INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT (IHHA) REPORT FOR ALVARADO CHANNEL (UPPER PORTION) MAP NUMBERS 63 & 64

August 5, 2010 Job Number 15541-A

RICK ENGINEERING COMPANY ENGINEERING COMPANY RICK ENGINEERING CO



INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT (IHHA) REPORT

Site Name/Facility:	Alvarado Channel (Upper Portion)
	Map Numbers 63 & 64
Date:	August 5, 2010
Civil Engineer:	Dennis C. Bowling
	Principal, R.C.E. #32838, Exp. 6/12
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• Instructions: This form must be completed for each target facility following the completion of the Individual Maintenance Plan (IMP) report form and prior to any work being conducted in the facility. Attach additional sheets if needed.

Description of creek/channel (limits of reach, surrounding land use and area, creek/channel geometry and vegetative condition):

The area of study extends from the location where the channel transitions from an underground culvert, immediately south of Alvarado Road, and flows in a westerly direction for approximately 4,000 feet to a point where the channel is conveyed in a crossing under College Avenue (see workmap located in the Attachments). This portion of the channel is aligned south of the medical and commercial buildings that are located on the south side of Alvarado Road. The upper portion of the channel, within the area of study, is fully concrete lined (approximately 1,400 feet). The central portion of the channel consists of concrete lined side slopes and a natural bottom (approximately 1,400 feet). The downstream portion of the area of study is a natural channel (approximately 1,400 feet). The channel geometry is trapezoidal in shape throughout the area of study.

For purposes of this assessment, the area of study has been divided into three reaches: Reach 1 (HEC-RAS Cross Sections 5.8 to 1432.62), Reach 2 (HEC-RAS Cross Sections 1432.62 to 2808.99) and Reach 3 (HEC-RAS Cross Sections 2808.99 to 3975.02). Reach 1 is the most downstream reach. Reach 1 extends from the downstream limits of the area of study and continues upstream for approximately 1,400 feet. Reach 1 consists of dense vegetation and is bounded by Alvarado Road to the north and a parking lot to the south. At the upstream limits of Reach 1 there is an existing pedestrian bridge. The downstream limits of Reach 2 begins approximately 120 feet upstream of the existing pedestrian bridge and extend upstream approximately 1,400 feet. Reach 2 has dense vegetation in the lower portion and is bounded by commercial and medical buildings to the north and a vegetated slope to the south. Reach 3 is the most upstream reach and is approximately 1,200 feet in length. Reach 3 is relatively free of vegetation and is bounded by the commercial and medical building to the north and a vegetated slope on the south. The channel at the upstream portion of Reach 3 is located immediately adjacent to a hospital.

Note: See attached pictures

Hydrologic information (source of hydrologic information, summary of flow rates and return frequencies):

There are two (2) sources to hydrologic information. The first source of hydrologic information is based on the Federal Emergency Management Agency's (FEMA's) DRAFT (no date) Flood Insurance Study (FIS). The second source of hydrologic information is based on FEMA's 2006 FIS. The difference between these two sources is that the DRAFT FIS has not been officially adopted at the authoring of this assessment. While the hydrologic information utilized for this project is based on the 2006 FIS, hydrologic information from the DRAFT FIS was compared for any discrepancies of information. For this project reach, no discrepancies were

noted. The FIS provided the 10-, 50-, and 100-year flow rate information. This flow rate information was then plotted on log-probability paper to determine a flow rate distribution. From this distribution, flow rates were determined and equated to a storm event. The following flow rates were provided in the FIS:

100-Year = 3,900 cubic feet per second (cfs) 50-Year = 3,400 cfs 10-Year = 2,100 cfs

The following flow rates were determined from log-probability paper:

35-Year = 3,000 cfs 7-Year = 2,000 cfs 5-Year = 1,700 cfs 2-Year = 1,000 cfs

Hydraulic analyses (description of hydraulic models created for project):

The US Army Corps of Engineers Hydraulic Engineering Center River Analysis System (HEC-RAS) Version 4.0 was used to analyze the hydraulic characteristics of Alvarado Channel. HEC-RAS has the ability to perform one-dimensional hydraulic calculations for natural and engineered channels, by utilizing the energy equation and the momentum equation. For the purposes of this project, all HEC-RAS modeling was performed using a sub-critical flow regime.

The hydraulic modeling prepared for the Current Vegetated Condition, Ultimate Vegetated Condition, the three Maintained Conditions (no sediment removed), and Maintained Condition (sediment removed) analyses are based on the 1999 City of San Diego 2-foot contour topographic information. The topography and the hydraulic modeling performed for Alvarado Channel are all on the National Geodetic Vertical Datum of 1929 (NGVD 29).

The following provides general descriptions of hydraulic analyses/models that were prepared for this area of study:

Current Vegetated Condition:

The hydraulic analysis for Current Vegetated Condition was created to reflect the current vegetated condition of the channel and determine the actual channel capacity. A field visit was performed on October 13, 2009 to determine and confirm the Manning's Roughness Coefficients within Alvarado Channel for the Current Vegetated Condition.

Based on the site visit, it was determined that Manning's Roughness Coefficients ranged from an n-value of 0.018 for concrete portion to an n-value of 0.15, reflecting dense vegetation.

Note: See Hydraulic Profiles for Current Vegetated Condition Model and Workmap

Ultimate Vegetated Condition:

The Ultimate Vegetated Condition reflects dense vegetation in the channel, which assumes no maintenance is being performed. The existing vegetation that currently exists in the channel will become more dense. This dense vegetation will reduce velocities. The slower velocities will cause sediment to drop out and ultimately cause deposition in the upstream areas where the channel is fully lined. The vegetation will migrate upstream and thus further decrease the capacity of the channel and potentially cause flooding to occur more frequently.

To establish this ultimate vegetated condition in the hydraulic model, a Manning's Roughness Coefficients of 0.15 was assumed throughout the area of study.

Note: See Hydraulic Profiles for Ultimate Vegetated Condition Model and Workmap

Maintained Condition (No sediment removed): 3 models were prepared.

1. Maintained Condition (Bank to Bank):

This Maintained Condition (Bank to Bank) assumes vegetation-only maintenance of the channel. With this model, maintenance was proposed for the bottom and the sides of the channel. The limits of maintenance, for modeling purposes, begin approximately 120 feet upstream of the pedestrian bridge and extend approximately 1,400 feet upstream of the beginning limits of maintenance.

For the above described limits of maintenance, to establish the maintained condition (bank to bank) in this hydraulic model, the Manning's Roughness Coefficient of 0.035 was utilized for the bottom and the sides of the channel. For the portions of the channel that is concrete lined, the Manning's Roughness Coefficient of 0.018 was utilized.

2. Maintained Condition (bottom of the channel only):

This Maintained Condition (bottom of the channel only) assumes vegetation-only maintenance of the channel bottom. The limits of maintenance, for modeling purposes, begin approximately 120 feet upstream of the pedestrian bridge and extend approximately 1,400 feet upstream of the beginning limits of maintenance.

For the above-described limits of maintenance, to establish the maintained condition (bottom of the channel only) in this hydraulic model, the Manning's Roughness Coefficient of 0.035 was utilized for the bottom of the channel. For the portions of the channel that is concrete lined, the Manning's Roughness Coefficient of 0.018 was utilized.

3. Maintained Condition (25-30 foot swath only):

This Maintained Condition (25-30 foot swath only) assumes vegetation-only maintenance of a 25-30-foot swath at the bottom of the channel. The limits of maintenance, for modeling purposes, begin approximately 120 feet upstream of the pedestrian bridge and extend approximately 1,400 feet upstream of the beginning limits of maintenance.

For the above described limits of maintenance, to establish the maintained condition (25-30-foot swath) in this hydraulic model, the Manning's Roughness Coefficient of 0.035 was utilized for the 25-30-foot swath of the bottom of the channel. For the portions of the channel that is concrete lined, the Manning's Roughness Coefficient of 0.018 was utilized.

Additional Notes:

For the three models prepared for the Maintained Condition (No sediment removed), it is important to note that the Manning's Roughness Coefficients for the remaining portions of the channel, outside of the limits of maintenance, were kept the same as the current vegetated condition.

Note: See Hydraulic Profiles for Maintained Condition Model (no sediment removed) and Workmap

Maintained Condition (Sediment and vegetation removed): 2 models were prepared.

1. Maintained Condition (bottom of the channel only):

In addition to the vegetation-only maintenance (3 models), a Maintained Condition was also prepared that modeled the removal of sediment and vegetation from the bottom of the channel, that has deposited over the years. The location of the beginning of the sediment removed is approximately 120 feet upstream of the pedestrian bridge. From that location, for modeling purposes, the sediment was removed for a distance of approximately 910 feet upstream. The removal of sediment, to the historic flowline from the bottom of the channel, will increase the capacity of the channel and thus reduce the potential for flooding.

2. Maintained Condition (25-30 foot swath):

This Maintained Condition (25-30 foot swath only) assumes sediment and vegetation removal maintenance of a 25-30-foot swath at the bottom of the channel that has deposited over the years. The limits of maintenance, for modeling purposes, begin approximately 120 feet upstream of the pedestrian bridge and extend approximately 910 feet upstream of the beginning limits of maintenance. The removal of sediment, to the historic flowline from the 25-30 foot swath from the bottom of the channel, will increase the capacity of the channel and thus allow retention of the vegetation along the channel banks and portions of the channel bottom (outside of 25-50 foot maintained swath).

In the hydraulic analysis, the low flow portion of the channel, for the two models maintained condition (sediment removed), was adjusted to reflect the approximate geometry of the channel after the sediment is removed.

Note: See Hydraulic Profiles for Maintained Condition Model (sediment and vegetation removed) and Workmap

Hydraulics Results (Describe capacity of channel for each condition):

Based on the hydrologic and hydraulic assessment, maintenance is recommended in only Reach 2. Additionally the maintenance is recommended to utilize the 25-30-foot swath approach with sediment removal over a portion of the channel. It is important to note that if maintenance does not occur within Reach 2 in the near future, the limits of maintenance that are identified in this assessment will most likely have to be extended into Reach 3.

The recommended approach would increase the flood conveyance capacity of Reach 2 from a less than 2-year storm event (1,000 cfs) to a 12.5-year storm event (2,330 cfs).

Current Vegetated Condition:

Capacity:

Reach 1 ranges from 3,000 to 3,900 cfs (50- to 100-year storm event & a 6- hour precipitation of 2.3" to 2.6"). Reach 2 is less than 1,000 cfs (less than 2-year storm event and a 6-hour precipitation of 1.25 "). Reach 3 ranges from 1,000 cfs to 1,700 cfs (2- to 5-year storm event & a 6- hour precipitation of 1.25" to 1.8").

The hydraulic model determined that the current channel, based on the vegetated condition observed during the site visit, does not have capacity to convey the 100-year storm event.

Note: Reference Detailed Hydraulic Results for Current Vegetated Condition Model

Ultimate Vegetated Condition:

Capacity:

Reach 1 is approximately 3,4 00 cfs (50-year storm event & a 6- hour precipitation of 2.3"). Reach 2 is less than 1,000 cfs (less than 2-year storm event and a 6-hour precipitation of less than 1.25" Reach 3 ranges from 1,000 cfs to 1,700 cfs (2- to 5-year storm event & a 6- hour precipitation of 1.25" to 1.65").

Due to the dense vegetation that currently exists today, there is not a significant change in the capacity when comparing the Ultimate Vegetated Condition model to the Current Vegetated Condition model.

Note: Reference Detailed Hydraulic Results for Ultimate Vegetated Condition Model

Maintained Condition (No sediment removed) - Based on the 3 models prepared, it was determined that the maintenance method of vegetation removal only along the 25-30-foot swath along the channel bottom in Reach 2 is the most beneficial model. The following are the results for the determined maintenance model:

Capacity would be:

Reach 1 ranges from 3,400 to 3,900 cfs (50- to 100-year storm event & a 6 hour precipitation of 2.3" to 2.6"). Reach 2 is approximately 1,700 cfs (5-year storm event & a 6- hour precipitation of 1.65") Reach 3 ranges from 1,000 cfs to 1,700 cfs (2- to 5-year storm event & a 6 hour precipitation of 1.2 5" to 1.65"). Based on the result of the hydraulic analyses, it was determined that the 25-30-foot swath method would be a beneficial approach because it would increase the channel capacity conveyance while allowing retention of vegetation along the channel banks and portions of the channel bottom (outside of 25-30 foot maintained swath).

Note: Reference Detailed Hydraulic Results for Maintained Condition Model (No Sediment Removed)

Maintained Condition (Sediment and vegetation removed): Based on the 2 models prepared, it was determined that the maintenance method, sediment and vegetation removal along 25-30-foot swath along the channel bottom in portion of Reach 2 is the most beneficial model. The following are the results for the determined maintenance model:

Capacity would be:

Reach 1 ranges from 3,400 to 3,900 cfs (50- to 100-year storm event & a 6- hour precipitation of 2.3" to 2.6"). Reach 2 ranges from 2,100 to 3,000 cfs (10- to 35-year storm event & a 6- hour precipitation of 1.85" to 2.2"). Reach 3 ranges from 1,000 cfs to 1,700 cfs (2- to 5-year storm event & a 6- hour precipitation of 1.25" to 1.65").

Based on the profiles, there was evidence of deposition in the lower portion of Reach 2. Additionally, based on the result of the hydraulic analyses, it was determined that the 25-30-foot swath method would be a beneficial approach because it would increase the channel capacity conveyance while allowing retention of vegetation along the channel banks and portions of the channel bottom (outside of 25-30 foot maintained swath). This hydraulic analysis modeled the removal of sediment and vegetation for a length of approximately 910 feet (within the 25-30 foot swath) and removal of vegetation-only for the remaining portion of Reach 2 for a length of approximately 490 feet (within the 25-30-foot swath). This approach would significantly increase the capacity of the channel and reduce the backwater effects upstream.

Note: Reference Detailed Hydraulic Results for Maintained Condition Model (Sediment and vegetation Removed)

Are there areas of native vegetation identified in the IBA that can be retained during maintenance? If so, identify location and any thinning or other modifications which must be made in the retained area.

In order to preserve additional vegetation within the channel, if there are individual mature native trees such as sycamores or cottonwoods within the swath of maintenance and the trees are located no closer than 50 feet apart, maintenance can be performed around the trees. As discussed above, the 25-30 foot swath would allow vegetation along banks and portions of channel bottom to remain.

Is a downstream check dam or comparably mechanism required pursuant to Water Quality Protocol # 24? If not, explain why. If so, describe what mechanism should be included in the IMP?

No. Based on the non-erosive velocities and capacity of the channel, it was determined in the above-described hydraulic analyses, that downstream check dams are not necessary.

Conclusion/Recommendations (Describe the limits of recommended maintenance, degree to which native vegetation within the facility can be retained, and capacity of maintained channel):

Several hydraulic models were created to determine the limits of maintenance. It was determined that sediment and vegetation removal should occur in Reach 2, along the channel bottom, within a 25 to 30-foot swath for a distance of 630 feet. In addition to the 630 feet sediment and vegetation removal in Reach 2, also it is recommended sediment and vegetation removal maintenance in the lower portion of Reach 2, for a distance of 280 feet (portion not owned by the City of San Diego). The balance of Reach 2 (490 feet) would involve removal of vegetation only. Please refer to the maintenance plan for limits of maintenance and notes. Furthermore, it is recommended that in the portion of Reach 2 for a distance of 910 feet, sediment and vegetation be removed to bring the channel back to the historic flowline.

Additional Comments:

It is important to note that the frequency of flooding will be increased and the capacity of the channel will be reduced should maintenance (sediment and vegetation removal) be neglected within 280 feet of State of California property (see Note 1 on IMP). The City is not responsible for maintenance on properties owned by others. If the City maintains its portion upstream of the State of California property, flooding frequency will be reduced, however, significant benefits with respect to increasing the capacity and further reducing the frequency of flooding would be achieved when this additional area offsite is maintained. The City will notify and request the responsible party to maintain this area (280 feet downstream of City-owned land) to minimize the backwater effect that could contribute to the frequency of flooding of adjacent properties.

- ☑ Site Photos
- ☑ Hydraulic Workmap
- ☑ Hydraulic Profiles for Current Vegetated Condition Model
- ☑ Hydraulic Profiles for Ultimate Vegetated Condition Model
- ☑ Hydraulic Profiles for Maintained Condition Model (No Sediment Removed)
- ☑ Hydraulic Profiles for Maintained Condition Model (Sediment Removed)
- Detailed Hydraulic Results for Current Vegetated Condition Model
- Detailed Hydraulic Results for Ultimate Vegetated Condition Model
- Detailed Hydraulic Results for Maintained Condition Model (No Sediment Removed)
- Detailed Hydraulic Results for Maintained Condition Model (Sediment Removed)

SITE PHOTOS:

A site visit was conducted on October 13, 2009. See Hydraulic Workmap for picture locations and orientation.













Alvarado Channel, Map Numbers 63 & 64 - Hydraulic Workmap

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REC JN: 15541A





HYDRAULIC PROFILE FOR CURRENT VEGETATED CONDITION MODEL



Main Channel Distance (ft) 1

	Legend WS Q100 = 3900 WS Q50=3400 WS Q35=3000 WS Q10=2100 WS Q7=2000 WS Q2=1000 WS Q2=1000 Ground LOB ROB
590.298 590.298 370.768 370.768 318.558 FEMA Section R 375.018	
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HYDRAULIC PROFILE FOR ULTIMATE VEGETATED CONDITION MODEL



Legend WS Q100 = 3900 WS Q50=3400 WS Q35=3000 WS Q10=2100 WS Q7=2000 WS Q5=1700 WS Q2=1000 Ground LOB ROB



Main Channel Distance (ft) 1

	Legend WS Q100 = 3900 WS Q50=3400 WS Q35=3000 WS Q10=2100 WS Q7=2000 WS Q5=1700 WS Q2=1000 Ground LOB ROB
3690.298 3690.298 3870.768 3918.558 FEMA Section R 3975.018	
40	00



HEC-RAS F	lan: Current Ve	3g River: Avarado Ck	Reach: Upp	er								
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chni	Flow Area	Top Width	Froude # Chl
	A PARTY AND A PARTY AN	arrest de la cuesta constante de la constante d La constante de la constante de La constante de la constante de	(cfs)	(ft)	(t) [(ft)	(tt)	(tiVit)	(ft/s)	(t) (sq.ft)	(ft)	
Upper	5,802783	Q100 = 3900	3900.00	296.00	337.00	307.02	337.01	0.000020	0.76	5135.41	313.42	0.03
Upper	5.802783	Q50=3400	3400.00	296.00	308.85	306.24	311.01	0.030015	11.82	287.75	29.60	0.67
Upper	5.802783	Q35=3000	3000.00	296.00	308.06	305.53	310.05	0.030023	11.34	264.65	28.90	0.66
Upper	5.802783	Q10=2100	2100.00	296.00	306.06	303.79	307.63	0.030014	10.05	208.96	27.07	0.64
Upper	5.802783	Q7=2000	2000.00	296.00	305.82	303.57	307.34	0.030020	9.89	202.32	26.81	0.63
Upper	5.802783	Q5=1700	1700.00	296.00	305.04	302.90	306.40	0.030036	9.35	181.78	25.98	0.62
Upper	5.802783	Q2=1000	1000.00	296.00	302.91	301.05	303.84	0.030013	17.7	128.72	23.68	0.59
Upper	196.5054	Q100 = 3900	3900.00	302.00	337.01		337.01	0.000013	0.63	6157.76	354.39	0.02
Upper	196.5054	Q50=3400	3400.00	302.00	312.05		312.19	0.002038	3.04	1117.07	151.76	0.20
Upper	196.5054	Q35=3000	3000.00	302.00	311.19		311.33	0.002344	3.04	987.92	147.42	0.21
Upper	196.5054	Q10=2100	2100.00	302.00	309.13		309.27	0.003536	3.02	695.11	136.97	0.24
Upper	196.5054	Q7=2000	2000,00	302.00	308.89		309-03	0.003742	3.02	662.56	135.74	0.24
Upper	196.5054	Q5=1700	1700.00	302.00	308.16		308.30	0.004518	3.01	565.02	132.02	0.26
Upper	196.5054	Q2=1000	1000.00	302.00	306.37		306.50	0.007662	2.92	342.70	115.27	0.30
Upper	478,6733	Q100 = 3900	3900.00	304.00	337.01		337.02	0.000028	0.84	4619.83	305.39	0.03
Upper	478.6733	Q50=3400	3400.00	304.00	312.87		313.20	0.006654	4.65	730.83	110.81	0.32
Upper	478.6733	035=3000	3000.00	304.00	312.14		312.47	0.007481	4.60	651.54	108.04	0.33
Upper	478.6733	Q10=2100	2100.00	304.00	310.56		310.85	0.009415	4.33	485.52	101.33	0.35
Upper	478.6733	Q7=2000	2000.00	304.00	310.39		310.67	0.009579	4.27	468.51	100.62	0.35
Upper	478.6733	Q5=1700	1700.00	304.00	309.89		310.15	0.009859	4.06	419.15	98.48	0.35
Upper	478,6733	Q2=1000	1000.00	304.00	308.71		308.88	0.009250	3.27	305.95	93.16	0.32
Upper	843.0025	Q100 = 3900	3900.00	312.00	336.92		337.10	0.000866	3.37	1158.29	241.59	0.16
Upper	843.0025	Q50=3400	3400.00	312.00	320.52	320.52	323.99	0.081603	14.96	227.24	32.60	1.00
Upper	843.0025	Q35=3000	3000.00	312.00	319.89	319.89	323.15	0.084785	14.48	207.13	31.86	1.00
Upper	843.0025	@10=2100	2100.00	312.00	318.40	318.40	321.05	0.091964	13.06	160.84	30.33	1.00
Upper	843.0025	Q7=2000	2000.00	312.00	318.22	318.22	320.80	0.093236	12.88	155.27	30.14	1.00
Upper	843.0025	QS=1700	1700.00	312.00	317.65	317.65	320.00	0.097055	12.29	138.38	29.57	1.00
Upper	843.0025	Q2=1000	1000.00	312.00	316.17	316.17	317.87	0.108524	10.47	95.50	28.16	1.00
Upper	893.1187	Q100 = 3900	3900.00	314.00	336.99		337.14	0.000581	3.02	1289.80	265.42	0.14
Upper	893.1187	Q50=3400	3400.00	314.00	324.65	322.19	326.24	0.024628	10.12	335.85	43.34	0.64
Upper	893.1187	Q35=3000	3000.00	314.00	323.97	321.62	325.45	0.025292	9.77	307.18	41.29	0.63
Upper	893.1187	Q10=2100	2100.00	314.00	322.27	320.25	323.46	0.026641	8.73	240.54	37.35	0.61
Upper	893.1187	07=2000	2000.00	314.00	322.07	320.08	323.21	0.026725	8.58	233.00	36.96	0.60
Upper	893.1187	05=1700	1700.00	314.00	321.43	319.56	322.45	0.026985	8.11	209.74	36.06	0.59
Upper	893,1187	02=1000	1000.00	314.00	319.72	318.20	320.41	0.027428	6.67	149.91	33.81	0.56
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HEC-RAS PI	an: Current Veg	River: Avarado C	k Reach: Uppe	er (Continued)							
Reach	River Sta	Profile	QTotal	Min Ch El	W.S. Elev Crit W.S	EG.Ele	E.G. Slope	Vel Chn	Flow Area	Iop Width	Froude # Chi
			(cfs)	(tt)	(ft) (ft)	(ll)	(ft/ft)	(ft/s)	(sq ft)	(¥)	
Upper	1126.981	Q100 = 3900	3900.00	318.00	337.19	337.31	0.001007	2.79	1399.19	334.62	0.13
Upper	1126.981	Q50=3400	3400.00	318.00	329.33	329.76	0.009617	5.26	646.24	87.09	0.34
Upper	1126,981	Q35=3000	3000.00	318.00	328.67	329.07	0.009956	5.08	590.50	83.70	0.34
Upper	1126.981	Q10=2100	2100.00	318.00	327.01	327.33	0.010899	4.58	458.32	75.02	0.33
Upper	1126.981	Q7=2000	2000.00	318.00	326.80	327.12	0.011018	4.51	442.97	73.94	0.33
Upper	1126:981	Q5=1700	1700.00	318.00	326.15	326.44	0.011378	4.29	396.02	70.56	0.32
Upper	1126.981	Q2=1000	1000.00	318.00	324.37	324.57	0.012189	3.59	278.28	61.24	0.30
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Upper	1432.619	Q100 = 3900	3900.00	324.00	337.66	337.89	0.003963	3.87	1006.97	191.46	0.23
Upper	1432.619	Q50=3400	3400.00	324.00	333.30	333.88	0.019806	6.11	556.65	85.69	0.42
Upper	1432.619	Q35=3000	3000.00	324.00	332.78	333.31	0.020166	5.86	512.27	83.28	0.42
Upper	1432.619	Q10=2100	2100.00	324.00	331.45	331.87	0.021045	5.18	405.62	77.17	0.40
Upper	1432,619	Q7=2000	2000.00	324.00	331.28	331.69	0.021155	5.09	392.98	76.41	0.40
Upper	1432.619	Q5=1700	1700.00	324.00	330.76	331.12	0.021519	4.81	353.72	74.02	0.39
Upper	1432.619	Q2=1000	1000.00	324.00	329.31	329.55	0.022845	3.99	250.84	67.41	0.36
Upper	1897.670	Q100 = 3900	3900.00	328.00	339.83	340.69	0.008520	7.42	525.38	396.74	0.45
Upper	1897.670	Q50=3400	3400.00	328.00	339.03	339.82	0.008753	7.13	476.85	387.65	0.44
Upper	1897.670	Q35=3000	3000.00	328.00	338.47	339.18	0.008518	6.76	443.95	380.02	0.43
Upper	1897.670	Q10=2100	2100.00	328.00	337.03	337.55	0.007907	5.80	362.16	365.61	0.40
Upper	1897.670	Q7=2000	2000.00	328.00	336.84	337.34	0.007835	5.68	352.13	364.33	0.39
Upper	1897.670	Q5=1700	1700.00	328.00	336.26	336.70	0.007577	5.30	321.04	360.26	0.38
Upper	1897.670	Q2=1000	1000.00	328.00	334.61	334.88	0.006842	4.21	237.32	165.52	0.34
Upper	2292.941	Q100 = 3900	3900.00	328.00	341.63	342.82	0.003444	8.73	446.57	266.33	0.47
Upper	2292.941	Q50=3400	3400.00	328.00	340.85	341.90	0.003287	8.22	413.82	265.59	0.46
Upper	2292.941	Q35=3000	3000.00	328.00	340.23	341.15	0.003096	7.72	388.38	265.00	0.44
Upper	2292.941	Q10=2100	2100.00	328.00	338.61	339.26	0.002629	6.49	323.80	243.61	0.40
Upper	2292.941	Q7=2000	2000.00	328.00	338.40	339.02	0.002574	6.33	315.77	243.42	0.39
Upper	2292.941	Q5=1700	1700.00	328.00	337.75	338.28	0.002400	5.85	290.47	242.81	0.37
Upper	2292.941	Q2=1000	1000.00	328.00	335.88	336.20	0.001937	4.53	220.55	212.94	0.33
					-						
Upper	2808.985	Q100=3900	3900.00	332.00	343.24	344.81	0.003854	10.06	387.76	334.28	0.62
Upper	2808.985	Q50=3400	3400.00	332.00	342.44	343.91	0.004089	9.72	349.63	315.46	0.63
Upper	2808.985	Q35=3000	3000.00	332.00	341.78	343.15	0.004286	9.41	318.88	92.89	0.63
Upper	2808.985	Q10=2100	2100.00	332.00	340.09	341.26	0.005122	8.67	242.25	46.53	0.65
Upper	2808.985	Q7=2000	2000.00	332.00	339.88	341.02	0.005268	8.59	232.83	43.83	0.66
Upper	2808.985	Q5=1700	1700.00	332.00	339.19	340.27	0.005772	8.34	203.73	41.34	0.66
Upper	2808.985	Q2=1000	1000.00	332.00	337.27	338.18	0.008078	7.64	130.89	35.05	0.70

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HEC-RAS PI	lan: Current Veg	River: Avarado C	X Reach: Upp	er (Continued)						Zenteka, Formánia kanya versegetetetetetetetetetetetetetetetetetete		
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chrl	Flow Area	lop Width	Froude # Chi
			(cfs)	(tt)	(t)	(tt)	(u)	(ft/ft)	(ft/s)	(th ps)	(H)	
Upper	3046.513	Q100 = 3900	3900.00	332.00	343.93		345.33	0.001313	9.49	410.99	170.29	0.59
Upper	3046.513	Q50=3400	3400.00	332.00	343.14		344.44	0.001340	9.15	371.61	80.65	0.59
Upper	3046,513	Q35=3000	3000.00	332.00	342.49		343.70	0.001358	8.83	339.81	61.91	0.59
Upper	3046,513	Q10=2100	2100.00	332.00	340.85		341.83	0.001338	7.95	264.31	42.84	0.56
Upper	3046.513	Q7=2000	2000.00	332.00	340.65	(meeting	341.60	0.001326	7.82	255.81	41.99	0.56
Upper	3046,513	Q5=1700	1700.00	332.00	340.01		340.86	0.001279	7.40	229.78	39.24	0.54
Upper	3046.513	Q2=1000	1000.00	332.00	338.22		338.80	0.001193	6.11	163.62	34.74	0.50
Upper.	3362.059	Q100 = 3900	3900.00	334.00	343.65	343.65	346.60	0.003426	13.80	282.63	123.76	1.00
Upper	3362.059	Q50=3400	3400.00	334.00	343.11	343.11	345.82	0.003476	13.23	257.07	123.28	1.00
Upper	3362 059	Q35=3000	3000.00	334.00	342.66	342.66	345.17	0.003523	12.72	235.87	93.25	1.00
Upper	3362.059	Q10=2100	2100.00	334.00	341.50	341.50	343.56	0.003720	11.50	182.56	44.34	1.00
Upper	3362.059	Q7=2000	2000.00	334.00	341.30	341.30	343.36	0.003750	11.50	173.90	42.25	1.00
Ubber	3362.059	Q5=1700	1700.00	334.00	340.58	340.58	342.68	0.003859	11.62	146.26	34.80	1.00
Upper	3362.059	Q2=1000	1000.00	334.00	338.76	338.76	340.53	0.004182	10.69	93.56	26.27	1.00
Upper	3690.298	Q100 = 3900	3900.00	338.00	347.73	347.73	351.34	0.003123	15.24	255.92	343.19	1.00
Upper	3690.298	Q50=3400	3400.00	338.00	347.03	347.03	350.38	0.003198	14.70	231.26	309.32	1.00
Upper	3690.298	Q35=3000	3000.00	338.00	346.43	346.43	349.57	0.003269	14.22	210.92	280.10	1.00
Upper	3690,298	Q10=2100	2100.00	338.00	344.94	344.94	347.53	0.003486	12.91	162.68	154.86	1.00
Upper	3690.298	Q7=2000	2000.00	338.00	344.76	344.76	347.28	0.003520	12.74	157.01	139.26	1.00
Upper	3690.298	Q5=1700	1700.00	338.00	344.18	344.18	346.49	0.003645	12.19	139.44	86.45	1.00
Upper	3690.298	Q2=1000	1000.00	338.00	342.57	342.57	344.34	0.003918	10.68	93.59	26.38	1.00
Upper	3870.768	Q100 = 3900	3900.00	340.00	350.30	350.30	353.85	0.003645	15.11	258.13	129.46	1.00
Upper	3870.768	Q50=3400	3400.00	340.00	349.57	349.57	352.90	0.003713	14.65	232.09	34.69	1.00
Upper	3870.768	Q35=3000	3000.00	340.00	348.93	348.93	352.09	0.003791	14.25	210.48	33.33	1.00
Upper	3870,768	Q10=2100	2100.00	340.00	347.36	347.36	350.02	0.003979	13.08	160.54	30.19	1.00
Upper	3870.768	Q7=2000	2000.00	340.00	347.17	347.17	349.76	0.004001	12.92	154.85	29.85	1.00
Upper	3870.768	Q5=1700	1700.00	340.00	346.57	346.57	348.95	0.004089	12.39	137.22	28.78	1.00
Upper	3870.768	Q2=1000	1000.00	340.00	344.97	344.97	346.75	0.004381	10.72	93.29	26.22	1.00
											.	
Upper	3881.736	Q100 = 3900	3900.00	340.00	352.36		354.05	0.001262	10.43	373.84	262.06	0.60
Upper	3881.736	Q50=3400	3400.00	340.00	351.58		353.10	0.001241	9.91	343.18	171.19	0.59
Upper	3881.736	Q35=3000	3000.00	340.00	350.90		352.29	0.001199	9.45	317.30	125.84	0.57
Upper	3881.736	Q10=2100	2100.00	340.00	349.13		350.20	0.001088	8.27	253.99	34.45	0.54
Upper	3881.736	Q7=2000	2000.00	340.00	348.91		349.94	0.001074	8.12	246.44	34.09	0.53
Upper	3881.736	Q5=1700	1700.00	340.00	348.22		349.12	0.001026	7.62	223.09	32.98	0.52
Upper	3881,736	02=1000	1000.00	340.00	346.30		346.89	0.000873	6.15	162.71	30.13	0.47

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	IL: CULIERI VEG	River: Avarado C	k Reach: Uppe	er (Continued)							
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev Cnt W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(tt)	(ft) (ft)	(u)	(fUT)	(\$/¥)	(sq ft)	(tt)	
oper	3918.558	Q100 = 3900	3900.00	340.00	352.88	354.14	0.000914	9.00	433.23	278.70	0.53
oper	3918.558	Q50=3400	3400.00	340.00	352.00	353.18	0.000982	8.71	390.46	177.04	0.54
oper	3918.558	Q35=3000	3000.00	340.00	351.24	352.35	0.001003	8.49	353.46	134.72	0.54
oper	3918.558	Q10=2100	2100.00	340.00	349.35	350.25	0.000891	7.61	276,12	37.94	0:50
pper	3918.558	Q7=2000	2000.00	340.00	349.12	349.99	0.000885	7.48	267.41	37.58	0.49
pper	3918.558	Q5=1700	1700.00	340.00	348.39	349.17	0.000867	10.7	240.41	36.44	0,49
oper	3918.558	Q2=1000	1000.00	340.00	346.39	346.92	0.000812	5.86	170.66	33.41	0.46
pper	3975.018	Q100 = 3900	3900.00	340.39	353,55	354.23	0.000506	6.61	589.83	298.86	0.42
pper	3975.018	Q50=3400	3400.00	340.39	352.60	353.27	0.000601	6.59	515.94	226.40	0.45
pper	3975.018	Q35=3000	3000.00	340.39	351.76	352.45	0.000732	6.65	450.92	139.89	0.49
pper	3975.018	Q10=2100	2100.00	340.39	349.43	350.31	0.001380	7.54	278.47	61.97	0.63
pper	3975,018	Q7=2000	2000.00	340.39	349.16	350.06	0.001387	7.63	262.21	56.95	0.63
pper	3975.018	Q5=1700	1700.00	340.39	348.36	349.26	0.001247	7.64	222.47	42.56	0.59
DDer	3975.018	Q2=1000	1000.00	340.39	346.34	347.02	0.001143	6.62	150.99	32.99	0.55

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HEC-RAS Version 4.0.0 March 2008 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

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х	х	х	х			Х	Х	х	х	Х
XXXX	XXXX	XXXX	х		XXX	XX	XX	XXX	XXX	XXXX
х	x	х	х			х	х	х	х	х
х	х	х	х	Х		X	Х	х	Х	Х
х	х	XXXXXX	XX	XX		Х	Х	х	x	XXXXX

PROJECT DATA Project Title: Alvarado Upper (Map 63&64) Project File : Alvarado6364.prj Run Date and Time: 8/3/2010 1:46:46 PM

Project in English units

Project Description: City Stormwater Maintenance (First Year) Alvarado Canyon Creek (Upper) Helix Map Number 63 & 64 October 17, 2009 J-15541A

PLAN DATA

Plan Title: Current Veg Condidition
Plan File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.p01

Geometry Title: Current n-value (GIS Geometry) Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g02

Flow Title : FEMAQ and WSE Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Plan Description: Geometry is from TIN Flow Data is from DRAFT FIS (no date at this time)

Plan Summary Information:Number of: Cross Sections = 17Multiple Openings = 0Culverts = 0Inline Structures = 0

Lateral Structures = Bridges 0 0 ____ Computational Information Water surface calculation tolerance = 0.01 Critical depth calculation tolerance = 0.01 Maximum number of iterations 20 = 0.3 Maximum difference tolerance -----= 0.001 Flow tolerance factor 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: Subcritical Flow FLOW DATA Flow Title: FEMAQ and WSE Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02 Flow Data (cfs) Q50=3400 RS Q100 = 3900River Reach 2330 Q5=1700 Q10=2100 Q7=2000 Q35=3000 800 3400 Avarado Ck 3975.018 3900 Upper 1700 2330 2000 3000 2100 800 Q2=1000 555 Reach RS River 1000 555 Avarado Ck Upper 3975.018 Boundary Conditions Upstream Reach Profile River Downstream Q100 = 3900Avarado Ck Upper Known WS = 337Avarado Ck Upper Q50=3400 Normal S = 0.03Avarado Ck Upper Q35=3000 Normal S = 0.03Avarado Ck Upper Q10=2100 Normal S = 0.03

Avarado CkUpperQ7=2000Normal S = 0.03Avarado CkUpperQ5=1700Normal S = 0.03Q5=1700

GEOMETRY DATA

Geometry Title: Current n-value (GIS Geometry) Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g02

CROSS SECTION

RIVER: Avarado Ck REACH: Upper RS: 3975.018

INPUT Description: 77 num= Station Elevation Data Elev Sta Sta Elev Sta Elev Sta Elev Sta Elev 169.75 352.62 174.25 350.66 54.55 352 168.06 352.55 0 352.81 196.62 353.69 203.07 354 216.59 354.69 229 186.4 353.2 355.32 321.79 354.85 340 354 340.76 244.96 356 313.71 355.2 353.95 353.92 350.36 353.29 359.4 352.68 368.34 341.22 340.92 353.94 352 382.41 377.54 350.68 379.23 350.46 351.95 369.6 351.82 368.63 350 385.58 347.89 388.06 346 389.7 348 385.42 385.23 348.13 344.66 394.26 340.86 394.64 392.73 342 390.99 343.53 390.46 344 340.91 340.64 414.41 340.39 403.98 400.41 395.4 340.47 397 340.44 341.66 417.94 342 418.25 416.29 341.81 416.76 341.84 341.75 415.6 342.52 420.38 346 420.56 419.1 344 419.12 344.02 419.07 343.94 346.28 348.64 454.83 350 478.38 348.06 431.94 422.75 421.71 348 350.41 505.16 504.44 351.53 504.87 351.54 503.88 351.51 499.51 351.3 351.55 354 588.66 353.98 588.51 587.99 515.48 352 567.91 353.08 354.05 603.15 357.45 603.3 357.01 602.99 357.43 356 600.77 595.5 357.48 360.83 620.64 605.48 358 609.26 358.92 613.68 360 616.49 362 362.78 626.85 364 623.06 Manning's n Values num= 5 n Val Sta n Val Sta n Val Sta n Sta n Val Sta Val 454.83 0 .025 244.96 .018 397 .02 418.25 .018 .025

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

377.54 454.83 56.06 56.46 57.46 .1 . 3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 377.54 F 454.83 626.85 F Blocked Obstructions 3 num= Sta R Elev Sta L Sta R Elev Sta L Sta R Elev Sta L 71.99 365 97.43 152.37 365 224.1 297.99 365 0 CROSS SECTION RIVER: Avarado Ck RS: 3918.558 **REACH:** Upper INPUT Description: FEMA Section R Station Elevation Data num= 66 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 350.89 45.61 352 179.04 353.17 180.56 353.23 193.04 353.58 197.76 353.78 203.01 354 230.15 355.16 237.25 355.42 250.67 356 294.4 355.68 314.27 354.58 324.48 354 341.01 352.75 350.82 352 352.57 350.58 353.44 350 354.29 349.11 355.36 348 357.25 346.02 357.27 346 357.33 345.94 359.19 344 359.68 343.53 361.3 342 340 365.91340.1096 388.28 341.18 388.59 361.7 341.63 363.62 342 389.11 343.38 389.34 344 389.62 344.72 390.14 389.03 343.17 346 347.66 391.19 348 392.09 349.49 392.37 390.5 346.84 391 350 393.96 350.46 398.11 351.25 399.59 351.32 400.7 351.38 402.6 351.24 403.71 351.29 432.41 350.39 438.19 350 526.18 351.95 526.68 351.96 599.34 353.8 606.95 354 614.22 526.98 351.97 527.72 352 355.8 615.89 356.21 620.14 357.22 623.29 358 630.16 615.03 356 359.69 362 640.01 362.42 642.45 631.4 360 634.28 360.79 638.7 363.24 644.88 364 Manning's n Values num= 5 Sta n Val .018 365.91 .02 388.28 0 .025 341.01 .018 399.59 .025 Coeff Contr. Bank Sta: Left Right Lengths: Left Channel Right Expan.

