0.65	%
Critical Slope	0.00650	ft/ft

Messages

Notes

BASIN A + BASIN B = 12.8 CFS (100 YR)

Cross Section for FM1

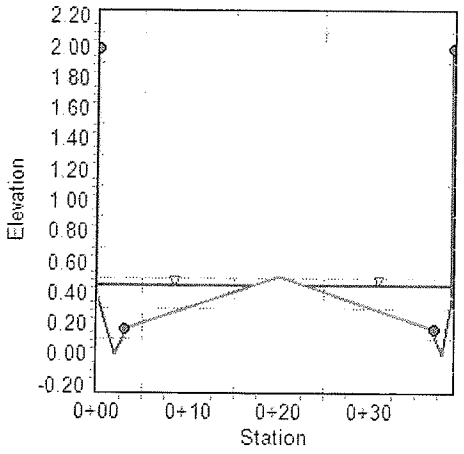
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.65	%
Normal Depth	0.45	ft
Discharge	12.80	ft³/s

Cross Section Image



Worksheet for FM2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Discharge	0.70	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.10
0+07	0.02
0+08	0.00
0+09	0.02
0+09	1.10

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.10)	(0+07, 0.02)	0.025
(0+07, 0.02)	(0+09, 1.10)	0.013

Options

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

Results

Normal Depth		0.15 ft
Elevation Range	0.00 to 1.10 ft	
Flow Area		0.35 ft²
Wetted Perimeter		3.01 ft
Hydraulic Radius		0.11 ft
Top Width		2.87 ft
Normal Depth		0.15 ft

Worksheet for FM2

Results

Critical Depth		0.16	ft
Critical Slope		0.00947	ft/ft
Velocity		2.02	ft/s
Velocity Head		0.06	ft
Specific Energy		0.22	ft
Froude Number		1.02	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.15	ft
Critical Depth	0.16	ft
Channel Slope	1.00	%
Critical Slope	0.00947	ft/ft

Messages

Notes

Basin F + Basin G + Basin H = 0.7 cfs

Cross Section for FM2

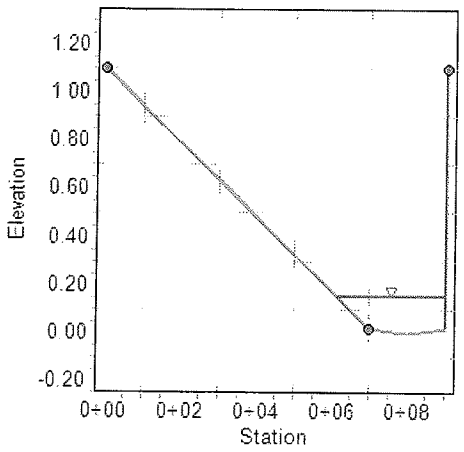
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Normal Depth	0.15	ft
Discharge	0.70	ft^3/s

Cross Section Image



Worksheet for FM3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.27	%
Discharge	5.10	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	2.00
0+00	0.38
0+02	0.00
0+03	0.13
0+03	0.17
0+20	0.51
0+37	0.17
0+37	0.13
0+38	0.00
0+39	0.38
0+39	2.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2.00)	(0+03, 0.17)	0.013
(0+03, 0.17)	(0+37, 0.17)	0.016
(0+37, 0.17)	(0+39, 2.00)	0.013

Options

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

Worksheet for FM3

Results

Normal Depth		0.28	ft
Elevation Range	0.00 to 2.00 ft		
Flow Area		1.30	ft^2
Wetted Perimeter		15.04	ft
Hydraulic Radius		0.09	ft
Top Width		14.86	ft
Normal Depth		0.28	ft
Critical Depth		0.35	ft
Critical Slope		0.00696	ft/ft
Velocity		3.94	ft/s
Velocity Head		0.24	ft
Specific Energy		0.52	ft
Froude Number		2.35	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.28	ft
Critical Depth	0.35	ft
Channel Slope	4.27	%
Critical Slope	0.00696	ft/ft

Messages

Notes

BASIN C + BASIN D = 5.1 CFS (100 YR)

Cross Section for FM3

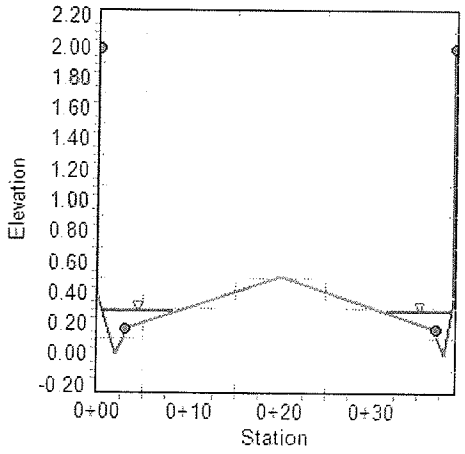
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.27	%
Normal Depth	0.28	ft
Discharge	5.10	ft^3/s

Cross Section Image



Worksheet for FM4

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.09	%
Discharge	5.10	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	2.00
0+00	0.54
0+27	0.00
0+54	0.54
0+54	2.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2.00)	(0+54, 2.00)	0.013

Options

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

Results

Normal Depth	0.18	ft
Elevation Range	0.00 to 2.00 ft	
Flow Area	1.56	ft²
Wetted Perimeter	17.57	ft
Hydraulic Radius	0.09	ft
Top Width	17.57	ft
Normal Depth	0.18	ft
Critical Depth	0.23	ft

Worksheet for FM4

Results

Critical Slope		0.00506	ft/ft
Velocity		3.28	ft/s
Velocity Head		0.17	ft
Specific Energy		0.34	ft
Froude Number		1.94	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.18	ft
Critical Depth	0.23	ft
Channel Slope	2.09	%
Critical Slope	0.00506	ft/ft

Messages

Notes

Basin C + Basin D = 5.1 cfs

Cross Section for FM4

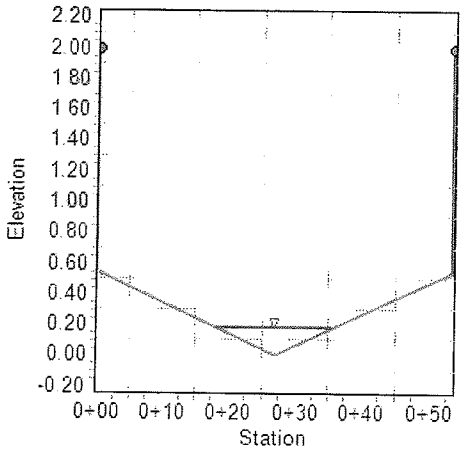
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

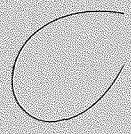
Input Data

Channel Slope	2.09	%
Normal Depth	0.18	ft
Discharge	5.10	ft³/s

Cross Section Image



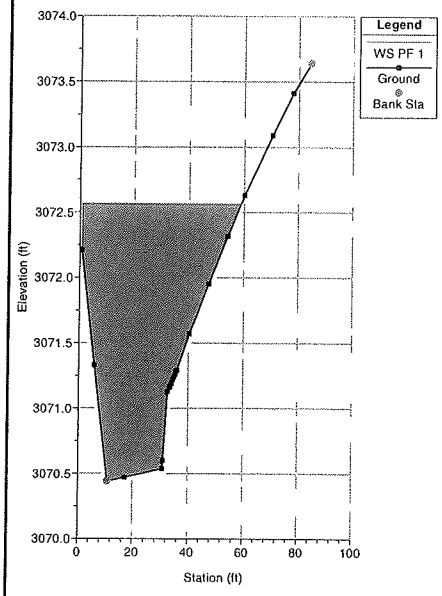
RESPONSE TO COMMENT #3



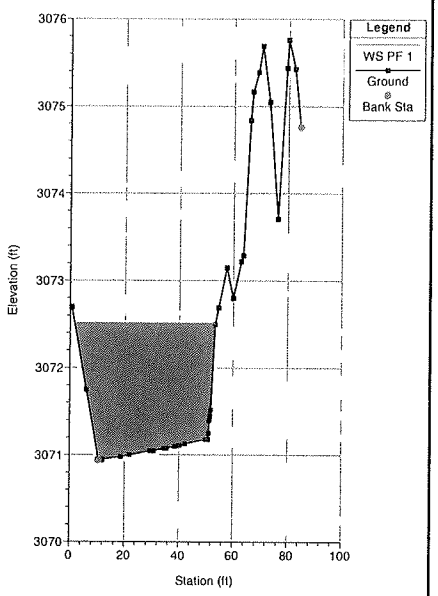
HEC-RAS Plan: Plan 07 River: Puli Reach: PULI-HEC-RAS Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
PULI-HEC-RAS	1003.6	PF 1	127.00	3070.44	3072.56	3071.51	3072.61	0.000627	1.78	75.48	58.10	0.27
PULI-HEC-RAS	950	PF 1	127.00	3070.94	3072.51		3072.57	0.000714	1.99	67.56	51.82	0.29
PULI-HEC-RAS	900	PF 1	127.00	3071.18	3072.07	3072.07	3072.45	0.009698	5.02	26.48	35.40	0.99
PULI-HEC-RAS	850	PF 1	127.00	3068.90	3071.36	3070.47	3071.40	0.000667	1.61	79.30	74.70	0.27
PULI-HEC-RAS	800	PF 1	127.00	3069.56	3070.93	3070.93	3071.28	0.009813	4.82	27.26	38.57	0.98
PULI-HEC-RAS	750	PF 1	127.00	3066.37	3069.62	3068.07	3069.69	0.000909	2.13	60.02	46.86	0.32
PULI-HEC-RAS	700	PF 1	127.00	3068.28	3069.19	3069.19	3069.56	0.009813	4.93	26.91	37.03	0.99
PULI-HEC-RAS	650	PF 1	127.00	3067.25	3068.12	3068.32	3068.84	0.019552	6.96	19.33	27.19	1.40
PULI-HEC-RAS	600	PF 1	127.00	3065.64	3066.50	3066.75	3067.27	0.058891	7.04	18.17	54.08	2.12
PULI-HEC-RAS	550.01	PF 1	127.00	3064.94	3065.76	3065.82	3066.12	0.015069	4.82	26.96	51.54	1.16
PULI-HEC-RAS	500	PF 1	127.00	3064.03	3065.08	3065.10	3065.54	0.009915	5.60	24.27	28.75	1.03
PULI-HEC-RAS	450	PF 1	127.00	3062.96	3063.74	3064.02	3064.69	0.030211	8.00	16.75	26.38	1.70
PULI-HEC-RAS	400	PF 1	127.00	3061.89	3062.51	3062.67	3063.05	0.030352	5.94	21.85	51.22	1.59
PULI-HEC-RAS	350	PF 1	127.00	3060.81	3061.55	3061.62	3061.98	0.015285	5.33	24.60	41.48	1.19
PULI-HEC-RAS	300	PF 1	127.00	3059.74	3060.72	3060.83	3061.27	0.012822	6.09	22.25	28.11	1.15
PULI-HEC-RAS	250	PF 1	127.00	3058.67	3059.48	3059.74	3060.34	0.025998	7.63	17.60	26.66	1.59
PULI-HEC-RAS	200	PF 1	127.00	3057.60	3058.47	3058.66	3059.18	0.019394	6.95	19.38	27.22	1.39
PULI-HEC-RAS	150	PF 1	127.00	3056.91	3058.18	3057.97	3058.47	0.004805	4.43	31.00	30.68	0.74
PULI-HEC-RAS	100	PF 1	127.00	3056.66	3057.83	3057.72	3058.18	0.006520	4.89	27.95	29.83	0.85
PULI-HEC-RAS	50	PF 1	127.00	3056.41	3057.43	3057.43	3057.77	0.010589	4.75	27.98	42.33	1.01
PULI-HEC-RAS	0	PF 1	127.00	3056.16	3056.89	3056.76	3057.02	0.005299	2.96	43.58	78.12	0.69

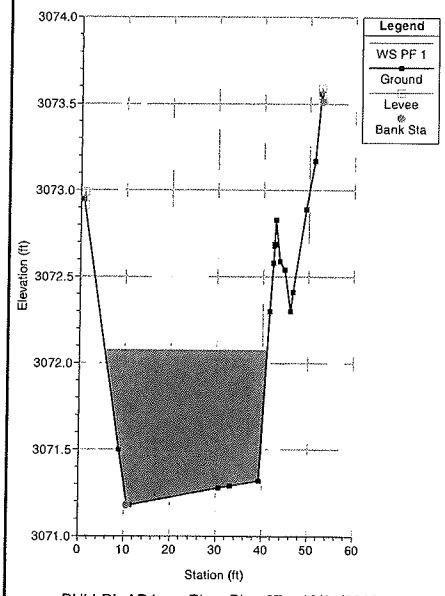
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 1003.6



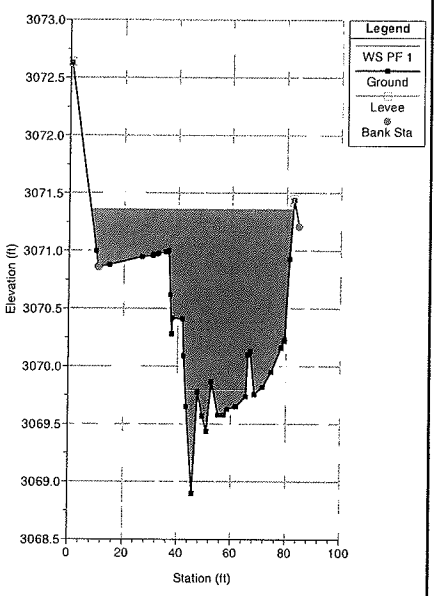
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 950



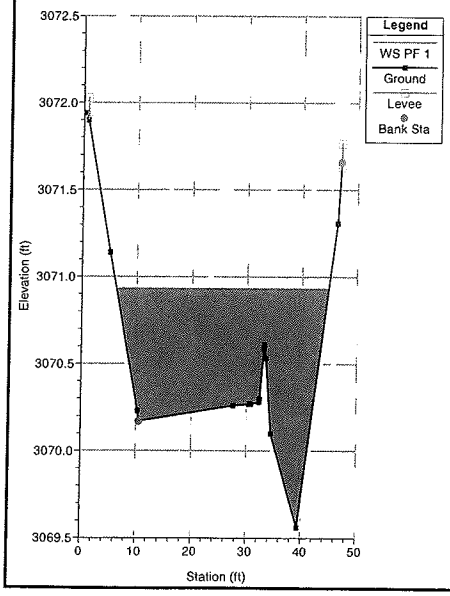
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 900



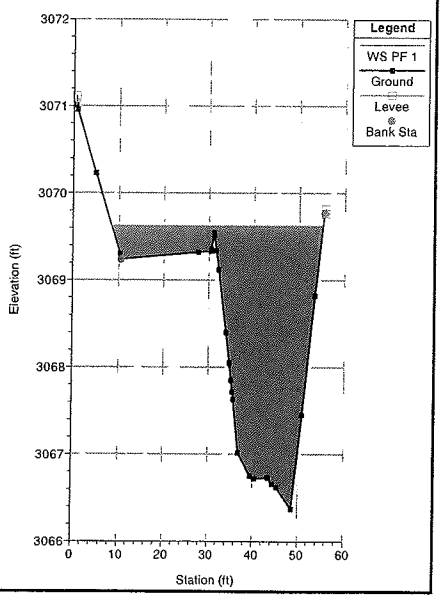
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 850



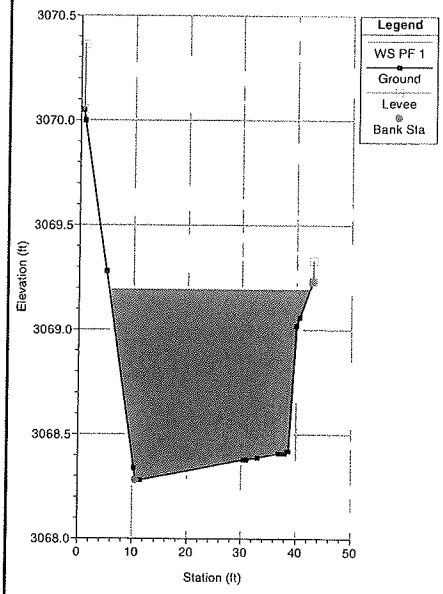
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 800