36.89 36.82 36.86 350.82 399.59 .1 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 350.82 F F 399.59 644.88 Blocked Obstructions 3 num= Elev Sta L Sta R Elev Sta R Elev Sta L Sta R Sta L 165.48 365 212.28 335.49 365 365 109.3 54.03 0 CROSS SECTION RIVER: Avarado Ck RS: 3881.736 REACH: Upper INPUT Description: Station Elevation Data num= 79 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 350.48 6.07 350.87 10.29 351.15 12.92 351.31 40.92 352 199 353.76 206.08 353.91 206.69 353.92 210.21 354 222.24 354.44 251.37 355.63 258.69 356 271.86 355.88 296.8 233.9 354.94 354 352 330.64 350.21 330.92 350 331.62 309.56 353.29 328.41 349.42 348 334.54 346.94 335.46 346 336.53 344.91 337.43 333.32 344 339.49 341.91 341.37 340 339.15 342.25 339.4 342 342.76340.0032 363.11 340.05 363.14 340.12 363.24 340.37 363.78 342 363.88 342.31 365.75 347.47 365.95 364.44 344 364.68 344.67 365.18 346 348 366.76 350 366.98 350.5 367.69 352 385.02 366.13 348.45 351.97 401.73 351.1 404.62 351.04 406.3 351 410.61 389.85 351.73 350.92 421.56 350.62 423.52 350.58 428.95 419.61 350.67 415.48 350.84 350.5 350 507.58 351.01 436.77 350.38 437.79 350.35 443.09 517.23 351.31 351.5 531.06 351.78 532.85 351.84 538.19 352 589.11 523.05 353.29 615.84 616.1 354.06 623.91 356 627.56 615.46 353.99 354 356.9 632.01 358 632.22 358.05 632.33 358.08 639.85 360 640.33 360.14 648.51 362.43 645.87 361.67 647.07 362 653.47 364 num= Manning's n Values 5 n Val n Val Sta Sta n Val Sta n Val Sta Sta Val

5 of 29

n
.025 328.41 .018 342.76 .02 363.11 .018 367.69 0 .025 Bank Sta: Left Right Lengths: Left Channel Coeff Contr. Right Expan. 11.11 10.97 10.38 .1 328.41 367.69 . 3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R F 0 328.41 F 367.69 653.47 3 Blocked Obstructions num= Elev Sta R Elev Sta L Sta L StaR Elev StaL Sta R 195.2 297.51 365 365 118.74 175.55 365 0 40.99 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 3870.768 INPUT Description: num= 93 Station Elevation Data Elev Sta Elev Sta Elev Sta Sta Sta Elev Elev .69 352 176.77 353.23 181.76 353.33 186.43 0 351.72 353.41 234.28 354.85 240.42 355.16 245.89 354 197.1 353.65 213.03 355.43 246.64 355.46 267.28 353.82 272.67 353.819 275.67 354 272.64 353.67 306.57 351.54 308.04 350.43 308.6 350 309.85 305.95 352 349.05 348 311.77 347.59 313.71 346 315.77 344.21 316.02 311.24 344 318.6 341.6 320.17 340 321.64 316.21 343.83 318.18 342 340.147 342 340.07 342.06 340.77 340.05 338.64 341.841 340.04 341.98 344 341.49 346.01 342.6 348 343.42 341.44 345.88 341.48 345.99 349.05 352 348.08 351.23 349.08 350 346.01 351.74 346.27 344.21 351.56 351.7 355.64 351.67 359.27 351.55 363.01 350.42 351.36 354.74 351.43 397.33 364.73 351.37 366.08 351.33 368.29 351.2 389.9 350.16 350.39 412.11 350.12 418.82 350 420.14 404.15 350.27 404.59 350.26 349.98 453.99 350 481.77 426.27 349.9 433.22 349.8 434.21 349.82 350.11 351.09 518.78 351.31 530.89 497.7 350.62 501.02 350.74 511.44 351.71 352 551.73 352.35 558.84 352.54 576.49 353.03 589.82 538.75 353.37

608.45 353.74 611.81 353.89 614.18 354 614.26 354.01 614.32 354.03 615.95 354.47 620.3 355.57 621.91 356 626.05 357.06 629.47 358 631.85 358.62 636.85 360 637.98 360.31 644.01 362 644.38 362.1 644.9 362.25 649.64 363.57 651.05 364 5 Manning's n Values num= Sta n Val Sta n Val Sta Sta n Val Sta n Val n Val 0 .025 305.95 .018 318.6 .02 338.64 .018 346.01 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 305.95 346.01 179.97 180.47 180.91 .1 . 3 num= Ineffective Flow 2 Sta L Sta R Elev Permanent 0 305.95 F F 346.01 651.05 Blocked Obstructions num= 2 Sta L Sta R Elev Sta L Sta R Elev 0 9.75 365 121.57 277.04 365 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 3690.298 INPUT Description: 90 Station Elevation Data num= Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 345.71 3.53 345.75 5.97 345.77 20.93 345.96 23.5 346 348 35.83 349.75 36.38 350 30.97 347.56 32.17 73.85 351.06 352 167.58 351.52 180.07 76.35 351.12 80.39 351.24 93.24 350.99 350 206.33 348.11 206.49 203.46 348 206.6 347.92 209.4 346 344 214.44 342.39 214.98 342 215.47 211.3 344.63 212.19 341.65 340 218.52 339.47 220.56 338 223.92338.0069 235.27 217.78 338.03 235.44 338.18 236.7 339.26 237.56 340 239.68 341.82 239.89 342 241.12 343.04 242.24 344 270.01 345.07 310.29 344.45 322.56 344.28 344.1 330.94 344 375.39 344.17 382.11 344.34 386.03 326.36 344.44 387.03 344.43 390.42 344.44 396.81 344.59 400.84 344.63 407.01 344.7

416.13 344.88 438.84 345.18 448.8 345.3 450.55 345.31 465.65 345.48 468.22 345.49 472.87 345.52 491.47 346 494.34 346.07 495.53 346.1 515.92 346.57 530.49 346.92 540.57 347.15 545.75 347.26 566.83 347.78 569.21 347.84 575.67 348 583.79 348.3 588.52 348.49 592.91 348.66 596.44 348.8 613.02 349.46 615.24 349.55 616.85 349.62 626.37 350 644.26 350.81 661.23 351.6 669.77 352 744.72 353.34 757.4 354 354.3 762.72 356 765.36 356.97 768.25 358 770.91 758.19 358.93 774.03 360 777.36 361.13 779.9 362 783.91 363.32 785.95 364 Manning's n Values num= 5 Sta n Val Sta n Val Sta n Val Sta Sta n Val n Val 0 .025 203.46 .018 223.92 .02 235.27 .018 242.24 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 344.53 328.24 316.06 203.46 242.24 .1 .3 2 Ineffective Flow num= Sta L Sta R Elev Permanent F 0 203.46 F 242.24 785.95 Blocked Obstructions num= 2 Sta L Sta R Elev Sta L Sta R Elev 275 321.35 360 57.06 198.78 3.60 CROSS SECTION RIVER: Avarado Ck RS: 3362.059 REACH: Upper INPUT Description: 187 Station Elevation Data num= Sta Elev Sta Elev Sta Sta Elev Sta Elev Elev 0 446.54 24.19 444.7 25.61 10.14 446.29 20.91 446 444 30.85 441.42 33,27 440.27 33.66 27.19 443.21 29.68 442 440.07 37.91 438 38.67 437.63 42.05 33.81 440 36.64 438.61 436 42.49 435.79 43.46 435.33 45.38 434.4 46.24 434 48.24 433.04 432 51.07 431.71 52.21 431.18 54.08 430.27 54.64 50.46 430

57.03	428.84	58.76	428	59.55	427.62	60.36	427.22	62.58
426								
64.09	425.13	66.11	424	68.65	422.51	69.49	422	70.86
421.16 72.75	420	73.27	419.67	74.6	418.83	75.91	418	78.23
416.53 79.06	416	80.3	415.22	82.22	414	83.08	413.46	85.03
412.22 85.27	412.07	85.38	412	85.58	411.87	88.54	410	90.63
408.68 91.7	408	92.99	407.18	94.86	406	97.97	404.03	98.02
404 101.08	402.03	101.11	402.01	101.13	402	101.2	401.96	104.22
400 105.29	399.3	107.26	398	109.04	396.82	110.28	396	113.2
113.28	394	113.32	393.98	113.51	393.85	115.98	392.19	116.26
117.51	391.16	119.23	390	119.73	389.67	122.21	388	123.85
125.08	386	127.54	384.11	127.67	384	130	382.21	130.28
131.19	381.3	132.89	380	133.44	379.58	135.54	378	135.6
136.13 374	377.56	138	376.16	138.21	376	140.41	374.38	140.92
142.28 369.97	373	143.63	372	146.21	370.09	146.35	370	146.39
149.39 366.38	368	167.44	367.39	173.88	367.1	183.82	366.76	190.8
197.44 362	366	198.93	364.92	200.18	364	202.56	362.3	202.97
203.33 356.14	361.74	205.83	360	208.02	358.47	208.7	358	211.37
211.57 352	356	213.46	354.69	214.45	354	215.2	353.47	217.32
218.52 347.15	351.16	220.19	350	221.67	348.86	222.79	348	223.55
224.57 342	346	226.32	344.03	226.34	344	226.44	343.89	228.12
229.22 337.01	340.76	229.89	340	230.44	339.38	231.72	338	232.63
233.63 334.87	336	233.78	335.91	236.2	334.56	237.12	334	252.9
253.61 339.26	335.49	254.18	336	255.55	337.21	256.43	338	257.85
258.68 342.14	340	266.68	340.85	274.32	341.65	277.87	342	284.94
302.27 344.35	342.45	306.07	342.51	309.61	342.52	431.19	344	758.76
768.31 346.34	344.6	797.19	345.41	821.62	346	830	340.31	000 41
833.5 348.03	346.43	847.74	346.96	856.58	347.25	879.57	348	88U.41
880.72 349.83	348.04	881.24	348.07	901.94	348,95	906.43	347.10	921./0

923.27 349.9 925.42 350 942.25 350.68 949.16 350.95 960.33 351.4 963.86 351.55 965.66 351.58 967.08 351.64 969.78 351.75 971.07 351.79 352 1038.39 353.93 1038.73 354 1041.06 354.92 1043.88 984.45 356 358 1050.91 358.78 1053.99 360 1059.87 1045.68 356.71 1048.94 361.95 1059.99 361.99 1060.03 362 Manning's n Values num= 5 Sta n Val .025 228.12 .018 233.78 .02 253.61 .018 274.32 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. .1 323.3 315.55 308.79 222.79 274.32 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 222.79 F 274.32 1060.03 F Blocked Obstructions num= 1 Sta L Sta R Elev 350.42 649.42 360 CROSS SECTION RIVER: Avarado Ck RS: 3046.513 REACH: Upper INPUT Description: Station Elevation Data num= 182 Elev Sta Elev Sta Elev Sta Elev Sta Sta Elev 1.65 440.18 2.26 439.73 0 441.38 1.89 440 4.62 438 7.36 436 8.5 435.16 10.09 434 10.57 6.7 436.48 433.65 17.26 428.76 432 13.42 431.56 15.56 430 18.29 12.82 428 21.03 21.34 425.77 424 24.83 20.08 426.69 426 23.76 423.22 27.68 421.13 29.23 420 30.54 419.04 31.97 422 26.5 418 36.66 414.57 37.43 414 38.34 33.39 416.96 34.7 416 413.34 412 41.97 410.69 42.9 410 44.71 408.84 46.04 40.17 408 47.74 406.95 49.28 406 51.46 404.66 52.53 404 55.65 402.08 56.21 401.73 58.56 400.29 59.03 400 61.34 402 55.78 398.58

62.29	398	62.38	397.94	63.73	397.12	65.44	396.06	65.55
396 66	395.72	68.81	394	69.5	393.58	72.08	392	73.03
391.42 75.35	390	76.54	389.27	78.62	388	80.04	387.13	81.89
386 84.06	384.67	85.16	384	86.41	383.24	88.44	382	90.48
380.76 91.72	380	93.93	378.65	95	378	97.38	376.55	98.28
376 100.9	374.4	101.56	374	102.26	373.57	104.84	372	105.98
371.3 108.12	370	110.66	368.46	111.41	368	114.45	366.15	114.7
366 117.91	364.04	117.98	364	118.05	363.96	121.2	362	121.22
121.34	361.9	123.3	360.47	123.95	360	124.33	359.72	126.69
128.6	356.62	129.44	356	131.8	354.28	132.19	354	132.86
134.94	352	136.83	350.63	137.7	350	139.3	348.84	140.46
142.24	346.71	143.23	346	144.6	345.01	146	344	146.37
148.77	342	150.97	340.41	151.55	340	152.21	339.52	154.32
156.46 334	336.46	157.1	336	157.84	335.47	158.82	334.77	159.88
161.68	333.02	163.38	332	181.72	332.23	181.93	332.42	182.16
183.79 338	334	185.96	335.84	186.15	336	187.92	337.5	188.51
189.01	338.46	190.75	340	196.48	341.99	196.52	342	219.42
228.12 343.63	343.15	232.61	343.32	245.18	343.4	249.52	343.53	252.86
255.39	343.7	264.28	343.83	281.18	343.76	295.78	343.7	309.77
324.93 345.21	343.72	342.77	343.67	618.57	343.93	628.31	344	669.36
680.15 346	345.54	689.98	345.88	691.38	345.92	692.91	345.96	693.63
747.86 348.57	347.89	748.45	347.91	748.79	347.92	749.9	348	772.09
776.41 349.77	348.74	784.94	349.02	798.19	349.5	802.2	349.65	805.77
812.25 351.54	350	818.51	350.2	839.73	350.56	858.41	350.94	883.51
888.56 353.53	351.65	890.61	351.69	899.49	351.84	903.12	352	908.37
909.21 355.8	353.73	910.24	354	914.52	355.26	915.46	355.54	916.35
917.05 360	356	917.51	356.13	924	358	926.64	358.81	930.52
934.83	361.33	937.02	362					
Manning's	n Value	s	num=	5				

n Val Sta n Val Sta n Val Sta n Val Sta n Sta Val .025 148.77 .018 161.68 .025 182.16 .018 196.48 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 136.83 196.48 240.61 237.53 235.74 .1 .3 2 Ineffective Flow num= Elev Permanent Sta R Sta L 0 136.83 F F 196.48 937.02 Blocked Obstructions 1 num= Sta R Elev Sta L 232.03 534.15 360 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 2808.985 INPUT Description: FEMA Section Q 166 Station Elevation Data num= Elev Sta Sta Elev Sta Sta Elev Sta Elev Elev 4.61 430.58 5.49 .91 432.99 2.45 432 433.56 0 430 426 8.37 428.05 8.45 428 8.51 427.96 11.2 13.39 424.38 19.22 13.9 424 14.4 423.62 16.57 422 18.29 420.7 420 21.83 22.65 417.37 24.42 416 26.9 20.43 419.08 418 414.09 30.93 410.98 32.19 27.25 413.82 29.6 412 27.01 414 410 35.27 407.62 37.38 406 39.74 408 408.4 34.79 34.27 404.46 402 45.26 401.25 47.44 402.78 43.95 404 42.6 40.46 400 53.08 396.77 54.41 396 57.9 50.93 398 398.6 49.89 394 64.13 390.43 64.88 390 65.68 61.39 392 57.93 393.98 389.54 72.47 385.65 75.35 71.86 386 388 71.48 386.21 68.37 384 380 84.45 380.19 82.32 82 76.94 383.09 78.84 382 378.78 92.78 376.59 89.29 376 91.35 374.82 85.81 378 88.27 374 98.55 370.68 99.74 370 102.85 372 94.32 373.11 96.26 368.21 368 103.47 367.85 106.69 366 107.94 365.28 110.16 103.21 364

111.9	363	113.64	362	115.55	360.9	117.11	360	118.88	
119.57	358	120.51	357.16	121.79	356	123.11	354.82	124.02	
354 125.82	352.38	126.24	352	128.08	350.35	128.47	350	129.47	
349.1 130.69	348	132.19	346.66	132.92	346	133.52	345.47	135.15	
344 136.86	342.47	137.39	342	139.59	340.03	139.62	340.01	139.63	
340	220 00	141 87	338	143 15	336 86	144 11	336	146.18	
334.16		141.07				111.11			
146.36 333.693	334	147.63	332.88	147.74	332.78	148.61	334	1/1.18	
173.54 337.36	333.87	173.71	334	174.92	334.97	176.2	336	177.85	
178.63	338	180.37	338.6	183.91	340	204.05	340.84	220.8	
223.19	341.56	224.98	341.61	226.38	341.66	230.53	341.78	231.59	
341.81 232.58	341.84	238.45	341.95	241.64	342	345.14	342.1	353.05	
342.11 364.5	342.13	374.22	342.15	375.34	342.14	387.76	342.16	397.36	
342.17 404.24	342.18	408.46	342.19	416.48	342.2	428.16	342.22	443.31	
342.24 485.66	342.33	497.31	342.35	503.12	342.36	507.71	342.39	507.93	
342.4 509.37	342.41	511.1	342.42	513.15	342.44	514.72	342.45	640.38	
344 743.14	344.08	752.59	345.12	756.86	346	759.82	346.64	766.1	
348	240 10	000 00	2 2 2 7 2 2 2	000 05	250 24	005 01	250 62	007 27	
804.74 351.1	349.19	830.08	350	903.05	350.24	905.01	350.63	907.37	
912.05 356	352	913.64	352.7	916.54	354	920.63	355.78	921.16	
921.92 361	356.29	926.64	358	931.03	359.58	932.27	360	935.2	
938.12	362								
Manning's Sta	n Value n Val	s Sta	num= n Val	5 Sta	n Val	Sta	n Val	Sta	n
Val 0	.018	137.39	.018	147.63	.05	171.18	.018	183.91	
.025									
Bank Sta: Expan.	Left	Right	Lengths	: Left (Channel	Right	Coeff	Contr.	
1:	29.47 1	83.91		519.53	516.04	514.95		.1	
.J Ineffectio	ve Flow	num=	2						
Sta L	Sta R	Elev	Permane	nt					
0	129.47		F						
183.91	938.12		F						
Blocked O	bstructi	ons	num=	2					
Sta L	Sta R	Elev	Sta L	Sta R	Elev				
531	680.76	360	427.1	487.82	360				

CROSS SECTION

RIVER: A REACH: U	warado Ck Ipper		RS: 229	2.941				
INPUT								
Descript	lon:	D		1.00				
Station	Elevation	Data	num=	168	Blorr	0± ~	Ploy	Cto
Sta	L Elev	Sta	Elev	SLa	FIEA	Sta	FIEA	SLA
FTeA	420		4 1 0 1 C	2 22	410	<u>ຮ່ວ1</u>	A16 53	5 92
416	420	1./1	419.13	5.44	410	لد شمه و	410.55	
*10 7.92	414.52	8.61	414	8.8	413.86	11.29	412	12.33
13.97	410	16.15	408.37	16.65	408	17.59	407.3	19.32
20.39	405.2	21.99	404	23.78	402.66	24.66	402	26.35
400.73		00 60	200 70	20.05	200	20.07	207 22	33 50
27.31	. 400	27.67	399.73	29.95	398	30.97	391.44	32.59
396	204 25	25 22	204	27 41	202 22	27 69	202	27 96
34./6	394.35	35.22	394	37.41	374.44	57.00	374	37.00
371.03	200	10 63	280 37	40 17	388	43 31	386 99	44 47
39.92	. 390	40.03	309.37	42.1/	500	40.01	300.99	TT·TD
300 45 85	384 73	46 66	384	47 84	382.95	48.91	382	50.93
380.2	, 204.12	40,00		1,.01	000100	10171		
51.15	380	51.41	379.76	53.39	378	55.09	376.48	55.62
376								
56.33	375.37	57.86	374	60.08	372.02	60.09	372	60.1
371.99								
62.23	370	63.05	369.22	64.34	368	65.95	366.45	66.41
366								
67.34	365.08	68.41	364	70.18	362.23	70.41	362	71.2
361.21								
72.39	9 360	73.19	359.18	74.36	358	74.78	357.57	76.32
356		mo oó	254	70 00	252 24	00.00	252	01 98
77.82	354.47	78.28	354	/8.92	353.34	80.22	352	01.32
350.84		00 00	240 22	017	210	96	246 02	96 02
246	350	04.04	349.34	04.1	240	00	540.05	00.02
340 86 AF	345 97	87 92	344	88 99	342 87	89.8	342	91.38
340 32	540.97	07.92	544	00.22	542.07	05.0	510	52100
91.68	340	91,91	339.76	93.56	338	94.02	337.5	95.43
336								
96.44	334.92	97.29	334	98.07	333.17	99.16	332	99.73
331.39								
100.54	330.52	100.87	330.16	101.02	330	111.2	328.65	116.9
328								
127.23	328.74	127.84	329.66	128.08	330	129.12	331.57	129.42
332								
130.42	333.5	130.77	334	131.73	335.44	132.12	336	146.63
335.88	· · ·					100 50		100 00
151.77	335.91	152.42	335.9	166.66	335.68	168.69	335.64	T80.33
335.44								

183.48 335.39 212.35 334.98 216.01 334.89 220.32 334.78 225.53 334.65 230.05 334.59 234.72 334.53 239.35 334.42 242.63 334.39 247.74 334.31 253.7 334.26 259.16 334.22 277.03 334 312.77 248.01 334.3 334.21 314.04 334.33 316.53 334.64 318.99 334.93 321.02 335.16 329.71 335.83 330.22 335.88 330.47 335.91 331.97 336 341.96 336.37 349.34 336.76 357.03 337.15 360.29 337.37 365.52 337.52 366.9 337.63 368 337.71 338 432.96 339.01 448.76 340 458.82 368.92 337.76 373.25 340.32 342 544.49 342.78 563.66 343.26 598.15 491.34 341.34 513.06 344 808.65 345.76 810.45 345.77 816.29 346 877.95 346.51 878.74 346.59 879.53 346.73 881.53 346.95 882.54 347.12 888.48 348 890.22 348.1 350 905.34 351.91 905.68 352 909.62 353.27 911.72 898.3 354 912.89 354.45 916.98 356 926.01 356.42 Manning's n Values num= 4 Sta Sta n Val Sta n Val n Val Sta n Val .04 100.54 .05 127.23 .018 132.12 .25 0 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 410.33 395.27 385.35 . 1 86 132.12 .3 2 Ineffective Flow num= Sta L Sta R Elev Permanent 0 . 86 F 132.12 926.01 F Blocked Obstructions num= 2 Sta L Sta R Elev Sta L Sta R Elev 360 336.6 413.18 360 433.05 515.24 CROSS SECTION RIVER: Avarado Ck RS: 1897.670 REACH: Upper INPUT Description: Station Elevation Data num= 153 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 3.11 372.85 372 6.33 0 375.06 1.5 374 4.3 370.55 370 7.55 369.79 11.35 368 14.21 366.7 15.72 7.1 366 24.52 20.12 364 23.9 362.28 362 24.63 19.52 364.27 361.95

28.93	360	29.87	359.58	33.36	358	34.75	357.36	37.56
356								
40	354.7	41.43	354	43.95	352.66	45.28	352	47.88
350.61								
49.11	350	51.79	348.58	52.94	348	55.68	346.54	56.76
346			.					
59.56	344.51	60.58	344	62.09	343.25	64.64	342	68.83
341.05		~ ~ ~ ~ ~				100 40		
73.08	340	94.71	339.87	98.75	339.89	102.49	340	113.39
341.51	240	100 4	240.00			107 (1		100 00
114.24	342	122.4	342.23	124.88	342.20	12/.41	342.18	129.99
343.4 131 34	242 61	107 00	244	120 70	344 13	120 22	344 16	140 96
244	343.51	137.02	544	130./9	344.11	139.23	344.10	140.00
244 1/2 1/	213 01	112 56	242 73	147 06	2/2 27	150 64	242	150 96
242,14 90 LVC	242.01	143.00	343.72	147.00	343.37	10.04	740	T20.30
341,00 151 36	3/1 72	152 81	3/0 79	155 86	340	156 96	330 58	158 44
330 UI TOT'20	541.14	102.01	340.79	122.00	240	100.90	339.30	100.44
160 34	338 27	161 02	338	163 87	226 88	166 13	336	166 97
335 67	550.27	101.02		100.07	530.00	100.10	550	100.07
167.91	335.3	169.86	334.54	171.23	334	173.09	333.27	176.16
332		200.00	JJ 1.J 1	1,1,00	001	210105	555.27	1.0110
177.75	331.34	178.78	330.86	179.76	330.41	180.39	330	180.67
329.81								
182.7	328.44	183.35	328	212.15	328.86	212.26	328.94	213.11
329.59								
213.63	330	214.45	330.73	216	332	217.37	333.26	218.15
334								
281.89	334.6	291.52	334.69	294.54	334.72	299.5	334.76	300.49
334.77								
304.09	334.81	309.86	334.87	317.13	334.94	371.4	335.28	376.63
335.32								
384.58	335.4	387.54	335.42	388.98	335.44	391.52	335.46	439.05
335.11								
441.03	334.99	442.89	334.88	444.37	334.79	445.18	334.74	446.08
334.68								
447.07	334.62	448.18	334.57	450.14	334.59	453.2	334.42	460.27
334.03	224		224 02		225	F00 40	~~	FD4 66
40V.91	224	520.63	334,92	524.57	330	549.40	337.11	534.00
530 55 530 55	338 45	544 97	338 G1	554 54	340	558 74	340 08	583 10
340 51	330.40	544.97	330.9I	004.04	540	550.74	540.00	505.12
610.25	341.05	636.17	341.55	639.13	341.6	659.54	342	675.97
342.47	012.00			000120	012.0	002101		0,010,
694.81	343.02	699.45	343.14	709.92	343.3	714.55	343.41	718.52
343.52								
739.32	343.71	741.92	343.76	743.78	343.8	752.4	343.9	775.83
344								
837.31	343.9	864.6	343.73	883.59	343.61	987.66	343.97	987.85
343.98							-	
988.73	344	1030.28	344.84	1032.62	346	1038.87	346.92	1045.1
348								
1051.6	349.55	1053.43	350	1059.26	351.34	1062.42	352	1072.59
353.99								
1072.65	354	1072.82	354.01	1095.66	354.97			

Manning's n Values

4

num=

16 of 29

n Val Sta n Val Sta n Val Sta n Val Sta .025 0 .045 180.67 .1 213.11 .018 218.15 Right Lengths: Left Channel Right Coeff Contr. Bank Sta: Left Expan. 469.57 465.05 461.75 137.82 218.15 .1 .3 2 Ineffective Flow num= Sta L Sta R Elev Permanent F 0 137.82 218.15 1095.66 F Blocked Obstructions num= 3 Sta R Elev Sta L Sta L Sta R Elev Sta L Sta R Elev 360 847.78 907.86 660.68 695.1 360 769.36 808.01 360 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 1432.619 INPUT Description: FEMA Section P 139 Station Elevation Data num= Sta Elev Sta Elev Sta Sta Elev Sta Elev Elev 354.9 19.72 353.99 46.71 19.02 354.02 19.48 354 0 353.33 54.53 353.16 58.29 353.3 49.15 353.27 50.37 353.24 47.47 353.05 352.47 352.32 66.86 352.74 75.27 84.62 88.84 64.75 352.82 352.09 89.18 352.11 90.76 352 108.71 353.03 109.25 353.09 111.15 353.31 353.2 114.07 353.17 114.65 353.12 115.4 353.04 118.93 113.74 352.69 119.69 352.62 125.83 352 127.94 351.78 128.86 351.68 135.28 351 138.97 350.46 141.76 350 145.19 348.86 147.4 348 149.89 347.02 344 187.92 343.35 344.7 165.1 192.1 152.5 346 159.12 343.25 197.63 342.97 200.39 342.79 208.12 342.27 209.15 194.8 343.13 342.22 340 215.83 338.79 216.76 212.11 342 214.19340.09 214.28338.07 337.39 230.4 337.22 216.85 338 217.04 337.98 225.83 246.26 336.41 251.6 336.16 253.84 336 258.54 334.45 259.92 334 265.29 332.22 332 270.74 330.42 271.98 330 272.18 329.93 277.9 265.97 328 279.21 327.55 281.05 326.93 283.79 326 287.35 324.99 290.43 324 325.98 336.23 326 336.25 326.02 336.71 326.31 339.1 336.19 327.83

328 339.66 328.18 342.52 330 343.53 330.64 345.66 339.37 332 364.84 335.75 366.23 335.9 368.11 348.32 333.69 348.77 334 336 337.16 406.41 337.3 419.79 393.3 336.84 402.63 336.44 384.32 338 342 513.92 473.52 340.89 493.94 457.12 340 439.23 339.05 342.98 582.7 346 622.44 344.01 622.46 344.92 556.37 534.12 344 344 639.24 629.54 341.87 633.24 341.02 628.97 342 628.46 342.15 340 656.06 338.14 656.43 655.27 338.24 641.39 339.67 645.57 338.93 338.11 689.49 338.31 696.6 659.82 338 656.69 338.09 656.9 338.07 338.63 340 762.36 340.92 766.54 704.11 339.04 709.79 339.33 722.31 341.55 343.4 780.44 343.81 781.79 766.8 341.57 769.87 342 778 344 802.12 344.39 791.78 346 794.24 346.85 797.54 348 783.64 349.59 819.76 352.52 825.72 350 808.59 351.78 809.21 352 803.3 352.81 354 353.14 833.66 353.18 851.54 829 352.97 832.85 Manning's n Values num= 5 n Val n Val Sta Sta n Val Sta n n Val Sta Sta Val .15 336.25 .045 364.84 .045 251.6 .04 281.05 0 .025 Coeff Contr. Lengths: Left Channel Right Bank Sta: Left Right Expan. 293.25 305.64 317.13 .1 251.6 364.84 .3 num= 2 Ineffective Flow Elev Permanent Sta R Sta L F 0 251.6 F 364.84 851.54 CROSS SECTION RIVER: Avarado Ck RS: 1126.981 REACH: Upper INPUT Description: Approx. local of old drop strucure (no plans available) Station Elevation Data num= 110 Elev Sta Elev Sta Sta Elev Sta Elev Sta Elev 16.72 356 20.79 355.76 23.82 0 356.26 8.34 356.12 355.4 39.21 352 39.55 354 38.94 352.15 31.25 354.85 35.62 351.81

42.81	350	44.6	349	46.43	348	48.45	346.91	50.12	
346 51.14	345.45	53.88	344	57.63	343.59	60.05	343.52	78.32	
342.8	510.10	33.00	0	<i></i>	010000				
85.89	342.69	88.55	342.73	90.46	342.76	100.83	342.61	101.59	
342.6	340 57	102 9	342 56	110 1	342	122.34	341.33	143.92	
340.14	344.21	102.9	342.30	*****	515		912.99	110,00	
147.12	340	169.65	338.35	174.57	338	208.21	336.95	213.89	
336.81	226 10	1 20 12	226 27	00E 7	226 08	226 85	336	251 45	
334.4	330.40	~~0·1J	330.37	233.7	330.00	200.00		<i>にし</i> し、エン	
254.25	334	257.5	333.86	285.84	332.72	299.59	332.17	301.18	
332.11		200 20	223 74	04 0 00	220	240.02	220 05	340 EA	
303.96	334	309.39	331./4	341.43	330	340.92	349.00	349.34	
350.55	329.26	353.92	328	354.81	327.67	359.29	326	359.7	
325.84			202 04	200.04	000 14	270 00	200	282 85	
364.66	324	364.81	323.94	369.64	322.14	370.02	344	314.15	
375.3	320	375.93	319.85	382.42	318	409.31	318.28	413.73	
320									
415.29	320.61	415.76	320.79	418.86	322	422.58	323.46	423.98	
427.27	325.29	429.07	326	429.99	326.37	434.12	328	437.37	
329.29									
439.16	330	442.8	331.45	444.28	332	460.94	332.52	465.33	
469.4	332.76	473.47	332.8	477.54	332.82	487.31	333.64	488.63	
333.63									
489.21	333.72	489.91	333.8	491.62	334	493.37	334.43	497.2	
500.02	336	538.15	337.3	562.32	338	566.66	339.56	567.88	
340									
570.08	340.79	571.45	341.28	573.44	342	575.51	342.74	579	
344 582.46	345.25	584.56	346	595.56	347.12	603.22	348	611.05	
348.43									
617.52	348.78	640.14	350	650.33	350.28	659.89	350.55	664.79	
350.69									
Manning's	n Value	S	num=	5					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n
Val 0	025	347 23	045	372.75	.15	415.29	.045	444.28	
.025	.025	517.00	.020	0.0.00	1				
			1	× - ()	~3 7	5 (1)	m F F	A	
Bank Sta: Expan	Left	Right	Lengths	: Left (Channel	Right	Coerr	Contr.	
34	47.23 4	44.28		215.16	233.86	259.36		.1	
.3	73		-						
Inerrectiv	ve Flow Sta P	num= Elev	2 Permane	nt					
0	347.23		F						
444.28	664.79		F						

CROSS SECTION

RIVER: Avarado Ck RS: 893.1187 **REACH:** Upper INPUT Description: u/s Entrance into Parking Lot from Alvarado Road Station Elevation Data num= 115 Sta Sta Elev Sta Elev Sta Elev Sta Elev Elev 8.27 340.96 35.41 341.07 .61 341.05 4.28 340.98 0 340.58 340.06 43.69 340 49.77 338.48 51.67 338 56.19 42.9 336.87 62.75 335.23 66.32 334.36 67.69 334 75.11 59.66 336 332.86 80.74 332 84.11 331.89 85.87 331.83 112.84 330.97 115.86 330.88 127.52 330.52 131.75 330.39 139 330.16 139.98 125.01 330.59 330.13 155.28 329.62 160.35 143.04 330.09 145.27 330 142.53 330.08 329.73 329.36 170.54 329.17 172.21 164.89 329.74 165.91 329.52 168.88 328.91 178.07 177.33 328.52 328.51 182.26 173.36 328.79 176.53 328.57 328.33 188.66 328.25 189.44 328.26 192.99 328.17 195.25 328.34 183.77 328.09 196.64 327.88 197.1 327.67 197.75 327.32 198.21 195.82 328 327.02 325.46 203.22 324.74 204.27 198.98 326.67 200.42 326 201.52 324.29 206.21 322.11 206.25 322 206.31 321.83 206.57 204.58 324 321.06 207.55 207.92 206.94 320 207.14 319.28 207.49 318 317.65 316 207.94 315.25 208.3 314 237.41 315.82 237.57 208.06 315.91 316 316.62 238.61 317.21 239.1 317.78 239.29 318 239.83 238.09 318.6 322.66 322 243.86 244.94 241.08 320 241.77 320.75 243.11 323.31 325.25 245.44 323.62 245.94 324 247.56 248.53 326 248.91 326.29 250.97 328 251.9 328.77 253.38 330 255.09 331.42 255.78 332 267.66 332.51 299.68 334 308.07 334.78 314.73 335.51 319.19 336 321.68 337.29 323.02 338 326.46 339.81 326.82 340 327.22 340.21 331.45 342.44 332.97 343.23 334.42 344 343.82 330.62 342 344.63 344.68 345.2 344.72 345.73 344.75 346.14 344.78 346.4 344.55 344.79 347.31 415.46 348 416.2 358.71 345.53 366.61 346 398.47 348.02