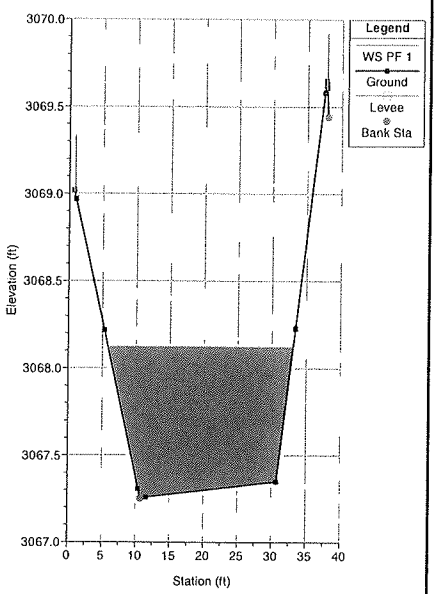
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 750



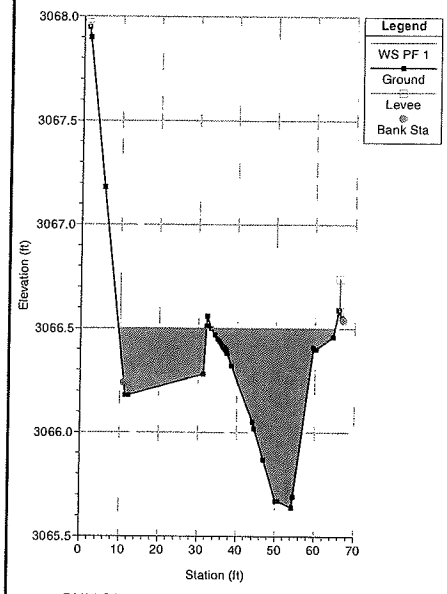
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 700



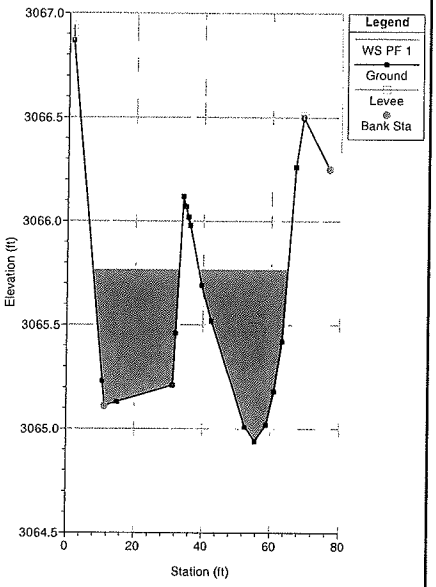
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 650



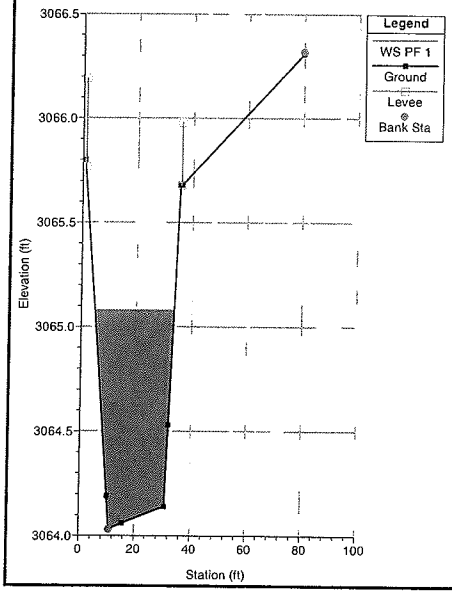
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 600



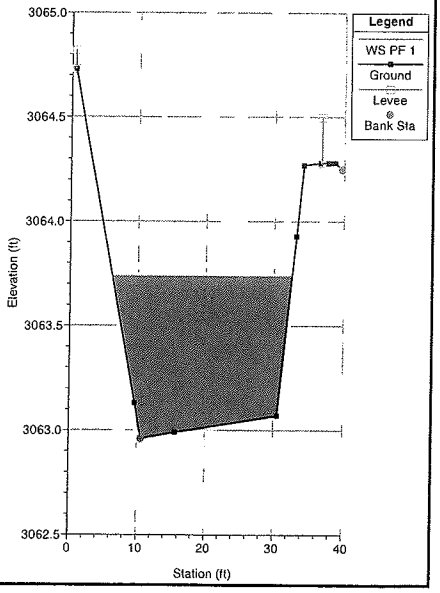
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 550.01



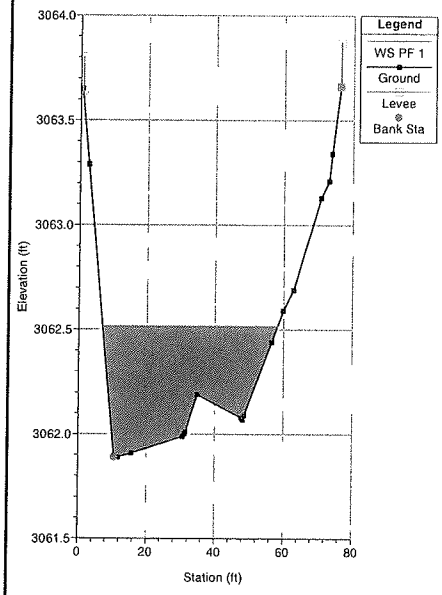
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 500



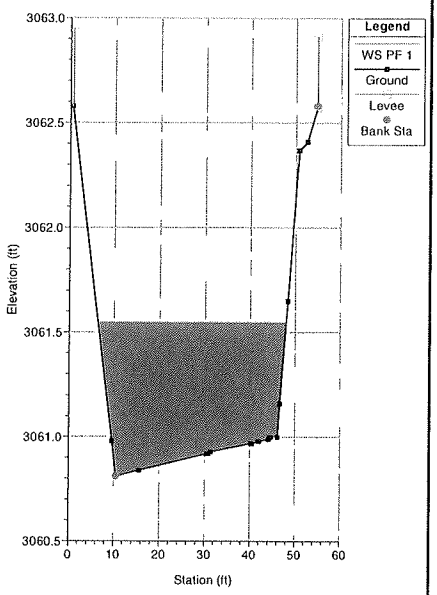
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 450



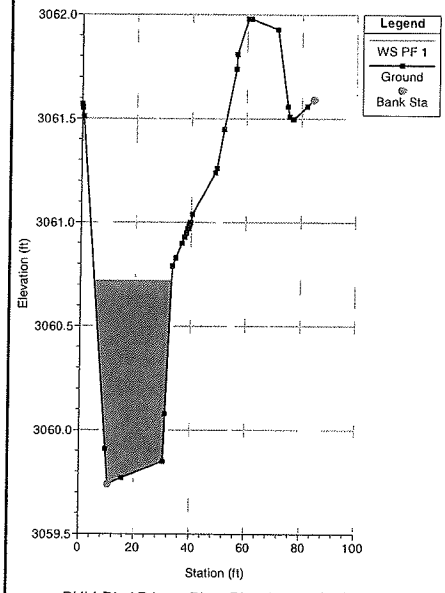
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 400



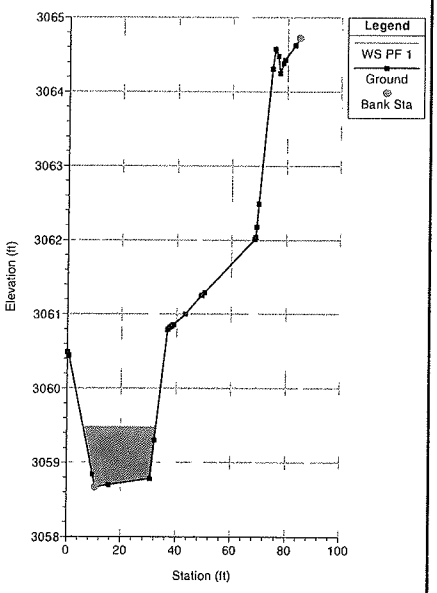
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 350



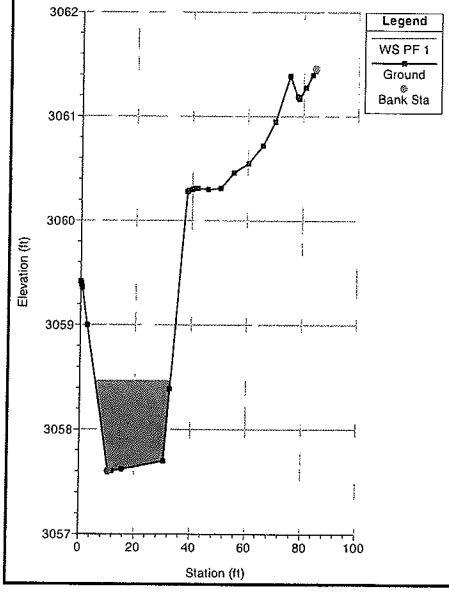
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 300