Manning's n Values num= 5 Sta n Val Sta n Val Sta n Val n Sta n Val Sta Val .1 237.57 .05 255.78 0 .05 192.99 .025 207.94 .025 Coeff Contr. Right Lengths: Left Channel Right Bank Sta: Left Expan. 51.56 .1 49.65 50.12 164.89 255.78 .3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R F 0 164.89 F 255.78 416.2 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 843.0025 INPUT Description: d/s Entrance into Parking Lot from Alvarado Road Station Elevation Data num= 156 Sta Elev Sta Elev Elev Sta Elev Sta Sta Elev 16.73 343.42 2.76 343.4 12.36 343.22 12.94 343.2 0 343.21 30.96 342.92 49.04 342.66 53.21 24.77 343.07 19.9 343.22 342.53 75.5 340 82.22 67.44 342 73.11 340.59 64.01 342.14 338.32 91.58 335.98 99.41 83.53 338 91.1 336.11 91.52 336 334 107.01 332.15 107.77 332 113.88 333.75 105.16 332.6 100.38 332.03 128.03 332.41 129.28 332.35 133.87 332.5 135.07 120.46 332.21 332.59 332.89 332.87 144.92 145.97 332.75 143.64 332.84 144.21 140.71 332.94 150.42 151.43 333.01 152.47 332.98 149.8 332.99 333 148.3 333.03 155.4 333.13 157.09 333.15 158.91 153.57 333.06 154.78 333.11 333.08 159.86 333.12 160.78 163.48 332.99 164.13 333.03 165.29 333.16 333.06 175.06 169.3 332.92 171.18 332.95 173.26 332.8 167.93 332.89 332.75 332.56 180.77 332.5 183.37 178.68 176.14 332.7 178.05 332.64 332 331.72 196.28 331.23 198.22 194 331.97 194.16 331.89 194.8 330 328.96 199.85 328.9 200.2 199.21 329.16 199.4 329.08 199.71 328.76 200.51 328.64 201.11 328.39 201.7 328 202.15 327.69 202.44 327.44

326 204.75 325.33 205.76 324.66 207.12 324 207.57 203.94 323.78 322 211.31 320.42 211.48 209.66 322.99 210.39 207.9 323.65 320 211.76 318.94 212.01 212,28 316.86 212.47 316 212.56 318 315.56 314 213.08 312.93 213.13 312.65 213.18 312.38 213.25 212.88 312 312.68 234.12 313.1 239.04 314 239.96 231.31 312.59 231.8 315.3 316 240.86 316.54 241.46 317.38 241.92 318 243.26 240.47 319.75 245.04 322 245.52 322.46 246.49 320.17 320 243.58 243.45 323.24 249.47 325.32 250.5 326 251.08 324 248.56 324.72 247.55 326.38 328 254.86 328.78 256.81 251.88 326.91 252.88 327.53 253.62 330 257.02 330.13 257.52 330.44 259.27 331.67 259.76 332 263.82 332,43 264.57 332.49 265.21 332.53 265.61 332.56 270.08 333.03 270.29 333,04 333.49 307.07 333.53 308.37 272.8 333.32 273.94 333.43 274.94 333.58 336 328.78 336.56 320.33 334 324.19 334.49 327.75 331.41 338 332.95 338.85 335 340 337.92 341.63 338.57 342 339.03 342.16 344 349.55 344.09 351.48 344.18 367.08 344.83 382.17 347.36 345.64 346 400.98 346.51 410.17 346.87 422.67 385.33 345.8 388.81 347.37 427.2 347.55 num= Manning's n Values 5 n Val n Val Sta n Val Sta n Val Sta Sta n Sta Val .1 240.86 0 .025 194 .05 213.13 .05 274.94 .025 Lengths: Left Channel Right Coeff Contr. Bank Sta: Left Right Expan. 194 274.94 356.37 364.33 373.23 .1 .3 Ineffective Flow 2 num= Elev Permanent Sta L Sta R 0 194 F F 274.94 427.2 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 478.6733 INPUT Description: FEMA Section O

Station El	levation	Data	num=	121	773	<u>a</u> +-	177] era	Cite o	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev		47 04	250	56.00	250 46	CO 10	250	C1 C2	
	358.8/	4/.84	358	50.90	357.46	60.13	350	01.02	
300.3	254	66 28	353 13	68 72	350	71 04	350 83	73 01	
350	JJ 4	00.20	333.13	00.74	244	12.227	330.03	,J.OI	
74.53	349.29	77.3	348	80.4	346.56	81.59	346	85,16	
344.34									
85.88	344	89.95	342.1	90.17	342	91.96	341.17	94.31	
340.07									
94.46	340	98.02	339.83	137.21	338	163.74	336.71	177.67	
336									
178.99	335.16	180.08	334.5	180.89	334	181.42	333.66	183.94	
332									
184.56	331.59	186.93	330	188.11	329.21	189.91	328	191.49	
326.94									
192.88	326	194.66	324.8	195.86	324	198.23	322.43	198.88	
322									
199.88	321.34	201.93	320	203.63	318.89	204.98	318	205.14	
317.89	226	000 21	015 54	011 05		210 70	210 00	014 00	
208.01	316	208,71	315.54	211.05	314	212.78	312.85	214.08	
312	210 0	216 02	270 10	0107	210	217 7	200 66	220.20	
215.9	310.8	210.02	310.10	21/.1	310	21/./	309.00	~~~~~	
200	207 28	22E 2	307 12	227 04	307	222 99	306	243 37	
305 4	207.20	440.4	J07.12	227.04	507	****	000	243.37	
249.15	305.07	255.69	304.67	267.57	304	301.99	305.35	303.99	
305.99		200.02							
304.03	306	310.1	307.95	310.25	308	310.65	308.13	316.08	
310									
320.93	311.79	321.52	312	322	312.18	326.14	314	327.11	
314.44									
330.44	316	332.55	316.94	334.84	318	339.33	319.69	340.14	
320									
341.39	320.46	345.91	322	347.4	322.49	352.62	324	354.42	
324.52									
359.24	326	366.15	327	369.19	327.2	376.25	327.85	377.77	
328					222 5	200 60	200 FF	402 40	
382.49	328.17	384.27	328.22	392.42	328.5	399.62	328.15	403.49	
328.85	220 AE	114 17	220 2	441 60	330	449 33	330 93	451 03	
403.04	329.03	** 1 ** • ** /	347.4	441.02	550	440.55	550.55	#JT.02	
252 453 44	333 04	455 81	334	459.99	335.81	460.42	336	460.73	
336.13	555.04	100.01		100.00	000.01			100010	
461.17	336.32	465.65	338	475.52	338.29	482.26	338.46	483.8	
338.5									
489.23	338.66	490.59	338.69	494.76	338.76	499.49	338.91	518.63	
339.3									
527.91	339.45	544.8	339.71	548.1	339.73	548.82	339.74	565.18	
339.99									
566.16	340								
Manning's	n Value	S	num=	5	** 7	~ (
Sta	n Val	Sta	n vai	Sta	n vai	Sta	n vai	Sta	
Veli									

n

0 .025 177.67 .05 216.82 .1 303.99 .05 376.25 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 263.01 282.17 291.3 177.67 376.25 . 1 .3 Ineffective Flow num= . 2 Sta L Sta R Elev Permanent F 0 177.67 F 376.25 566.16 CROSS SECTION RIVER: Avarado Ck RS: 196.5054 REACH: Upper INPUT Description: Station Elevation Data num= 148Sta Elev Sta Elev Sta Sta Elev Sta Elev Elev 22.8 358.47 23.36 0 361.57 13.89 360.66 20.01 360 358.18 24.06 357.81 27.45 356 29.87 354.71 31.2 23.7 358 354 38.53 350.09 38.7 32.34 353.39 34.95 352 350 39.78 349.42 346 46.47 345.9 50.12 348 42.66 347.9 46.29 42.46 344 50.28 343.92 53.95 342 54.07 341.94 57.78 340 57.83 339.97 61.71 337.94 65.43 336 66.12 59.41 339.15 61.6 338 335.64 87.67 333.02 91.15 332.9 96.79 67.23 335.06 69.26 334 332.76 99.06 332.7 104.37 332.57 115.16 332.6 118.43 332.53 122.53 332.56 332.7 136.91 332.82 142.54 332.88 154.09 124.74 332.63 133.39 332 156.48 331.51 158.27 330 159.16 329.85 162.09 330.4 158.91 328 324 167.64 324.39 168.23 169.1 163.72 326.97 165.2 326 323.42 322 172.95 320.84 174.2 320 176.62 318.69 177.61 171.23 318.16 318 183.93 316.11 184.28 316 187.09 315.12 190.19 177.95 314.14 312 198.77 311.43 203.32 196.98 314 191.07 313.86 190.63 310 308 210.45 307.75 216.44 306 219.05 208.74 308.29 209.66 305.56 249.87 302.01 249.97 302 311.64 219.58 305.47 228.46 304 303.39 313.2 303.68 314.95 304 317.39 304.38 328.22 306 335.63 307.21

.

308 344.52 309.88 344.74 310 344.93 310.1 348.49 340.86 312 314 352.38 314.07 348.58 312.05 350.53 313.08 352.25 356 316 358.18 317.16 359.75 318 361.34 318.87 362.11 319.28 363.45 320 364.29 320.52 364.86 320.89 366.56 322 368.37 323.18 369.63 324 371.52 325.24 372.69 326 374.73 327.33 375.76 328 379.79 328.4 380.58 328.42 382.12 328.46 385.05 328.55 410.07 329.71 415.78 330 416.23 331.48 416.39 332 416.84 333.51 416.99 334 417.09 334.32 336 418.15 337.87 418.19 417.59 338 418.68 339.69 418.77 340 419.27 341.68 419.36 342 419.78 343.3 420.01 344 430.88 344.29 435.08 344.7 448.65 346 463.87 346.83 487.74 348 544.46 347.54 548.06 347.24 556.42 346.5 559.66 346.24 562.4 346 564.14 345.65 569.42 344.57 572.14 344 575.15 343.33 581.2 342 584.36 341.28 588.47 340.35 590.08 340 592.51 339.4 Manning's n Values num= 5 Sta n Val 0 .025 20.01 .05 219.05 .1 313.2 .05 487.74 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 142.54 379.79 225.51 190.7 180.22 . 1 .3 Ineffective Flow num= . 2 Elev Permanent Sta L Sta R 0 142.54 ਸ 379.79 592.51 F CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 5.802783 INPUT Description: u/s face of Alvarado Road Crossing Station Elevation Data num= 201 Elev Sta Elev Sta Elev Sta Elev Sta Sta Elev 1.9 342.17 1.15 342.36 0 342.76 2.32 342 16.02 340.49 17.61 340.36 19.05 340 30.76 338.79 31.07 338.72 32.63 338.54

33.27	338.48	33.96	338.41	34.71	338.32	35.54	338.21	35.96
338.16							226	CD 1C
37.07	338	49.83	336.52	51.17	336.24	52.37	336	6∠.45
64.12	334	73.81	332.59	74.03	332.53	74.89	332.4	75.32
332.34 75.75	332.27	76.17	332.21	76.58	332.15	76.8	332.12	77.56
332								
94.75	330.52	97.74	330	108.92	328.71	110.44	328.16	110.95
328.1 111.98	328	118.11	327.48	118.61	327.36	122.35	326.97	124.09
326.81								
125.85 325.84	326.6	127.73	326.42	129.89	326.17	131.16	326	132.29
133.38 322	325.59	137.89	324.62	140.44	324	148.67	322.76	151.57
162.45	320.52	165.25	320.16	165.98	320	167.04	319.84	168.34
319.71								
177.69	318.66	181.47	318.39	186.04	318	204.84	317.28	212.3
317.06	226 46	224 20	33C 4	220 7	216	777 67	215 27	240.21
221.00	316.46	224.29	310.4	228.1	310	233.03	315.37	240.31
243 05	314 4	244.97	314.27	248.46	314	253.32	313.64	254.46
313.58	J	WII.	J11.27	210,10	<i></i>		515.01	201110
261.21	313.24	263.52	313.11	267.01	312.92	270.54	312.76	272.63
312.7								
276.97 310	312.4	281.46	312	281.91	311.9	282.48	311.5	284.62
285.74	308.06	285.78	308	285.82	307.93	286.93	306	287.26
305.45								
287.51	305.02	288.09	304	288.89	302.65	289.29	302	289.61
301.51								
290.56	300	291.66	298.35	291.91	298	292.07	297.77	292.1
297.73	206	207 28	206 23	308 28	207 51	308 67	208	208 89
293.33	290	307.20	290.23	500.20	297.91	500.07	200	500.02
310.28	300	310,44	300.2	311.76	301.84	311.89	302	312
302.14								
313.02	304	313.68	305.49	313.94	306	314.34	307.3	314.63
308								
314.97	309.13	315.16	309.75	315.22	310	315.5	310.49	316.4
312		230 30	244	201 45	235 61	200	71 C	220 27
317.97	313.13	319.19	314	321.45	312.01	322	316	322.31
374 82	318	327 16	319 66	327 65	320	328 35	320 5	330 47
322	010	221110	519.00	527.05	020	520.00	520.5	550.17
332.04	323.11	333.3	324	334.77	325.04	336.12	326	337.6
327.04								
338.91	328	341.25	329.73	341.63	330	343.48	331.42	344.25
332								
345.15	332.7	346.84	334	348.83	335.46	349.54	336	351.35
330.25	226 15	262	227 2	360 0	337 75	369 76	237 00	272 02
323.03	330.43	202	5.100	300.3		202.10	331.04	214.73
375.05	338.07	375.57	338.11	376.42	338.18	380.73	338.42	382
338.5								

385.92 338.73 396.28 340 396.64 340.53 397.6 342 397.91 342.49 415.3 346 473.91 347.62 476.83 344 399.12 344.41 398.85 347.27 477.02 347.19 477.22 347.12 477.4 347.08 477.7 347.13 478.68 346.94 482.66 346.63 484.13 346.55 484.71 346.49 490.41 346 493.45 345.96 506.78 345.79 507.71 345.76 507.76 345.75 508.59 345.73 516.71 345.61 517.78 345.58 521.56 345.52 522.54 345.49 523.29 345.47 523.71 345.45 524.12 345.44 524.46 345.43 524.83 345.42 524.95 345.41 525.61 345.39 526.52 345.35 526.91 345.34 527.41 345.32 528.95 345.27 529.36 345.25 535.06 345.09 539.77 344.87 542.14 344.81 543.79 344.77 555.55 344.13 555.77 344.12 555.89 344.11 556.15 344.1 557.82 344 574.08 342.79 579.5 342.38 Manning's n Values num= 4 Sta n Val Sta n Val Sta n Val n Val Sta .1 310.44 .05 415.3 .025 0 .05 292.07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 1.15 362 8.78 5.8 0 .1 .3

SUMMARY OF MANNING'S N VALUES

River:Avarado Ck

	Reach	River Sta.	nl	n2	n3	n4
n5						
Uppe: .025	c	3975.018	.025	.018	.02	.018
Uppe:	c	3918.558	.025	.018	.02	.018
Uppe:	r	3881.736	.025	.018	.02	.018
Uppe:	r	3870.768	.025	.018	.02	.018
Uppe:	r	3690.298	.025	.018	.02	.018
Uppei	¢	3362.059	.025	.018	.02	.018
Uppe:	r	3046.513	.025	.018	.025	.018
Uppe:	r	2808.985	.018	.018	.05	.018
Uppe	r	2292.941	.04	.05	.018	.25

Upper Upper	1897.670 1432.619	.045 .045	.1 .04	.018 .15	.025
.025 Upper .025	1126.981	.025	.045	.15	.045
Upper .025	893.1187	.05	.025	.1	.05
Upper .025	843.0025	.025	.05	.1	.05
Upper .025	478.6733	.025	.05	.1	.05
Upper .025	196.5054	.025	.05	.1	.05
Upper	5.802783	.05	.1	.05	.025

SUMMARY OF REACH LENGTHS

River: Avarado Ck

Reach	River Sta.	Left	Channel	Right
Upper	3975.018	56.06	56.46	57.46
Upper	3918.558	36.89	36.82	36.86
Upper	3881.736	11.11	10.97	10.38
Upper	3870.768	179.97	180.47	180.91
Upper	3690.298	344.53	328.24	316.06
Upper	3362.059	323.3	315.55	308.79
Upper	3046.513	240.61	237.53	235.74
Upper	2808.985	519.53	516.04	514.95
Upper	2292.941	410.33	395.27	385.35
Upper	1897.670	469.57	465.05	461.75
Upper	1432.619	293.25	305.64	317.13
Upper	1126.981	215.16	233.86	259.36
Upper	893.1187	49.65	50.12	51.56
Upper	843.0025	356.37	364.33	373.23
Upper	478.6733	263.01	282.17	291.3
Upper	196.5054	225.51	190.7	180.22
Upper	5.802783	8.78	5.8	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: Avarado Ck

Reach	River Sta.	Contr.	Expan.
Upper	3975.018	.1	.3
Upper	3918.558	.1	.3
Upper	3881.736	.1	. 3
Upper	3870.768	.1	. 3
Upper	3690.298	.1	. 3
Upper	3362.059	.1	. 3

Upper	3046.513	.1	.3
Upper	2808.985	.1	. 3
Upper	2292.941	.1	.3
Upper	1897.670	.1	.3
Upper	1432.619	.1	.3
Upper	1126.981	.1	.3
Upper	893.1187	.1	.3
Upper	843.0025	.1	.3
Upper	478.6733	.1	.3
Upper	196.5054	.1	.3
Upper	5.802783	.1	.3

HEU-KAN T Reach	Ian: Cap Kiver	- Avarado CK read	at. upper O Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chul	Flow Area	Top Width	Froude # Chl
			(cfs)	(t)	(tt)	(tt)	(t)	(tt/tt)	(s/t)	(t) (bs)	(¥)	
Upper	5.802783	Q100 = 3900	3900.00	296.00	337.00	307.02	337.01	0.000024	0.76	5135.41	313.42	0.03
Upper	5.802783	Q50=3400	3400.00	296.00	310.98	306.24	312.41	0.030019	9.62	353.36	32.56	0.51
Upper	5.802783	Q35=3000	3000.00	296.00	310.09	305.53	311.41	0.030038	9.22	325.28	30.78	0.50
Upper	5.802783	Q10=2100	2100.00	296.00	307.85	303.79	308.87	0.030012	8.12	258.78	28.70	0.48
Upper	5.802783	Q7=2000	2000.00	296.00	307.57	303.57	308.56	0.030015	7.97	250.83	28.43	0.47
Upper	5.802783	Q5=1700	1700.00	296.00	306.69	302.90	307.57	0.030030	7.52	226.12	27.62	0.46
Upper	5.802783	Q2=1000	1000.00	296.00	304.25	301.05	304.85	0.030013	6.19	161.65	25.19	0.43
Upper	196.5054	Q100 = 3900	3900-00	302.00	337.01		337.01	0.000022	0.63	6158.09	354.39	0.02
Upper	196.5054	Q50=3400	3400.00	302.00	313.50	[313.60	0.002250	2.53	1343.35	159.13	0.15
Upper	196.5054	Q35=3000	3000.00	302.00	312.59		312.69	0.002520	2.50	1200.27	154.51	0.16
Upper	196.5054	Q10=2100	2100.00	302.00	310.37		310.46	0.003520	2.42	868.79	143.27	0.17
Upper	196,5054	@7=2000	2000.00	302.00	310.10		310.19	0.003689	2.41	831.11	141.94	. 0.18
Upper	196.5054	Q5=1700	1700.00	302.00	309.29		309.37	0.004312	2.37	716.98	137.78	0.18
Upper	196.5054	Q2=1000	1000.00	302.00	307.24		307.32	0.006936	2.24	447.13	123.63	0.21
Upper	478.6733	Q100 = 3900	3900.00	304.00	337.01		337.02	0.000051	0.84	4620.91	305.51	0.03
Upper	478.6733	Q50=3400	3400.00	304.00	314.45		314.67	0.006902	3.73	911.15	116.77	0.24
Upper	478.6733	Q35=3000	3000.00	304.00	313.66		313.87	0.007575	3.66	819.67	113.80	0.24
Upper	478.6733	Q10=2100	2100.00	304.00	311.83		312.01	0.009319	3.40	617.75	106.70	0.25
Upper	478,6733	07=2000	2000.00	304.00	311.62		311.80	0.009503	3.36	595.94	105.83	0.25
Upper	478.6733	Q5=1700	1700.00	304.00	311.01		311.17	0.009969	3.20	531.57	103.23	0.25
Upper	478.6733	Q2=1000	1000.00	304.00	309.53		309.64	0.009854	2.60	383.90	96.82	0.23
		A DESCRIPTION OF A DESC										
Upper	843.0025	Q100 = 3900	3900.00	312.00	336.95		337.13	0.001423	3.36	1160.63	241.76	0.16
Upper	843.0025	Q50=3400	3400.00	312.00	320.52	320.52	323.99	0.168737	14.96	227.24	32.60	1.00
Upper	843.0025	Q35=3000	3000.00	312.00	319.89	319.89	323.15	0.176826	14.48	207.13	31.86	1.00
Upper	843.0025	Q10=2100	2100.00	312.00	319.02		321.14	0.137186	11.69	179.58	30.96	0.86
Upper	843.0025	Q7=2000	2000.00	312.00	318.94		320.92	0.129680	11.28	177.29	30.88	0.83
Upper	843.0025	Q5=1700	1700.00	312.00	318.63		320.22	0.112330	10.14	167.61	30.56	0.76
Upper	843.0025	Q2=1000	1000.00	312.00	317.22		318.20	0.099071	7.96	125.58	29.15	0.68
Upper	893.1187	Q100=3900	3900.00	314.00	337.05		337.19	0.000985	3.01	1294.60	265.73	0.14
Upper	893.1187	Q50=3400	3400.00	314.00	326.01	322.19	327.14	0.029149	8.53	398.42	48.16	0.52
Upper	893.1187	[Q35=3000]	3000.00	314.00	325.33	321.62	326.37	0.029710	8.19	366.13	45.82	0,51
Upper	893.1187	Q10=2100	2100.00	314.00	323.39		324.24	0.032928	7.40	283.67	39.96	0.49
Upper	893.1187	@7=2000	2000.00	314.00	323.15		323.98	0.033331	7.30	274.12	39.36	0.49
Upper	893,1187	05=1700	1700.00	314.00	322.42		323.16	0.034123	6.91	245.98	37.64	0.48
Upper	893.1187	02=1000	1000.00	314.00	320.50		321.00	0.034566	5.66	176.75	34.77	0.44
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HEC-RAS P	lan: Cap Rive	r. Avarado Ck Read	h: Upper (Contin	lued)							
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)	(t)	(ft) (ft)	(u)	(tt/t)	(ft/s)	(t) (sq ft)	(tt)	
Upper	1126.981	Q100 = 3900	3900.00	318.00	337.30	337.42	0.000983	2.77	1409.68	341.26	0.13
Upper	1126.981	Q50=3400	3400.00	318.00	329.94	330.30	0.007481	4.85	700.53	91.07	0.31
Upper	1126.981	035=3000	3000.00	318.00	329.26	329.60	0.007697	4.68	640.59	86.75	0.30
Upper	1126.981	Q10=2100	2100.00	318.00	327.50	327.78	0.008464	4.23	496.27	77.61	0.29
Upper	1126.981	Q7=2000	2000.00	318.00	327.29	327,56	0.008565	4.17	479.48	76.48	0.29
Upper	1126.981	Q5=1700	1700.00	318.00	326.60	326.84	0.008881	3.97	428.02	72.88	0.29
Upper	1126.981	Q2=1000	1000.00	318.00	324.71	324.88	0.009608	3.34	299.68	63.04	0.27
						n ha ha ha h					
Upper	1432.619	Q100=3900	3900.00	324.00	337.75	337.98	0.003825	3.83	1017.73	194.69	0.23
Upper	1432.619	Q50=3400	3400.00	324.00	333.30	333.88	0.019862	6.11	556.17	85.67	0.42
Upper	1432.619	Q35=3000	3000.00	324.00	332.74	333.28	0.020557	5.89	509.23	83.11	0.42
Upper	1432.619	Q10=2100	2100.00	324.00	331.36	331.79	0.022300	5.27	398.45	76.74	0.41
Upper	1432.619	Q7=2000	2000.00	324.00	331.19	331.60	0.022526	5.19	385.45	75.96	0.41
Upper	1432,619	Q5=1700	1700.00	324.00	330.65	331.03	0.023270	4.92	345.31	73.50	0.40
Upper	1432.619	Q2=1000	1000.00	324.00	329.17	329.44	0.025738	4.13	241.86	66.80	0.38
Upper	1897.670	Q100 = 3900	3900.00	328.00	340.42	341.17	0.013531	6.93	562.64	457.72	0.41
Upper	1897.670	Q50=3400	3400.00	328.00	340.14	340.75	0.011390	6.24	544.93	437.89	0.37
Upper	1897.670	Q35=3000	3000.00	328.00	339.57	340.11	0.011003	5.89	509.35	393.77	0.36
Upper	1897.670	Q10=2100	2100.00	328.00	338.07	338.46	0.009971	4.99	420.48	374.56	0.32
Upper	1897,670	Q7=2000	2000.00	328.00	337.88	338.25	0.009841	4.88	409.59	372.62	0.32
Upper	1897.670	Q5=1700	1700.00	328.00	337.26	337.58	0.009431	4.53	375.17	367.48	0.31
Upper	1897.670	02=1000	1000.00	328.00	335.50	335.70	0.008238	3.55	281.70	355.34	0.27
						2 - 20 - 20 - 20 - 20 - 20 - 20 - 20 -					
Upper	2292.941	Q100 = 3900	3900.00	328.00	344.75	345.45	0.008829	6.70	581.91	441.88	0.33
Upper	2292,941	Q50=3400	3400.00	328.00	343.95	344.55	0.008231	6.22	546.23	349.02	0.31
Upper	2292.941	Q35=3000	3000.00	328.00	343.21	343.74	0.007798	5.84	514.03	314.38	0.30
Upper	2292.941	Q10=2100	2100.00	328.00	341.29	341.66	0.006703	4.86	432.15	266.00	0.27
Upper	2292.941	Q7=2000	2000.00	328.00	341.05	341.39	0.006567	4.74	421.99	265.77	0.26
Upper	2292.941	Q5=1700	1700.00	328.00	340.26	340.56	0.006141	4.36	389.79	265.03	0.25
Upper	2292.941	Q2=1000	1000.00	328.00	338.01	338.18	0.004953	3.33	300.62	243.05	0.21
Upper	2808.985		3900.00	332.00	348.28	348.85	0.005070	6.06	643.19	434.28	0.31
Upper	2808.985	Q50=3400	3400.00	332.00	347.33	347.84	0.005045	5.74	592.68	421.06	0.30
Upper	2808.985	Q35=3000	3000.00	332.00	346.49	346.95	0.005052	5.46	549.11	416.25	0.29
Upper	2808.985	Q10=2100	2100.00	332.00	344.32	344.67	0.005143	4.77	440.03	400.04	0.28
Upper	2808.985	Q7=2000	2000.00	332.00	344.05	344.39	0.005164	4.69	426.68	355.41	0.28
Upper	2808.985	Q5=1700	1700.00	332.00	343.18	343.48	0.005253	4.42	384.73	334.21	0.27
Upper	2808.985	Q2=1000	1000.00	332.00	340.74	340.95	0.005776	3.69	271.32	62.83	0.26

HEC-RAS F	Plan: Cap River	: Avarado Ck Read	h: Upper (Conti	nued)								
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 # Chi
		and the straight in the straight in the straight of the straig	(cfs)	(ft)	(ft)	(1)	(tt)	(ft/ft)	(fi/s)	(sq ft)	(tt)	
Upper	3046.513	Q100 = 3900	3900.00	332.00	348.63		349.17	0.000603	5.88	663.27	331.98	0.30
Upper	3046.513	Q50=3400	3400.00	332.00	347.67		348.15	0.000593	5.58	609.00	298.44	0.30
Upper	3046.513	Q35=3000	3000.00	332.00	346.82		347.26	0.000588	5.33	562.50	273.01	0.29
Upper	3046.513	Q10=2100	2100.00	332.00	344.64		344.98	0.000580	4.70	447.16	202.82	0.28
Upper	3046.513	Q7=2000	2000.00	332.00	344.37		344,70	0.000580	4.62	433.17	193.17	0.28
Upper	3046,513	Q5=1700	1700.00	332.00	343.50		343.79	0.000582	4.37	389.38	85.34	0.28
Upper	3046.513	02=1000	1000.00	332.00	341.07		341.27	0.000591	3.66	273.58	43.75	0.26
Upper	3362.059	Q100 = 3900	3900.00	334.00	348.68	-	349.51	0.001136	7.31	533.75	374.76	0.40
Upper	3362.059	Q50=3400	3400.00	334.00	347.73		348.49	0.001184	7.02	484.57	349.20	0.40
Upper	3362.059	Q35=3000	3000.00	334.00	346.89		347.61	0.001229	6.79	441.86	323.06	0.40
Upper	3362.059	Q10=2100	2100.00	334.00	344.73		345.34	0.001443	6.28	334.65	248.13	0.42
Upper	3362.059	Q7=2000	2000.00	334.00	344.46		345.06	0.001486	6.22	321.51	237.86	0.43
Upper	3362.059	Q5=1700	1700.00	334.00	343.60		344.17	0.001661	6.07	280.21	123.72	0.44
Upper	3362.059	Q2=1000	1000.00	334.00	341.18		341.72	0.002791	5.92	168.81	40.98	0.51
Upper	3690.298	Q100 = 3900	3900.00	338.00	347.73	347.73	351.34	0.006539	15.24	255.92	343.19	1.00
Upper	3690.298	Q50=3400	3400.00	338.00	347.03	347.03	350.38	0.006810	14.70	231.26	309.32	1.00
Upper	3690.298	Q35=3000	3000.00	338.00	346.43	346.43	349.57	0.007068	14.22	210.92	280.10	1.00
Upper	3690.298	Q10=2100	2100.00	338.00	344.94	344.94	347.53	0.007840	12.91	162.68	154.86	1.00
Upper	3690.298	Q7=2000	2000.00	338.00	344.76	344.76	347.28	0.007956	12.74	157.01	139.26	1.00
Upper	3690.298	Q5=1700	1700.00	338.00	344.18	344.18	346.49	0.008376	12.19	139.44	86.45	1.00
Upper	3690.298	02=1000	1000.00	338.00	342.57	342.57	344.34	0.009893	10.68	93.59	26.38	1.00
Upper	3870.768	Q100 = 3900	3900.00	340.00	350.30	350.30	353.85	0.010323	15.11	258.13	129.46	1.00
Upper	3870.768	Q50=3400	3400.00	340.00	349.57	349.57	352.90	0.010877	14.65	232.09	34.69	1.00
Upper	3870.768	Q35=3000	3000.00	340.00	348.93	348.93	352.09	0.011451	14.25	210.48	33.33	1.00
Upper	3870.768	Q10=2100	2100.00	340.00	347.36	347.36	350.02	0.013036	13.08	160.54	30.19	1.00
Upper	3870.768	Q7=2000	2000.00	340.00	347.17	347.17	349,76	0.013242	12.92	154.85	29.85	1.00
Upper	3870.768	Q5=1700	1700.00	340.00	346.57	346.57	348.95	0.013993	12.39	137.22	28.78	1.00
Upper	3870.768	Q2=1000	1000.00	340.00	344.97	344.97	346.75	0.016509	10.72	93.29	26.22	1.00
			iron a laur									
Upper	3881.736	Q100 = 3900	3900.00	340.00	352.42		354.09	0.003149	10.37	376.14	270.47	0.59
Upper	3881.736	Q50=3400	3400.00	340.00	351.64		353.14	0.003142	9.84	345.45	174.07	0.58
Upper	3881.736	Q35=3000	3000.00	340.00	350.96		352.33	0.003104	9.39	319.49	132.97	0.57
Upper	3881.736	Q10=2100	2100.00	340.00	349.19		350.24	0.003001	8.20	255.98	34.54	0.53
Upper	3881.736	Q7=2000	2000.00	340.00	348.97		349.98	0.002987	8.05	248.41	34.18	0.53
Upper	3881,736	05=1700	1700.00	340.00	348.27		349.16	0.002932	7.56	224.98	33.07	0.51
Upper	3881.736	Q2=1000	1000.00	340.00	346.36		346.93	0.002703	6.08	164.40	30.21	0.46
		AN APPENDIX NOT AN APPENDIX FRAME										

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Dper 3318 556 0100=3300 340.00 353.01 (f)	Reach River Sta	Profile	O Total	Min Ch El	W.S. Elev (3rt W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chi
JDper 3918.558 Q100=3300 390.00 340.00 353.01 353.21 0.002171 8.87 439.64 JDper 3918.558 Q50=3400 340.00 340.00 352.14 353.28 0.002467 8.87 337.19 JDper 3918.558 Q35=3000 340.00 340.00 349.49 352.46 0.002467 8.33 380.32 JDper 3918.558 Q10=2100 2100.00 340.00 349.49 350.35 0.002467 8.33 380.32 JDper 3918.558 Q10=2100 2100.00 340.00 349.26 350.35 0.002445 6.37 281.44 JDper 3918.558 Q1=72000 1700.00 340.20 346.53 347.03 0.002445 6.92 245.51 JDper 3918.558 Q1000=33000 340.00 346.53 347.03 0.002446 6.47 175.23 JDper 3918.558 Q1000=33000 340.30 346.53 0.002446 6.47 6.76			(cfs)	(U)	(t)	(ft)	(Ψ)	(11/1)	(tvs)	(sq ft)	(U)	A STREET A STREET AND A STREET
Jpper 3518.558 0.503400 340.00 352.14 353.28 0.002314 8.56 397.19 Jpper 3918.558 0.35=3000 300.00 340.00 351.38 352.46 0.0023467 8.33 360.32 Jpper 3918.558 0.10=2100 2100.00 340.00 340.30 349.49 352.36 0.002467 8.33 360.32 Jpper 3918.558 0.17=2100 2100.00 340.00 349.26 350.35 0.002445 6.32 245.51 Jpper 3918.558 0.5=1700 1770.00 340.00 340.53 343.27 0.002445 6.92 245.51 Jpper 3918.558 0.5=1700 1770.00 340.53 348.53 343.27 0.002445 6.92 245.51 Jpper 3918.558 0.2=1700 1770.00 340.53 348.53 0.002445 6.92 245.51 Jpper 3918.558 0.2=1700 340.33 352.78 348.53 0.002446 6.47 6.02.35 </td <td>oper 3918.558</td> <td>Q100 = 3900</td> <td>3900.00</td> <td>340.00</td> <td>353.01</td> <td></td> <td>354.23</td> <td>0.002171</td> <td>8.87</td> <td>439.64</td> <td>285.66</td> <td>0.52</td>	oper 3918.558	Q100 = 3900	3900.00	340.00	353.01		354.23	0.002171	8.87	439.64	285.66	0.52
Jpper 351.65 (355.65) (305.55) (305.55) (306.32) 360.32 Jpper 3918.558 (316-2100) 2100.00 340.00 340.00 349.49 7.55 (0.002456) 7.46 281.44 Jpper 3918.558 (316-2100) 2000.00 340.00 349.26 350.35 (0.002436) 7.46 281.44 Jpper 3918.558 (37-2000) 2000.00 340.00 348.53 (0.002446) 6.92 245.51 Jpper 3918.558 (32=1700) 17700.00 340.00 346.53 (0.002446) 6.92 245.51 Jpper 3918.558 (0.2=1700) 340.00 346.53 (348.53) (0.002446) 6.92 245.51 Jpper 3918.558 (0.002-3900) 340.30 (348.53) (347.20) (347.20) (347.20) (345.26) (345.56) (356.56) (356.56) (356.56) (356.56) (356.56) (356.56) (356.56) (356.56) (356.56) (356.56) (356.56) <td< td=""><td>oper 3918,558</td><td>Q50=3400</td><td>3400.00</td><td>340.00</td><td>352.14</td><td></td><td>353.28</td><td>0.002314</td><td>8.56</td><td>397.19</td><td>191.95</td><td>0.53</td></td<>	oper 3918,558	Q50=3400	3400.00	340.00	352.14		353.28	0.002314	8.56	397.19	191.95	0.53
Jpper 3918.558 Q10=2100 2100.00 340.00 349.49 350.35 0.002436 7.46 281.44 Jpper 3918.558 Q7=2000 2000.00 340.00 349.26 350.35 0.002439 7.33 272.67 Jpper 3918.558 Q5=1700 17700.00 340.00 348.53 349.27 0.002445 6.92 245.51 Jpper 3918.558 Q2=1000 17700.00 340.00 346.53 347.03 0.002445 6.92 245.51 Jpper 3918.558 Q2=1000 1000.00 340.30 345.53 347.03 0.002446 6.47 602.35 Jpper 3975.018 Q100=3300 340.39 353.72 354.37 0.000146 6.47 602.35 Jpper 3975.018 Q10=2100 340.39 357.18 353.42 0.001104 6.42 526.60 Jpper 3975.018 Q10=2100 340.39 357.42 0.001104 6.43 466.26 Jpper	oper 5 3918.558	Q35=3000	3000.00	340.00	351.38		352.46	0.002467	8.33	360.32	148.86	0.54
Jpper 351.558 Q7=Z00 2000.00 340.00 349.25 57.09 0.002439 7.33 272.67 Jpper 3918.558 Q5=1700 1700.00 340.00 346.53 347.03 0.002445 6.92 245.51 Jpper 3918.558 Q5=1700 1000.00 340.00 346.53 347.03 0.002445 6.92 245.51 Jpper 3918.558 Q2=1000 1000.00 340.30 346.53 347.03 0.002446 5.71 175.23 Jpper 3975.018 Q100=3900 390.30 340.39 353.72 354.37 0.00046 6.47 602.35 Jpper 3975.018 Q100=3300 340.39 353.72 355.42 0.001104 6.47 602.35 Jpper 3975.018 Q10=2100 340.39 353.72 355.42 0.001304 6.47 602.35 Jpper 3975.018 Q10=2100 340.39 353.42 0.001104 6.43 466.26 Jpper 37	oper 3918.558	Q10=2100	2100.00	340.00	349.49		350.35	0.002436	7.46	281.44	38.16	0.48
Jpper 349.27 0.002445 6.92 245.51 Jpper 3918.558 02=1700 1700.00 340.00 346.53 245.51 245.51 Jpper 3918.558 02=1000 1000.00 340.00 346.53 245.51 175.23 Jpper 3975.018 02=400 3900.00 340.39 353.72 354.37 0.00046 6.47 602.35 Jpper 3975.018 020=3400 340.39 353.72 354.37 0.000146 6.47 602.35 Jpper 3975.018 035=3000 340.39 357.18 355.42 0.001104 6.47 602.35 Upper 3975.018 035=3000 340.39 357.18 356.51 0.002603 7.04 298.32 Upper 3975.018 07=2100 240.39 349.45 356.25 0.002773 7.15 279.86 Upper 357.018 07-400 340.39 349.45 0.002603 7.04 236.36 Upper 357.018	oper 3918.558	Q7=2000	2000.00	340.00	349.26		350.09	0.002439	7.33	272.67	37.80	0.48
Jpper 347.03 0.002446 5.71 175.23 Jpper 345.53 346.53 346.53 146.53 5.71 175.23 Jpper 357.5018 0.002446 6.47 602.35 160.35 Joper 357.5018 0.000346 6.47 602.35 160.35 Joper 357.5018 0.55=300 340.30 340.39 352.78 355.342 0.001104 6.42 529.60 Joper 357.5018 0.55=3000 340.39 351.96 355.60 0.001314 6.43 466.26 Joper 357.5018 0.72000 340.39 351.96 355.60 0.001314 6.43 466.26 Joper 357.5018 0.72000 340.39 349.45 350.51 0.002603 7.15 279.86 Joper 357.618 0.72000 340.39 348.63 349.45 0.002773 7.15 279.86 Joper 357.618 0.55.700 0.55.700 0.002773 7.15 234.33	oper 3918,558	Q5=1700	1700.00	340.00	348.53		349.27	0.002445	6.92	245.51	36.66	0.47
Opper 354.37 0.000946 6.47 602.35 Jpper 3975.018 Q100=3900 3900.00 340.39 353.72 354.37 0.000946 6.47 602.35 Jpper 3975.018 Q56=3400 340.39 353.72 354.37 0.001104 6.42 529.60 Jopper 3975.018 Q55=3000 340.39 351.96 355.42 0.001104 6.42 529.60 Jopper 3975.018 Q35=3000 340.39 351.96 355.60 0.001314 6.43 466.26 Upper 3975.018 Q10=2100 2100.00 340.39 349.45 350.51 0.002603 7.04 298.32 Upper 3975.018 Q7=2000 2000.00 340.39 348.63 350.51 0.002603 7.04 298.32 Upper 3975.018 Q7=2000 2000.00 340.39 348.63 349.45 0.003773 7.15 279.86 Low 3375.018 O5=17000 0.0010 340.39 <	oper 3918.558	Q2=1000	1000.00	340.00	346.53		347.03	0.002446	5.71	175.23	33.60	0.44
Upper 357.5 018 Q100 = 3900 3900.00 340.39 353.72 354.37 0.000946 6.47 602.35 Upper 397.5 018 Q50=3400 340.30 340.39 352.78 353.42 0.001104 6.42 529.60 Upper 397.5 018 Q55=3400 340.39 351.96 352.60 0.001114 6.43 466.26 Upper 397.5 018 Q10=2100 340.39 349.74 350.51 0.002603 7.04 298.32 Upper 3975.018 Q17=2100 2100.00 340.39 348.45 350.51 0.002603 7.04 298.32 Upper 3975.018 Q7=2000 240.39 348.45 350.51 0.002603 7.04 298.32 Upper 3975.018 Q7=2000 240.39 348.63 349.45 0.002603 7.15 279.86 Upper 357.618 0.55-7000 340.39 348.63 0.002603 7.15 234.33												-
Upper 357.5 018 Q50=3400 340.00 340.39 352.78 353.42 0.001104 6.42 529.60 Upper 397.5 018 Q35=300 3000.00 340.39 351.96 352.60 0.001314 6.42 529.60 Upper 397.5 018 Q10=2100 340.39 351.96 352.60 0.001314 6.43 466.26 Upper 397.5 018 Q10=2100 2100.00 340.39 349.45 350.51 0.002603 7.04 298.32 Upper 3375.018 Q7=2000 2000.00 340.39 348.45 350.25 0.002773 7.15 279.86 Upper 3375.018 Q7=2700 200.00 340.39 348.63 349.45 0.002773 7.15 279.86	oper 3975.018	Q100 = 3900	3900.00	340.39	353.72		354.37	0.000946	6.47	602.35	308.20	0.41
Upper 3875.018 Q35=300 3000.00 340.39 351.96 352.60 0.001314 6.43 466.26 Upper 3975.018 Q10=2100 2100.00 340.39 343.74 350.51 0.002603 7.04 298.32 Upper 3975.018 Q17=2000 240.39 349.45 350.51 0.002603 7.04 298.32 Upper 3975.018 Q17=2000 240.39 349.45 350.25 0.002773 7.15 279.86 Unver 3375.018 O5=7700 1700.00 340.39 348.63 349.45 0.003503 7.15 234.93	oper 3975.018	Q50=3400	3400.00	340.39	352.78		353.42	0.001104	6.42	529.60	241.66	0.43
Upper 3875.018 Q10=2100 2100.00 340.39 349.74 350.51 0.002603 7.04 298.32 Upper 3975.018 Q7=2000 340.39 349.45 350.25 0.002773 7.15 279.86 Unver 3375.018 D7=7700 1700.00 340.39 348.63 349.45 0.003503 7.15 234.93	oper 3975.018	Q35=3000	3000.00	340.39	351.96		352.60	0.001314	6.43	466.26	145.88	0.46
Upper 3875.018 Q7=2000 2000.00 340.39 349.45 350.25 0.002773 7.15 279.86 Unver 3475.018 07=1700 1700.00 340.39 348.63 349.45 0.003050 7.45 234.93	oper 3975.018	Q10=2100	2100.00	340.39	349.74		350.51	0.002603	7.04	298.32	67.59	0.59
1000 1000 105-1700 1700 00 340 348 63 348 63 349 45 0.003050 7.24 234 93	oper 3975.018	Q7=2000	2000.00	340.39	349.45		350.25	0.002773	7.15	279.86	62.38	0.59
	oper 3975.018	Q5=1700	1700.00	340.39	348.63		349.45	0.003050	7.24	234.93	47.37	0.57
Upber 3375.018 Q2=1000 1000.00 340.39 346.61 347.22 0.003154 6.25 160.00	oper 3975.018	02=1000	1000.00	340.39	346.61		347.22	0.003154	6.25	160.00	33.53	0:20









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HEC-RAS Version 4.0.0 March 2008 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

х	х	XXXXXX	XX	XX		XX	XX	Х	Х	XXXX	
Х	х	х	х	Х		Х	х	х	х	х	
Х	х	х	х			Х	Х	х	х	х	
XXX	XXXX	XXXX	х		XXX	XX	XX	XXX	XXX	XXXX	
х	х	Х	х			Х	х	X	х	х	
Х	х	х	х	Х		Х	X	х	х	Х	
Χ.	х	XXXXXX	XX	XX		Х	х	х	х	XXXXX	

PROJECT DATA Project Title: Alvarado Upper (Map 63&64) Project File : Alvarado6364.prj Run Date and Time: 8/3/2010 1:51:08 PM

Project in English units

Project Description: City Stormwater Maintenance (First Year) Alvarado Canyon Creek (Upper) Helix Map Number 63 & 64 October 17, 2009 J-15541A

PLAN DATA

Plan Title: Capacity Model Plan File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.p03

Geometry Title: Capacity Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g04

Flow Title : FEMAQ and WSE Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Plan Description: Geometry is from TIN Flow Data is from DRAFT FIS (no date at this time)

Plan Summary Information:Number of: Cross Sections = 17Multiple Openings = 0Culverts = 0Inline Structures = 0

Bridges Lateral Structures = **=** 0 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: Subcritical Flow

FLOW DATA

Flow Title: FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Flow Data (cfs)

River Q35=3000	Reach Q10=2100	RS Q7=2000	Q100 = 3900 Q5=1700	Q50=3400 2330
800				
Avarado Ck	Upper	3975.018	3900	3400
3000 800	2100	2000	1700	2330

River	Reach	RS	Q2=1000	555
Avarado Ck	Upper	3975.018	1000	555

Boundary Conditions

River Downstream	Reach	Profile	Upstream
Avarado Ck Known WS = 337	Upper	Q100 = 3900	
Avarado Ck	Upper	Q50=3400	
Normal $S = 0.03$	**	005 0000	
Avarado CK Normal S = 0.03	upper	Q35=3000	
Avarado Ck	Upper	Q10=2100	
Normal $S = 0.03$			
Avarado Ck	Upper	Q7=2000	
Normal $S = 0.03$			
Avarado Ck	Upper	Q5=1700	
Normal $S = 0.03$			
GEOMETRY DATA Geometry Title: Capacity Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g04 CROSS SECTION RIVER: Avarado Ck RS: 3975.018 REACH: Upper INPUT Description: 77 Station Elevation Data num= Elev Sta Sta Sta Sta Elev Sta Elev Elev Elev 0 350.66 54.55 352 168.06 352.55 169.75 352.62 174.25 352.81 186.4 353.2 196.62 353.69 203.07 354 216.59 354.69 229 355.32 321.79 244.96 356 313.71 355.2 354.85 340 354 340.76 353.95 340.92 353.94 341.22 353.92 350.36 353.29 359.4 352.68 368.34 352 377.54 369.6 351.82 350.68 379.23 350.46 382.41 368.63 351.95 350 385.42 348 385.58 347.89 388.06 346 389.7 385.23 348.13 344.66 394.26 340.86 394.64 390.46 344 390.99 343.53 392.73 342 340.91 400.41 340.39 403.98 340.64 414.41 397 340.44 340.47 395.4 341.66 416.29 341.81 416.76 341.84 417.94 342 418.25 415.6 341.75 342.52 420.38 419.12 344.02 346 420.56 419.07 343.94 419.1 344 346.28 422.75 348.06 431.94 348.64 454.83 350 478.38 421.71 348 350.41 499.51 351.3 503.88 351.51 504.44 351.53 504.87 351.54 505.16 351.55 353.98 588.51 354 588,66 567.91 353.08 587.99 515.48 352 354.05 600.77 357.01 602.99 357.43 603.15 357.45 603.3 595.5 356 357.48 616.49 360.83 620.64 609.26 358.92 613.68 360 605.48 358 362 623.06 362.78 626.85 364 Manning's n Values num= 5 n Val Sta n Val Sta Sta Sta n Val Sta n Val n Val .045 418.25 .018 454.83 0 .025 244.96 .018 397 .025 Coeff Contr. Lengths: Left Channel Right Bank Sta: Left Right Expan.

37	77.54 4	54.83		56.06	56.46	57.46		.1	
.3			0						
Sta L	Sta R	num= Elev	2 Permane	nt					
0	377.54		F						
454.83	626.85		F	_					
Blocked Of	structi	ons Flev	num= Stai.	5 ⊊ ⇔+⊃	Elev	Sta L	Sta R	Elev	
3CA 1	71.99	365	97.43	152.37	365	224.1	297.99	365	
CROSS SEC	TION								
RIVER: Ava REACH: Upp	arado Ck per	:	RS: 391	8.558					
INPUT									
Descriptio	on:								
Station E.	levation Flew	i Data Sta	num= Elev	66 Sta	Elev	Sta	Elev	Sta	
Elev	UTC A	Dua		Dea	2101				
0	350.89	45.61	352	179.04	353.17	180.56	353.23	193.04	
353.58 197.76	353.78	203.01	354	230.15	355.16	237.25	355.42	250.67	
356 294.4	355.68	314.27	354.58	324.48	354	341.01	352.75	350.82	
352 352.57	350.58	353.44	350	354.29	349.11	355.36	348	357.25	
346.02	346	357.33	345.94	359.19	344	359.68	343.53	361.3	
342									
361.7 342	341.63	363.62	340	365.913	40.1096	388.28	341.18	388.59	
389.03 346	343.17	389.11	343.38	389.34	344	389.62	344.72	390.14	
390.5	346.84	391	347.66	391.19	348	392.09	349.49	392.37	
393.96	350.46	398.11	351.25	399.59	351.32	400.7	351.38	402.6	
403.71	351.29	432.41	350.39	438.19	350	526.18	351.95	526.68	
351.96 526.98	351.97	527.72	352	599.34	353.8	606.95	354	614.22	
355.8 615.03	356	615.89	356.21	620.14	357.22	623.29	358	630.16	
359.69	360	634 28	360 79	638 7	362	640.01	362.42	642.45	
363.24	500	094.20		00017	202	0.000			
644.88	364								
Manning's	n Value	s	num=	5		æ.	*	~ .	
Sta Val	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n
var O	.025	341.01	.018	365.91	.045	388.28	.018	399.59	
.025									
Bank Sta: Expan.	Left	Right	Lengths	: Left C	hannel	Right	Coeff	Contr.	

4 of 29

350.82 399.59 36.89 36.82 36.86 .1 .3 num= Ineffective Flow 2 Sta L Sta R Elev Permanent 0 350.82 \mathbf{F} 399.59 644.88 F 3 Blocked Obstructions num= Sta R Elev Sta L Sta R Elev Sta L Sta R Elev Sta L 365 365 212.28 335.49 365 ٥ 54.03 109.3 165.48 CROSS SECTION RIVER: Avarado Ck RS: 3881.736 REACH: Upper INPUT Description: 79 Station Elevation Data num= Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 350.87 0 350.48 6.07 10.29 351.15 12.92 351.31 40.92 352 199 353.76 206.08 353.91 206.69 353.92 210.21 354 222.24 354.44 251.37 355.63 258.69 356 271.86 355.88 296.8 233.9 354.94 354 309.56 353.29 328.41 352 330.64 350.21 330.92 350 331.62 349.42 333.32 348 334.54 346.94 335.46 346 336.53 344.91 337.43 344 339.15 342.25 339.4 339.49 341.91 341.37 340 342 342.76340.0032 363.11 340.05 363.14 340.12 363.24 340.37 363.78 342 363.88 342.31 364.68 344.67 365.18 364.44 344 346 365.75 347.47 365.95 348 366.76 350 366.98 350.5 367.69 352 385.02 366.13 348.45 351.97 389.85 351.73 401.73 351.1 404.62 351.04 406.3 351 410.61 350.92 350.67 421.56 350.62 423.52 350.58 428.95 415.48 350.84 419.61 350.5 436.77 350.38 437.79 350.35 443.09 350 507.58 351.01 517.23 351.31 351.78 532.85 351.84 538.19 352 589.11 523.05 351.5 531.06 353.29 616.1 354.06 623.91 356 627.56 615.46 353.99 615.84 354 356.9 632.01 358 632.22 358.05 632.33 358.08 639.85 360 640.33 360.14 645.87 361.67 647.07 362 648.51 362.43 653.47 364 Manning's n Values num= 5 Sta n Val Sta n Val Sta n Val Sta n Val Sta Val

n

.025 328.41 .018 342.76 .045 363.11 .018 367.69 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 328.41 367.69 11.11 10.97 10.38 .1 .3 Ineffective Flow 2 num= Sta L Sta R Elev Permanent 0 328.41 F 367.69 653.47 F Blocked Obstructions num= 3 Elev Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R 365 118.74 175.55 365 195.2 297.51 365 0 40.99 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 3870.768 INPUT Description: Station Elevation Data 93 num= Elev Sta Elev Elev Sta Elev Sta Sta Sta Elev 0 351.72 .69 352 176.77 353.23 181.76 353.33 186.43 353.41 234.28 354.85 240.42 355.16 245.89 197.1 353.65 213.03 354 355.43 353.82 272.67 353.819 246.64 355.46 267.28 354 272.64 275.67 353.67 306.57 351.54 308.04 350.43 308.6 350 309.85 305.95 352 349.05 311.24 348 311.77 347.59 313.71 346 315.77 344.21 316.02 344 342 318.6 341.6 320.17 340 321.64 316.21 343.83 318.18 340.147 342 340.07 342.06 340.77 341.98 340.05 338.64 341.841 340.04 344 341.48 345.99 341.49 346.01 342.6 348 343.42 341.44 345.88 349.05 352 348.08 351.23 349.08 344.21 350 346.01 351.74 346.27 351.56 351.7 355.64 351.67 359.27 351.55 363.01 350.42 351.36 354.74 351.43 364.73 351.37 366.08 351.33 368.29 351.2 389.9 350.16 397.33 350.39 350 404.15 350.27 404.59 350.26 412.11 350.12 418.82 420.14 349.98 349.82 453.99 350 426.27 349.9 433.22 349.8 434.21 481.77 350.11 497.7 350.62 351.09 518.78 351.31 530.89 501.02 350.74 511.44351.71 352 551.73 352.35 558.84 352.54 576.49 353.03 589.82 538.75 353.37

608.45 353.74 611.81 353.89 614.18 354 614.26 354.01 614.32 354.03 615.95 354.47 620.3 355.57 621.91 356 626.05 357.06 629.47 358 631.85 358.62 636.85 360 637.98 360.31 644.01 362 644.38 362.1 644.9 362.25 649.64 363.57 651.05 364 5 num= Manning's n Values Sta n Val Sta n Sta n Val Sta n Val Sta n Val Val .018 346.01 0 .025 305.95 .018 318.6 .045 338.64 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 179.97 180.47 180.91 .1 305.95 346.01 .3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R 0 305.95 F F 346.01 651.05 Blocked Obstructions num= 2 Sta L Sta R Elev Sta L Sta R Elev 9.75 365 121.57 277.04 365 0 CROSS SECTION RIVER: Avarado Ck RS: 3690.298 REACH: Upper INPUT Description: Station Elevation Data num= 90 Sta Elev Sta Elev Elev Sta Elev Sta Sta Elev 3.53 345.75 5.97 345.77 20.93 345.96 23.5 0 345.71 346 35.83 349.75 36.38 350 73.85 30.97 347.56 32.17 348 351.06 352 167.58 351.52 180.07 93.24 80.39 351.24 76.35 351.12 350.99 206.6 347.92 350 206.33 348.11 206.49 209.4 348 203.46 346 344 214.44 342.39 214.98 342 215.47 211.3 344.63 212.19 341.65 340 218.52 339.47 220.56 338 223.92338.0069 235.27 217.78 338.03 340 239.68 341.82 239.89 235.44 338.18 236.7 339.26 237.56 342 344 270.01 345.07 310.29 344.45 322.56 241.12 343.04 242.24 344.28 344 375.39 344.17 382.11 344.34 386.03 326.36 344.1 330.94 344.44 387.03 344.43 390.42 344.44 396.81 344.59 400.84 344.63 407.01 344.7

416.13 344.88 438.84 345.18 448.8 345.3 450.55 345.31 465.65 345.48 468.22 345.49 472.87 345.52 491.47 346 494.34 346.07 495.53 346.1 515.92 346.57 530.49 346.92 540.57 347.15 545.75 347.26 566.83 347.78 569.21 347.84 575.67 348 583.79 348.3 588.52 348.49 592.91 348.66 596.44 348.8 613.02 349.46 615.24 349.55 616.85 349.62 626.37 350 644.26 350.81 661.23 351.6 669.77 352 744.72 353.34 757.4 354 354.3 762.72 356 765.36 356.97 768.25 358 770.91 758.19 358.93 774.03 360 777.36 361.13 779.9 362 783.91 363.32 785.95 364 Manning's n Values num= 5 Sta n Val 0 .025 203.46 .018 223.92 .045 235.27 .018 242.24 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 203.46 242.24 344.53 328.24 316.06 .1 .3 2 Ineffective Flow num= Sta L Sta R Elev Permanent F 0 203.46 242.24 785.95 F Blocked Obstructions num= 2 Sta L Sta R Elev Sta L Sta R Elev 275 321.35 360 57.06 198.78 360 CROSS SECTION RIVER: Avarado Ck RS: 3362.059 REACH: Upper INPUT Description: Station Elevation Data num= 187 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 446.54 10.14 446.29 25.61 24.19 444.7 20.91 446 44429.68 30.85 441.42 33.27 440.27 27.19 443.21 442 33.66 440.07 33.81 440 36.64 438.61 37.91 438 38.67 437.63 42.05 436 46.24 434 42.49 435.79 43.46 435.33 45.38 434.4 48.24 433.04 54.08 430.27 50.46 432 51.07 431.71 52.21 431.18 54.64 430

57.03	428.84	58.76	428	59.55	427.62	60.36	427.22	62.58
426 64.09	425.13	66.11	424	68.65	422.51	69.49	422	70.86
421.16 72.75	420	73.27	419.67	74.6	418.83	75.91	418	78.23
416.53	416	80.3	415.22	82.22	414	83.08	413.46	85.03
412.22	410 07	0= 20	410	00 00	411 07		410	90 63
408.68	412.07	03,30	412	65,50	477.01	00.54	440	20.00
91.7 404	408	92.99	407.18	94.86	406	97.97	404.03	98.02
101.08	402.03	101.11	402.01	101.13	402	101.2	401.96	104.22
105.29	399.3	107.26	398	109.04	396.82	110.28	396	113.2
113.28	394	113.32	393.98	113.51	393.85	115.98	392.19	116.26
117.51	391.16	119.23	390	119.73	389.67	122.21	388	123.85
125.08	386	127.54	384.11	127.67	384	130	382.21	130.28
382 131.19	381.3	132.89	380	133.44	379.58	135.54	378	135.6
377.96 136.13	377.56	138	376.16	138.21	376	140.41	374.38	140.92
374	222	140 60	~~ ~ ~	146 01	270 00	146 25	270	116 30
142.28 369.97	3/3	143.03	314	T40'ST	370.09	140.00	570	140.00
149.39 366.38	368	167.44	367.39	173.88	367.1	183.82	366.76	190.8
197.44	366	198.93	364.92	200.18	364	202.56	362.3	202.97
203.33	361.74	205.83	360	208.02	358.47	208.7	358	211.37
211.57	356	213.46	354.69	214.45	354	215.2	353.47	217.32
352 218.52	351.16	220.19	350	221.67	348.86	222.79	348	223.55
347.15	246	006 00	244 02	226 24	244	226 44	242 00	000 ID
224.57 342	346	226.32	344.03	226.34	544	220.44	343.09	220,12
229.22 337.01	340.76	229.89	340	230.44	339.38	231.72	338	232.63
233.63	336	233.78	335.91	236.2	334.56	237.12	334	252.9
253.61	335.49	254.18	336	255.55	337.21	256.43	338	257.85
339.26 258.68	340	266.68	340.85	274.32	341.65	277.87	342	284.94
342.14 302.27	342.45	306.07	342.51	309.61	342.52	431.19	344	758.76
344.35 768.31	344.6	797.19	345.41	821.62	346	830	346.31	831.03
346.34 833.5	346.43	847.74	346.96	856.58	347.25	879.57	348	880.41
348.03	240 04	001 04	340 07	001 04	349 95	906 13	349 16	921 76
349.83	340,04	001.24	J*±0.U/	JUI. 94	540.33	200.43	742.10	261.10

350 942.25 350.68 949.16 350.95 960.33 923.27 349.9 925.42 351.4 963.86 351.55 965.66 351.58 967.08 351.64 969.78 351.75 971.07 351.79 354 1041.06 354.92 1043.88 352 1038.39 353.93 1038.73 984.45 356 358 1050.91 358.78 1053.99 360 1059.87 1045.68 356.71 1048.94 361.95 1059.99 361.99 1060.03 362 num= 5 Manning's n Values n Val Sta Sta n Val Sta n Sta n Val Sta n Val Val .025 228.12 .018 233.78 .045 253.61 .018 274.32 0 .025 Coeff Contr. Bank Sta: Left Right Lengths: Left Channel Right Expan. 323.3 315.55 308.79 .1 222.79 274.32 .3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R 0 222.79 \mathbf{F} 274.32 1060.03 F 1 Blocked Obstructions num= Sta L Sta R Elev 350.42 649.42 360 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 3046.513 INPUT Description: 182 num= Station Elevation Data Elev Sta Elev Sta Sta Elev Sta Sta Elev Elev 2.26 439.73 4.62 0 1.65 440.18 1.89 440 441.38 438 10.57 8.5 435.16 10,09 434 436 7.36 6.7 436.48 433.65 17.26 428.76 18.29 13.42 431.56 15.56 430 12.82 432 428 24.83 21.34 425.77 23.76 424 20.08 426.69 21.03 426 423.22 30.54 419.04 31.97 27.68 29.23 420 26.5 422 421.13 418 37.43 414 38.34 33.39 416.96 34.7 416 36.66 414.57 413.34 410 41.97 410.69 42.9 44.71 408.84 46.04 40.17 412 408 47.74 406.95 49.28 406 51.46 404.66 52.53 404 55.65 402.08 58.56 400.29 59.03 400 61.34 56.21 401.73 55.78 402 398.58

62.29	398	62.38	397.94	63.73	397.12	65.44	396.06	65.55
396		<i>c</i> o os	2.04	60 F	202 50	70 00	202	72 02
· 66	395.72	68.8T	394	69.5	393.58	12.08	394	/3.03
75.35	390	76.54	389.27	78.62	388	80.04	387.13	81.89
84.06	384.67	85.16	384	86.41	383.24	88.44	382	90.48
380.76 91.72	380	93.93	378.65	95	378	97.38	376.55	98.28
376 100.9	374.4	101.56	374	102.26	373.57	104.84	372	105.98
371.3 108.12	370	110.66	368.46	111.41	368	114.45	366.15	114.7
366 117.91	364.04	117.98	364	118.05	363.96	121.2	362	121.22
121.34	361.9	123.3	360.47	123.95	360	124.33	359.72	126.69
128.6	356.62	129.44	356	131.8	354.28	132.19	354	132.86
134.94 348	352	136.83	350.63	137.7	350	139.3	348.84	140.46
142.24 343 73	346.71	143.23	346	144.6	345.01	146	344	146.37
148.77	342	150.97	340.41	151.55	340	152.21	339.52	154.32
156.46	336.46	157.1	336	157.84	335.47	158.82	334.77	159.88
161.68	333.02	163.38	332	181.72	332.23	181.93	332.42	182.16
183.79 338	334	185.96	335.84	186.15	336	187.92	337.5	188.51
189.01 342.83	338.46	190.75	340	196.48	341.99	196.52	342	219.42
228.12 343.63	343.15	232.61	343.32	245.18	343.4	249.52	343.53	252.86
255.39 343.77	343.7	264.28	343.83	281.18	343.76	295.78	343.7	309.77
324.93 345.21	343.72	342.77	343.67	618.57	343.93	628.31	344	669.36
680.15 346	345.54	689.98	345.88	691.38	345.92	692.91	345.96	693.63
747.86 348.57	347.89	748.45	.347.91	748.79	347.92	749.9	348	772.09
776.41 349.77	348.74	784.94	349.02	798.19	349.5	802.2	349.65	805.77
812.25 351.54	350	818.51	350.2	839.73	350.56	858.41	350.94	883.51
888.56 353.53	351.65	890.61	351.69	899.49	351.84	903.12	352	908.37
909.21 355.8	353.73	910.24	354	914.52	355.26	915.46	355.54	916.35
917.05 360	356	917.51	356.13	924	358	926.64	358.81	930.52
934.83	361.33	937.02	362					

Manning's n Values

num=

n Val Sta n Val Sta n Val Sta n Val Sta Sta n Val .025 148.77 .018 161.68 .045 182.16 .018 196.48 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 240.61 237.53 235.74 136.83 196.48 . 1 .3 2 Ineffective Flow num= Sta L Sta R Elev Permanent 0 136.83 F 196.48 937.02 F Blocked Obstructions num= 1 Sta L Sta R Elev 232.03 534.15 360 CROSS SECTION RIVER: Avarado Ck RS: 2808.985 REACH: Upper INPUT Description: 166 Station Elevation Data num= Elev Sta Elev Sta Sta Elev Sta Elev Sta Elev 0 433.56 432 4.61 430.58 5.49 .91 432.99 2.45 430 8.37 428.05 8.45 428 8.51 427.96 11.2 426 13.39 424.38 14.4 423.62 16.57 422 18.29 420.7 19.22 13.9 424420 22.65 417.37 24.42 416 26.9 20.43 419.08 21.83 418 414.09 30.93 410.98 27.01 414 27.25 413.82 29.6 412 32.19 410 408.4 34.79 408 35.27 407.62 37.38 406 39.74 34.27 404.46 40445.26 401.25 47.44 42.6 402.78 43.95 402 40.46 400 50.93 398 53.08 396.77 54.41 396 57.9 49.89 398.6 394 61.39 392 64.13 390.43 64.88 390 65.68 57.93 393.98 389.54 72.47 385.65 68.37 71.48 386.21 71.86 386 75.35 388 384 82 380.19 82.32 380 76,94 383.09 78.84 382 84.45 378.78 89.29 376 91.35 374.82 92.78 85.81 378 88.27 376.59 374 98.55 370.68 99.74 370 102.85 94.32 373.11 96.26 372 368.21 368 103.47 367.85 106.69 366 107.94 365.28 110.16 103.21 364

111.9	363	113.64	362	115.55	360.9	117.11	360	118.88	
358.56	358	120 51	357.16	121.79	356	123.11	354.82	124.02	
354	550	#20°2Ŧ	557.20	122.4.9.2					
125.82	352.38	126.24	352	128.08	350.35	128.47	350	129.47	
349.1			~ . ~ ~ ~ ~	100 00	246	100 00	ר <u>א</u> ר איז	105 15	
130.69	348	132.19	346.66	132.92	346	133.54	340.4/	T22.T2	
136.86	342.47	137.39	342	139.59	340.03	139.62	340.01	139.63	
340									
139.64	339.99	141.87	338	143.15	336.86	144.11	336	146.18	
334.16	334	147 63	332 88	147 74	332.78	148.61	332	171.18	
333.693	2°2°1	11/:05	552.00		002				
173.54	333.87	173.71	334	174.92	334.97	176.2	336	177.85	
337.36				100 01	240	204 05	240 84	220 0	
178.63	338	180.37	338.6	183.91	340	204.05	340.84	220.8	
223.19	341.56	224.98	341.61	226.38	341.66	230.53	341.78	231.59	
341.81									
232.58	341.84	238.45	341.95	241.64	342	345.14	342.1	353.05	
342.11	२४० १२	274 22	240 15	275 24	343 14	227 76	342 16	297 36	
364.5	342.13	3/4.22	342.13	373.3%	J44.14	507.70	J72.10		
404.24	342.18	408.46	342.19	416.48	342.2	428.16	342.22	443.31	
342.24									
485.66	342.33	497.31	342.35	503.12	342.36	507.71	342.39	507.93	
342.4 509.37	342.41	511.1	342.42	513.15	342.44	514.72	342.45	640.38	
344			• • • • • • • •						
743.14	344.08	752.59	345.12	756.86	346	759.82	346.64	766.1	
348	240 10	020 00	250	002 05	250 24	905 01	350 63	907 37	
804.74	349.19	830.08	350	905.05	350.24	905.01	330.03	207.27	
912.05	352	913.64	352.7	916.54	354	920.63	355.78	921.16	
356									
921.92	356.29	926.64	358	931.03	359.58	932.27	360	935.2	
361 938 17	362								
<i>J</i> J <u>J</u> J <u>J</u>	504								
Manning's	n Value	S	num=	5	_				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n
Val	018	137 39	.018	147.63	.15	171.18	.018	183.91	
.025	.010	10/.02	.010	T41.00	•	.,		100172	
Bank Sta:	Left	Right	Lengths	: Left (Channel	Right	Coeff	Contr.	
Expan.	79 A77 1	83 61		519 53	516.04	514.95		. 1	
.3	69.71 I	-0J . J T		2.2.22	520.02	011100			
Ineffectiv	ve Flow	num=	2						
Sta L	Sta R	Elev	Permane	ent					
0	129.47		F 5						
IOS.YI Blocked O	∋so.⊥∠ bstructi	ons	num=	2					
Sta L	Sta R	Elev	Sta L	Sta R	Elev				
531	680.76	360	427.1	487.82	360				

CROSS SECTION

RIVER: REACH:	Avarado Ck Upper		RS: 229	2.941				
INPUT Deceria	tion.							
Descrip	DELON:	Data	~	1.00				
Station	Elevation	Data	num≃	168	71 7	04	137	
50	a siev	Sta	Elev	sta	RIEV	sca	Elev	SLa
Elev							436 50	F 00
	0 420	1.71	419.13	3.22	418	5.21	416.53	5.92
416								
7.9	2 414.52	8.61	414	8.8	413.86	11.29	412	12.33
411.23								
13.9	97 410	16.15	408.37	16.65	408	17.59	407.3	19.32
406								
20.3	9 405.2	21.99	404	23.78	402.66	24.66	402	26.35
400.73								
27.3	1 400	27.67	399.73	29.95	398	30.97	397.22	32.59
396								
34.7	6 394.35	35.22	394	37.41	392.22	37.68	392	37.86
201 83	0 001100	55,22	021	0,,,,,		0,100		0.100
20100	200	10 62	200 27	40 17	200	12 21	206 00	11 13
201	2 390	40.03	202.21	42.17	200	42:2T	300.99	44.42
386								
45.8	5 384.73	46,66	384	47.84	382.95	48.91	382	50.93
380.2								
51.1	.5 380	51.41	379.76	53.39	378	55.09	376.48	55.62
376								
56.3	3 375.37	57.86	374	60.08	372.02	60.09	372	60.1
371.99								
62.2	3 370	63.05	369.22	64.34	368	65.95	366.45	66.41
366								
67.3	4 365.08	68,41	364	70.18	362.23	70.41	362	71.2
361.21								
72 3	9 360	73 19	359 18	74 36	358	74 78	357 57	76 32
256	5 500	10110	000,40	,1.50	000	/11/0	557.57	,0.02
550	10 DEA 47	70 00	254	70 00	252 24	00 22	252	01 25
//.8	2 354.47	18.20	304	10.92	333.34	00.22	354	01.30
350.84						0.5		
82.1	.7 350	82.82	349.32	84.1	348	86	346.03	86.02
346								
86.0	5 345.97	87.92	344	88.99	342.87	89.8	342	91.38
340.32								
91.6	8 340	91.91	339.76	93.56	338	94.02	337.5	95.43
336								
96.4	4 334.92	97.29	334	98.07	333.17	99.16	332	99.73
331.39								
100.5	4 330.52	100.87	330.16	101.02	330	111.2	328,65	116.9
328								
107 0	3 328 74	127 84	329 66	128 08	330	129 12	331 57	129 42
772			525.00		550		JJ1.J/	
222 100 M	ດ ວວວະ	120 77	33 /	101 00	225 44	122 10	59 <i>6</i>	116 67
225 00		T20'11	224	137.13	222.44	122.12	220	T#0.03
333.00		150 40	225 0	100 00	33F 60	100 00	225 64	100 00
151./	7 335.9L	152.42	335.9	T00.00	335.68	TOR.07	335.64	TQA'73
335.44								

183.48 335.39 212.35 334.98 216.01 334.89 220.32 334.78 225.53 334.65 230.05 334.59 234.72 334.53 239.35 334.42 242.63 334.39 247.74 334.31 253.7 334.26 259.16 334.22 277.03 334 312.77 248.01 334.3 334.21 314.04 334.33 316.53 334.64 318.99 334.93 321.02 335.16 329.71 335.83 330.22 335.88 330.47 335.91 331.97 336 341.96 336.37 349.34 336.76 357.03 337.15 360.29 337.37 365.52 337.52 366.9 337.63 368 337.71 338 432.96 339.01 448.76 340 458.82 368.92 337.76 373.25 340.32 342 544.49 342.78 563.66 343.26 598.15 491.34 341.34 513.06 344 808.65 345.76 810.45 345.77 816.29 346 877.95 346.51 878.74 346.59 879.53 346.73 881.53 346.95 882.54 347.12 888.48 348 890.22 348.1 350 905.34 351.91 905.68 352 909.62 353.27 911.72 898.3 354 912.89 354.45 916.98 356 926.01 356.42 Manning's n Values num= 4 Sta n Val Sta n Val Sta n Val Sta n Val .04 100.54 .15 127.23 .018 132.12 .25 0 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 86 132.12 410.33 395.27 385.35 . 1 .3 2 Ineffective Flow num= Sta L Sta R Elev Permanent 86 F 0 132.12 926.01 ਸ Blocked Obstructions num= 2 Sta R Elev Sta L Sta R Elev Sta L 433.05 515.24 360 336.6 413.18 360 CROSS SECTION RIVER: Avarado Ck RS: 1897.670 REACH: Upper INPUT Description: Station Elevation Data 153 num= Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 374 3.11 372.85 4.3 372 6.33 0 375,06 1.5 370.55 7.55 369.79 15.72 7.1 370 11.35 368 14.21 366.7 366 20.12 364 23.9 362.28 24.52 362 24.63 19.52 364.27 361.95