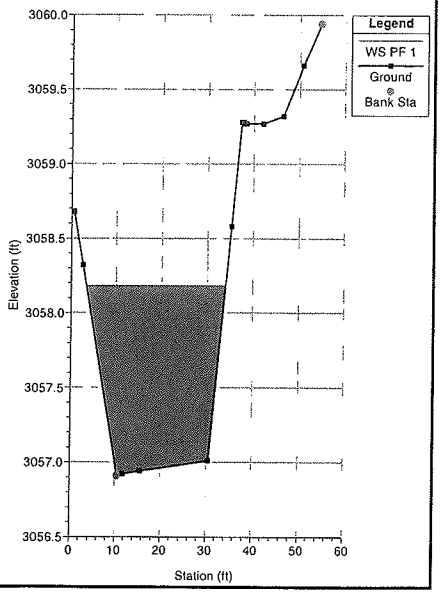
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 250

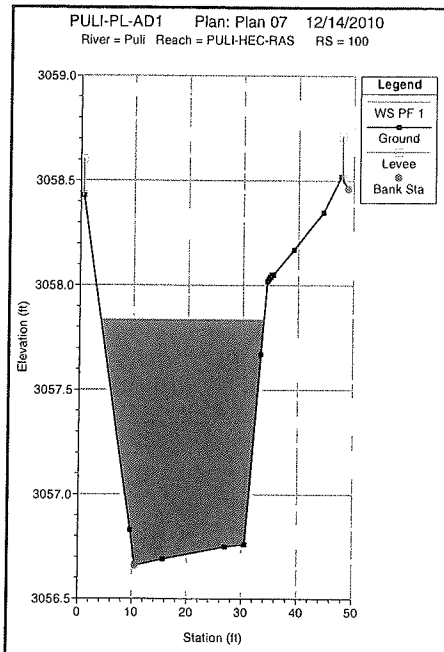


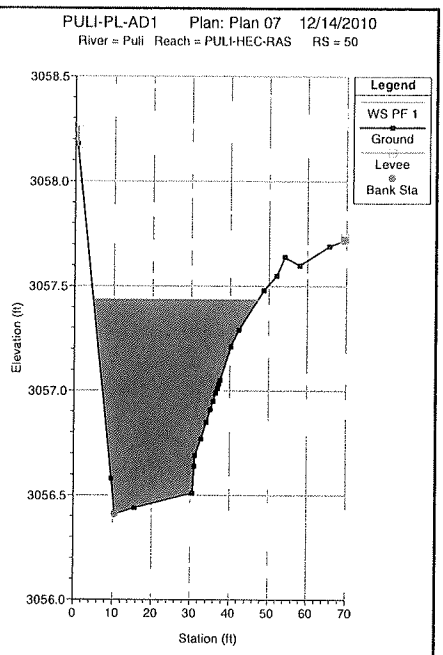
PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 200

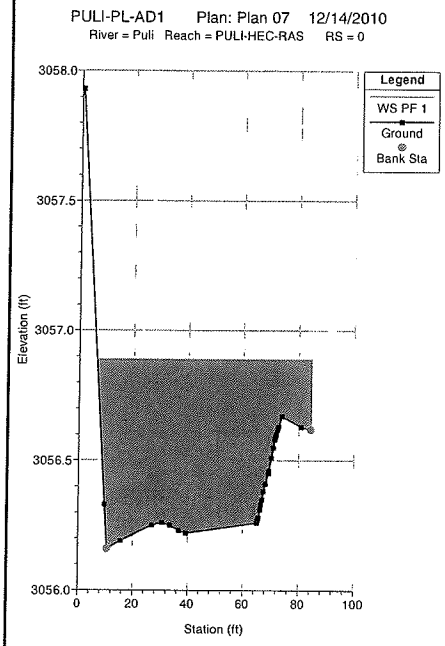


PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 150




PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 100
Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
3059.0
3058.5
3058.0
3057.5
3057.0
3056.5
0
10
20
30
40
50


PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 50
Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
3058.5
3058.0
3057.5
3057.0
3056.5
3056.0
0
10
20
30
40
50
60
70


PULI-PL-AD1 Plan: Plan 07 12/14/2010
River = Puli Reach = PULI-HEC-RAS RS = 0
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
3058.0
3057.5
3057.0
3056.5
3056.0
0
20
40
60
80
100

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X             X      X   X     X    X   X
XXXXXXX  XXXX        X       XXX  XXXX    XXXXXX    XXXX
X     X  X           X             X  X    X    X        X
X     X  X        X    X           X   X    X    X        X
X     X  XXXXXX    XXXX            X    X   X    X   XXXXX
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PROJECT DATA
Project Title: PULI-PL-AD1
Project File : PULI-PL-AD1.prj
Run Date and Time: 12/14/2010 4:06:49 PM

Project in English units

PLAN DATA

Plan Title: Plan 07
Plan File : j:\6335- CAMBRIDGE\Update3\AD1 to UP\Hydraulic\HEC-RAS\PULI-PL-AD1.p07

Geometry Title: Puli Rd FG + 20ft
Geometry File : j:\6335- CAMBRIDGE\Update3\AD1 to UP\Hydraulic\HEC-RAS\PULI-PL-AD1.g06

Flow Title : EX 100YR FLOW
Flow File : j:\6335- CAMBRIDGE\Update3\AD1 to UP\Hydraulic\HEC-RAS\PULI-PL-AD1.f01

Plan Summary Information:
Number of: Cross Sections = 21 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: EX 100YR FLOW
Flow File : j:\6335- CAMBRIDGE\Update3\AD1 to UP\Hydraulic\HEC-RAS\PULI-PL-AD1.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Puli	PULI-HEC-RAS	1003.6	127

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Puli	PULI-HEC-RAS	PF 1	Normal S = 0.0032	Normal S = 0.0053

GEOMETRY DATA

Geometry Title: Puli Rd FG + 20ft
Geometry File : j:\6335- CAMBRIDGE\Update3\AD1 to UP\Hydraulic\HEC-RAS\PULI-PL-AD1.g06

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 1003.6

INPUT
Description:
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
.7799988	3072.215.760002	3071.33	10.78	3070.44	17.14	3070.47	30.79	3070.54	
30.96	3070.6	32.55	3071.13	33.26	3071.16	33.47	3071.17	33.9	3071.19
34.43	3071.22	34.88	3071.24	35.27	3071.26	35.61	3071.28	35.92	3071.29
40.38	3071.57	47.25	3071.95	54.13	3072.32	60.23	3072.63	70.43	3073.09
78.08	3073.41	84.61	3073.64						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
.7799988	.035	10.78	.025	84.61	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

10.78	84.61		53.6	53.6	53.6	.1	.3

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 950

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
.5699997	3072.75.980003	3071.75	10.61	3070.94	11.58	3070.94	12.01	3070.95	
18.7	3070.98	21.93	3071	29.48	3071.05	30.04	3071.05	30.25	3071.05
30.71	3071.05	34.73	3071.08	35.55	3071.08	38.73	3071.1	40.26	3071.11
42.33	3071.13	50.02	3071.18	50.24	3071.18	50.25	3071.18	50.29	3071.18
50.39	3071.18	50.66	3071.18	50.93	3071.18	51.08	3071.25	51.45	3071.4
51.59	3071.45	51.87	3071.52	53.38	3072.5	54.63	3072.69	57.6	3073.15
60.03	3072.8	62.83	3073.22	63.63	3073.29	65.91	3074.84	66.77	3075.17
68.78	3075.39	70.3	3075.69	72.99	3075.05	76.34	3073.71	79.36	3075.44
79.96	3075.76	82.42	3075.43	84.61	3074.76				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
.5699997	.035	10.61	.025	84.61	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
10.61	84.61	50	50	.1	.3

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 900

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
.7200012	3072.958.889999	3071.5	10.72	3071.18	11.31	3071.18	30.72	3071.28	
33.1	3071.29	39.4	3071.32	41.57	3072.3	42.22	3072.58	42.44	3072.68
42.46	3072.69	42.78	3072.83	43.69	3072.59	44.79	3072.54	46.05	3072.3
46.65	3072.41	49.36	3072.89	51.25	3073.17	52.55	3073.56	52.86	3073.51

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
.7200012	.035	10.72	.025	52.86	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
10.72	52.86	50	50	.1	.3