28.93	360	29.87	359.58	33.36	358	34.75	357.36	37.56
356 40	354.7	41.43	354	43.95	352.66	45.28	352	47.88
350.61 49.11	350	51.79	348.58	52.94	348	55.68	346.54	56.76
346 59.56	344.51	60.58	344	62.09	343.25	64.64	342	68.83
341.05 73.08	340	94.71	339.87	98.75	339.89	102.49	340	113.39
341.51 114.24	342	122.4	342.23	124.88	342.26	127.41	342.78	129.99
343.2 131.34	343.51	137.82	344	138.79	344.11	139.23	344.16	140.86
344 143.14	343.81	143.66	343.72	147.06	343.37	150.64	342	150.96
341.88 151.36	341.72	153.81	340.79	155.86	340	156.96	339.58	158.44
339.01 160.34	338.27	161.02	338	163.87	336.88	166.13	336	166.97
167.91	335.3	169.86	334.54	171.23	334	173.09	333.27	176.16
177.75	331.34	178.78	330.86	179.76	330.41	180.39	330	180.67
182.7	328.44	183.35	328	212.15	328.86	212.26	328.94	213.11
213.63	330	214.45	330.73	216	332	217.37	333.26	218.15
281.89 334.77	334.6	291.52	334.69	294.54	334.72	299.5	334.76	300.49
304.09 335.32	334.81	309.86	334.87	317.13	334.94	371.4	335.28	376.63
384.58 335.11	335.4	387.54	335.42	388.98	335.44	391.52	335.46	439.05
441.03 334.68	334.99	442.89	334.88	444.37	334.79	445.18	334.74	446.08
447.07 334.03	334.62	448.18	334.57	450.14	334.59	453.2	334.42	460.27
460.91 338	334	520.63	334.92	524.57	336	529.48	337.11	534.66
539.55 340.51	338.45	544.97	338.91	554.54	340	558.74	340.08	583.12
610.25 342.47	341.05	636.17	341.55	639.13	341.6	659.54	342	675.97
694.81 343.52	343.02	699.45	343.14	709.92	343.3	714.55	343.41	718.52
739.32 344	343.71	741.92	343.76	743.78	343.8	752.4	343.9	775.83
837.31 343.98	343.9	864.6	343.73	883.59	343.61	987.66	343.97	987.85
988.73 348	344	1030.28	344.84	1032.62	346	1038.87	346.92	1045.1
1051.6 353.99	349.55	1053.43	350	1059.26	351.34	1062.42	352	1072.59
1072.65	354	1072.82	354.01	1095.66	354.97			

Manning's n Values num=

n Val Sta n Val Sta Sta n Val Sta n Val 0 .045 180.67 .15 213.11 .018 218.15 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 137.82 218.15 469.57 465.05 461.75 .1 .3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R 0 137.82 F 218.15 1095.66 F Blocked Obstructions num= 3 Elev Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R 660.68 695.1 360 769.36 808.01 360 847.78 907.86 360 CROSS SECTION RIVER: Avarado Ck **REACH:** Upper RS: 1432.619 INPUT Description: Station Elevation Data num= 139 Elev Elev Sta Elev Sta Elev Sta Sta Sta Elev 354.9 19.02 354.02 19.48 354 19.72 353.99 46.71 0 353.33 353.3 49.15 353.27 50.37 353.24 54.53 353.16 58.29 47.47 353.05 75.27 352.47 64.75 352.82 66.86 352.74 84.62 352.32 88.84 352.09 108.71 353.03 109.25 353.09 111.15 89.18 352.11 90.76 352 353.31 113.74 353.2 114.07 353.17 114.65 353.12 115.4 353.04 118.93 352.69 119.69 352.62 125.83 352 127.94 351.78 128.86 351.68 135.28 351 145.19 348.86 147.4 138.97 350.46 141.76 350 348 149.89 347.02 165.1 344 187.92 343.35 152.5 346 159.12 344.7192.1 343.25 197.63 342.97 200.39 342.79 208.12 342.27 209.15 194.8 343.13 342.22 214.19 340.09 214.28 340 215.83 338.79 216.76 212.11 342 338.07 217.04 337.98 225.83 337.39 230.4 337.22 246.26 216.85 338 336.41 258.54 334.45 259.92 251.6 336.16 253.84 336 334 265.29 332.22 330.42 271.98 330 272.18 329.93 265.97 332 270.74 277.9 328 279.21 327.55 281.05 326.93 283.79 326 287.35 324.99 290.43 324 336.19 325.98 336.23 326 336.25 326.02 336.71 326.31 339.1 327.83

339.66 328.18 342.52 330 343.53 330.64 345.66 339.37 328 332 348.32 364.84 335.75 366.23 335.9 368.11 333.69 348.77 334 336 384.32 336.44 393.3 336.84 402.63 337.16 406.41 337.3 419.79 338 439.23 339.05 457.12 340 473.52 340.89 493.94 342 513.92 342.98 622.44 344.01 622.46 556.37 344.92 582.7 346 534.12 344 344 633.24 628.46 342.15 628.97 342 629.54 341.87 341.02 639.24 340 338.24 656.06 338.14 656.43 641.39 339.67 645.57 338.93 655.27 338.11 656.9 338.07 659.82 338 689.49 338.31 696.6 656.69 338.09 338.63 704.11 339.04 709.79 339.33 722.31 340 762.36 340.92 766.54 341.55 766.8 341.57 769.87 342 778 343.4 780.44 343.81 781.79 344 783.64 344.39 791.78 346 794.24 346.85 797.54 348 802.12 349.59 350 808.59 351.78 809.21 352 819.76 352.52 825.72 803.3 352.81 829 352.97 832.85 353.14 833.66 353.18 851.54 354 Manning's n Values num= 5 Sta n Val 0 .045 251.6 .04 281.05 .15 336.25 .045 364.84 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 293.25 305.64 317.13 251.6 364.84 .1 .3 2 Ineffective Flow num= Elev Permanent Sta L Sta R F 0 251.6 F 364.84 851.54 CROSS SECTION RIVER: Avarado Ck RS: 1126.981 REACH: Upper · INPUT Description: Approx. local of old drop strucure (no plans available) Station Elevation Data num= 110 Elev Elev Sta Sta Elev Sta Elev Sta Sta Elev 356.26 8.34 356.12 16.72 20.79 355.76 23.82 0 356 355.4 35.62 354 38.94 352.15 39.21 352 39.55 31.25 354.85 351.81

42.81	350	44.6	349	46.43	348	48.45	346.91	50.12	
346 51.14	345.45	53.88	344	57.63	343.59	60.05	343.52	78.32	
342.8 85.89	342.69	88.55	342.73	90.46	342.76	100.83	342.61	101.59	
342.6	240 57	102 9	242 56	110 1	342	100 34	341.33	143.92	
340.14	342.57	102.9	542.00	· · · · ·	242	102.01		010 00	
147.12 336.81	340	169.65	338.35	1/4.5/	330	208.21	330.25	£13.05	
222.42 334.4	336.48	228.13	336.37	235.7	336.08	236.85	336	251.45	
254.25	334	257.5	333.86	285.84	332.72	299.59	332.17	301.18	
303.96	332	309.39	331.74	347.23	330	348.92	329.85	349.54	
329.63 350.55	329.26	353.92	328	354.81	327.67	359.29	326	359.7	
325.84 364.66	324	364.81	323.94	369.64	322.14	370.02	322	372.75	
320.97 375.3	320	375.93	319.85	382.42	318	409.31	318.28	413.73	
320 415,29	320.61	415.76	320.79	418.86	322	422.58	323.46	423.98	
324		429.07	376	120 00	326 37	434 12	328	437.37	
329.29	323.23	*±2,9.07	520	+44.00		460.04	220 50	4CE 22	
439.16 332.6	330	442.8	331.45	444.28	334	460.94	332.52	405.33	
469.4 333.63	332.76	473.47	332.8	477.54	332.82	487.31	333.64	488.63	
489.21	333.72	489.91	333.8	491.62	334	493.37	334.43	497.2	
500.02	336	538.15	337.3	562.32	338	566.66	339.56	567.88	
570.08	340.79	571.45	341.28	573.44	342	575.51	342.74	579	
344 582.46	345.25	584.56	346	595.56	347.12	603.22	348	611.05	
348.43 617.52	348.78	640.14	350	650.33	350.28	659.89	350.55	664.79	
350.69									
Manning's	n Value	S	num=	5	_		· ·		
Sta Val	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n
0 .025	.025	347.23	.045	372.75	.15	415.29	.045	444.28	
Bank Sta:	Left	Right	Lengths	: Left	Channel	Right	Coeff	Contr.	
Expan. 34	47.23 4	44.28	:	215.16	233.86	259.36		.1	
.3 Ineffectiv Sta L 0 444.28	ve Flow Sta R 347.23 664.79	num≖ Elev	2 Permane: F F	nt					

CROSS SECTION

RIVER: Avarado Ck REACH: Upper

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INPUT								
Descripti	escription: u/s Entrance into Parking Lot from Alvarado Road							
Station H	Slevation	Data	num=	115				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
0	341.07	.61	341.05	4.28	340.98	8.27	340.96	35.41
340.58								
42.9	340.06	43.69	340	49.77	338.48	51.67	338	56.19
336.87								
59.66	336	62.75	335.23	66.32	334.36	67.69	334	75.11
332.86								
80 74	332	84 11	331.89	85.87	331.83	112.84	330.97	115.86
330.88		0	202.02	00.07	501.00		000101	
125 01	330 59	127 52	330 52	131 75	330 39	139	330 16	129.98
330 13	550.55	1. M. / • J. M.	220.22	حب ∌ منگر فيت بلير	550.55	100	550.20	
142 53	330 08	143 04	330 09	145 27	330	155 28	329 62	160 35
279 73	550.00	142.04	330.03	110.07	000	100.20	525.02	100.00
164 99	320 74	165 01	379 57	168 88	379 36	170 54	329 17	172 21
202.02	529.74	103.91	562.56	700.00	222.20	1/0.54	329.11	ملد (<i>مگر + «مگر) ع</i> ل
320.21	220 70	176 52	220 57	177 22	328 52	179 07	328 51	182 26
200 22	520.13	T10.00	520.57	1//.55	320.32	110.07	320.31	102.20
340.33	220 24	100 66	330 35	100 44	220 26	100 00	220 17	105 25
103.//	320.34	100.00	340.40	109.44	220.20	192.99	320.17	190.20
328.09	220	100 04	227 00	107 1	227 67	107 75	207 20	100 01
195.82	328	196.64	32/.00	197.1	321.01	191112	341.34	170.21
327.02	206 67	000 40	200	007 50	205 46		224 54	004 07
198.98	326.67	200.42	320	201.52	323.40	203.22	324.74	204.27
324.29	2.0.4	206 21	200 11		200	206 21	201 02	20 <i>6</i> E7
204.58	324	206.21	322.11	206.25	344	206.31	341.83	206.57
321.06	200	0.07 14	210 00	207 40	23.0	207 55	219 65	207 02
206.94	320	207.14	319.28	207.49	310	207.55	311.00	201.92
310		000 05			014	000 41	215 00	
207.94	315.91	208.06	315.45	208.3	314	237.41	312.84	231.51
310		000 61		000 1			210	000 00
238.09	316.62	238.61	317.21	239.1	317.78	239.29	318	239.83
318.6				040 II		040.06	200 66	D 4 4 D 4
241.08	320	241.77	320.75	243.11	344	243.86	322.00	244.94
323.31			204		005 OF		200	D 4 0 01
245.44	323.62	245.94	324	247.56	325.25	248.53	326	248.91
326.29	200	051 0	222 22	050 00	220	055 00	221 42	0
250.97	328	251.9	328.77	253.38	330	255.09	331.44	255.78
332				200 05		.	F.	210 10
267.66	332.51	299.68	334	308.07	334.78	314./3	332.51	319.19
336				206 46	220 01	226 02	240	207 00
321.68	337.29	323.02	338	326.46	339.81	326.82	340	321.22
340.21							~	
330.62	342	331.45	342.44	332.97	343.23	334.42	344	343.82
344.63	n,,	<u></u>					~ ~ ~ ~ ~ ~	
344.55	344.68	345.2	344.72	345.73	344.75	346.14	344.78	346.4
344.79	~			200 · 7	0.4P 05		~	
358.71	345.53	366.61	346	398.4/	347.31	415.46	348	416.2
348.02								

Manning's n Values num= 5 n Val n Val Sta n Val Sta n Val Sta Sta Sta n Val .05 255.78 0 .05 192.99 .025 207.94 .15 237.57 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 164.89 255.78 49.65 50.12 51.56 .1 .3 2 Ineffective Flow num= Sta R Elev Permanent Sta L 0 164.89 F F 255.78 416.2 CROSS SECTION RIVER: Avarado Ck RS: 843.0025 REACH: Upper INPUT Description: d/s Entrance into Parking Lot from Alvarado Road Station Elevation Data 156 num= Elev Sta Elev Sta Elev Sta Elev Sta Sta Elev 16.73 0 343.42 2.76 343.4 12.36 343.22 12.94 343.2 343.21 19.9 343.22 24.77 343.07 30.96 342.92 49.04 342.66 53.21 342.53 64.01 342.14 67.44 342 73.11 340.59 75.5 340 82.22 338.32 83.53 338 91.1 336.11 91.52 336 91.58 335.98 99.41 334 100.38 333.75 105.16 332.6 107.01 332.15 107.77 332 113.88 332.03 120.46 332.21 128.03 332.41 129.28 332.35 133.87 332.5 135.07 332.59 140.71 332.75 143.64 332.84 144.21332.87 144.92 332.89 145.97 332.94 150.42 148.3 332.98 149.8 332.99 333 151.43 333.01 152.47 333.03 154.78 333.11 155.4 333.13 157.09 333.15 158.91 153.57 333.06 333.08 159.86 333.12 160.78 333.16 163.48 332.99 164.13 333.03 165.29 333.06 169.3 332.92 171.18 332.95 173.26 332.8 175.06 167.93 332.89 332.75 178.05 332.64 178.68 332.56 180.77 332.5 176.14 332.7 183.37 332 194.8 331.72 196.28 331.23 194 331.97 194.16 331.89 198.22 330 199.4329.08 199.71 328.96 199.85 328.9 199.21 329.16 200.2 328.76 200.51 328.64 201.11 328.39 201.7 328 202.15 327.69 202.44 327.44

203.94	326	204.75	325.33	205.76	324.66	207.12	324	207.57	
323.78 207.9	323.65	209.66	322.99	210.39	322	211.31	320.42	211.48	
320 211.76	318.94	212.01	318	212.28	316.86	212.47	316	212.56	
315.56 212.88	314	213.08	312.93	213.13	312.65	213.18	312.38	213.25	
312 231.31	312.59	231.8	312.68	234.12	313.1	239.04	314	239.96	
315.3 240.47	316	240.86	316.54	241.46	317.38	241.92	318	243.26	
319.75 243.45	320	243.58	320.17	245.04	322	245.52	322.46	246.49	
323.24 247.55	324	248.56	324.72	249.47	325.32	250.5	326	251.08	
251.88	326.91	252.88	327.53	253.62	328	254.86	328.78	256.81	
257.02	330.13	257.52	330.44	259.27	331.67	259.76	332	263.82	
264.57	332.49	265.21	332.53	265.61	332.56	270.08	333.03	270.29	
272.8	333.32	273.94	333.43	274.94	333.49	307.07	333.53	308.37	
320.33	334	324.19	334.49	327.75	336	328.78	336.56	331.41	
332.95 342 16	338.85	335	340	337.92	341.63	338.57	342	339.03	
347.36	344	349.55	344.09	351.48	344.18	367.08	344.83	382.17	
385.33	345.8	388.81	346	400.98	346.51	410.17	346.87	422.67	
427.2	347.55								
Manning's Sta	n Value n Val	s Sta	num= n Val	5 Sta	n Val	Sta	n Val	Sta	n
Val 0	.025	194	.05	213.13	.15	240.86	.05	274.94	
Bank Sta:	Left	Right	Lenqths	: Left (Channel	Right	Coeff	Contr.	
Expan.	194 2	274.94	-	356.37	364.33	373.23		.1	
. 3									
Ineffecti Sta L	ve Flow Sta R	num= Elev	2 Permane F	ent					
274.94	427.2		F						
CROSS SEC	TION								
DIVED. N.	arado Cl	-							
REACH: Up	per	h	RS: 478	8.6733					
INPUT									
Descripti	on:								

Station E	levation Elev	Data Sta	num= Elev	121 Sta	Elev	942	Flev	Sta
Flev	DTC.A	oca	BICV	Dea	21. Ç V	0¢a	DICV	DLA
0	358 87	47 84	358	56 98	357 46	60 13	356	61 62
355 3	330.07	17.01	550	30.90	337140	00.13	550	01.05
64.42	354	66.28	353.13	68.72	352	71.24	350.83	73.01
350								
74.53	349.29	77.3	348	80.4	346.56	81.59	346	85.16
344.34								
85.88	344	89.95	342.1	90.17	342	91.96	341.17	94.31
340.07								
94.46	340	98.02	339.83	137.21	338	163.74	336.71	177.67
336		÷						
178.99	335.16	180.08	334.5	180.89	334	181.42	333.66	183.94
332								
184.56	331.59	186.93	330	188.11	329.21	189.91	328	191.49
326.94	206	101 66	224 2	105 05	204			
192.88	326	194.66	324.8	195.86	324	198.23	322.43	198.88
322	201 24	0.03 0.0	200	202 62	210 00	004 00	23.0	005 14
199.88	321.34	201.93	320	203.63	318.89	204.98	318	205.14
317.89	376	200 73	31E E4	211 05	71	212 70	212 05	214 00
208.01	310	208.71	315.54	211.05	314	212-18	312.85	214.08
312 - 215 Q	210 0	216 92	210 10	01771	210	217 7	200 66	220 20
308	510.0	210.02	210.10	/	210	a. 1. 1 . 1	309.00	<i>~~</i> 0.29
200	307 28	226.2	307 12	227 04	307	233 99	305	2/2 27
305.4	507.20	220.2	507.12	227.0H	507	223.22	500	443.31
249.15	305.07	255.69	304.67	267.57	304	301.99	305.35	303.99
305.99			00100		501	001100	505.55	
304.03	306	310.1	307.95	310.25	308	310.65	308.13	316.08
310								
320.93	311.79	321.52	312	322	312.18	326.14	314	327.11
314.44								
330.44	316	332.55	316.94	334.84	318	339.33	319.69	340.14
320								
341.39	320.46	345.91	322	347.4	322.49	352.62	324	354.42
324.52								
359.24	326	366.15	327	369.19	327.2	376.25	327.85	377.77
328								
382.49	328.17	384.27	328.22	392.42	328.5	399.62	328.75	403.49
328.85								
409.64	329.05	414.47	329.2	441.62	330	448.33	330.93	451.03
332								
453.44	333.04	455.81	334	459.99	335.81	460.42	336	460.73
336.13	~~~ ~~		~ ~ ~ ~					
461.17	336.32	465.65	338	475.52	338.29	482.26	338.46	483.8
338.5	220 66	400 F0	220 60	101 50	220 56			
489.43	338.66	490.59	338.69	494.76	338.76	499.49	338.91	518.63
227.2 577 01	220 15	EAA O	220 71	E10 1	220 72	E40 00	220 74	ECE 10
770 00 741.2T	332.43	0.±±.0	11,72,11	0+±0•⊥	333.13	340.04	337./4	202.10
555.99 566 16	340							
JUU. 10	540							
Manning's	n Values	3	num=	5				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta

Val

n

.05 216.82 .15 303.99 .05 376.25 0 .025 177.67 .025 Coeff Contr. Bank Sta: Left Lengths: Left Channel Right Right Expan. 177.67 376.25 263.01 282.17 291.3 .1 .3 Ineffective Flow 2 num= Sta R Elev Permanent Sta L 0 177.67 F F 376.25 566.16 CROSS SECTION RIVER: Avarado Ck RS: 196.5054 **REACH:** Upper INPUT Description: Station Elevation Data num= 148Elev Sta Elev Sta Elev Sta Elev Sta Sta Elev 22.8 358.47 0 361.57 13.89 360.66 20.01 360 23.36 358.18 357.81 27.45 356 29.87 354.71 31.2 23.7 358 24.06 354 32.34 353.39 34.95 352 38.53 350.09 38.7 350 39.78 349.42 42.66 347.9 46.29 346 46.47 345.9 50.12 42.46 348 344 343.92 53.95 342 54.07 341.94 57.78 340 57.83 50.28 339.97 66.12 59.41 339.15 61.6 338 61.71 337.94 65.43 336 335.64 333.02 332.9 96.79 67.23 335.06 69.26 334 87.67 91.15 332.76 332.7 99.06 104.37 332.57 115.16 332.6 118.43 332.53 122.53 332.56 136.91 332.82 142.54 332.88 332.7 154.09 124.74 332.63 133.39 332 331.51 158.27 330.4 158.91 330 159.16 329.85 162.09 156.48 328 163.72 326.97 165.2 326 167.64 324.39 168.23 324 169.1 323.42 320 176.62 318.69 177.61 171.23 172.95 320.84 174.2 322 318.16 177.95 183.93 316.11 184.28 316 187.09 315.12 190.19 318 314.14 196.98 312 198.77 311.43 203.32 190.63 191.07 313.86 314 310 307.75 216.44 208.74 308.29 209.66 308 210.45 306 219.05 305.56 219.58 305.47 228.46 304 249.87 302.01 249.97 302 311.64 303.39 304 317.39 304.38 328.22 306 335.63 313.2 303.68 314.95 307.21

308 344.52 309.88 344.74 310 344.93 310.1 348.49 340.86 312 314 352.38 314.07 356 348.58 312.05 350.53 313.08 352.25 316 318 361.34 318.87 362.11 319.28 363.45 358.18 317.16 359.75 320 364.29 320.52 364.86 320.89 366.56 322 368.37 323.18 369.63 324 328 379.79 326 374.73 327.33 375.76 371.52 325.24 372.69 328.4 380.58 328.42 382.12 328.46 385.05 328.55 410.07 329.71 415.78 330 416.23 331.48 416.39 332 416.84 333.51 416.99 334 417.09 334.32 336 418.15 337.87 418.19 338 418.68 339.69 418.77 417.59 340 342 419.78 343.3 420.01 344 430.88 419.27 341.68 419.36 344.29 346 463.87 346.83 487.74 348 544.46 435.08 344.7 448.65 347.54 346 564.14 346.5 559.66 346.24 562.4 548.06 347.24 556.42 345.65 569.42 344.57 572.14 342 584.36 344 575.15 343.33 581.2 341.28 588.47 340.35 590.08 340 592.51 339.4 num= 5 Manning's n Values Sta nVal Sta n Val Sta n Sta n Val Sta n Val Val 0.025 .025 313.2 .05 487.74 20.01 .05 219.05 .15 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 225.51 190.7 180.22 142.54 379.79 .1 .3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R 0 142.54 \mathbf{F} 379.79 592.51 ਸ਼ਾ CROSS SECTION RIVER: Avarado Ck RS: 5.802783 REACH: Upper INPUT Description: u/s face of Alvarado Road Crossing 201 Station Elevation Data num= Sta Elev Sta Elev Sta Sta Elev Elev Sta Elev 16.02 1.15 342.36 1.9 342.17 2.32 342 0 342.76 340.49 19.05 340 30.76 338.79 31.07 338.72 17.61 340.36 32.63 338.54

33.27 338.16	338.48	33.96	338.41	34.71	338.32	35.54	338.21	35.96
37.07 334.46	338	49.83	336.52	51.17	336.24	52.37	336	62.46
64.12	334	73.81	332.59	74.03	332.53	74.89	332.4	75.32
332.34 75.75	332.27	76.17	332.21	76.58	332.15	76.8	332.12	77.56
332 94.75	330.52	97.74	330	108.92	328.71	110.44	328.16	110.95
328.1	328	118,11	327.48	118.61	327.36	122.35	326.97	124.09
326.81				****				100 00
125.85 325.84	326.6	127.73	326.42	129.89	326.17	131.16	326	132.29
133.38 322	325.59	137.89	324.62	140.44	324	148.67	322.76	151.57
162.45	320.52	165.25	320.16	165.98	320	167.04	319.84	168.34
177.69	318.66	181.47	318.39	186.04	318	204.84	317.28	212.3
221.66	316.46	224.29	316.4	228.7	316	233.63	315.37	240.31
314.71 243.05	314.4	244.97	314.27	248.46	314	253.32	313.64	254.46
313.58	212 24		212 11	267 01	212 02	270 54	212 76	272 62
312.7	JLJ.24	203.32	313.11	207.01	314.74	270.5 4	312.70	212.03
276.97 310	312.4	281.46	312	281.91	311.9	282.48	311.5	284.62
285.74	308.06	285.78	308	285.82	307.93	286.93	306	287.26
287.51	305.02	288.09	304	288.89	302.65	289.29	302	289.61
290.56	300	291.66	298.35	291.91	298	292.07	297.77	292.1
297.73	. 296	307.28	296.23	308.28	297.51	308.67	298	308.89
298.27 310.28	300	310.44	300.2	311.76	301.84	311.89	302	312
302.14	204	212 60	205 49	212 04	306	214 24	207 2	21/ 62
308	304	313.00	305.49	313.24	300	274.24	307.3	514.03
314.97 312	309.13	315.16	309.75	315.22	310	315.5	310.49	316.4
317.97	313.13	319.19	314	321.45	315.61	322	316	322.37
324.82	318	327.16	319.66	327.65	320	328.35	320.5	330.47
322 332.04	323.11	333.3	324	334.77	325.04	336.12	326	337.6
327.04 338.91	328	341.25	329.73	341.63	330	343.48	331.42	344.25
332	222 7	216 91	224	o/o oo	225 46	740 54	226	251 25
336.25	334.1	240.04	224	740.03	JJJ.40	542.54	000	
353.83 338	336.45	362	337.3	368.9	337.75	369.76	337.82	372.93
375.05 338.5	338.07	375.57	338.11	376.42	338.18	380.73	338.42	382

385.92 338.73 396.28 340 396.64 340.53 397.6 342 397.91 342.49 398.85 344 399.12 344.41 415.3 346 473.91 347.62 476.83 347.27 477.02 347.19 477.22 347.12 477.4 347.08 477.7 347.13 478.68 346.94 482.66 346.63 484.13 346.55 484.71 346.49 490.41 346 493.45 345,96 506.78 345.79 507.71 345.76 507.76 345.75 508.59 345.73 516.71 345.61 517.78 345.58 521.56 345.52 522.54 345.49 523.29 345.47 523.71 345.45 524.12 345.44 524.46 345.43 524.83 345.42 524.95 345.41 525.61 345.39 526.52 345.35 526.91 345.34 527.41 345.32 528.95 345.27 529.36 345.25 535.06 345.09 539.77 344.87 542.14 344.81 543.79 344.77 555.55 344.13 555.77 344.12 555.89 344.11 556.15 344.1 557.82 344 574.08 342.79 579.5 342.38 num= Manning's n Values 4 Sta n Val Sta n Val Sta n Val n Val Sta .05 292.07 .15 310.44 .05 415.3 0 .025 Lengths: Left Channel Right Coeff Contr. Bank Sta: Left Right Expan. 1.15 362 8.78 5.8 0 .1 .3 SUMMARY OF MANNING'S N VALUES River:Avarado Ck

Reach	River Sta.	n1	n2	n3	n4 .
n5					
Upper .025	3975.018	.025	.018	.045	.018
Upper .025	3918.558	.025	.018	.045	.018
Upper .025	3881.736	.025	.018	.045	.018
Upper .025	3870.768	.025	.018	.045	.018
Upper .025	3690.298	.025	.018	.045	.018
Upper .025	3362.059	.025	.018	.045	.018
Upper .025	3046.513	.025	.018	.045	.018
Upper .025	2808.985	.018	.018	.15	.018
Upper	2292.941	.04	.15	.018	.25

Upper Upper	1897.670 1432.619	.045 .045	.15 .04	.018 .15	.025 .045
Upper .025	1126.981	.025	.045	.15	.045
Upper .025	893.1187	.05	.025	.15	.05
Upper .025	843.0025	.025	.05	.15	.05
Upper	478.6733	.025	.05	.15	.05
Upper 025	196.5054	.025	.05	.15	.05
Upper	5.802783	.05	.15	.05	.025

SUMMARY OF REACH LENGTHS

River: Avarado Ck

Reach	River Sta.	Left	Channel	Right
Upper	3975.018	56.06	56.46	57.46
Upper	3918.558	36.89	36.82	36.86
Upper	3881,736	11.11	10.97	10.38
Upper	3870.768	179.97	180.47	180.91
Upper	3690,298	344.53	328.24	316.06
Upper	3362.059	323.3	315.55	308.79
Upper	3046.513	240.61	237.53	235.74
Upper	2808.985	519.53	516.04	514.95
Upper	2292.941	410.33	395.27	385.35
Upper	1897.670	469.57	465.05	461.75
Upper	1432.619	293.25	305.64	317.13
Upper	1126.981	215.16	233.86	259.36
Upper	893.1187	49.65	50.12	51.56
Upper	843.0025	356.37	364.33	373.23
Upper	478.6733	263.01	282.17	291.3
Upper	196.5054	225.51	190.7	180.22
Upper	5.802783	8.78	5.8	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: Avarado Ck

Reach	River Sta.	Contr.	Expan.
Upper	3975.018	.1	. 3
Upper	3918.558	.1	.3
Upper	3881.736	.1	.3
Upper	3870.768	.1	.3
Upper	3690.298	.1	.3
Upper	3362.059	.1	.3

Upper	3046.513	.1	.3
Upper	2808.985	.1	.3
Upper	2292.941	.1	.3
Upper	1897.670	.1	.3
Upper	1432.619	.1	.3
Upper	1126.981	.1	.3
Upper	893.1187	.1	.3
Upper	843.0025	.1	.3
Upper	478.6733	.1	.3
Upper	196.5054	.1	.3
Upper	5.802783	.1	.3

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Reach	lan: maint ou s River Sta	waun kivel. Avalaou	O UK REAUT. L	Min Ch El I	W.S. Elev	CritW.S.	E.G. Elev	E.G. Slope	Vel Chrif	Flow Area	Top Width	Froude # Chi
			(cfs)	(ft)	(¥)	(μ)	(tt)	(U/U)	(ft/s)	(t) (t)	(ft)	
Üpper	5.802783	Q100 = 3900	3900.00	296.00	337.00	307.02	337.01	0.000020	0.76	5135.41	313.42	0.03
Upper	5.802783	Q50=3400	3400.00	296.00	308.85	306.24	311.01	0.030015	11.82	287.75	29.60	0.67
Upper	5.802783	Q35=3000	3000.00	296.00	308.06	305.53	310.05	0.030023	11.34	264.65	28.90	0.66
Upper	5.802783	Q10=2100	2100.00	296.00	306.06	303.79	307.63	0.030014	10.05	208.96	27.07	0.64
Upper	5.802783	Q7=2000	2000.00	296.00	305.82	303.57	307.34	0.030020	9.89	202.32	26.81	0.63
Upper	5.802783	Q5=1700	1700.00	296.00	305.04	302.90	306.40	0.030036	9.35	181.78	25.98	0.62
Upper	5.802783	02=1000	1000.00	296.00	302.91	301.05	303.84	0.030013	77.7	128.72	23.68	0.59
Upper	196,5054	Q100=3900	3900.00	302.00	337.01		337.01	0.000013	0.63	6157.76	354.39	0.02
Upper	196.5054	Q50=3400	3400.00	302.00	312.05		312.19	0.002038	3.04	1117.07	151.76	0.20
Upper	196.5054	Q35=3000	3000.00	302.00	311.19		311.33	0.002344	3.04	987.92	147.42	0.21
Upper	196.5054	Q10=2100	2100.00	302.00	309.13		309.27	0.003536	3.02	695.11	136.97	0.24
Upper	196.5054	Q7=2000	2000.00	302.00	308.89		309.03	0.003742	3.02	662.56	135.74	0.24
Upper	196.5054	Q5=1700	1700.00	302.00	308.16		308.30	0.004518	3.01	565.02	132.02	0.26
Upper.	196.5054	Q2=1000	1000.00	302.00	306.37		306.50	0.007662	2.92	342.70	115.27	0.30
Upper	478.6733	Q100 = 3900	3900.00	304.00	337.01		337.02	0.000028	0.84	4619.83	305.39	0.03
Upper	478.6733	Q50=3400	3400.00	304.00	312.87		313.20	0.006654	4.65	730.83	110.81	0.32
Upper	478.6733	Q35=3000	3000.00	304.00	312.14		312.47	0.007481	4.60	651.54	108.04	0.33
Upper	478.6733	Q10=2100	2100.00	304.00	310.56		310.85	0.009415	4.33	485.52	101.33	0.35
Upper	478.6733	Q7=2000	2000.00	304.00	310.39		310.67	0.009579	4.27	468.51	100.62	0.35
Upper	478.6733	Q5=1700	1700.00	304.00	309.89		310.15	0.009859	4.06	419.15	98.48	0.35
Upper	478.6733	Q2=1000	1000.00	304.00	308.71		308.88	0.009250	3.27	305.95	93.16	0.32
Upper	843.0025	Q100 = 3900	3900.00	312.00	336.92		337.10	0.000866	3.37	1158.29	241.59	0.16
Upper	843.0025	Q50=3400	3400.00	312.00	320.52	320.52	323.99	0.081603	14.96	227.24	32.60	1.00
Upper	843.0025	Q35=3000	3000.00	312.00	319.89	319.89	323.15	0.084785	14.48	207.13	31.86	1.00
Upper	843.0025	Q10=2100	2100.00	312.00	318.40	318.40	321.05	0.091964	13.06	160.84	30.33	1.00
Upper	843.0025	Q7=2000	2000.00	312.00	318.22	318.22	320.80	0.093236	12.88	155.27	30.14	1.00
Upper	843.0025	Q5=1700	1700.00	312.00	317.65	317.65	320.00	0.097055	12.29	138.38	29.57	1.00
Upper	843.0025	Q2=1000	1000.00	312.00	316.17	316.17	317.87	. 0.108524	10.47	95.50	28.16	1.00
Upper	893.1187	Q100 = 3900	3900.00	314.00	336.99	******	337.14	0.000581	3.02	1289.80	265.42	0.14
Upper	893.1187	Q50=3400	3400.00	314.00	324.65	322.19	326.24	0.024628	10.12	335.85	43.34	0.64
Upper	893.1187		3000.00	314.00	323.97	321.62	325.45	0.025292	9.77	307.18	41.29	0.63
Upper	893.1187	Q10=2100	2100.00	314.00	322.27	320.25	323.46	0.026641	8.73	240.54	37.35	0.61
	893.1187	Q7=2000	2000.00	314.00	322.07	320.08	323.21	0.026725	8.58	233.00	36.96	0.60
Upper	893.1187	Q5=1700	1700.00	314.00	321.43	319.56	322.45	0.026985	8.11	209.74	36.06	0.59
Upper	893.1187	Q2=1000	1000.00	314.00	319.72	318.20	320.41	0.027428	6.67	149.91	33.81	0.56