Left Levee Station= .93 Elevation= 3072.99
Right Levee Station= 52.61 Elevation= 3073.59

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 850

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
.590004	3072.639.830002	3071	10.59	3070.86	14.68	3070.88	26.78	3070.95	
30.59	3070.96	31.08	3070.97	32.2	3070.97	32.75	3070.98	35.45	3070.99
35.83	3070.99	35.86	3070.99	36.51	3071	37.18	3070.62	37.8	3070.28
38.12	3070.42	41.81	3070.41	42.25	3070.09	43.29	3069.65	45.71	3068.9
47.48	3069.78	49.24	3069.57	50.91	3069.44	52.73	3069.87	55.34	3069.58
57.27	3069.58	58.52	3069.63	61.75	3069.65	65.4	3069.74	66.06	3070.1
66.87	3070.13	68.44	3069.76	71.5	3069.82	74.67	3069.95	78.31	3070.16
79.36	3070.22	79.52	3070.23	81.23	3070.93	82.74	3071.44	84.61	3071.21

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
.590004	.035	10.59	.025	84.61	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
10.59	84.61	50	50	.1	.3

Left Levee Station= .56 Elevation= 3072.64
Right Levee Station= 82.68 Elevation= 3071.45

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 800

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
.590004	3071.94.8600006	3071.95.120003	3071.14	10.26	3070.23	10.59	3070.17		
27.66	3070.26	30.59	3070.27	30.82	3070.27	32.34	3070.28	32.39	3070.3
33.12	3070.59	33.22	3070.61	33.23	3070.61	33.47	3070.53	34.46	3070.1
39.35	3069.56	46.39	3071.31	47.03	3071.66				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
.590004	.035	10.59	.025	47.03	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
10.59	47.03	50	50	.1	.3

Left Levee Station= .84 Elevation= 3072.03
Right Levee Station= 46.98 Elevation= 3071.77

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 750

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
.590004	3071.01	.8499985	3070.96	4.959999	3070.23	10.25	3069.3	10.59	3069.24
27.65	3069.32	30.59	3069.33	30.66	3069.36	31.23	3069.55	31.29	3069.52
31.72	3069.34	32.23	3069.12	33.94	3068.4	34.75	3068.05	35.16	3067.85
35.42	3067.72	35.61	3067.63	36.82	3067.02	39.49	3066.75	40.48	3066.72
43.44	3066.73	44.4	3066.66	45.34	3066.62	48.65	3066.37	50.95	3067.45
53.61	3068.82	55.58	3069.77						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
.590004	.035	10.59	.025	55.58	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
10.59	55.58	50	50	.1	.3

Left Levee Station= .56 Elevation= 3071.12
Right Levee Station= 55.68 Elevation= 3069.82

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 700

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
.590004	3070.05	.8499985	3070	4.959999	3069.28	10.25	3068.34	10.59	3068.28
11.43	3068.28	30.59	3068.38	30.78	3068.38	30.96	3068.38	33.05	3068.39
36.96	3068.41	37.77	3068.41	38.05	3068.41	38.5	3068.42	38.76	3068.42
40.1	3069.02	40.64	3069.06	43.04	3069.23				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
.590004	.035	10.59	.025	43.04	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
10.59	43.04	50	50	.1	.3

Left Levee Station= .56 Elevation= 3070.36
Right Levee Station= 43.04 Elevation= 3069.33

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 650

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
.7700043	3069.02	1.050003	3068.97	5.330002	3068.22	10.44	3067.31	10.77	3067.25
11.59	3067.26	30.77	3067.35	33.42	3068.23	37.47	3069.58	37.69	3069.65
37.73	3069.63	37.74	3069.63	37.79	3069.61	38	3069.44		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
.7700043	.035	10.77	.025	38	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
10.77	38	50	50	.1	.3

Left Levee Station= .84 Elevation= 3069.33
Right Levee Station= 37.8 Elevation= 3069.92

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 600

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1.419998	3067.95	1.690002	3067.95	2.790001	3067.18	11.08	3066.24	11.42	3066.18
12.26	3066.18	31.42	3066.28	32.11	3066.51	32.26	3066.56	33.37	3066.5
34.31	3066.47	35	3066.45	35.51	3066.44	35.91	3066.43	36.23	3066.42
36.49	3066.41	36.71	3066.41	36.89	3066.4	37.05	3066.4	37.18	3066.4
37.29	3066.39	37.39	3066.38	37.47	3066.38	38.63	3066.32	44.09	3066.05
44.53	3066.02	47	3065.87	50.18	3065.67	50.81	3065.67	54.28	3065.64
54.6	3065.69	59.66	3066.41	60.29	3066.4	64.59	3066.46	66.01	3066.59
66.74	3066.55	67.23	3066.54						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1.419998	.035	11.08	.025	67.23	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
11.08	67.23	49.99	49.99	.1	.3

Left Levee Station= 1.3 Elevation= 3067.97
Right Levee Station= 66.11 Elevation= 3066.74

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 550.01

```
INPUT
Description:
Station Elevation Data    num=      20
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
1.290001 3066.87    10.6 3065.23   11.29 3065.11   15.02 3065.13    31.3 3065.21
   32.02 3065.46   34.02 3066.12   34.74 3066.07    35.5 3066.02   36.06 3065.98
   39.58 3065.69   42.54 3065.52   52.67 3065.01   55.61 3064.94   58.87 3065.02
   61.11 3065.18   63.41 3065.42   66.94 3066.26   69.12  3066.5   76.85 3066.25

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
1.290001    .035    11.29    .025    76.85    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          11.29   76.85             50.01   50.01   50.01            .1       .3
Left Levee      Station=    1.21      Elevation= 3066.94
Right Levee     Station=   69.23      Elevation= 3066.51

CROSS SECTION


RIVER: Puli
REACH: PULI-HEC-RAS       RS: 500

INPUT
Description:
Station Elevation Data    num=      10
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
 .840004  3065.8     9.93 3064.19   10.84 3064.03   15.72 3064.06   30.84 3064.14
   32.01 3064.53   35.47 3065.68   35.99 3065.68   79.95 3066.31   80.06 3066.32

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
 .840004    .035   10.84    .025   80.06    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          10.84   80.06              50      50      50            .1       .3
Left Levee      Station=    1.02      Elevation= 3066.19
Right Levee     Station=   35.85      Elevation= 3065.98

CROSS SECTION


RIVER: Puli
REACH: PULI-HEC-RAS       RS: 450

INPUT
Description:
Station Elevation Data    num=      14
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
 .590004 3064.739.650002 3063.13   10.59 3062.96   15.64 3062.99   30.59 3063.07
   33.18 3063.93    34.2 3064.27   36.54 3064.28   37.66 3064.28   38.16 3064.28
   38.44 3064.28   38.62 3064.28   38.74 3064.28   39.74 3064.25

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
 .590004    .035   10.59    .025   39.74    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          10.59   39.74              50      50      50            .1       .3
Left Levee      Station=     .56      Elevation= 3064.82
Right Levee     Station=   36.78      Elevation=  3064.5

CROSS SECTION


RIVER: Puli
REACH: PULI-HEC-RAS       RS: 400

INPUT
Description:
Station Elevation Data    num=      20
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
 .590004 3063.652.629997 3063.29   10.59 3061.89    11.8 3061.89   15.64 3061.91
   30.59 3061.99   30.64 3061.99   31.19    3062   31.43 3062.01    34.9 3062.19
   47.76 3062.08   48.17 3062.07   48.65 3062.09    56.6 3062.44   59.95 3062.59
   62.93 3062.69   70.86 3063.13   73.17 3063.21   74.01 3063.34   76.42 3063.66

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
 .590004    .035   10.59    .025   76.42    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          10.59   76.42              50      50      50            .1       .3
Left Levee      Station=     .65      Elevation=  3063.8
Right Levee     Station=   76.44      Elevation= 3063.87

CROSS SECTION


RIVER: Puli
REACH: PULI-HEC-RAS       RS: 350

INPUT
Description:
Station Elevation Data    num=      20
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
 .590004 3062.589.650002 3060.98   10.59 3060.81   15.64 3060.84   30.59 3060.92
   30.87 3060.92   31.39 3060.93   40.28 3060.97   40.49 3060.97    41.9 3060.98
   42.12 3060.98    44.2 3060.99   44.45    3061    44.7    3061   46.12    3061
   46.59 3061.16    48.3 3061.65   50.78 3062.37   52.57 3062.41   54.86 3062.58

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
 .590004    .035   10.59    .025   54.86    .025
```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
10.59 54.86 50 50 50 .1 .3
Left Levee Station= .56 Elevation= 3062.95
Right Levee Station= 54.75 Elevation= 3062.91