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HEC-RAS PI	an: maint 30 s	wath River: Avaradi	o Ck Reach: U	pper (Continued	()							
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chrl	Flow Area	Top Width	Froude # Chi
			(cfs)	(tt)	(ft)	(tt)	(tt)	(ft/ft)	(t/s)	(sq ft)	(ft)	
Upper	1126.981	Q100 = 3900	3900.00	318.00	337.19		337.31	0.001007	2.79	1399.19	334.62	0.13
Upper	1126.981		3400.00	318.00	329.33		329.76	0.009617	5.26	646.24	87.09	0.34
Upper	1126.981	Q35=3000	3000.00	318.00	328.67		329.07	0.009956	5.08	590.50	83.70	0.34
Upper	1126.981	Q10=2100	2100.00	318.00	327.01		327.33	0.010899	4.58	458.32	75.02	0.33
Upper	1126.981	Q7=2000	2000.00	318.00	326.80		327.12	0.011018	4.51	442.97	73.94	0.33
Upper	1126.981	Q5=1700	1700.00	318.00	326.15		326.44	0.011378	4.29	396.02	70.56	0.32
Upper	1126.981	Q2=1000	1000.00	318.00	324.37		324.57	0.012189	3.59	278.28	61.24	0.30
Upper	1432.619	Q100=3900	3900.00	324.00	337.35		337.60	0.000666	4.01	972.02	180.49	0.24
Upper	1432.619	Q50=3400	3400.00	324.00	331.08		332.34	0.006210	9.01	377.23	75.46	0.71
Upper	1432.619	Q35=3000	3000.00	324.00	330.55		331.77	0.006599	8.88	337.92	73.03	0.73
Upper	1432.619	Q10=2100	2100.00	324.00	329.26	328.64	330.38	0.007873	8.48	247.77	67.20	0.78
Upper	1432.619	Q7=2000	2000.00	324.00	329.11	328.52	330.21	0.008069	8.42	237.55	66.51	0.79
Upper	1432.619	Q5=1700	1700.00	324.00	328.65	328.18	329.69	0.008689	8.21	207.17	64.40	0.81
Upper	1432.619	02=1000	1000.00	324.00	327.45	327.25	328.32	0.011108	7.49	133.46	59.00	0.88
					-							
Upper	1897.670	Q100 = 3900	3900.00	328.00	336.94		338.79	0.006459	10.91	357.61	365.03	0.75
Upper	1897.670	Q50=3400	3400.00	328.00	335.10	335.10	337.72	0.011795	13.01	261.43	255.62	1.00
Upper	1897.670	Q35=3000	3000.00	328.00	334.63	334.63	337.09	0.011872	12.56	238.76	171.28	1.00
Upper	1897.670	Q10=2100	2100.00	328.00	333.44	333.44	335.49	0.012404	11.49	182.81	44.91	1.00
Upper	1897.670	07=2000	2000.00	328.00	333.30	333.30	335.29	0.012396	11.32	176.65	44.41	1.00
Upper	1897.670	Q5=1700	1700.00	328.00	332.88	332.85	334.67	0.012239	10.74	158.35	42.94	0.99
Upper	1897.670	02=1000	1000.00	328.00	331.99		333.04	0.009117	8.24	121.43	39.81	0.83
Upper	2292.941	Q100 = 3900	3900.00	328.00	339.01		341.06	0.004870	11.49	339.56	263.64	0.69
Upper	2292.941	Q50=3400	3400.00	328.00	338.71		340.38	0.004095	10.37	327.95	245.92	0.63
Upper	2292.941	Q35=3000	3000.00	328.00	338.18		339.66	0.003862	9.77	307.07	243.21	0.61
Upper	2292.941	010=2100	2100.00	328.00	336.80		337.85	0.003287	8.25	254.54	241.92	0.56
Upper	2292.941	07=2000	2000.00	328.00	336.62		337.63	0.003228	8.07	247.82	241.75	0.55
Upper	2292.941	<u>05=1700</u>	1700.00	328.00	336.04		336.91	0.003055	7.51	226.32	237.57	0.53
Upper	2292.941	02=1000	1000.00	328.00	334.30		334.87	0.002673	6.07	164.80	20.66	0.49
					u statete							
Upper	2808.985	Q100= 3900	3900.00	332.00	341.20	340.88	343.97	0.005606	13.35	292.11	75.11	0.93
Upper	2808,985	Q50=3400	3400.00	332.00	340.59	340.30	343.15	0.005841	12.85	264.68	59.13	0.93
Upper	2808.985	035=3000	3000,00	332.00	340.01	339.81	342.46	0.006327	12.56	238.80	44.57	0.95
Upper	2808,985	010=2100	2100.00	332.00	338.48	338.45	340.71	0.007875	11.98	175.25	38.69	0.99
Upper	2808.985	Q7=2000	2000.00	332.00	338.29	338.27	340.49	0.008119	11.91	167.94	37.93	1.00
Upper	2808.985	05=1700	1700.00	332.00	337.76	337.76	339.80	0.008584	11.46	148.30	36.20	1.00
Upper	2808.985	Q2=1000	1000.00	332.00	336.38	336.38	337.91	0.010045	9.93	100.71	32.98	1.00
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| 78 0.001862 10.69 97 0.001850 10.21 29 0.001814 9.76 25 0.001620 8.53 26 0.001591 8.53 27 0.001521 7.86 28 0.001522 7.86 29 0.001322 6.33 20 0.003426 13.80 21 0.003323 12.72 26 0.003523 11.50
 | 0.001862 10.69 0.001850 10.21 0.001814 9.76 0.001620 8.53 0.001521 7.86 0.001322 7.86 0.001322 7.36 0.001322 1.360 0.003326 13.23 0.003376 13.23 0.003523 12.72 0.003524 13.23 0.003523 11.50 0.003560 11.50 | 62 10.69 50 10.21 14 9.76 20 8.53 91 8.53 22 7.86 22 6.33 26 13.20 76 13.23 76 13.23 23 12.72 50 11.50 50 11.50 51 11.60 | 10.69
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	oude # Chl		0.53	0.54	0.54	0.50	0.49	0.49	0.46		0.42	0.45	0.49	0.63	0.63	0.00	
	Top Width FI	(t)	278.70	177.04	134.72	37.94	37.58	36.44	33.41		298.86	226.40	139.89	£1 07	ER OF	10.00	00 00
	Flow Area	(sq ft)	433.23	390.46	353.46	276.12	267.41	240.41	170.66		589.83	515.94	450.92	278.47	262.24	12:202	
	Vel Chnl	(fi/s)	9.00	8.71	8.49	7.61	7.48	20.7	5.86		6.61	6.59	6.65	7 54	7 82	1.0.1	
	E.G. Slope	(ft/ft)	0.000914	0.000982	0.001003	0.000891	0.000885	0.000867	0.000812		0.000506	0.000601	0.000732	0.001380	0.001287	2702000	1-3:00.0
and the second s	E.G. Elev	(ft)	354.14	353.18	352.35	350.25	349.99	349.17	346.92		354.23	353.27	352.45	350 31	350.06	940.00	0-1-0-0
A REAL PROPERTY AND ADDRESS OF A DESCRIPTION OF A DESCRIP	Crit W.S.	(t)															
	W.S. Elev	(f)	352.88	352.00	351.24	349.35	349.12	348.39	346.39		353.55	352.60	351.76	240 43	34046	01-040	
	Min Ch El	(t)	340.00	340.00	340.00	340.00	340.00	340.00	340.00	2	340.39	340.39	340.39	340.30	00.010	00.040	2000
	Q Total	(cfs)	3900.00	3400.00	3000.00	2100.00	2000.00	1700-00	1000.001		3900.00	3400.00	3000 00	2100.00	00000	2000.00	00.001
	Profile		2100 = 3900	250=3400	335=3000	010=2100	37=2000	05=1700	32=1000	2.2.4	0100 = 3900	350=3400	335=3000	040-0400	22200	27-2000	
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	Reach		Jpper	Jpper	Joner	Inter	loper	Inner	Inner	2222	finer	Joner	lonar		upher 	uppei	Buy










HEC-RAS Version 4.0.0 March 2008 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

Х	х	XXXXXX	XX	XXXX		XX	XX	XX		XXXX
х	Х	х	х	Х		Х	Х	х	Х	x
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XXXX	XXX	XXXX	х		XXX	XX	XX	XXX	XXX	XXXX
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Х	Х	Х	х	Х		Х	Х	х	х	x
Х	Х	XXXXXX	XX	XX		Х	Х	Х	х	XXXXX

PROJECT DATA Project Title: Alvarado Upper (Map 63&64) Project File : Alvarado6364.prj Run Date and Time: 8/3/2010 2:04:36 PM

Project in English units

Project Description: City Stormwater Maintenance (First Year) Alvarado Canyon Creek (Upper) Helix Map Number 63 & 64 October 17, 2009 J-15541A

PLAN DATA

Plan Title: Maintained (Swath)
Plan File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.p06

Geometry Title: Maintained 30' Swath Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g06

Flow Title : FEMAQ and WSE Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Plan Description: Geometry is from TIN Flow Data is from DRAFT FIS (no date at this time)

Plan Summary Information: Number of: Cross Sections = 17 Multiple Openings = 0 Culverts = 0 Inline Structures = 0

Bridges Lateral Structures = 0 0 ----Computational Information Water surface calculation tolerance = 0.01 Critical depth calculation tolerance = 0.01 = 20 Maximum number of iterations = 0.3 Maximum difference tolerance 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: Subcritical Flow

FLOW DATA

Flow Title: FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Flow Data (cfs)

River Q35=3000	Reach Q10=2100	RS Q7=2000	Q100 = 3900 Q5=1700	Q50=3400 2330
Avarado Ck 3000 800	Upper 2100	3975.018 2000	3900 1700	3400 2330
River Avarado Ck	Reach Upper	RS 3975.018	Q2=1000 1000	555 555
Boundary Condit	ions			
River Downstream	Reach	Profile		Upstream
Avarado Ck Known WS = 337	Upper	Q100 = 3900		
Avarado Ck	Upper	Q50=3400		
Normal $S = 0.03$ Avarado Ck Normal $S = 0.03$	Upper	Q35=3000		
Avarado Ck	Upper	Q10=2100		
Avarado Ck	Upper	Q7=2000		
Avarado Ck Normal S = 0.03	Upper	Q5=1700		

GEOMETRY DATA

Geometry Title: Maintained 30' Swath Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g06

CROSS SECTION

.025

RIVER: Avarado Ck REACH: Upper RS: 3975.018

INPUT						·			
Descriptio	on:	1							
Station E	levation	Data	num=	77					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	350.66	54.55	352	168.06	352.55	169.75	352.62	174.25	
352.81									
186.4	353.2	196.62	353.69	203.07	354	216.59	354.69	229	
355.32									
244.96	356	313.71	355.2	321.79	354.85	340	354	340.76	
353.95					•				
340.92	353.94	341.22	353.92	350.36	353.29	359.4	352.68	368.34	
352									
368.63	351.95	369.6	351.82	377.54	350.68	379.23	350.46	382.41	
350									
385.23	348.13	385.42	348	385.58	347.89	388.06	346	389.7	
344.66									
390.46	344	390.99	343.53	392.73	342	394.26	340.86	394.64	
340.91									
395.4	340.47	397	340.44	400.41	340.39	403.98	340.64	414.41	
341.66									
415.6	341.75	416.29	341.81	416.76	341.84	417.94	342	418.25	
342.52									
419.07	343.94	419.1	344	419.12	344.02	420.38	346	420.56	
346.28									
421.71	348	422.75	348.06	431.94	348.64	454.83	350	478.38	
350.41			~ ~ ~ ~ ~ ~						
499.51	351.3	503.88	351.51	504.44	351.53	504.87	351.54	505.16	
351.55							254		
515.48	352	567.91	353.08	587.99	353.98	588.51	354	588.66	
354.05			~	~~~ ~~		COD 15	055 45	<i>c</i> oo o	
595.5	356	600.77	357.01	602.99	357.43	603.15	357.45	603.3	
357.48						~ ~ ~ ~ ~ ~		600 <i>C</i> 1	
605.48	358	609.26	358.92	613.68	360	616.49	360.83	620.64	
362		<i></i>	2.54						
623.06	362.78	626.85	364						
Manager in a set -	w	~		r ·					
manning's	n vaiue	с+0 С+0	บนแเ≕	5 C+ 5		0+ -		et a	~
val Val	u val	bld	n val	old	ii vai	old	II VCLL	old	11
va. A	025	244 96	018	297	02	418 25	018	454 83	
v	. 025	∴	.0.10	166	2	-270.23	.010	202.00	

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

56.06 377.54 454.83 56.46 57.46 .1 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 377.54 0 F 454.83 626.85 F 3 Blocked Obstructions num= Elev Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R 71.99 365 152.37 365 224.1 297.99 365 n 97.43 CROSS SECTION RIVER: Avarado Ck RS: 3918.558 REACH: Upper INPUT Description: FEMA Section R Station Elevation Data num= 66 Elev Sta Elev Sta Elev Sta Elev Sta Sta Elev 0 350.89 45.61 352 179.04 353.17 180.56 353.23 193.04 353.58 197.76 353.78 203.01 354 230.15 355.16 237.25 355.42 250.67 356 352.75 355.68 314.27 354.58 324.48 354 341.01 350.82 294.4 352 352.57 350.58 353.44 350 354.29 349.11 355.36 348 357.25 346.02 345.94 359.19 344 359.68 343.53 361.3 357.27 346 357.33 342 363.62 340 365.91340.1096 388.28 341.18 388.59 341.63 361.7 342 389.11 343.38 389.34 344 389.62 344.72 390.14 389.03 343.17 346 391 347.66 391.19 348 392.09 349.49 392.37 390.5 346.84 350 351.32 393.96 350.46 398.11 351.25 399.59 400.7 351.38 402.6 351.24 350 526.18 351.95 526.68 403.71 350.39 438.19 351.29 432.41 351.96 526.98 351.97 527.72 352 599.34 353.8 606.95 354 614.22 355.8 615.03 356 615.89 356.21 620.14 357.22 623.29 358 630.16 359.69 638.7 640.01 362.42 642.45 631.4 360 634.28 360.79 362 363.24 644.88 364 Manning's n Values 5 num= Sta n Val Sta n Val Sta n Val Sta Sta n Val n Val .025 341.01 .018 399.59 .018 365.91 .02 388.28 0 .025 Lengths: Left Channel Right Coeff Contr. Right Bank Sta: Left Expan.

36.89 36.82 36.86 .1 350.82 399.59 .3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R 0 350.82 F F 399.59 644.88 3 Blocked Obstructions num= Sta R Elev Sta L Elev StaR Elev StaL Sta R Sta L 365 212.28 335.49 365 109.3 165.48 0 54.03 365 CROSS SECTION RIVER: Avarado Ck RS: 3881.736 **REACH: Upper** INPUT Description: 79 Station Elevation Data num= Elev Elev Sta Elev Sta Elev Sta Sta Sta Elev 12.92 351.31 10.29 351.15 40.92 6.07 350.87 0 350.48 352 206.08 353.91 206.69 353.92 210.21 354 222.24 199 353.76 354.44 356 271.86 355.88 296.8 251.37 355.63 258.69 233.9 354.94 354 352 330.64 350.21 330.92 350 331.62 309.56 353.29 328.41 349.42 346 336.53 344.91 337.43 335.46 348 334.54 346.94 333.32 344 339.49 341.91 341.37 340 339.15 342.25 339.4 342 342.76340.0032 363.78 342 363.88 363.11 340.05 363.14 340.12 363.24 340.37 342.31 365.75 347.47 365.95 364.68 344.67 365.18 346 364.44 344 348 350.5 367.69 352 385.02 350 366.98 366.76 366.13 348.45 351.97 351 410.61 404.62 351.04 406.3 401.73 351.1 389.85 351.73 350.92 350.62 423.52 350.58 428.95 415.48 350.84 419.61 350.67 421.56 350.5 507.58 351.01 517.23 436.77 350.38 437.79 350.35 443.09 350 351.31 352 589.11 523.05 351.5 531.06 351.78 532.85 351.84 538.19 353.29 616.1 354.06 623.91 356 627.56 615.46 353.99 615.84 354 356.9 360 640.33 358 632.22 358.05 632.33 358.08 639.85 632.01 360.14 362.43 653.47 364 645.87 361.67 647.07 362 648.51 num= 5 Manning's n Values Sta Sta n Val Sta n Val n Val Sta n Val Sta Val

5 of 29

n

.025 328.41 .018 342.76 .02 363.11 .018 367.69 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 328.41 367.69 11.11 10.97 10.38 .1 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 328.41 F F 367.69 653.47 3 Blocked Obstructions num= Sta R Sta R Elev Sta L Sta R Elev Elev Sta L Sta L 365 118.74 175.55 195.2 297.51 365 365 Ö 40.99 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 3870.768 INPUT Description: 93 Station Elevation Data num= Elev Elev Sta Elev Sta Elev Sta Sta Sta Elev 352 176.77 353.23 181.76 353.33 186.43 0 351.72 .69 353.41 354 197.1 353.65 213.03 234.28 354.85 240.42 355.16 245.89 355.43 246.64 355.46 267.28 354 272.64 353.82 272.67 353.819 275.67 353.67 305.95 352 306.57 351.54 308.04 350.43 308.6 350 309.85 349.05 348 311.77 347.59 313.71 346 315.77 344.21 316.02 311.24 344 316.21 343.83 318.18 342 318.6 341.6 320.17 340 321.64 340.147 338.64 341.841 340.04 341.98 340.05 342 340.07 342.06 340.77 344341.44 345.88 341.48 345.99 341.49 346.01 342.6 348 343.42 349.05 350 346.01 351.74 346.27 352 348.08 351.23 349.08 344.21 351.56 350.42 351.36 354.74 351.7 355.64 351.67 359.27 351.55 363.01 351.43 364.73 351.37 366.08 351.33 368.29 351.2 389.9 350.16 397.33 350.39 404.15 350.27 404.59 350.26 412.11 350.12 418.82 350 420.14 349.98 426.27 349.9 433.22 349.8 434.21 349.82 453.99 350 481.77 350.11 497.7 350.62 501.02 350.74 511.44 351.09 518.78 351.31 530.89 351.71 538.75 352 551.73 352.35 558.84 352.54 576.49 353.03 589.82 353.37

608.45 353.74 611.81 353.89 614.18 354 614.26 354.01 614.32 354.03 356 626.05 357.06 629.47 615.95 354.47 620.3 355.57 621.91 358 360 637.98 360.31 644.01 631.85 358.62 636.85 362 644.38 362.1 644.9 362.25 649.64 363.57 651.05 364 5 num= Manning's n Values n Val Sta Sta n Val Sta n Val Sta n Sta n Val Val .018 .025 305.95 318.6 .02 338.64 .018 346.01 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 305.95 346.01 179.97 180.47 180.91 .1 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 305.95 F 346.01 651.05 \mathbf{F} Blocked Obstructions num= 2 Sta L Sta R Elev Sta L Sta R Elev 0 9.75 365 121.57 277.04 365 CROSS SECTION RIVER: Avarado Ck RS: 3690.298 REACH: Upper INPUT Description: 90 Station Elevation Data num= Sta Sta Elev Sta Elev Elev Sta Elev Sta Elev 0 345.71 3.53 345.75 5.97 345.77 20.93 345.96 23.5 346 30.97 347.56 32.17 348 35.83 349.75 36.38 350 73.85 351.06 76.35 351.12 80.39 351.24 93.24 352 167.58 351.52 180.07 350.99 206.6 347.92 203.46 350 206.33 348.11 206.49 348 209.4 346 342 215.47 344 214.44 342.39 214.98 211.3 344.63 212.19 341.65 340 218,52 339,47 220,56 338 223.92338.0069 235.27 217.78 338.03 236 7 339.26 237.56 340 239.68 341.82 239.89 235.44 338.18 342 241.12 343.04 242.24 344 270.01 345.07 310.29 344.45 322.56 344.28 326.36 344.1 330.94 344 375.39 344.17 382.11 344.34 386.03 344.44 387.03 344.43 390.42 344.44 396.81 344.59 400.84 344.63 407.01 344.7

416.13 344.88 438.84 345.18 448.8 345.3 450.55 345.31 465.65 345.48 468.22 345.49 472.87 345.52 491.47 346 494.34 346.07 495.53 346.1 515.92 346.57 530.49 346.92 540.57 347.15 545.75 347.26 566.83 347.78 569.21 347.84 575.67 348 583.79 348.3 588.52 348.49 592.91 348.66 596.44 348.8 613.02 349.46 615.24 349.55 616.85 349.62 626.37 350 644.26 350.81 661.23 351.6 669.77 352 744.72 353.34 757.4 354 758.19 354.3 762.72 356 765.36 356.97 768.25 358 770.91 358.93 774.03 360 777.36 361.13 779.9 362 783.91 363.32 785.95 364 Manning's n Values num= 5 Sta n Val Sta n Val Sta Sta n Val n Sta n Val Val 0 .025 203.46 .018 223.92 .02 235.27 .018 242.24 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 203.46 242.24 344.53 328.24 316.06 .1 .3 num= 2 Ineffective Flow Sta L Sta R Elev Permanent F 0 203.46 242.24 785.95 F Blocked Obstructions num= 2 Sta L Sta R Elev Sta L Sta R Elev 275 321.35 360 57.06 198.78 360 CROSS SECTION RIVER: Avarado Ck RS: 3362.059 REACH: Upper INPUT Description: Station Elevation Data num= 187 Sta Elev Sta Elev Sta Sta Elev Sta Elev Elev 25.61 0 446.54 446 24.19 444.7 20.91 10.14 446.29 444 30.85 441.42 33.27 440.27 33.66 29.68 442 27.19 443.21 440.07 38.67 437.63 42.05 33.81 37.91 438 440 36.64 438.61 436 45.38 434.4 46.24 434 48.24 43.46 435.33 42.49 435.79 433.04 50.46 432 51.07 431.71 52.21 431.18 54.08 430.27 54.64 430

57.03	428.84	58.76	428	59.55	427.62	60.36	427.22	62.58
426 64.09	425.13	66.11	424	68.65	422.51	69.49	422	70.86
421.16 72.75	420	73.27	419.67	74.6	418.83	75.91	418	78.23
416.53 79.06	416	80.3	415.22	82.22	414	83.08	413.46	85.03
412.22	410.07	00.0	430	05 50	413 07	00.00	410	00 63
85.27 408.68	412.07	00.00	412	00.00	411.0/	00.04	410	90.03
91.7 404	408	92.99	407.18	94.86	406	97.97	404.03	98.02
101.08 400	402.03	101.11	402.01	101.13	402	101.2	401.96	104.22
105.29 394.05	399.3	107.26	398	109.04	396.82	110.28	396	113.2
113.28	394	113.32	393.98	113.51	393.85	115.98	392.19	116.26
117.51	391.16	119.23	390	119.73	389.67	122.21	388	123.85
125.08	386	127.54	384.11	127.67	384	130	382.21	130.28
131.19	381.3	132.89	380	133.44	379.58	135.54	378	135.6
377.96 136.13	377.56	138	376.16	138.21	376	140.41	374.38	140.92
142.28	373	143.63	372	146.21	370.09	146.35	370	146.39
149.39	368	167.44	367.39	173.88	367.1	183.82	366.76	190.8
197.44	366	198.93	364.92	200.18	364	202.56	362.3	202.97
203.33	361.74	205.83	360	208.02	358.47	208.7	358	211.37
211.57	356	213.46	354.69	214.45	354	215.2	353.47	217.32
352 218.52	351.16	220.19	350	221.67	348.86	222.79	348	223.55
347.15 224.57	346	226.32	344.03	226.34	344	226.44	343.89	228.12
342 229.22	340.76	229.89	340	230.44	339.38	231.72	338	232.63
337.01 233.63	336	233.78	335.91	236.2	334.56	237.12	334	252.9
334.87 253.61	335.49	254.18	336	255.55	337.21	256.43	338	257.85
339.26 258.68	340	266.68	340.85	274.32	341.65	277.87	342	284.94
342.14 302.27	342.45	306.07	342.51	309.61	342.52	431,19	344	758.76
344.35 768.31	344.6	797.19	345.41	821.62	346	830	346.31	831.03
346.34 833.5	346.43	847.74	346.96	856.58	347.25	879.57	348	880.41
348.03 880.72	348.04	881.24	348.07	901.94	348.95	906.43	349.16	921.76
349.83								

923.27 349.9 925.42 350 942.25 350.68 949.16 350.95 960.33 351.4 963.86 351.55 965.66 351.58 967.08 351.64 969.78 351.75 971.07 351.79 352 1038.39 353.93 1038.73 354 1041.06 354.92 1043.88 984.45 356 358 1050.91 358.78 1053.99 360 1059.87 1045.68 356.71 1048.94 361.95 1059.99 361.99 1060.03 362 Manning's n Values num= 5 Sta n Val .025 228.12 .018 233.78 .02 253.61 .018 274.32 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 323.3 315.55 308.79 222.79 274.32 .1 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent F 0 222.79 274.32 1060.03 F Blocked Obstructions num= 1 Sta L Sta R Elev 350.42 649.42 360 CROSS SECTION RIVER: Avarado Ck RS: 3046.513 REACH: Upper INPUT Description: Station Elevation Data num= 182 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 441.38 1.65 440.18 1.89 440 2.26 439.73 4.62 438 7.36 436 8.5 435.16 10.09 434 10.57 6.7 436.48 433.65 13.42 431.56 15.56 17.26 428.76 18.29 12.82 432 430 428 20.08 426.69 21.03 426 21.34 425.77 23.76 424 24.83 423.22 30.54 419.04 422 27.68 421.13 29.23 420 31.97 26.5 418 36.66 414.57 33.39 416.96 37.43 414 38.34 34.7 416 413.34 41.97 410.69 42.9 410 44.71 408.84 46.04 40.17 412 408 51.46 404.66 52.53 47.74 406.95 49.28 406 40455.65 402.08 55.78 402 56.21 401.73 58.56 400.29 59.03 400 61.34 398.58

62.29	398	62.38	397.94	63.73	397.12	65.44	396.06	65.55
396 66	395.72	68,81	394	69.5	393.58	72.08	392	73.03
391.42 75.35	390	76.54	389.27	78.62	388	80.04	387.13	81.89
386 84.06	384.67	85.16	384	86.41	383.24	88.44	382	90.48
380.76 91.72	380	93.93	378.65	95	378	97.38	376.55	98.28
376 100.9	374.4	101.56	374	102.26	373.57	104.84	372	105.98
371.3 108.12	370	110.66	368.46	111.41	368	114.45	366.15	114.7
366 117.91	364.04	117.98	364	118.05	363.96	121.2	362	121.22
361.99 121.34	361.9	123.3	360.47	123.95	360	124.33	359.72	126.69
358 128.6	356.62	129.44	356	131.8	354.28	132.19	354	132.86
353.52 134.94	352	136.83	350.63	137.7	350	139.3	348.84	140.46
348	346.71	143.23	346	144.6	345.01	146	344	146.37
343.73	342	150.97	340.41	151.55	340	152.21	339.52	154.32
338 156.46	336.46	157.1	336	157.84	335.47	158.82	334.77	159.88
161.68	333.02	163.38	332	181.72	332.23	181.93	332.42	182.16
183.79	334	185.96	335.84	186.15	336	187.92	337.5	188.51
189.01	338.46	190.75	340	196.48	341.99	196.52	342	219.42
228.12	343.15	232.61	343.32	245.18	343.4	249.52	343.53	252.86
255.39	343.7	264.28	343.83	281.18	343.76	295.78	343.7	309.77
324.93 345 21	343.72	342.77	343.67	618.57	343.93	628.31	344	669.36
680.15	345.54	689.98	345.88	691.38	345.92	692.91	345.96	693.63
747.86	347.89	748.45	347.91	748.79	347.92	749.9	348	772.09
776.41	348.74	784.94	349.02	798.19	349.5	802.2	349.65	805.77
812.25	350	818.51	350.2	839.73	350.56	858.41	350.94	883.51
888.56	351.65	890.61	351.69	899.49	351.84	903.12	352	908.37
909.21 355.8	353.73	910.24	354	914.52	355.26	915.46	355.54	916.35
917.05 360	356	917.51	356.13	924	358	926.64	358.81	930.52
934.83	361.33	937.02	362					
Manning's	n Value	25	num=	5				

Manning's n Values

Sta n Val Sta n Val Sta n Val Sta n Val 0 .025 148.77 .018 161.68 .025 182.16 .018 196.48 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. .1 136.83 196.48 240.61 237.53 235.74 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 136.83 F 196.48 937.02 F Blocked Obstructions num= 1 Sta L Sta R Elev 232.03 534.15 360 CROSS SECTION RIVER: Avarado Ck RS: 2808.985 REACH: Upper INPUT Description: FEMA Section Q Station Elevation Data num= 166 Elev Sta Elev Sta Elev Sta Sta Sta Elev Elev 0 433.56 .91 432.99 2.45 432 4.61 430.58 5.49 430 8.37 428.05 8.45 428 8.51 427.96 11.2 426 13.39 424.38 424 14.4 423.62 13.9 16.57 422 18.29 420.7 19.22 420 22.65 417.37 20.43 419.08 21.83 418 24.42 416 26.9 414.09 27.01 414 27.25 413.82 29.6 412 30.93 410.98 32.19 410 34.27 408.4 34.79 408 35.27 407.62 37.38 406 39.74 404.46 40.46 40442.6 402.78 43.95 402 45.26 401.25 47.44 400 49.89 398.6 50.93 398 53.08 396.77 54.41 396 57.9 394 57.93 393.98 61.39 392 64.13 390.43 64.88 390 65.68 389.54 68.37 388 71.48 386.21 71.86 386 72.47 385.65 75.35 384 76.94 383.09 78.84 382 82 380.19 82.32 380 84.45 378.78 85.81 378 88.27 376.59 89.29 376 91.35 374.82 92.78 374 94.32 373.11 96.26 372 98.55 370.68 99.74 370 102.85 368.21 103.21 368 103.47 367.85 106.69 366 107.94 365.28 110.16 364

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111.9	363	113.64	362	115.55	360.9	117.11	360	118.88	
358.56	358	120.51	357.16	121.79	356	123.11	354.82	124.02	
354	550		JJ / · L (101.77					
125.82	352.38	126.24	352	128.08	350.35	128.47	350	129.47	
349.1	348	120 19	346 66	132 92	346	133 50	345.47	135,15	
344	240	132.12	540.00	136.36	940	100.02	343.47	200.20	
136.86	342.47	137.39	342	139.59	340.03	139.62	340.01	139.63	
340	220 00	141 07	220	140 15	226 06	1// 11		146 18	
334.16	333.33	141.01	530	143.10	330.00	T.T.T. • T.T	550	140.10	
146.36	334	147.63	332.88	147.74	332.78	148.61	332	171.18	
333.693		100 01	224	194 00	224 07	196 0	225	377 05	
173.54	333.8/	1/3./1	334	1/4.92	334,97	1/6.2	336	1//.05	
178.63	338	180.37	338.6	183.91	340	204.05	340.84	220.8	
341.48						~~~ ~~~		~~~ ~~	
223.19 341 81	341.56	224.98	341.61	226.38	341.66	230.53	341.78	231.59	
232.58	341.84	238.45	341.95	241.64	342	345.14	342.1	353.05	
342.11									
364.5	342.13	374.22	342.15	375.34	342.14	387.76	342.16	397.36	
404.24	342.18	408.46	342.19	416.48	342.2	428.16	342.22	443.31	
342.24									
485.66	342.33	497.31	342.35	503.12	342.36	507.71	342.39	507.93	
342.4 509.37	342.41	511.1	342.42	513.15	342.44	514.72	342.45	640.38	
344									
743.14	344.08	752.59	345.12	756.86	346	759.82	346.64	766.1	
348 804.74	349,19	830.08	350	903.05	350.24	905.01	350.63	907.37	
351.1									
912.05	352	913.64	352.7	916.54	354	920.63	355.78	921.16	
356	356 29	926 64	358	931 N3	359 58	932 27	360	935 2	
361	220.22	20.01	550	JJ1.0J	555.50	552.27		20010	
938.12	362								
Manningle			21100-	c.					
Sta	n Val	Sta	n Val	5 Sta	n Val	Sta	n Val	Sta	n
Val									
0025	.018	137.39	.018	147.63	.035	171.18	.018	183.91	
.025									
Bank Sta:	Left	Right	Lengths	: Left (Channel	Right	Coeff	Contr.	
Expan.		~~ ~1		-10 - 50		F14 0F		-	
.3	29.47 1	.83.91		519.53	516.04	514.95		• 1	
Ineffectiv	ve Flow	num=	2						
Sta L	Sta R	Elev	Permane	nt					
0 182 91	129 47 938 12		ਸ ਸ						
Blocked Ol	ostructi	ons	num=	2					
Sta L	Sta R	Elev	Sta L	Sta R	Elev				
531	680.76	360	427.1	487.82	360				

CROSS SECTION

RIVER: Avarado Ck RS: 2292.941 **REACH:** Upper INPUT Description: 168 Station Elevation Data num= Sta Elev Sta Elev Elev Sta Elev Sta Sta Elev 5.92 416.53 5.21 0 420 1.71 419.13 3.22 418 416 412 12.33 8.8 413.86 11.29 7.92 414.52 8.61 414411.23 19.32 16.15 408.37 407.3 13.97 410 16.65 408 17.59 406 26.35 23.78 402.66 402 20.39 405.2 21.99 404 24.66 400.73 32.59 400 27.67 399.73 29.95 398 30.97 397.22 27.31 396 392 37.86 394 37.41 392.22 37.68 34.76 394.35 35.22 391.83 42.17 388 43.31 386.99 44.42 389.37 39.92 390 40.63 386 47.84 382.95 48.91 382 50.93 46.66 384 384.73 45.85 380.2 378 55.09 376.48 55.62 53.39 380 51.41 379.76 51.15 376 60.08 372.02 60.09 372 60.1 374 57.86 56.33 375.37 371.99 66.41 65.95 366.45 368 370 63.05 369.22 64.34 62.23 366 71.2 70.41 362 364 70.18 362.23 67.34 365.08 68.41 361.21 74.36 358 74.78 357.57 76.32 73.19 359.18 360 72.39 356 352 81.35 78.92 353.34 80.22 354.47 78.28 354 77.82 350.84 348 86 346.03 86.02 82.82 349.32 84.1 350 82.17 346 91.38 89.8 342 88.99 342.87 87.92 344 86.05 345.97 340.32 337.5 95.43 91.91 339.76 93.56 338 94.02 91.68 340 336 332 99.73 98.07 333.17 99.16 96.44 334.92 97.29 334 331.39 111.2 328.65 116.9 100.54 330.52 100.87 330.16 101.02 330 328 330 129.12 331.57 129.42 127.23 328.74 127.84 329.66 128.08 332 335.44 132.12 336 146.63 130.42 333.5 130.77 334 131.73 335.88 335.9 166.66 335.68 168.69 335.64 180.39 335.91 152.42 151.77 335.44

183.48 335.39 212.35 334.98 216.01 334.89 220.32 334.78 225.53 334.65 230.05 334.59 234.72 334.53 239.35 334.42 242.63 334.39 247.74 334.31 248.01 253.7 334.26 259.16 334.22 277.03 334 312.77 334.3 334.21 314.04 334.33 316.53 334.64 318.99 334.93 321.02 335.16 329.71 335.83 330.22 335.88 330.47 335.91 331.97 336 341.96 336.37 349.34 336.76 365.52 357.03 337.15 360.29 337.37 337.52 366.9 337.63 368 337.71 368.92 337.76 373.25 338 432.96 339.01 448.76 340 458.82 340.32 544.49 342.78 563.66 343.26 598.15 491.34 341.34 513.06 342 344 808.65 345.76 810.45 345.77 816.29 346 877.95 346.51 878.74 346.59 879.53 346.73 881.53 346.95 882.54 347.12 888.48 348 890.22 348.1 352 909.62 353.27 911.72 898.3 350 905.34 351.91 905.68 354 912.89 354.45 916.98 356 926.01 356.42 Manning's n Values num= 4 Sta n Val Sta n Val Sta n Val Sta n Val 0 .04 100.54 .035 127.23 .018 132.12 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 86 132.12 410.33 395.27 385.35 .1 .3 Ineffective Flow 2 num= Elev Permanent Sta L Sta R 0 86 F 132.12 926.01 F Blocked Obstructions num= 2 Sta L StaR Elev StaL Sta R Elev 433.05 515.24 360 336.6 413.18 360 CROSS SECTION RIVER: Avarado Ck RS: 1897.670 REACH: Upper INPUT Description: Station Elevation Data num= 153 Elev Elev Sta Sta Sta Elev Sta Elev Sta Elev 0 375.06 1.5 374 3.11 372.85 4.3 372 6.33 370.55 370 7.55 369.79 11.35 368 7.114.21 366.7 15.72 366 19.52 364.27 20.12 364 23.9 362.28 24.52 362 24.63 361.95

28.93	360	29.87	359.58	33.36	358	34.75	357.36	37.56
356. 40	354.7	41.43	354	43.95	352.66	45.28	352	47.88
350.61 49.11	350	51.79	348.58	52.94	348	55.68	346.54	56.76
346 59.56	344.51	60.58	344	62.09	343.25	64.64	342	68.83
341.05 73.08	340	94.71	339.87	98.75	339.89	102.49	340	113.39
341.51 114.24	342	122.4	342.23	124.88	342.26	127.41	342.78	129.99
343.2	343.51	137.82	344	138.79	344.11	139.23	344.16	140.86
143.14	343.81	143.66	343.72	147.06	343.37	150.64	342	150.96
151.36	341.72	153.81	340.79	155.86	340	156.96	339.58	158.44
160.34	338.27	161.02	338	163.87	336.88	166.13	336	166.97
167.91 332	335.3	169.86	334.54	171.23	334	173.09	333.27	176.16
177.75 329.81	331.34	178.78	330.86	179.76	330.41	180.39	330	180.67
182.7 329.59	328.44	183.35	328	212.15	328.86	212.26	328.94	213.11
213.63 334	330	214.45	330.73	216	332	217.37	333.26	218.15
281.89 334.77	334.6	291.52	334.69	294.54	334.72	299.5	334.76	300.49
304.09 335.32	334.81	309.86	334.87	317.13	334.94	371.4	335.28	376.63
384.58 335.11	335.4	387.54	335.42	388.98	335.44	391.52	335.46	439.05
441.03 334.68	334.99	442.89	334.88	444.37	334.79	445.18	334./4	440.08
447.07	334.62	448.18	334.5/	450.14	334.59	403.4 529 48	334.42	534 66
338 E30 EE	338 AE	544 97	334.92	554 54	340	558 74	340.08	583.12
340.51 610 25	341.05	636.17	341.55	639.13	341.6	659.54	342	675.97
342.47 694.81	343.02	699,45	343.14	709.92	343.3	714.55	343.41	718.52
343.52 739.32	343.71	741.92	343.76	743.78	343.8	752.4	343.9	775.83
344 837.31	343.9	864.6	343.73	883.59	343.61	987.66	343.97	987.85
343.98 988.73	344	1030.28	344.84	1032.62	346	1038.87	346.92	1045.1
348 1051.6	349.55	1053.43	350	1059.26	351.34	1062.42	352	1072.59
353.99 1072.65	354	1072.82	354.01	1095.66	354.97			