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 300

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3061.57	.02	3061.57	.05	3061.57	.1100006	3061.56	.25	3061.55
.590004	3061.51	9.650002	3059.91	10.59	3059.74	15.64	3059.77	30.59	3059.85
31.27	3060.08	33.4	3060.79	34.61	3060.83	36.83	3060.9	37.83	3060.93
38.4	3060.95	38.77	3060.97	39.03	3060.97	39.22	3060.98	39.37	3060.99
39.48	3060.99	39.58	3060.99	39.66	3061	39.72	3061	39.78	3061
39.83	3061	39.88	3061	40.49	3061.04	48.86	3061.24	49.36	3061.26
51.89	3061.45	56.18	3061.74	56.5	3061.81	60.43	3061.98	61.66	3061.98
71.24	3061.93	74.98	3061.56	75.6	3061.51	76.81	3061.5	77.23	3061.5
82.09	3061.56	84.61	3061.59						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	10.59	.025	84.61	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
10.59 84.61 50 50 50 .1 .3

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 250

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3060.49	4599991	3060.45	4700012	3060.45	4800034	3060.45	4899979	3060.45
.5	3060.45	5100021	3060.44	5200043	3060.44	5299988	3060.44	5400009	3060.44
.5500031	3060.44	5699997	3060.44	5800018	3060.44	.590004	3060.44	9.650002	3058.84
10.59	3058.67	15.64	3058.7	30.59	3058.78	32.16	3059.3	36.64	3060.79
36.84	3060.8	37.37	3060.82	37.81	3060.83	38.19	3060.84	38.52	3060.85
38.8	3060.86	43.2	3061	49	3061.25	49.04	3061.25	49.18	3061.26
50.09	3061.29	68.48	3062.01	68.83	3062.04	69.14	3062.18	69.8	3062.49
74.55	3064.31	75.48	3064.58	76.64	3064.48	77.18	3064.25	78.52	3064.38
78.99	3064.43	82.75	3064.62	82.97	3064.63	84.61	3064.72		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	10.59	.025	84.61	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
10.59 84.61 50 50 50 .1 .3

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 200

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3059.42	.01	3059.42	.02	3059.42	.0299	3059.42	.04	3059.42
.05	3059.42	.0599	3059.41	.0699	3059.41	.08	3059.41	.09	3059.41
.1100006	3059.41	1299973	3059.41	1600037	3059.4	1900024	3059.4	2300034	3059.4
.2799988	3059.39	3499985	3059.39	4599991	3059.38	.590004	3059.36	2.629997	3059
10.59	3057.6	11.8	3057.6	15.64	3057.62	30.59	3057.7	32.66	3058.39
38.33	3060.28	38.9	3060.29	40.11	3060.3	40.95	3060.31	41.56	3060.31
42.02	3060.31	45.72	3060.3	50.36	3060.31	55.03	3060.46	60.3	3060.55
65.48	3060.72	69.96	3060.95	75.17	3061.39	77.98	3061.19	78.54	3061.17
80.89	3061.28	83.41	3061.4	84.42	3061.44	84.61	3061.46		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	10.59	.025	84.61	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
10.59 84.61 50 50 50 .1 .3

CROSS SECTION

RIVER: Puli
REACH: PULI-HEC-RAS RS: 150

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
.590004	3058.68	2.629997	3058.32	10.59	3056.91	11.8	3056.92	15.64	3056.94
30.59	3057.01	35.28	3058.58	37.39	3059.28	37.55	3059.28	37.73	3059.28
37.87	3059.27	37.98	3059.27	38.07	3059.27	38.14	3059.27	38.2	3059.27
38.25	3059.27	38.29	3059.27	38.33	3059.27	38.36	3059.27	38.39	3059.27
38.41	3059.27	38.42	3059.27	38.44	3059.27	42.05	3059.27	46.38	3059.32
50.79	3059.66	54.69	3059.94						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
.590004	.035	10.59	.025	54.69	.025

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          10.59   54.69               50      50      50            .1       .3

CROSS SECTION


RIVER: Puli
REACH: PULI-HEC-RAS       RS: 100

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
 .590004 3058.439.650002 3056.83   10.59 3056.66   15.64 3056.69   27.01 3056.75
   30.59 3056.76   33.31 3057.67   34.37 3058.02   34.44 3058.02   34.66 3058.03
   34.85 3058.04   35.02 3058.04   35.17 3058.05   35.31 3058.05   35.43 3058.05
   39.22 3058.17   44.55 3058.35   47.72 3058.52   49.08 3058.46

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
 .590004    .035   10.59    .025   49.08    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          10.59   49.08               50      50      50            .1       .3
Left Levee      Station=     .47      Elevation=  3058.6
Right Levee     Station=   47.95      Elevation= 3058.71

CROSS SECTION


RIVER: Puli
REACH: PULI-HEC-RAS       RS: 50

INPUT
Description:
Station Elevation Data    num=      23
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
 .590004 3058.189.650002 3056.58   10.59 3056.41   15.64 3056.44   30.59 3056.51
   30.97 3056.64   31.11 3056.69   32.68 3056.77   34.11 3056.85   35.11 3056.91
   35.85 3056.95   36.42 3056.99   36.87 3057.01   37.23 3057.03   37.53 3057.05
   40.25 3057.21   42.28 3057.29   48.75 3057.48    52.1 3057.55   54.17 3057.64
   58.03  3057.6   65.65 3057.69    69.5 3057.72

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
 .590004    .035   10.59    .025    69.5    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          10.59    69.5               50      50      50            .1       .3
Left Levee      Station=     .65      Elevation= 3058.26
Right Levee     Station=   69.51      Elevation= 3057.73

CROSS SECTION


RIVER: Puli
REACH: PULI-HEC-RAS       RS: 0

INPUT
Description:
Station Elevation Data    num=      29
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
 .590004 3057.939.650002 3056.33   10.59 3056.16   15.64 3056.19   27.01 3056.25
   30.59 3056.26   33.62 3056.25   36.85 3056.23   39.47 3056.22   65.16 3056.26
   65.41 3056.27   65.68 3056.28   66.26 3056.31   66.59 3056.33   66.98 3056.35
    67.5 3056.38   68.25 3056.41    69.2 3056.45   69.37 3056.46   70.32 3056.51
   71.04 3056.55   71.53 3056.58   71.73 3056.59   72.01  3056.6    72.5 3056.62
   72.88 3056.63   74.01 3056.67   81.07 3056.63   84.61 3056.62

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
 .590004    .035   10.59    .025   84.61    .025

Bank Sta: Left   Right    Coeff Contr.    Expan.
          10.59   84.61             .1       .3


SUMMARY OF MANNING'S N VALUES

River:Puli

      Reach          River Sta.       n1        n2        n3

 PULI-HEC-RAS         1003.6           .035      .025      .025
 PULI-HEC-RAS         950              .035      .025      .025
 PULI-HEC-RAS         900              .035      .025      .025
 PULI-HEC-RAS         850              .035      .025      .025
 PULI-HEC-RAS         800              .035      .025      .025
 PULI-HEC-RAS         750              .035      .025      .025
 PULI-HEC-RAS         700              .035      .025      .025
 PULI-HEC-RAS         650              .035      .025      .025
 PULI-HEC-RAS         600              .035      .025      .025
 PULI-HEC-RAS         550.01           .035      .025      .025
 PULI-HEC-RAS         500              .035      .025      .025
 PULI-HEC-RAS         450              .035      .025      .025
 PULI-HEC-RAS         400              .035      .025      .025
 PULI-HEC-RAS         350              .035      .025      .025
 PULI-HEC-RAS         300              .035      .025      .025
 PULI-HEC-RAS         250              .035      .025      .025
 PULI-HEC-RAS         200              .035      .025      .025
 PULI-HEC-RAS         150              .035      .025      .025
 PULI-HEC-RAS         100              .035      .025      .025
 PULI-HEC-RAS         50               .035      .025      .025
 PULI-HEC-RAS         0                .035      .025      .025
```

SUMMARY OF REACH LENGTHS

River: Puli

Reach	River Sta.	Left	Channel	Right
PULI-HEC-RAS	1003.6	53.6	53.6	53.6
PULI-HEC-RAS	950	50	50	50
PULI-HEC-RAS	900	50	50	50
PULI-HEC-RAS	850	50	50	50
PULI-HEC-RAS	800	50	50	50
PULI-HEC-RAS	750	50	50	50
PULI-HEC-RAS	700	50	50	50
PULI-HEC-RAS	650	50	50	50
PULI-HEC-RAS	600	49.99	49.99	49.99
PULI-HEC-RAS	550.01	50.01	50.01	50.01
PULI-HEC-RAS	500	50	50	50
PULI-HEC-RAS	450	50	50	50
PULI-HEC-RAS	400	50	50	50
PULI-HEC-RAS	350	50	50	50
PULI-HEC-RAS	300	50	50	50
PULI-HEC-RAS	250	50	50	50
PULI-HEC-RAS	200	50	50	50
PULI-HEC-RAS	150	50	50	50
PULI-HEC-RAS	100	50	50	50
PULI-HEC-RAS	50	50	50	50
PULI-HEC-RAS	0			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Puli

Reach	River Sta.	Contr.	Expan.
PULI-HEC-RAS	1003.6	.1	.3
PULI-HEC-RAS	950	.1	.3
PULI-HEC-RAS	900	.1	.3
PULI-HEC-RAS	850	.1	.3
PULI-HEC-RAS	800	.1	.3
PULI-HEC-RAS	750	.1	.3
PULI-HEC-RAS	700	.1	.3
PULI-HEC-RAS	650	.1	.3
PULI-HEC-RAS	600	.1	.3
PULI-HEC-RAS	550.01	.1	.3
PULI-HEC-RAS	500	.1	.3
PULI-HEC-RAS	450	.1	.3
PULI-HEC-RAS	400	.1	.3
PULI-HEC-RAS	350	.1	.3
PULI-HEC-RAS	300	.1	.3
PULI-HEC-RAS	250	.1	.3
PULI-HEC-RAS	200	.1	.3
PULI-HEC-RAS	150	.1	.3
PULI-HEC-RAS	100	.1	.3
PULI-HEC-RAS	50	.1	.3
PULI-HEC-RAS	0	.1	.3

CITY OF LAS VEGAS
COMMENT LETTER

6335-5

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: November 10, 2010
TO: Land Development Services Department of Public Works				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Cliff's Edge PODs 201 & 203 – Unit 5 (aka Cambridge Villas / Cambridge Crossing)			COPIES TO: VTN Nevada
Cross Streets:	SEC of Grand Teton Drive & Puli Road			KB Homes
File Number:	F:\Depot\DSMemos\DS4501A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-13-110-016			CCRFCD
Zoning Action:	TMP-39088 & WVR-39089			CCPW
FEMA Flood Zone	YES	NO	X	
Proposed Storm Drain	YES	NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID (Transaction #)
1st Submittal	10/28/2010	11/10/2010	See Comments Below	$400.00	166512: $400
			TOTAL FEES (LDDRS):	$400.00	

DISTRIBUTED
11-11-10

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 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.

2. The site is also adjacent to the west half of Puli Road which is a *Clark County* right-of-way. The engineer must coordinate with *Clark County Public Works* and incorporate any concerns for boundary conditions. CCPW concurrence is required prior to final acceptance of the study.

3. On the west boundary, according to the *HEC-RAS Exhibit*, the *"Min Ch El"* column show uneven bottom elevations which results in uneven flow depths along the river stations. At one point (River Station 3+50.00), the flow depth (or ponding depth) behind the flood wall is 6.7' which is not acceptable. It appears that the existing grades along the back of the proposed flood wall does not provide for positive drainage in a southerly direction. The engineer is advised to meet with Flood Control staff to resolve this issue prior to the submittal of the next addendum.

4. The improvement plan for *Puli Road* had been approved by the *City*. Show the approved design of *Puli* (TC information as future) on the grading plans. Label with *City of Las Vegas* recorded plan number and identify storm drain system with size and type (inlets) on the grading plans.