Manning's n Values num=

4

Sta n Val Sta n Val n Val Sta n Val Sta 0 .045 180.67 .035 213.11 .018 218.15 .025 Lengths: Left Channel Right Coeff Contr. Right Bank Sta: Left Expan. 469.57 465.05 461.75 .1 137.82 218.15 .3 Ineffective Flow num= 2 Sta R Elev Permanent Sta L 0 137.82 F 218.15 1095.66 F Blocked Obstructions num≕ 3 Sta R Elev Sta R Elev Sta L Sta R Elev Sta L Sta L 360 847.78 907.86 360 360 769.36 808.01 660.68 695.1 CROSS SECTION RIVER: Avarado Ck RS: 1432.619 REACH: Upper INPUT Description: FEMA Section P 139 Station Elevation Data num= Elev Sta Elev Sta Sta Elev Sta Elev Sta Elev 354 19.72 353.99 46.71 19.02 354.02 19.48 354.9 0 353.33 54.53 353.16 58.29 353.24 49.15 353.27 50.37 353.3 47.47 353.05 352.47 88.84 84.62 352.32 75.27 64.75 352.82 66.86 352.74 352.09 353.09 111.15 90.76 352 108.71 353.03 109.25 352.11 89.18 353.31 115.4 353.04 118.93 114.65 353.12 353.2 114.07 353.17 113.74 352.69 351.78 128.86 351.68 135.28 352 127.94 125.83 119.69 352.62 351 348 149.89 138.97 350.46 141.76 348.86 147.4 350 145.19 347.02 192.1 344 187.92 343.35 344.7 165.1 152.5 346 159.12 343.25 209.15 200.39 342.79 208.12 342.27 194.8 343.13 197.63 342.97 342.22 215.83 338.79 216.76 340 342 214.19 340.09 214.28 212.11 338.07 337.39 230.4 337.22 246.26 338 217.04 337.98 225.83 216.85 336.41 259.92 334 265.29 251.6 336.16 253.84 336 258.54 334.45 332.22 329.93 277.9 270.74 330.42 271.98 330 272.18 265.97 332 328 287.35 324.99 290.43 327.55 281.05 326.93 283.79 326 279.21 324 326 336.25 326.02 336.71 326.31 339.1 336.19 325.98 336.23 327.83

339.37 328 339.66 328.18 342.52 330 343.53 330.64 345.66 332 348.32 333.69 348.77 334 364.84 335.75 366.23 335.9 368.11 336 384.32 336.44 393.3 336.84 402.63 337.16 406.41 337.3 419.79 338 439.23 339.05 457.12 340 473.52 340.89 493.94 342 513.92 342.98 346 534.12 556.37 344.92 582.7 622.44 344.01 622.46 344 344 628.46 342.15 628.97 342 629.54 341.87 633.24 341.02 639.24 340 655.27 338.24 656.06 338.14 656.43 641.39 339.67 645.57 338.93 338.11 656.69 338.09 656.9 338.07 659.82 338 689.49 338.31 696.6 338.63 704.11 339.04 709.79 339.33 722.31 340 762.36 340.92 766.54 341.55 342 778 343.4 780.44 343.81 781.79 766.8 341.57 769.87 344 783.64 344.39 791.78 346 794.24 346.85 797.54 348 802.12 349.59 803.3 350 808.59 351.78 809.21 352 819.76 352.52 825.72 352.81 829 352.97 832.85 353.14 833.66 353.18 851.54 354 Manning's n Values num= 5 Sta n Val .04 281.05 Ö .045 251.6 .035 336.25 .045 364.84 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. .1 251.6 364.84 293.25 305.64 317.13 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 251.6 ਸ਼ਾ F 364.84 851.54 CROSS SECTION RIVER: Avarado Ck RS: 1126.981 REACH: Upper INPUT Description: Approx. local of old drop strucure (no plans available) Station Elevation Data 110 num= Elev Elev Sta Elev Sta Elev Sta Sta Sta Elev 20.79 355.76 0 356.26 8.34 356.12 16.72 356 23.82 355.4 35.62 354 38.94 352.15 39.21 31.25 354.85 352 39.55 351.81

42.81	350	44.6	349	46.43	348	48.45	346.91	50.12	
51.14	345.45	53.88	344	57.63	343.59	60.05	343.52	78.32	
342.8 85.89	342.69	88.55	342.73	90.46	342.76	100.83	342.61	101.59	
342.6 102.59	342.57	102.9	342.56	110.1	342	122.34	341.33	143.92	
340.14 147.12	340	169.65	338.35	174.57	338	208.21	336.95	213.89	
336.81 222.42	336.48	228.13	336.37	235.7	336.08	236.85	336	251.45	
334.4 254.25	334	257.5	333.86	285.84	332.72	299.59	332.17	301.18	
332.11 303.96	332	309.39	331.74	347.23	330	348.92	329.85	349.54	
329.63 350.55	329.26	353.92	328	354.81	327.67	359.29	326	359.7	
325.84 364.66	324	364.81	323.94	369.64	322.14	370.02	322	372.75	
320.97 375.3	320	375.93	319.85	382.42	318	409.31	318.28	413.73	
320 415.29	320.61	415.76	320.79	418.86	322	422.58	323.46	423.98	
324 427.27	325.29	429.07	326	429.99	326.37	434.12	328	437.37	
329.29 439.16	330	442.8	331.45	444.28	332	460.94	332.52	465.33	
332.6 469.4	332.76	473.47	332.8	477.54	332.82	487.31	333.64	488.63	
333.63 489.21	333.72	489.91	333.8	491.62	334	493.37	334.43	497.2	
335.37 500.02	336	538.15	337.3	562.32	338	566.66	339.56	567.88	
340 570.08	340.79	571.45	341.28	573.44	342	575.51	342.74	579	
344 582.46	345.25	584.56	346	595.56	347.12	603.22	348	611.05	
348.43	348.78	640.14	350	650.33	350.28	659.89	350.55	664.79	
350.69		010011			000120		200,00	001012	
Manning's Sta Val	n Value n Val	es Sta	num= `n Val	5 Sta	n Val	Sta	n Val	Sta	. n
0.025	.025	347.23	.045	372.75	.15	415.29	.045	444.28	
Bank Sta:	Left	Right	Lengths	: Left	Channel	Right	Coeff	Contr.	
34	47.23	144.28		215.16	233.86	259.36		.1	
Ineffectiv Sta L 0 444.28	ve Flow Sta R 347.23 664.79	num= Elev	2 Permane F F	nt					
CROSS SEC	FION								

RIVER: Av REACH: Up	arado Ck per		RS: 893	.1187				
INPUT								
Descripti	.on: u/s	Entrance	into Pa	rking Lo	t from A	lvarado	Road	
Station E	levation	Data	num=	115				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev (0	341.07	.61	341.05	4.28	340.98	8.27	340.96	35.41
340.58 42.9	340.06	43.69	340	49.77	338.48	51.67	338	56.19
336.87 59.66	336	62.75	335.23	66.32	334.36	67.69	334	75.11
332.86	220	0/ 11	221 20	85 87	221 83	112 84	330.97	115.86
330.88	222	04.11	331.05			110.01	220.27	100.00
125.01 330.13	330.59	127.52	330.52	131.75	330.39	139	330.16	139.98
142.53	330.08	143.04	330.09	145.27	330	155.28	329.62	160.35
164.89	329.74	165.91	329.52	168.88	329.36	170.54	329.17	172.21
173.36	328.79	176.53	328.57	177.33	328.52	178.07	328.51	182.26
328.33 183.77	328.34	188.66	328.25	189.44	328.26	192.99	328.17	195.25
328.09 195.82	328	196.64	327.88	197.1	327.67	197.75	327.32	198.21
327.02	326.67	200.42	326	201.52	325.46	203.22	324.74	204.27
324.29	324	206 21	322.11	206.25	322	206.31	321.83	206.57
321.06	220	207 14	210 20	207 49	219	207 55	317 65	207.92
206.94 316	320	207.14	319.20	207.49	510	207.00	015 00	007.52
207.94 316	315.91	208.06	315.25	208.3	314	237.41	315.82	237.57
238.09 318.6	316.62	238.61	317.21	239.1	317.78	239.29	318	239.83
241.08	320	241.77	320.75	243.11	322	243.86	322.66	244.94
245.44	323.62	245.94	324	247.56	325.25	248.53	326	248.91
250.97	328	251.9	328.77	253.38	330	255.09	331.42	255.78
332 267.66	332.51	299.68	334	308.07	334.78	314.73	335.51	319.19
336 321.68	337.29	323.02	338	326.46	339.81	326.82	340	327.22
340.21 330.62	342	331.45	342.44	332.97	343.23	334.42	344	343.82
344.63 344.55	344.68	345.2	344.72	345.73	344.75	346.14	344.78	346.4
344.79 358.71	345.53	366.61	346	398.47	347.31	415.46	348	416.2
348.02								

Manning's n Values 5 num= Sta n Val .05 192.99 .025 207.94 237.57 .05 255.78 Ω .1 .025 Lengths: Left Channel Right Right Coeff Contr. Bank Sta: Left Expan. 164.89 255.78 49.65 50.12 51.56 .1 .3 Ineffective Flow 2 num= Sta L Sta R Elev Permanent 0 164.89 F 255.78 416.2 F CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 843.0025 INPUT Description: d/s Entrance into Parking Lot from Alvarado Road Station Elevation Data 156 num= Elev Sta Sta Elev Sta Elev Sta Sta Elev Elev 343.42 2.76 343.4 12.36 343.22 12.94 343.2 16.73 0 343.21 19.9 343.22 24.77 343.07 30.96 342.92 49.04 342.66 53.21 342.53 73.11 340.59 75.5 64.01 342.14 67.44 342 340 82.22 338.32 83.53 338 91.1 336.11 91.52 336 91.58 335.98 99.41 334 105.16 332.6 107.01 107.77 100.38 333.75 332.15 332 113.88 332.03 128.03 332.41 129.28 332.35 133.87 332.5 120.46 332.21 135.07 332.59 140.71 332.75 143.64 332.84 144.21 332.87 144.92 332.89 145.97 332.94 148.3 332.98 149.8 332.99 150.42 333 151.43 333.01 152.47 333.03 333.11 155.4 333.13 157.09 333.15 153.57 333.06 154.78 158.91 333.08 163.48 159.86 333.12 160.78 333.16 332.99 164.13 333.03 165.29 333.06 167.93 332.89 169.3 332.92 171.18 332.95 173.26 332.8 175.06 332.75 176.14 332.7 178.05 332.64 178.68 332.56 180.77 332.5 183.37 332 194 331.97 194.16 331.89 194.8 331.72 196.28 331.23 198.22 330 199.21 329.16 199.4 329.08 199.71 328.96 199.85 328.9 200.2 328.76 200.51 328.64 201.11 328.39 201.7 328 202.15 327.69 202.44 327.44

326 204.75 325.33 205.76 324.66 207.12 324 207.57 203.94 323.78 322 211.31 320.42 211.48 207.9 323.65 209.66 322.99 210.39 320 212.28 316.86 212.47 316 212.56 211.76 318.94 212.01 318 315.56 213.13 312.65 213.18 312.38 213.25 314 213.08 312.93 212.88 312 313.1 239.04 314 239.96 231.31 312.59 231.8 312.68 234.12 315.3 316 240.86 316.54 241.46 317.38 241.92 318 243.26 240.47 319.75 322 245.52 322.46 246.49 243.45 320 243.58 320.17 245.04 323.24 249.47 325.32 250.5 326 251.08 324 248.56 324.72 247.55 326.38 251.88 326.91 252.88 327.53 253.62 328 254.86 328.78 256.81 330 259.27 331.67 259.76 332 257.02 330.13 257.52 330.44 263.82 332.43 264.57 332.49 265.21 332.53 265.61 332.56 270.08 333.03 270.29 333.04 273.94 333.43 274.94 333.49 307.07 333.53 308.37 272.8 333.32 333.58 334.49 327.75 336 328.78 336.56 331.41 334 324.19 320.33 338 337.92 341.63 338.57 342 339.03 332.95 338.85 335 340 342.16 351.48 344.18 367.08 344.83 382.17 347.36 344 349.55 344.09 345.64 345.8 388.81 346 400.98 346.51 410.17 346.87 422.67 385.33 347.37 427.2 347.55 Manning's n Values num= 5 n Val Sta n Val Sta n Val Sta n Val Sta n Sta Val .05 213.13 .1 240.86 .05 274.94 .025 194 0 .025 Lengths: Left Channel Right Coeff Contr. Bank Sta: Left Right Expan. 356.37 364.33 373.23 194 274.94 .1 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 194 F 427.2 ਸ਼ 274.94 CROSS SECTION RIVER: Avarado Ck RS: 478.6733 REACH: Upper INPUT Description: FEMA Section O

Elev	<i></i>
FIGA	
0 358.87 47.84 358 56.98 357.46 60.13 356 61	.62
355.3 64.42 354 66.28 353.13 68.72 352 71.24 350.83 73	.01
350 71 F2 210 20 FE 2 240 00 4 246 FC 81 F9 246 85	16
74.53 349.29 77.3 348 80.4 346.56 81.59 346 65	. 10
344.34 85.88 344 89.95 342.1 90.17 342 91.96 341.17 94	.31
340.07 94.46 340 98.02 339.83 137.21 338 163.74 336.71 177	.67
336	~
178.99 335.16 180.08 334.5 180.89 334 181.42 333.66 183 332	.94
184.56 331.59 186.93 330 188.11 329.21 189.91 328 191	.49
326.94 192.88 326 194.66 324.8 195.86 324 198.23 322.43 198	.88
322 199.88 321.34 201.93 320 203.63 318.89 204.98 318 205	.14
317.89 208.01 316 208.71 315.54 211.05 314 212.78 312.85 214	.08
312 215.9 310.8 216.82 310.18 217.1 310 217.7 309.66 220	.29
308 307 207 207 207 207 207 207 207 207 207 2	27
225.13 307.28 226.2 307.12 227.04 307 233.99 306 243 305.4	. 57
249.15 305.07 255.69 304.67 267.57 304 301.99 305.35 303	.99
305.99 304.03 306 310.1 307.95 310.25 308 310.65 308.13 316	.08
310 320.93 311.79 321.52 312 322 312.18 326.14 314 327	.11
314.44	7 4
330.44 316 332.55 316.94 334.84 318 339.33 319.69 340 320	.14
341.39 320.46 345.91 322 347.4 322.49 352.62 324 354	.42
324.52 359.24 326 366.15 327 369.19 327.2 376.25 327.85 377	.77
328 382.49 328.17 384.27 328.22 392.42 328.5 399.62 328.75 403	.49
328.85	0.2
409.64 329.05 414.47 329.2 441.62 330 448.33 330.93 451332	.03
453.44 333.04 455.81 334 459.99 335.81 460.42 336 460	.73
461.17 336.32 465.65 338 475.52 338.29 482.26 338.46 48	3.8
338.5 489.23 338.66 490.59 338.69 494.76 338.76 499.49 338.91 518	.63
339.3 527 91 339.45 544.8 339.71 548.1 339.73 548.82 339.74 565	.18
339.99	
566.16 340	
Manning's n Values num= 5	
Sta n vai Sta n vai Sta n vai Sta n vai Val	old

n

.025 177.67 .05 216.82 .1 303.99 .05 376.25 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 177.67 376.25 263.01 282.17 291.3 .1 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 177.67 F 376.25 566.16 F CROSS SECTION RIVER: Avarado Ck RS: 196.5054 **REACH:** Upper INPUT Description: Station Elevation Data 148num= Sta Sta Elev Sta Elev Sta Elev Sta Elev Elev 0 361.57 13.89 360.66 20.01 360 22.8 358.47 23.36 358.18 23.7 358 24.06 357.81 27.45 356 29.87 354.71 31.2 354 32.34 353.39 34.95 352 38.53 350.09 38.7 350 39.78 349.42 42.46 42.66 347.9 348 46.29 346 46.47 345.9 50.12 344 50.28 343.92 53.95 342 54.07 341.94 57.78 340 57.83 339.97 59.41 339.15 61.6 338 61.71 337.94 65.43 336 66.12 335.64 67.23 335.06 69.26 334 87.67 333.02 91.15 332.9 96.79 332.76 99.06 122.53 332.7 104.37 332.57 115.16 332.6 118.43 332.53 332.56 124.74 332.63 133.39 332.7 136.91 332.82 142.54 332.88 154.09 332 156.48 331.51 158.27 330.4 158.91 330 159.16 329.85 162.09 328 326.97 165.2 326 167.64 324.39 168.23 163.72 324 169.1 323.42 172.95 320.84 174.2 171.23 322 320 176.62 318.69 177.61 318.16 177.95 183.93 318 316.11 184.28 316 187.09 315.12 190.19 314.14 190.63 191.07 313.86 196.98 198.77 311.43 203.32 314 312 310 208.74 308.29 209.66 308 210.45 307.75 216.44 306 219.05 305.56 219.58 305.47 228.46 304 249.87 302.01 249.97 302 311.64 303.39 313.2 303.68 314.95 304 317.39 304.38 328.22 306 335.63 307.21

310 344.93 310.1 348.49 340.86 308 344.52 309.88 344.74 312 348.58 312.05 350.53 313.08 352.25 314 352.38 314.07 356 316 318 361.34 318.87 362.11 319.28 363.45 358.18 317.16 359.75 320 364.29 320.52 364.86 320.89 366.56 322 368.37 323.18 369.63 324 371.52 325.24 372.69 326 374.73 327.33 375.76 328 379.79 328.4 380.58 328.42 382.12 328.46 385.05 328.55 410.07 329.71 415.78 330 416.23 331.48 416.39 332 416.84 333.51 416.99 334 417.09 334.32 417.59 336 418.15 337.87 418.19 338 418.68 339.69 418.77 340 419.27 341.68 419.36 342 419.78 343.3 420.01 344 430.88 344.29 346 463.87 346.83 487.74 344.7 448.65 348 544.46 435.08 347.54 548.06 347.24 556.42 346.5 559.66 346.24 562.4 346 564.14 345.65 581.2 569.42 344.57 572.14 344 575.15 343.33 342 584.36 341.28 588.47 340.35 590.08 340 592.51 339.4 Manning's n Values **r** . num= Sta n Val .025 0 20.01 .05 219.05 .1 313.2 .05 487.74 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 142.54 379.79 225.51 190.7 180.22 .1 .3 Ineffective Flow 2 num= Sta L Sta R Elev Permanent 0 142.54 F 379.79 592.51 F CROSS SECTION RIVER: Avarado Ck RS: 5.802783 REACH: Upper INPUT Description: u/s face of Alvarado Road Crossing Station Elevation Data num= 201 Elev Elev Sta Elev · Sta Sta Elev Sta Sta Elev 1.9 342.17 0 342.76 1.15 342.36 2.32 342 16.02 340.49 17.61 340.36 19.05 340 30.76 338.79 31.07 338.72 32.63 338.54

33.27 338.16	338.48	33.96	338.41	34.71	338.32	35.54	338.21	35.96
37.07	338	49.83	336.52	51.17	336.24	52.37	336	62.46
334.46 64.12	334	73.81	332.59	74.03	332.53	74.89	332.4	75.32
332.34 75.75	332.27	76.17	332.21	76.58	332.15	76.8	332.12	77.56
332 · 94 75	330 52	97 74	. 330	108 92	328.71	110.44	328,16	110.95
328.1	330.22	27.74		100.92	520.71			
111.98 326.81	328	118.11	327.48	118.61	327.36	122.35	326.97	124.09
125.85 325.84	326.6	127.73	326.42	129.89	326.17	131.16	326	132.29
133.38	325.59	137.89	324.62	140.44	324	148.67	322.76	151.57
162.45	320.52	165.25	320.16	165.98	320	167.04	319.84	168.34
177.69	318.66	181.47	318.39	186.04	318	204.84	317.28	212.3
221.66	316.46	224.29	316.4	228.7	316	233.63	315.37	240.31
314.71 243.05	314.4	244.97	314.27	248.46	314	253.32	313.64	254.46
313.58 261.21	313.24	263.52	313.11	267.01	312.92	270.54	312.76	272.63
312.7	210 /	291 46	210	291 91	311 9	282 48	211 5	284.62
310	J±2.*±	201.40	512				01110	
285.74 305.45	308.06	285.78	308	285.82	307.93	286.93	306	287.26
287.51	305.02	288.09	304	288.89	302.65	289.29	302	289.61
290.56	300	291.66	298.35	291.91	298	292.07	297.77	292.1
293.33	296	307.28	296.23	308.28	297.51	308.67	298	308.89
298.27 310.28	300	310.44	300.2	311.76	301.84	311.89	302	312
302.14	304	313.68	305.49	313.94	306	314.34	307.3	314.63
308	501				0.1.0		010 40	216.4
314.97 312	309.13	315.16	309.75	315.22	310	315.5	310,49	316.4
317.97	313.13	319.19	314	321.45	315.61	322	316	322.37
324.82	318	327.16	319.66	327.65	320	328.35	320.5	330.47
322 332.04	323.11	333.3	324	334.77	325.04	336.12	326	337.6
327.04 338.91	328	341.25	329.73	341.63	330	343.48	331.42	344.25
332	332.7	346.84	334	348.83	335.46	349.54	336	351.35
336.25			5 5 FT 5	268 0		360 76	227 60	272 02
353,83 338	330.45	362	5.725	308.9	331.15	307.10	221.02	512.23
375.05 338.5	338.07	375.57	338.11	376.42	338.18	380.73	338.42	382

385.92 338.73 396.28 340 396.64 340.53 397.6 342 397.91 342.49 398.85 344 399.12 344.41 415.3 346 473.91 347.62 476.83 347.27 477.02 347.19 477.22 347.12 477.4 347.08 477.7 347.13 478.68 346.94 482.66 346.63 484.13 346.55 484.71 346.49 490.41 346 493.45 345.96 506.78 345.79 507.71 345.76 507.76 345.75 508.59 345.73 516.71 345.61 522.54 345.49 523.29 345.47 523.71 517.78 345.58 521.56 345.52 345.45 524.12 345.44 524.46 345.43 524.83 345.42 524.95 345.41 525.61 345.39 526.52 345.35 526.91 345.34 527.41 345.32 528.95 345.27 529.36 345.25 535.06 345.09 539.77 344.87 542.14 344.81 543.79 344.77 555.55 344.13 555.77 344.12 555.89 344.11 556.15 344.1 557.82 344 574.08 342.79 579.5 342.38 Manning's n Values num= 4 Sta n Val Sta n Val Sta n Val Sta n Val .05 0 .05 292.07 .1 310.44 415.3 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.

Expan. 1.15 362 8.78 5.8 0 .1 .3

SUMMARY OF MANNING'S N VALUES

River:Avarado Ck

Reach	River Sta.	nl	n2	n3	n4
n5					
Upper .025	3975.018	.025	.018	.02	.018
Upper .025	3918.558	.025	.018	.02	.018
Upper .025	3881.736	.025	.018	.02	.018
Upper .025	3870.768	.025	.018	.02	.018
Upper .025	3690.298	.025	.018	.02	.018
Upper .025	3362.059	.025	.018	.02	.018
Upper .025	3046.513	.025	.018	.025	.018
Upper .025	2808.985	.018	.018	.035	.018
Upper	2292.941	.04	.035	.018	.025

Upper Upper 025	1897.670 1432.619	.045 .045	.035 .04	.018 .035	.025 .045
Upper .025	1126.981	.025	.045	.15	.045
Upper .025	893.1187	.05	.025	.1	.05
Upper .025	843.0025	.025	.05	.1	.05
Upper .025	478.6733	.025	.05	.1	.05
Upper .025	196.5054	.025	.05	.1	.05
Upper	5.802783	.05	.1	.05	.025

SUMMARY OF REACH LENGTHS

River: Avarado Ck

Reach	River Sta.	Left	Channel	Right
Upper	3975.018	56.06	56.46	57.46
Upper	3918.558	36.89	36.82	36.86
Upper	3881.736	11.11	10.97	10.38
Upper	3870.768	179.97	180.47	180.91
Upper	3690.298	344.53	328.24	316.06
Upper	3362.059	323.3	315.55	308.79
Upper	3046.513	240.61	237.53	235.74
Upper	2808.985	519.53	516.04	514.95
Upper	2292.941	410.33	395.27	385.35
Upper	1897.670	469.57	465.05	461.75
Upper	1432.619	293.25	305.64	317.13
Upper	1126.981	215.16	233.86	259.36
Upper	893.1187	49.65	50.12	51.56
Upper	843.0025	356.37	364.33	373.23
Upper	478.6733	263.01	282.17	291.3
Upper	196.5054	225.51	190.7	180.22
Upper	5.802783	8.78	5.8	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: Avarado Ck

Reach	River Sta.	Contr.	Expan.
Upper	3975.018	.1	.3
Upper	3918.558	.1	.3
Upper	3881.736	.1	.3
Upper	3870.768	.1	.3
Upper	3690.298	.1	.3
Upper	3362.059	.1	.3

Upper 843.0025 .1 .3 Upper 478.6733 .1 .3 Upper 196.5054 .1 .3 Upper 5.802783 .1 .3	Upper Upper Upper Upper Upper Upper	3046.513 2808.985 2292.941 1897.670 1432.619 1126.981	.1 .1 .1 .1 .1 .1	.3 .3 .3 .3 .3 .3
Upper 1126.981 .1 .3 Upper 893.1187 .1 .3 Upper 843.0025 .1 .3 Upper 478.6733 .1 .3 Upper 196.5054 .1 .3 Upper 5.802783 .1 .3	Upper	1432 619		3
Upper1126.981.1.3Upper893.1187.1.3Upper843.0025.1.3Upper478.6733.1.3Upper196.5054.1.3Upper5.802783.1.3	obber	1432.012	• -	• •
Upper893.1187.1.3Upper843.0025.1.3Upper478.6733.1.3Upper196.5054.1.3Upper5.802783.1.3	Upper	1126.981	.1	.3
Upper843.0025.1.3Upper478.6733.1.3Upper196.5054.1.3Upper5.802783.1.3	Upper	893.1187	.1	.3
Upper 478.6733 .1 .3 Upper 196.5054 .1 .3 Upper 5.802783 .1 .3	Upper	843.0025	.1	.3
Upper 196.5054 .1 .3 Upper 5.802783 .1 .3	Upper	478.6733	.1	.3
Upper 5.802783 .1 .3	Upper	196.5054	.1	.3
	Upper	5.802783	.1	.3

Reach	Birder Sta	mi sou invoi, rvai			MIS FLAN	SWE	E C. Elav	E C CLAD	Vial Chai	Elow Area	TAAWAHA	EXX.42 # CM
			(cfs)	E C	(i)	(ff)	(W)	(ft/ft)	(f)(s)	(soft)	(H)	
Upper	5.802783	Q100 = 3900	3900.00	296.00	337.00	307.02	337.01	0.000017	0.76	5135.41	313.42	0.03
Upper	5.802783	Q50=3400	3400.00	296.00	306.24	306.24	310.17	0.020395	15.90	213.77	27.22	1.00
Upper	5.802783	Q35=3000	3000.00	296.00	305.53	305.53	309.22	0.020156	15.42	194.57	26.49	1,00
Upper	5.802783	@10=2100	2100.00	296.00	303.79	303.79	306.83	0.019197	14.00	150.01	24.69	1.00
Upper	5.802783	Q7=2000	2000.00	296.00	303.57	303.57	306.54	0.019129	13.83	144.59	24.43	1.00
Upper	5.802783	Q5=1700	1700.00	296.00	302.90	302.90	305.61	0.018685	13.22	128.55	23.67	1.00
Upper	5.802783	02=1000	1000.00	296.00	301.05	301.05	303.10	0.017552	11.49	87.02	21.23	1.00
Upper	196.5054	Q100 = 3900	3900.00	302.00	337.00		337.01	0.00005	0.63	6157.42	354.39	0.02
Upper	196.5054	Q50=3400	3400.00	302.00	310.79		311.00	0.000862	3.66	929.57	145.40	0.25
Upper	196.5054	Q35=3000	3000.00	302.00	309.88		310.09	0.001044	3.75	799.06	140.80	0.28
Upper	196.5054	Q10=2100	2100.00	302.00	307.70		307.97	0.001967	4.16	504.66	128.22	0.37
Upper	196,5054	@7=2000	2000.00	302.00	307.44		307.72	0.002141	4.24	472.16	125.65	0.39
Upper	196.5054	Q5=1700	1700.00	302.00	306.67		306.98	0.002868	4.49	378.20	118.17	0.44
Upper	196,5054	Q2=1000	1000.00	302.00	304.89		305.35	0.007431	5.40	185.34	97.77	0.69
Upper	478,6733	Q100 = 3900	3900.00	304.00	337.00		337.01	0.00006	0.84	4618.85	305.27	0.03
Upper	478.6733	050=3400	3400.00	304.00	310.87		311.54	0.002847	6.57	517.19	102.63	0.52
Upper	478.6733	035=3000	3000.00	304.00	310.01		310.76	0.003866	6.96	430.88	99.03	0.59
Upper	478.6733	Q10=2100	2100.00	304.00	308.21		309.22	0.009068	8.09	259.52	90.91	0.84
Upper	478.6733	Q7=2000	2000.00	304.00	308.03	307.78	309.08	0.009991	8.20	243.88	90.12	0.88
Upper	478.6733	Q5=1700	1700.00	304.00	307.61	307.50	308.66	0.011894	8.25	206.07	86.09	0.94
Upper	478.6733	02=1000	1000.00	304.00	307.06		307.66	0.008726	6.24	160.17	80.66	0.78
Upper	843.0025	Q100 = 3900	3900.00	312.00	336.89		337.07	0.000238	3.37	1156.04	241.43	0.16
Upper	843.0025	Q50=3400	3400.00	312.00	320.52	320.52	323.99	0.013407	14.96	227.24	32.60	1.00
Upper	843.0025	Q35=3000	3000.00	312.00	319.89	319.89	323.15	0.013569	14.48	207.13	31.86	1.00
Upper	843.0025	Q10=2100	2100.00	312.00	318.40	318.40	321.05	0.013771	13.06	160.84	30.33	1.00
Upper	843.0025	Q7=2000	2000.00	312.00	318.22	318.22	320.80	0.013838	12.88	155.27	30.14	1.00
Upper	843.0025	Q5=1700	1700.00	312.00	317.65	317.65	320.00	0.014010	12.29	138.38	29.57	1.00
Upper	843.0025	02=1000	1000.00	312.00	316.17	316.17	317.87	0.014658	10.47	95.50	28.16	1.00
Upper	893.1187	Q100 = 3900	3900.00	314.00	336.94		337.09	0.000209	3.03	1285.04	265.11	0.14
Upper	893,1187	Q50=3400	3400.00	314.00	322.19	322.19	325.37	0.011940	14.32	237.39	37.18	1.00
Upper	893.1187	Q35=3000	3000.00	314.00	321.62	321.62	324.60	0.012144	13.85	216.66	36.33	1.00
Upper	893.1187	Q10=2100	2100.00	314.00	320.25	320.25	322.67	0.012655	12.50	168.06	34.46	1.00
Upper	893,1187	07=2000	2000.00	314.00	320.08	320.08	322.44	0.012797	12.34	162.10	34.24	1.00
Upper	893.1187	@5=1700	1700.00	314.00	319.56	319.56	321.71	0.013071	11.76	144.59	33.62	1.00
Upper	893.1187	02=1000	1000.00	314.00	318.20	318.20	319.75	0.014106	10.02	99.84	32.03	1.00

HEC-RAS Plan: maint30swath sed River: Avarado CK Reach: Upper

HEC-RAS Pli	an: maint30sw	ath sed River. Avar	ado Ck Reach	t: Upper (Continut	sd)						•	
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chni	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(f)	(ff)	(t)	(ft/ft)	(ft/s)	(sq ft)	(tt)	
Upper	1126.981	Q100 = 3900	3900.00	318.00	337.00		337.13	0.000137	2.82	1380.63	322.88	0.13
Upper	1126.981	Q50=3400	3400.00	318.00	326.01		327.22	0.004632	8.80	386.32	69.85	0.66
Upper	1126.981	@35=3000	3000.00	318.00	325.33		326.54	0.005141	8.82	339.98	66.31	0.69
Upper	1126.981	Q10=2100	2100.00	318.00	323.71		324.90	0.006746	8.79	238.99	57.78	0.76
Upper	1126.981	Q7=2000	2000.00	318.00	323.52		324.71	0.006949	8.76	228.43	56.80	0.77
Upper	1126.981	Q5=1700	1700.00	318.00	322.95		324.11	0.007678	8.65	196.61	53.79	0.80
Upper	1126.981	Q2=1000	1000.00	318.00	321.53		322.51	0.009593	7.95	125.77	46.40	0.85
			-									
Upper	1177.92*	Q100 = 3900	3900.00	319.00	337.00		337.14	0.000162	2.96	1319.24	270.45	0.14
Upper	1177.92*	Q50=3400	3400.00	319.00	325.96		327.67	0.007627	10.49	324.27	66.17	0.83
Upper	1177.92*	Q35=3000	3000.00	319.00	325.27	324.91	327.06	0.008995	10.71	280.06	62.72	0.89
Upper	1177.92*	Q10=2100	2100.00	319.00	323.86	323.86	325.63	0.012174	10.68	196.57	55.65	1.00
Upper	1177.92*	Q7=2000	2000.00	319.00	323.73	323.73	325.46	0.012299	10.56	189.40	55.00	1.00
Upper	1177.92*	Q5=1700	1700.00	319.00	323.34	323.34	324.93	0.012565	10.11	168.16	53.03	1.00
Upper	1177,92*	Q2=1000	1000.00	319.00	322.24	322.24	323.45	0.013657	8.83	113.31	46.83	1.00
Upper	1228.86*	Q100 = 3900	3900.00	320.00	337.00		337.15	0.000199	3.11	1252.57	254.72	0.16
Upper	1228.86*	Q50=3400	3400.00	320.00	326.24	326.24	328.44	0.011226	11.92	285.35	64.45	1.00
Upper	1228.86*	Q35=3000	3000.00	320.00	325.83	325.83	327.91	0.011461	11.55	259.75	62.51	1.00
Upper	1228.86*	Q10=2100	2100.00	320.00	324.82	324.82	326.55	0.012163	10.55	199.12	57.60	1.00
Upper	1228.86*	Q7=2000	2000.00	320.00	324.70	324.70	326.39	0.012291	10.42	191.92	56.99	1.00
Upper	1228.86*	Q5=1700	1700.00	320.00	324.31	324.31	325.86	0.012649	9.99	170.21	55.11	1.00
Upper	1228.86*	Q2=1000	1000.00	320.00	323.26	323.26	324.43	0.013828	8.70	114.98	49.17	1.00
Upper	1279.8*	Q100 = 3900	3900.00	321.00	337.00		337.17	0.000250	3.30	1180.35	223.04	0.17
Upper	1279.8*	Q50=3400	3400.00	321.00	327.15	327.15	329.33	0.011294	11.84	287.22	65.90	1.00
Upper	1279.8*	Q35=3000	3000.00	321,00	326.76	326.76	328.80	0.011538	11.47	261.60	64.04	1.00
Upper	1279.8*	Q10=2100	2100.00	321.00	325.77	325.77	327.47	0.012280	10.46	200.83	- 59.37	1.00
Upper	1279.8*	Q7=2000	2000.00	321.00	325.66	325.66	327.31	0.012334	10.31	194.03	58.83	1.00
Upper	1279.8*	Q5=1700	1700.00	321.00	325.29	325.29	326.79	0.012649	9.86	172.47	57.07	1.00
Upper	1279.8*	Q2=1000	1000.00	321.00	324.29	324.29	325.41	0.013800	8.48	117.86	52.36	1.00
		station and the state of the st										
Upper	1330.74*	Q100=3900	3900.00	322.00	337.00		337.19	0.000324	3.54	1102.56	209.88	0.19
Upper	1330,74*	Q50=3400	3400.00	322.00	328.07	328.07	330.22	0.011363	11.76	289.13	67.34	1.00
Upper	1330.74*	Q35=3000	3000.00	322.00	327.70	327.70	329.70	0.011521	11.36	264.20	65.61	1.00
Upper	1330.74*	Q10=2100	2100.00	322.00	326.72	326.72	328.39	0.012392	10.37	202.51	61.09	1.00
Upper	1330.74*	Q7=2000	2000.00	322.00	326.62	326.62	328.23	0.012369	10.20	196.12	60.60	1.00
Upper	1330.74*	Q5=1700	1700.00	322.00	326.26	326.26	327.73	0.012708	9.75	174.35	58.89	1.00
Upper	1330.74*	Q2=1000	1000.00	322.00	325.28	325.28	326.37	0.014032	8.40	119.02	54.39	1.00

N

HEC-KAS P	ran: maint30sw River Sta	ath sed Kiver: Ava	Tado UK Reach	: Upper (Conun Min Ch El	ueu) W.S.Elev II	GritWiS	E.G. Elev	E G. Slope	Vel Chri	Flow Area	Top Width	Froude # Chi
			(cfs)	(1)	(U)	(ft)	(ft)	(U/U)	(tt/s)	(t) (sq ft)	(¥)	
Upper	1381.67*	Q100 = 3900	3900.00	323.00	337.00		337.22	0.000411	3.74	1042.39	194.45	0.21
Upper	1381.67*	Q50=3400	3400.00	323.00	328.76	328.63	330.79	0.010510	11.43	297.37	61.69	0.96
Upper	1381.67*	Q35=3000	3000.000	323.00	328.41	328.25	330.27	0.010403	10.95	273.89	66.08	0.95
Upper	1381.67*	Q10=2100	2100.00	323.00	327.56	327.29	328.98	0.009842	9.59	219.04	62,17	0:90
Upper	1381.67*	Q7=2000	2000.00	323.00	327.44	327.17	328.82	0.009888	9.45	211.64	61.63	0.90
Upper	1381.67*	Q5=1700	1700.00	323.00	327.09	326.82	328.32	0.009802	8.93	190.32	60.03	0.88
Upper	1381.67*	Q2=1000	1000.00	323.00	326.13		326.98	0.009493	7.39	135.33	55.69	0.84
Upper	1432,619	Q100 = 3900	3900.00	323.28	337.01		337.25	0.000648	3.89	1003.50	163.83	0.23
Upper	1432.619	050=3400	3400.00	323.28	329.90		331.28	0.006670	9.40	361.59	70.11	0.73
Upper	1432.619	Q35=3000	3000.00	323.28	329.48		330.75	0.006524	9.02	332.51	68.20	0.72
Upper	1432.619	@10=2100	2100.00	323.28	328.42		329.41	0.006088	7.99	262.90	63.40	0.69
Upper	1432.619	@7=2000	2000.00	323.28	328.30		329.26	0.005996	7.84	255.18	62.85	0.69
Upper	1432.619	Q5=1700	1700.00	323.28	327.89		328.74	0.005787	7.40	229.87	60.99	0.67
Upper	1432,619	Q2=1000	1000.00	323.28	326.79		327.36	0.005094	6.05	165.22	55.99	0.62