5. The proposed finish floor elevations of Lot 300 to Lot 307 along *Grand Teton Drive* are below the corresponding street elevations. The bottom portion of the boundary wall must provide eighteen (18") inches of freeboard and be constructed with 8"-CMU to be solid grouted. Revise the pertinent detail section accordingly.
6. **Sheet G1**: Extend a proposed concrete valley gutter along the east boundary northerly to meet *Brighton Beach Avenue*.
7. Private streets must be public drainage easements. Provide a note on the grading plans "Note: All Private streets are P.U.E., Public Sewer Easements and Public Drainage Easements to be privately maintained by the HOA".
8. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
9. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map. The minimum width for a public drainage easement is 10' if the 100-year flow is less than 20 CFS.
10. All flood wall must be "8"-CMU to be solid grouted". Revise all pertinent details to show as such.

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.

NOTES: This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.

Any proposed public drainage easement within a residential subdivision must also be dedicated as a "COMMON LOT" to be owned and maintained by the Homeowners Association.

END OF REMARKS
ays

T/R/S: T19S/R59E/13
AREA F-13

Post-it® Fax Note 7671	Date 11/10/10	# of pages ▶ 2
To Wei Then	From Albert Sung	
Co./Dept. VTN	Co. CLV	
Phone #	Phone # 229-2057	
Fax # 362-2597	Fax #	

REVISED GRADING PLANS

vtn nevada

LETTER OF TRANSMITTAL

TO:	**City of Las Vegas** **Dept. of Public Works** **731 South Fourth Street** **Las Vegas, NV 89101**	DATE:	**January 25, 2011**
		PROJECT:	**Cliff's Edge – PODS 201 & 203 – Unit 4 (a.k.a. Cambridge Villas / Cambridge Crossings)**
ATTN:	**Mr. Robert Welsh, P.E.**	W.O. NO.:	**6335-5**

BY MAIL: BY MESSENGER: XXX PICK-UP: EXPRESS MAIL:

FAX: FEDERAL EXPRESS:

No. Copies:	Description
1	Addendum #1 to Update # 3 to Technical Drainage Study For Cliff's Edge PODS 201 & 203 – Unit 5 (a.k.a. Cambridge Villas / Cambridge Crossings)
1	Check # 04869973 For $400.00

COMMENTS:

MATERIAL SENT FOR THE FOLLOWING REASONS:

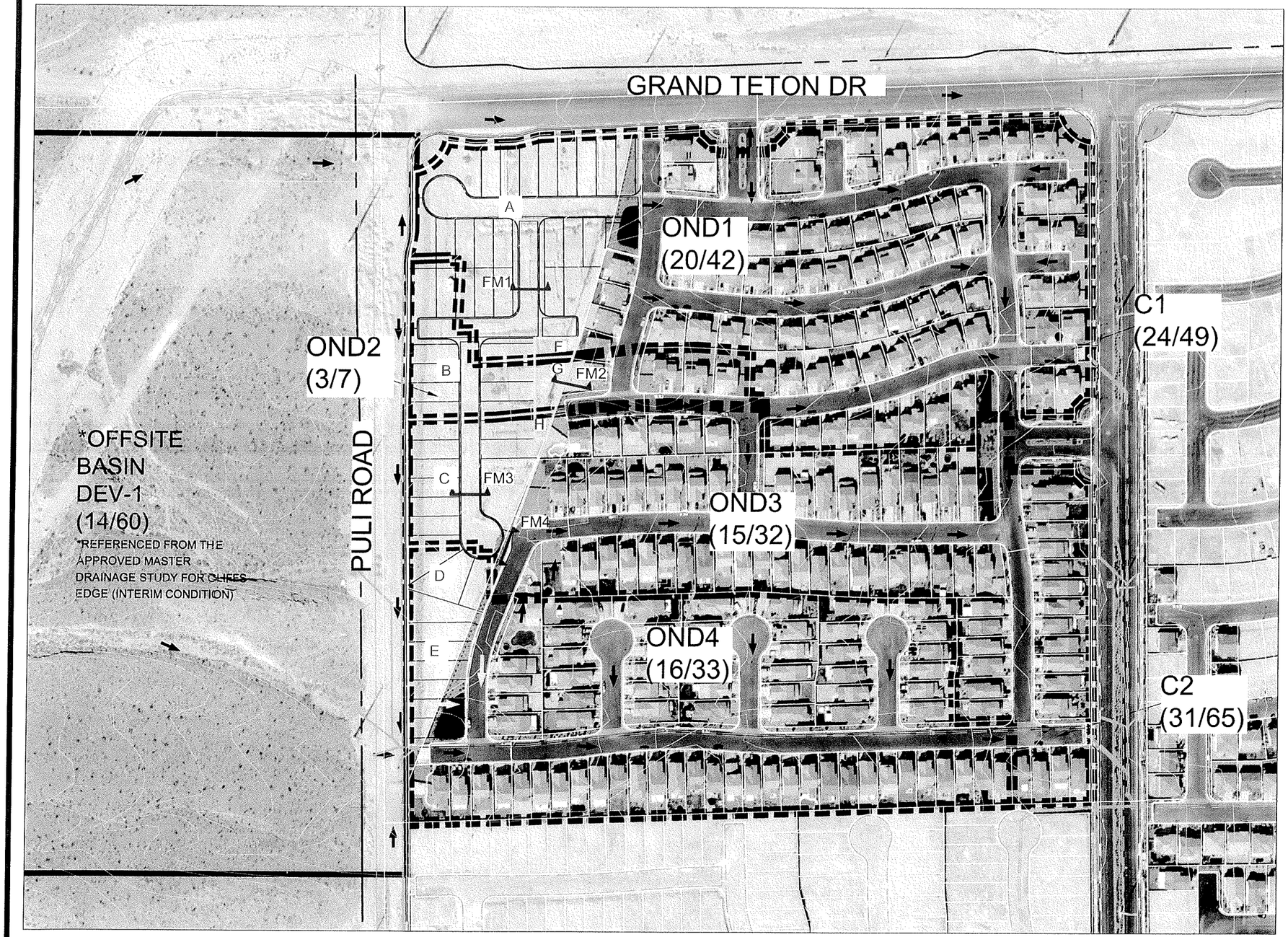
CHECKING: FILING: APPROVAL: XXX YOUR FILES:

OTHER: CC:

SENDER: Woei Y. Then, P.E.

ABOVE MATERIAL RECEIVED BY:

2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89146-5148
TEL: (702)873-7550 FAX: 362-2597
PUBLIC WORKS DEPARTMENT TEL: (702) 247-4020 FAX: (702) 247-4262



MAGNETIC

GRAPHIC SCALE

200 0 100 200 400

1" = 200'

LEGEND

OND4 (16/33)	BASIN NAME PER APPROVED TDS FLOW VALUE (10 YR/100YR) IN CFS PER APPROVED TDS
→	DIRECTION OF FLOW
	BASIN DELINEATION PER APPROVED TDS
A	NEW BASIN NAME FOR PROPOSED SITE NEW BASIN DELINEATION
FM2	FLOWMASTER SECTIONS

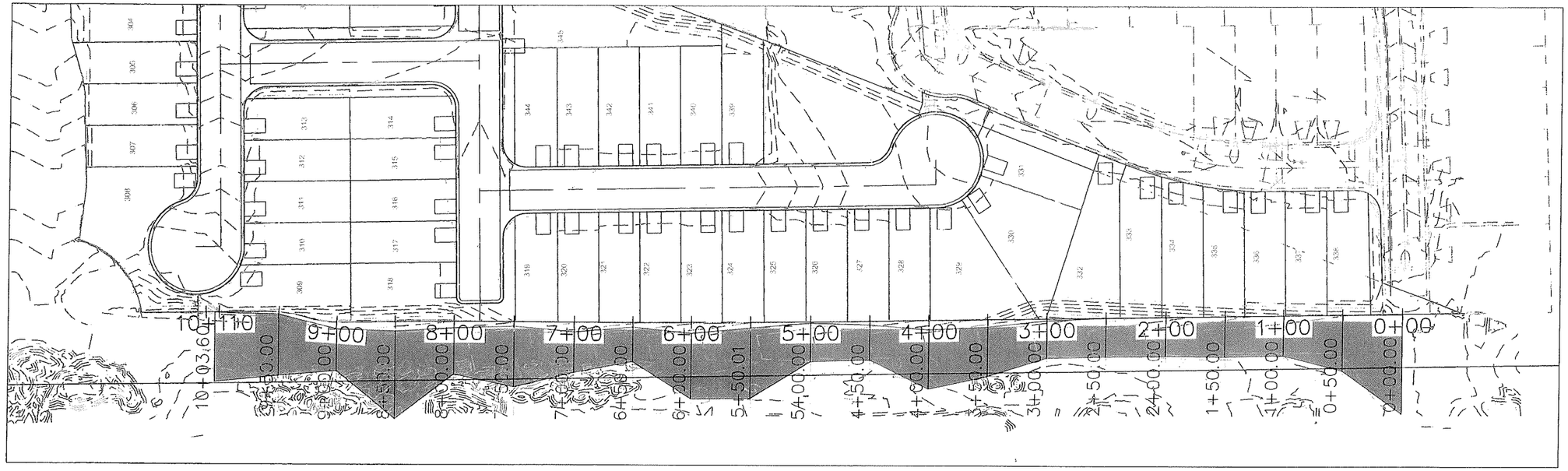
FLOW SUMMARY

NEW BASIN NAME	BASIN AREA (ac)	10-YR FLOW (cfs)	100-YR FLOW (cfs)
A	2.88	4.4	9.2
B	0.99	1.6	3.6
C	1.24	1.8	3.9
D	0.35	0.6	1.2
E	0.70	1.1	2.4
F	0.06	0.1	0.2
G	0.12	0.2	0.4
H	0.03	0.0	0.1

* Basin referenced from the approved Master Drainage Study for Cliffs Edge

W.O.#: 6335-5
DATE: 12-9-2010
BY: WT
SCALE:
SHEET 1 OF 1

CAMBRIDGE VILLAS UNIT 5
DRAINAGE BASIN MAP
UPDATE #3 – AD1



River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1003.6	127	3070.44	3072.56	3071.51	3072.61	0.000627	1.78	75.48	58.10	0.27
950	127	3070.94	3072.51		3072.57	0.000714	1.99	67.56	51.82	0.29
900	127	3071.18	3072.07	3072.07	3072.45	0.009698	5.02	26.48	35.40	0.99
850	127	3068.90	3071.36	3070.47	3071.40	0.000667	1.61	79.30	74.70	0.27
800	127	3069.56	3070.93	3070.93	3071.28	0.009813	4.82	27.26	38.57	0.98
750	127	3066.37	3069.62	3068.07	3069.69	0.000909	2.13	60.02	46.86	0.32
700	127	3068.28	3069.19	3069.19	3069.56	0.009813	4.93	26.91	37.03	0.99
650	127	3067.25	3068.12	3068.32	3068.84	0.019552	6.96	19.33	27.19	1.40
600	127	3065.64	3066.50	3066.75	3067.27	0.058891	7.04	18.17	54.08	2.12
550.01	127	3064.94	3065.76	3065.82	3066.12	0.015069	4.82	26.96	51.54	1.16
500	127	3064.03	3065.08	3065.10	3065.54	0.009915	5.60	24.27	28.75	1.03
450	127	3062.96	3063.74	3064.02	3064.69	0.030211	8.00	16.75	26.38	1.70
400	127	3061.89	3062.51	3062.67	3063.05	0.030352	5.94	21.85	51.22	1.59
350	127	3060.81	3061.55	3061.62	3061.98	0.015285	5.33	24.60	41.48	1.19
300	127	3059.74	3060.72	3060.83	3061.27	0.012822	6.09	22.25	28.11	1.15
250	127	3058.67	3059.48	3059.74	3060.34	0.025998	7.63	17.60	26.66	1.59
200	127	3057.60	3058.47	3058.66	3059.18	0.019394	6.95	19.38	27.22	1.39
150	127	3056.91	3058.18	3057.97	3058.47	0.004805	4.43	31.00	30.68	0.74
100	127	3056.66	3057.83	3057.72	3058.18	0.006520	4.89	27.95	29.83	0.85
50	127	3056.41	3057.43	3057.43	3057.77	0.010589	4.75	27.98	42.33	1.01
0	127	3056.16	3056.89	3056.76	3057.02	0.005299	2.96	43.58	78.12	0.69

MAGNETIC

LEGENDS

329 UNIT 5 LOT NUMBER

1+50.00 HEC-RAS STATIONING

WATER SURFACE EXTEND

CAMBRIDGE VILLAS / COMBRIDGE CROSSING
HEC-RAS EXHIBIT
UPDATE #3

W.O.#: 6335-5
DATE: 12/9/2010
BY: WT
SCALE: ____
SHEET ____ OF