Upper	1897.670	Q100 = 3900	3900.00	325.84	336.83		338.21	0.004092	9.41	414.66	364.26	0.60
Upper	1897.670	050=3400	3400.00	325.84	333.61	333.61	336.40	0.011851	13.42	253.42	45,51	1.00
Upper	1897.670	Q35=3000	3000.00	325.84	333.10	333.10	335.72	0.011884	13.01	230.64	43.68	1.00
Upper	1897.670	Q10=2100	2100.00	325.84	331.74	331.74	333.99	0.012392	12.02	174.65	38.90	1.00
Upper	1897.670	Q7=2000	2000.00	325.84	331.58	331.58	333.77	0.012423	11.88	168.36	38.31	1.00
Upper	1897.670	Q5=1700	1700.00	325.84	331.04	331.04	333.08	0.012713	11.46	148.40	36.45	1.00
Upper	1897.670	Q2=1000	1000.00	325.84	329.71	329.63	331.19	0.012742	9.75	102.57	32.44	0.97
Upper	2292.941	Q100 = 3900	3900.00	328.00	338.13		340.37	0.005747	12.01	324.75	243.16	0.73
Upper	2292.941	Q50=3400	3400.00	328.00	337.56		339.52	0.005360	11.23	302.81	242.63	0.70
Upper	2292.941	Q35=3000	3000.00	328.00	337.01		338.77	0.005138	10.63	282.11	242.12	0.68
Upper	2292.941	Q10=2100	2100.00	328.00	335.59		336.89	0.004604	9.14	229.70	191.21	0.64
Upper	2292.941	Q7=2000	2000.00	328.00	335.41		336.66	0.004549	8.97	223.01	177.46	0.63
Upper	2292.941	Q5=1700	1700.00	328.00	334.82		335.92	0.004358	8.40	202.36	134.12	0.61
Upper	2292.941	Q2=1000	1000.00	328.00	333.11		333.85	0.003992	6.88	145.34	32.04	0.57
Upper	2808.985	Q100 = 3900	3900.00	332.00	340.88	340.88	343.94	0.006594	14.05	277.66	66.44	1.00
Upper	2808.985	Q50=3400	3400.00	332.00	340.30	340.30	343.14	0.006866	13.51	251.67	51.84	1.00
Upper	2808.985	Q35=3000	3000.00	332.00	339.81	339.81	342.45	0.007094	13.05	229.90	43.58	1.00
Upper	2808.985	Q10=2100	2100.00	332.00	338.45	338.45	340.71	0.008020	12.06	174.19	38.58	1.00
Upper	2808.985	Q7=2000	2000.00	332.00	338.27	338.27	340.49	0.008227	11.96	167.20	37.85	1.00
Upper	2808,985	Q5=1700	1700.00	332.00	337.76	337.76	339.80	0.008584	11.46	148.30	36.20	1.00
Upper	2808.985	Q2=1000	1000.00	332.00	336.38	336.38	337.91	0.010045	9.93	100.71	32.98	1.00

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HEC-RAS PI	an: maint30sw	ath sed River, Avar	ado Ck Reach	1: Upper (Contin	ued)							
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chni	Flow Area	Top Width	Froude # Chi
			(cfs)	(t)	(ft)	(¥)	(t)	(fUft)	(ft/s)	(sq.ft)	(T)	
Upper	3046.513	0100 = 3900	3900.00	332.00	342.93		344.74	0.001567	10.79	361.45	74.75	0.70
Upper	3046.513	Q50=3400	3400.00	332.00	342.28		343.93	0.001552	10.31	329.71	55.85	0.69
Upper	3046.513	Q35=3000	3000.00	332.00	341.72		343.24	0.001523	9.90	303.17	46.55	0.68
Upper	3046.513	Q10=2100	2100.00	332.00	340.28		341.47	0.001356	8.73	240.67	40.42	0.63
Upper	3046.513	Q7=2000	2000.00	332.00	340.11		341.24	0.001329	8.56	233.53	39.65	0.62
Upper	3046.513	Q5=1700	1700.00	332.00	339.53		340.53	0.001271	8.05	211.07	38.01	0.60
Upper	3046.513	Q2=1000	1000.00	332.00	337.93		338.59	0.001087	6.51	153.53	34.00	0.54
A DESCRIPTION OF A DESC	A STATE AND A STAT											
Upper	3362.059	Q100 = 3900	3900.00	334.00	343.65	343.65	346.60	0.003426	13.80	282.63	123.76	1.00
Upper	3362.059	Q50=3400	3400.00	334.00	343.11	343.11	345.82	0.003476	13.23	257.07	123.28	1.00
Upper	3362.059	035=3000	3000.00	334.00	342.66	342.66	345.17	0.003523	12.72	235.87	93.25	1.00
Upper	3362.059	Q10=2100	2100.00	334.00	341.50	341.50	343.56	0.003720	11.50	182.56	44.34	1.00
Upper	3362.059	Q7=2000	2000.00	334.00	341.30	341.30	343.36	0.003750	11.50	173.90	42.25	1.00
Upper	3362.059	Q5=1700	1700.00	334.00	340.58	340.58	342.68	0.003859	11.62	146.26	34.80	1.00
Upper	3362.059	Q2=1000	1000.00	334.00	338.76	338.76	340.53	0.004182	10.69	93.56	26.27	1.00
Upper	3690.298	Q100=3900	3900.00	338.00	347.73	347.73	351.34	0.003123	15.24	255.92	343.19	1.00
Upper	3690.298	Q50=3400	3400.00	338.00	347.03	347.03	350.38	0.003198	14.70	231.26	309.32	1.00
Upper	3690.298	Q35=3000	3000.00	338.00	346.43	346.43	349.57	0.003269	14.22	210.92	280.10	1.00
Upper	3690.298	Q10=2100	2100.00	338.00	344.94	344.94	347.53	0.003486	12.91	162.68	154.86	1.00
Upper	3690.298	Q7=2000	2000.00	338.00	344.76	344.76	347.28	0.003520	12.74	157.01	139.26	1.00
Upper	3690.298	Q5=1700	1700,00	338.00	344.18	344.18	346.49	0.003645	12.19	139.44	86.45	1.00
Upper	3690.298	02=1000	1000.00	338.00	342.57	342.57	344.34	0.003918	10.68	93.59	26.38	1.00
								-				
Upper	3870,768	0100 = 3900	3900.00	340.00	350.30	350.30	353.85	0.003645	15.11	258.13	129.46	1.00
Upper	3870.768	G50=3400	3400.00	340.00	349.57	349.57	352.90	0.003713	14.65	232.09	34.69	1.00
Upper	3870.768	Q35=3000	3000.00	340.00	348.93	348.93	352.09	0.003791	14.25	210.48	33.33	1.00
Upper	3870.768	Q10=2100	2100.00	340.00	347.36	347.36	350.02	0.003979	13.08	160.54	30.19	1.00
Jpper	3870,768	07=2000	2000.00	340.00	347.17	347.17	349.76	0.004001	12.92	154.85	29.85	1.00
Upper	3870,768	Q5=1700	1700.00	340.00	346.57	346.57	348.95	0.004089	12.39	137.22	28.78	1.00
Jpper	3870.768	02=1000	1000.00	340.00	344.97	344.97	346.75	0.004381	10.72	93.29	26.22	1.00

Upper	3881.736	Q100 = 3900	3900.00	340.00	352.36		354.05	0.001262	10.43	373.84	262.06	0.60
Upper	3881,736	050=3400	3400.00	340.00	351.58		353.10	0.001241	9.91	343.18	171.19	0.59
Upper	3881.736	Q35=3000	3000.00	340.00	350.90		352.29	0.001199	9.45	317.30	125.84	0.57
Upper	3881.736	010=2100	2100.00	340.00	349.13		350.20	0.001088	8.27	253.99	34.45	0.54
Upper	3881.736	07=2000	2000.00	340.00	348.91		349.94	0.001074	8.12	246.44	34.09	0.53
Jpper	3881.736	Q5=1700	1700.00	340.00	348.22		349.12	0.001026	7.62	223.09	32.98	0.52
Upper	3881.736	Q2=1000	1000.00	340.00	346.30		346.89	0.000873	6.15	162.71	30.13	0.47
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HEC-RAS F	Nan: maint30sw	ath sed River: Ava	arado Ck Reach:	: Upper (Contin	ued)							
Reach	River Sta	Profile	C Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chul	Flow Area	Top Width	Froude # Chi
			(cfs)	(ft)	(4)	(tt)	(tt)	(ft/ft)	(ft/s)	(sq.ft)	(ft)	
Upper	3918.558	Q100 = 3900	3900.00	340.00	352.88		354.14	0.000914	9.00	433.23	278.70	0.53
Upper	3918,558	Q50=3400	3400.00	340.00	352.00		353.18	0.000982	8.71	390.46	177.04	0.54
Upper	3918.558	Q35=3000	3000-00	340.00	351.24		352.35	0.001003	8.49	353.46	134.72	0.54
Upper	3918.558	O10=2100	2100.00	340.00	349.35		350.25	0.000891	7.61	276.12	37.94	0.50
Upper	3918,558	Q7=2000	2000.00	340.00	349.12		349.99	0.000885	7.48	267.41	37.58	0.49
Upper	3918.558	Q5=1700	1700.00	340.00	348.39		349.17	0.000867	7.07	240.41	36.44	0.49
Upper	3918,558	02=1000	1000.00	340.00	346.39		346.92	0.000812	5.86	170.66	33.41	0.46
			12.11									
Upper	3975.018	Q100 = 3900	3900.00	340.39	353.55		354.23	0.000506	6.61	589.83	298.86	0.42
Upper	3975.018	Q50=3400	3400.00	340.39	352.60		353.27	0.000601	6.59	515.94	226.40	0,45
Upper	3975.018	Q35=3000	3000.00	340.39	351.76		352.45	0.000732	6.65	450.92	139.89	0.49
Upper	3975.018	Q10=2100	2100.00	340.39	349.43		350.31	0.001380	7.54	278.47	61.97	0.63
Upper	3975.018	Q7=2000	2000.00	340.39	349.16		350.06	0.001387	7.63	262.21	56.95	0.63
Upper	3975.018	Q5=1700	1700.00	340.39	348.36		349.26	0.001247	7.64	222.47	42.56	0.59
Upper	3975.018	Q2=1000	1000.00	340.39	346.34		347.02	0.001143	6.62	150.99	32.99	0.55

Avarado Ck Reach: Upper (Continued) and Riv naint30s ñ

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HEC-RAS Version 4.0.0 March 2008 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

х	х	XXXXXX	XX	XX		XX	XX	Х	X	XXXX
Х	х	Х	х	Х		Х	Х	Х	Х	х
х	х	х	х			Х	Х	х	Х	х
XXXX	XXXX	XXXX	Х		XXX	XX	XX	XXX	XXX	XXXX
х	х	х	х			Х	Х	х	х	Х
Х	х	X	X	Х		х	х	х	х	Х
Х	Х	XXXXXX	XX	XX		Х	х	х	Х	XXXXX

PROJECT DATA Project Title: Alvarado Upper (Map 63&64) Project File : Alvarado6364.prj Run Date and Time: 8/3/2010 2:37:55 PM

Project in English units

Project Description: City Stormwater Maintenance (First Year) Alvarado Canyon Creek (Upper) Helix Map Number 63 & 64 October 17, 2009 J-15541A

PLAN DATA

Plan Title: Maint 30' Swath - Sediment Removed Plan File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.p08

Geometry Title: Maint 30' Swath - Sediment Removed Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g07

Flow Title : FEMAQ and WSE Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Plan Description: Geometry is from TIN Flow Data is from DRAFT FIS (no date at this time)

Plan Summary Information:Number of: Cross Sections =22Multiple Openings =0Culverts =0Inline Structures =0

Bridges Lateral Structures = 0 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 ConveyanceComputational Flow Regime:Subcritical Flow

FLOW DATA

Flow Title: FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Flow Data (cfs)

River	Reach	RS	Q100 = 3900	Q50=3400
Q35=3000	Q10=2100	Q7=2000	Q5=1700	2330
Avarado Ck	Upper	3975.018	3900	3400
3000	2100	2000	1700	2330
000				

River	Reach	RS	Q2=1000	555
Avarado Ck	Upper	3975.018	1000	555

Boundary Conditions

River Downstream	Reach	Profile	Upstream
Avarado Ck Known WS = 337	Upper	Q100 = 3900	
Avarado Ck	Upper	Q50=3400	
Normal $S = 0.03$	I Tanan a se	025 2000	
Normal $S = 0.03$	opper	Q35=3000	
Avarado Ck	Upper	Q10=2100	
Normal $S = 0.03$	-		
Avarado Ck	Upper	Q7=2000	
Normal $S = 0.03$			
Avarado Ck	Upper	Q5=1700	
Normal $S = 0.03$			

GEOMETRY DATA Geometry Title: Maint 30' Swath - Sediment Removed Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g07 CROSS SECTION RIVER: Avarado Ck RS: 3975.018 **REACH: Upper** INPUT Description: Station Elevation Data 77 num= Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 352.55 169.75 352.62 174.25 350.66 54.55 352 168.06 0 352.81 203.07 354 216.59 354.69 229 196.62 353.69 186.4 353.2 355.32 355.2 321.79 354.85 340 354 340.76 244.96 356 313.71 353.95 340.92 352.68 368.34 353.94 341.22 353.92 350.36 353.29 359.4 352 369.6 351.82 377.54 350.68 379.23 350.46 382.41 368.63 351.95 350 385.23 348.13 385.42 348 385.58 347.89 388.06 346 389.7 344.66 342 394.26 340.86 394.64 390.46 390.99 343.53 392.73 344 340.91 395.4 340.47 397 340.44 400.41 340.39 403.98 340.64 414.41 341.66 416.76 341.84 417.94 342 418.25 415.6 341.75 416.29 341.81 342.52 344 419.12 344.02 420.38 346 420.56 419.07 343.94 419.1 346.28 421.71 348 422.75 348.06 431.94 348.64 454.83 350 478.38 350.41 351.51 504.44 351.53 504.87 351.54 505.16 503.88 499.51 351.3 351.55 353.08 587.99 353.98 588.51 354 588.66 515.48 352 567.91 354.05 602.99 357.43 603.15 357.45 603.3 595.5 356 600.77 357.01 357.48 358.92 613.68 360 616.49 360.83 620.64 358 609.26 605.48 362 362.78 364 623.06 626.85 5 Manning's n Values num= Sta n Val Sta n Val Sta n Val Sta n Val n Sta Val 397 .02 418.25 .018 454.83 0 .025 244.96 .018 .025 Right Lengths: Left Channel Right Coeff Contr. Bank Sta: Left Expan.

56.06 56.46 57.46 .1 377.54 454.83 .3 num= 2 Ineffective Flow Elev Permanent Sta L Sta R 0 377.54 F 454.83 626.85 F 3 Blocked Obstructions num= Sta L Sta R Elev Sta R Elev Sta L Sta R Elev Sta L 224.1 297.99 365 71.99 365 97.43 152.37 365 0 CROSS SECTION RIVER: Avarado Ck RS: 3918.558 REACH: Upper INPUT Description: 66 Station Elevation Data num= Elev Sta Elev Sta Elev Sta Sta Elev Sta Elev 179.04 353.17 180.56 353.23 193.04 0 350.89 45.61 352 353.58 230.15 355.16 237.25 355.42 250.67 197.76 353.78 203.01 354 356 354 341.01 352.75 350.82 294.4 355.68 314.27 354.58 324.48 352 354.29 349.11 355.36 348 357.25 352.57 350.58 353.44 350 346.02 344 359.68 343.53 346 357.33 345.94 359.19 361.3 357.27 342 365.91340.1096 388.28 341.18 388.59 361.7 341.63 363.62 340 342 344 389.62 344.72 390.14 389.03 343.17 389.11 343.38 389.34 346 347.66 391.19 348 392.09 349.49 392.37 390.5 346.84 391 350 399.59 351.32 400.7 351.38 402.6 393.96 350.46 398.11 351.25 351.24 403.71 351.29 350.39 438.19 350 526.18 351.95 526.68 432.41 351.96 526.98 351.97 352 599.34 353.8 606.95 354 614.22 527.72 355.8 356.21 620.14 357.22 623.29 358 630.16 615.03 356 615.89 359.69 638.7 362 640.01 362.42 642.45 634.28 360.79 360 631.4 363.24 364 644.88 5 Manning's n Values num= n Val Sta Sta n Val Sta n n Val Sta n Val Sta Val .02 388.28 .018 399.59 .025 341.01 .018 365.91 0 .025 Lengths: Left Channel Right Coeff Contr. Bank Sta: Left Right Expan.

36.89 36.82 36.86 350.82 399.59 .1 .3 Ineffective Flow 2 num= Sta L Sta R Elev Permanent 0 350.82 F 399.59 644.88 F 3 Blocked Obstructions num= Elev Sta R Elev Sta L Sta R Elev Sta L Sta R Sta L 365 212.28 335.49 365 0 54.03 365 109.3 165.48 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 3881.736 INPUT Description: 79 Station Elevation Data num= Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 6.07 350.87 0 350.48 10.29 351.15 12.92 351.31 40.92 352 199 353.76 206.08 353.91 206.69 353.92 210.21 354 222.24 354.44 354.94 251.37 355.63 258.69 233.9 356 271.86 355.88 296.8 354 309.56 353.29 328.41 352 330.64 350.21 330.92 350 331.62 349.42 348 334.54 346.94 335.46 346 336.53 344.91 333.32 337.43 344 339.15 342.25 339.4 342 339.49 341.91 341.37 340 342.76340.0032 363.11 340.05 363.14 340.12 363.24 340.37 363.78 342 363.88 342.31 364:44 344 364.68 344.67 365.18 346 365.75 347.47 365.95 348 366.98 350.5 385.02 366.13 348.45 366.76 350 367.69 352 351.97 351.1 404.62 351.04 389.85 351.73 401.73 406.3 351 410.61 350.92 419.61 350.67 421.56 350.62 423.52 350.58 428.95 415.48 350.84 350.5 436.77 350.38 437.79 350.35 443.09 350 507.58 351.01 517.23 351.31 523.05 351.5 531.06 351.78 532.85 351.84 538.19 352 589.11 353.29 615.46 353.99 615.84 354 616.1 354.06 623.91 356 627.56 356.9 358 632.22 358.05 632.33 358.08 639.85 632.01 360 640.33 360.14 645.87 361.67 647.07 362 648.51 362.43 653.47 364 Manning's n Values num= 5 Sta n Val Sta n Val Sta n Val Sta n Val Sta Val

n

0 .025 328.41 .018 342.76 .02 363.11 .018 367.69 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 11.11 10.97 10.38 328.41 367.69 .1 .3 Ineffective Flow 2 num≖ Elev Permanent Sta L Sta R F 0 328.41 367.69 653.47 F Blocked Obstructions num= 3 Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev 195.2 297.51 365 118.74 175.55 365 365 0 40.99 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 3870.768 INPUT Description: Station Elevation Data num= 93 Elev Sta Elev Sta Sta Elev Sta Elev Sta Elev .69 352 176.77 353.23 181.76 353.33 186.43 0 351.72 353,41 354 234.28 354.85 240.42 355.16 245.89 197.1 353.65 213.03 355.43 246.64 355.46 267.28 354 272.64 353.82 272.67 353.819 275.67 353.67 305.95 352 306.57 351.54 308.04 350.43 308.6 350 309.85 349.05 348 311.77 347.59 313.71 346 315.77 344.21 316.02 311.24 344 318.6 341.6 320.17 340 321.64 316.21 343.83 318.18 342 340.147 342 340.07 342.06 340.77 338.64 341.841 340.04 341.98 340.05 344 341.44 345.88 341.48 345.99 341.49 346.01 342.6 348 343.42 349.05 350 346.01 351.74 346.27 352 348.08 351.23 349.08 344.21 351.56 351.7 355.64 351.67 359.27 351.55 363.01 350.42 351.36 354.74 351.43 364.73 351.37 366.08 351.33 368.29 351.2 389.9 350.16 397.33 350.39 404.15 350.27 404.59 350.26 412.11 350.12 418.82 420.14 350 349.98 426.27 349.9 433.22 349.8 434.21 349.82 453.99 350 481.77 350.11 497.7 350.62 501.02 350.74 511.44 351.09 518.78 351.31 530.89 351.71 352 551.73 352.35 558.84 352.54 576.49 353.03 589.82 538.75 353.37

608.45 353.74 611.81 353.89 614.18 354 614.26 354.01 614.32 354.03 615.95 354.47 620.3 355.57 621.91 356 626.05 357.06 629.47 358 631.85 358.62 636.85 360 637.98 360.31 644.01 362 644.38 362.1 644.9 362.25 649.64 363.57 651.05 364 5 num= Manning's n Values n Val Sta Sta n Val Sta n Sta n Val Sta n Val Val .02 338.64 .018 346.01 .025 305.95 .018 318.6 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 179.97 180.47 180.91 305.95 346.01 . 1 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 305.95 F 346.01 651.05 \mathbf{F} Blocked Obstructions num= 2 Sta L Sta R Elev Sta L Sta R Elev 0 9.75 365 121.57 277.04 365 CROSS SECTION RIVER: Avarado Ck RS: 3690.298 REACH: Upper INPUT Description: 90 Station Elevation Data num= Sta Elev Sta Sta Elev Sta Elev Sta Elev Elev 23.5 0 345.71 3.53 345.75 5.97 345.77 20.93 345.96 346 350 348 35.83 349.75 36.38 73.85 30.97 347.56 32.17 351.06 80.39 351.24 93.24 352 167.58 351.52 180.07 76.35 351.12 350.99 206.6 347.92 209.4 350 206.33 348.11 206.49 348 203.46 346 344 214.44 342.39 214.98 342 215.47 211.3 344.63 212.19 341.65 340 218.52 339.47 220.56 338 223.92338.0069 235.27 217.78 338.03 340 239.68 341.82 239.89 236.7 339.26 237.56 235,44 338.18 342 241.12 343.04 242.24 344 270.01 345.07 310.29 344.45 322.56 344.28 344 375.39 344.17 382.11 344.34 386.03 344.1 330.94 326.36 344.44 387.03 344.43 390.42 344.44 396.81 344.59 400.84 344.63 407.01 344.7

416.13 344.88 438.84 345.18 448.8 345.3 450.55 345.31 465.65 345.48 468.22 345.49 472.87 345.52 491.47 346 494.34 346.07 495.53 346.1 515.92 346.57 530.49 346.92 540.57 347.15 545.75 347.26 566.83 347.78 569.21 347.84 575.67 348 583.79 348.3 588.52 348.49 592.91 348.66 596.44 348.8 613.02 349.46 615.24 349.55 616.85 349.62 626.37 350 351.6 669.77 352 744.72 353.34 757.4 644.26 350.81 661.23 354 354.3 762.72 356 765.36 356.97 768.25 358 770.91 758.19 358.93 774.03 360 777.36 361.13 779.9 362 783.91 363.32 785.95 364 Manning's n Values num= 5 Sta n Val .025 203.46 .018 223.92 .02 235.27 .018 242.24 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 203.46 242.24 344.53 328.24 316.06 .1 .3 2 Ineffective Flow num= Sta L Sta R Elev Permanent 0 203.46 F F 242.24 785.95 Blocked Obstructions num= 2 Sta L Sta R Elev Sta L Sta R Elev 360 57.06 198.78 275 321.35 360 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 3362.059 INPUT Description: Station Elevation Data num= 187 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 446.54 10.14 446.29 20.91 446 24.19 444.7 25.61 444 27.19 443.21 29.68 442 30.85 441.42 33.27 440.27 33.66 440:07 440 36.64 438.61 37.91 438 38.67 437.63 42.05 33.81 436 43.46 435.33 45.38 434.4 42.49 435.79 46.24 434 48.24 433.04 50.46 432 51.07 431.71 52.21 431.18 54.08 430.27 54.64 430

57.03	428.84	58.76	428	59.55	427.62	60.36	427.22	62.58
426								
64.09	425.13	66.11	424	68.65	422.51	69.49	422	70.86
421.16 72.75	420	73.27	419.67	74.6	418.83	75.91	418	78.23
416.53 79.06	416	80.3	415.22	82.22	414	83.08	413.46	85.03
412.22								
85.27	412.07	85.38	412	85.58	411.87	88.54	410	90.63
408.68								
91.7	408	92.99	407.18	94.86	406	97.97	404.03	98.02
404								
101.08	402.03	101.11	402.01	101.13	402	101.2	401.96	104.22
400				100 04	00C 00	110 00	200	110 0
105.29	399.3	107.26	398	109.04	396.82	110.28	396	113.2
394.05	204			115 61	202 05	115 00	202 10	116 26
113.20	224	113.34	393.90	TT2.2T	393.05	TT2.20	392.19	110.20
117 51	391 16	119 23	390	119 73	389.67	122.21	388	123.85
386.85	JJ1.10	2. <i>2. 2</i> + <i>6.</i> 2	550	112,13	505.0,		200	
125.08	386	127.54	384.11	127.67	384	130	382.21	130.28
382								
131.19	381.3	132.89	380	133.44	379.58	135.54	378	135.6
377.96								
136.13	377.56	138	376.16	138.21	376	140.41	374.38	140.92
374								
142.28	373	143.63	372	146.21	370.09	146.35	370	146.39
369.97								
149.39	368	167.44	367.39	173.88	367.1	183.82	366.76	190.8
366.38	255	100 00	264 00	200 10	264	202 50	262.2	202 07
197.44	366	198.93	364.92	200.18	364	202.56	302.3	202.97
302-	261 71	205 93	360	208 02	358 47	208 7	358	211 37
203.33	301./4	205.83	300	200.02	JJ0.±/	200.7	550	211.7/
211.57	356	213.46	354.69	214.45	354	215.2	353.47	217.32
352	000		001100					
218.52	351.16	220.19	350	221.67	348.86	222.79	348	223.55
347.15								
224.57	346	226.32	344.03	226.34	344	226.44	343.89	228.12
342								
229.22	340.76	229.89	340	230.44	339.38	231.72	338	232.63
337.01								
233.63	336	233.78	335.91	236.2	334.56	237.12	334	252.9
334.87			200	0	222 01	056 40	220	
253.61	335.49	254.18	336	255.55	337.21	250.43	338	257.85
339.20	240	266 69	240 9E	27/ 22	241 65	277 07	345	204 04
200.00	340	200.00	340.00	2/4.32	241.00	211.01	344	204.94
342.14	342 45	306 07	342.51	309.61	342.52	431,19	344	758.76
344.35	512.15	500107	0.0.01	000001	0			
768.31	344.6	797.19	345.41	821.62	346	830	346.31	831.03
346.34								
833.5	346.43	847.74	346.96	856.58	347.25	879.57	348	880.41
348.03								
880.72	348.04	881.24	348.07	901.94	348.95	906.43	349.16	921.76
349.83								

923.27 349.9 925.42 350 942.25 350.68 949.16 350.95 960.33 351.4 963.86 351.55 965.66 351.58 967.08 351.64 969.78 351.75 971.07 351.79 354 1041.06 354.92 1043.88 984.45 352 1038.39 353.93 1038.73 356 358 1050.91 358.78 1053.99 360 1059.87 1045.68 356.71 1048.94 361.95 362 1059.99 361.99 1060.03 Manning's n Values num= 5 Sta n Val Sta n Val Sta n Val Sta n Sta n Val Val .025 228.12 .018 233.78 .02 253.61 .018 274.32 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 323.3 315.55 308.79 222.79 274.32 .1 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent F 0 222.79 \mathbf{F} 274.32 1060.03 Blocked Obstructions num= 1 Sta L Sta R Elev 350.42 649.42 360 CROSS SECTION RIVER: Avarado Ck RS: 3046.513 REACH: Upper INPUT Description: Station Elevation Data num= 182 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 441.38 1.65 440.18 1.89 440 2.26 439.73 4.62 438 436 8.5 435.16 10.09 434 10.57 6.7 436.48 7.36 433.65 17.26 428.76 18.29 430 432 13.42 431.56 15.56 12.82 428 24.83 21.34 425.77 23.76 424 21.03 426 20.08 426.69 423.22 30.54 419.04 31.97 27.68 421.13 29.23 420 422 26.5 418 36.66 414.57 37.43 414 38.34 416 33.39 416.96 34.7 413.34 41.97 410.69 42.9 410 44.71 408.84 46.04 40.17 412 408 51.46 404.66 52.53 404 55.65 47.74 406.95 49.28 406 402.08 59.03 400 55.78 402 56.21 401.73 58.56 400.29 61.34 398.58

62.29	398	62.38	397.94	63.73	397.12	65.44	396.06	65.55
396								
66	395.72	68.81	394	69.5	393.58	72.08	392	73.03
391.42 75.35	390	76.54	389.27	78.62	388	80.04	387.13	81.89
386 84.06	384.67	85.16	384	86.41	383.24	88.44	382	90.48
380.76 91.72	380	93.93	378.65	95	378	97.38	376.55	98.28
376 100.9	374.4	101.56	374	102.26	373.57	104.84	372	105.98
371.3 108.12	370	110.66	368.46	111.41	368	114.45	366.15	114.7
366 117.91	364.04	117.98	364	118.05	363.96	121.2	362	121.22
121.34	361.9	123.3	360.47	123.95	360	124.33	359.72	126.69
358 128.6	356.62	129.44	356	131.8	354.28	132.19	354	132.86
134.94 348	352	136.83	350.63	137.7	350	139.3	348.84	140.46
142.24 343.73	346.71	143.23	346	144.6	345.01	146	344	146.37
148.77 338	342	150.97	340.41	151.55	340	152.21	339.52	154.32
156.46 334	336.46	157.1	336	157.84	335.47	158.82	334.77	159.88
161.68	333.02	163.38	332	181.72	332.23	181.93	332.42	182.16
183.79 338	334	185.96	335.84	186.15	336	187.92	337.5	188.51
189.01 342.83	338.46	190.75	340	196.48	341.99	196.52	342	219.42
228.12 343.63	343.15	232.61	343.32	245.18	343.4	249.52	343.53	252.86
255.39 343.77	343.7	264.28	343.83	281.18	343.76	295.78	343.7	309.77
324.93 345.21	343.72	342.77	343.67	618.57	343.93	628.31	344	669.36
680.15 346	345.54	689.98	345.88	691.38	345.92	692.91	345.96	693.63
747.86 348.57	347.89	748.45	347.91	748.79	347.92	749.9	348	772.09
776.41 349.77	348.74	784.94	349.02	798.19	349.5	802.2	349.65	805.77
812.25 351.54	350	818.51	350.2	839.73	350.56	858.41	350.94	883.51
888.56 353.53	351.65	890.61	351.69	899.49	351.84	903.12	352	908.37
909.21 355.8	353.73	910.24	354	914.52	355.26	915.46	355.54	916.35
917.05 360	356	917.51	356.13	924	358	926.64	358.81	930.52
934.83	361.33	937.02	362					

Manning's n Values

num=

n Val Sta n Val Sta n Val Sta n Val Sta n Sta Val .018 196.48 .025 148.77 .018 161.68 .02 182.16 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 240.61 237.53 235.74 136.83 196.48 .1 .3 Ineffective Flow num= 2 Elev Permanent Sta R Sta L 0 136.83 F 196.48 937.02 F Blocked Obstructions num= 1 Sta L Sta R Elev 232.03 534.15 360 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 2808.985 INPUT Description: 166 Station Elevation Data num= Sta Elev Sta Elev Sta Elev Sta Sta Elev Elev 4.61 430.58 5.49 432.99 2.45 432 0 433.56 .91 430 8.51 427.96 13.39 8.45 428 11.2426 8.37 428.05 424.38 420.7 422 18.29 19.22 13.9 424 14.4 423.62 16.57 420 22.65 417.37 21.83 24.42 416 26.9 20.43 419.08 418 414.09 27.25 413.82 29.6 412 30.93 410.98 32.19 27.01 414 410 35.27 407.62 37.38 406 39.74 408.4 34.79 408 34.27 404.46 402 45.26 401.25 47.44 404 42.6 402.78 43.95 40.46 400 57.9 53.08 396.77 54.41 396 398.6 50.93 398 49.89 394 392 64.13 390.43 64.88 390 65.68 61.39 57.93 393.98 389.54 388 71.48 386.21 71.86 386 72.47 385.65 75.35 68.37 384 380 82 380.19 82.32 84.45 76.94 383.09 78.84 382 378.78 376 91.35 374.82 92.78 85.81 378 88.27 376.59 89.29 374 372 98.55 370.68 99.74 370 102.85 94.32 373.11 96.26 368.21 368 103.47 367.85 106.69 366 107.94 365.28 110.16 103.21 364

111.9	363	113.64	362	115.55	360.9	117.11	360	118.88	
358.56 119.57	358	120.51	357.16	121.79	356	123.11	354.82	124.02	
354 125.82	352.38	126.24	352	128.08	350.35	128.47	350	129.47	
349.1 130.69	348	132.19	346.66	132.92	346	133.52	345.47	135.15	
344 136.86	342.47	137.39	342	139.59	340.03	139.62	340.01	139.63	
340 139.64	339.99	141.87	338	143.15	336.86	144.11	336	146.18	
334.16 146.36	334	147.63	332.88	147.74	332.78	148.61	332	171.18	
333.693 173.54	333.87	173.71	334	174.92	334.97	176.2	336	177.85	
337.36 178.63	338	180.37	338.6	183.91	340	204.05	340.84	220.8	
341.48 223.19	341.56	224.98	341.61	226.38	341.66	230.53	341.78	231.59	
341.81 232.58	341.84	238.45	341.95	241.64	342	345.14	342.1	353.05	
342.11 364.5	342.13	374.22	342.15	375.34	342.14	387.76	342.16	397.36	
$\begin{array}{r} 342.17\\ 404.24\end{array}$	342.18	408.46	342.19	416.48	342.2	428.16	342.22	443.31	
342.24 485.66	342.33	497.31	342.35	503.12	342.36	507.71	342.39	507.93	
342.4 509.37	342.41	511.1	342.42	513.15	342.44	514.72	342.45	640.38	
344 743.14	344.08	752.59	345.12	756.86	346	759.82	346.64	766.1	
348 804.74	349.19	830.08	350	903.05	350.24	905.01	350.63	907.37	
912.05	352	913.64	352.7	916.54	354	920.63	355.78	921.16	
921.92	356.29	926.64	358	931.03	359.58	932.27	360	935.2	
938.12	362								
Manning's Sta	n Value n Val	s Sta	num= n Val	5 Sta	n Val	Sta	n Val	Sta	n
0 .025	.018	137.39	.018	147.63	.035	171.18	.018	183.91	
Bank Sta: Expan.	Left	Right	Lengths	s: Left (Channel	Right	Coeff	Contr.	
1:	29.47 1	.83.91		519.53	516.04	514.95		.1	
Ineffecti	ve Flow	num=	: 2	2					
Sta L	Sta R	Elev	Permane	ent					
0	129.47		F						
183.91	938.12		F	n					
RTOCKEC O	Structl	LOUIS RIPAN	num≕ Sta T	∠ Sta P	Elev				
531	680.76	360	427.1	487.82	360				

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CROSS SECTION

RIVER:	Avarado Ck							
REACH:	Upper		RS: 229	2.941				
INPUT								
Descrip	tion:							
Station	1 Elevation	Data	num=	168				
St	a Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
116	0 420	1.71	419.13	3.22	418	5.21	416.53	5.92
7.9	2 414.52	8.61	414	8.8	413.86	11.29	412	12.33
411.23	97 410	16.15	408.37	16.65	408	17.59	407.3	19.32
406								
20.3 400.73	405.2	21.99	404	23.78	402.66	24.66	402	26.35
27.3	400	27.67	399.73	29.95	398	30.97	397.22	32.59
390	6 394.35	35.22	394	37.41	392.22	37.68	392	37.86
391.83 39.9	2 390	40.63	389.37	42.17	388	43.31	386.99	44.42
386			2.0.4	4 5 0 4	202 05	40.01	200	E0 02
45.8 380.2	5 384.73	40.00	384	4/.84	382.95	48.91	382	50.93
51.1 376	.5 380	51.41	379.76	53.39	378	55.09	376.48	55.62
56.3	3 375.37	57.86	374	60.08	372.02	60.09	372	60.1
62.2	3 370	63.05	369.22	64.34	368	65.95	366.45	66.41
366 67.3	4 365.08	68.41	364	70.18	362.23	70.41	362	71.2
361.21								
72.3	9 360	73.19	359.18	74.36	358	74.78	357.57	76.32
77.8	32 354.47	78.28	354	78.92	353.34	80.22	352	81.35
350.84 82.1	.7 350	82.82	349.32	84.1	348	86	346.03	86.02
346	5 345 97	87 92	344	88 99	342 87	89.8	342	91 38
340.32	/	07,92	544	00.00	542.07	05.0	944	91.00
91.6 336	340	91.91	339.76	93.56	338	94.02	337.5	95.43
96.4	4 334.92	97.29	334	98.07	333.17	99.16	332	99.73
100.5	54 330.52	100.87	330.16	101.02	328	111.2	328	116.9
328	3 328	127.84	329.66	128.08	330	129.12	331.57	129.42
332	10 203 F	120 77	<i>م</i> د د	121 72	335 44	130 10	39 <i>6</i>	146 53
335.88	*4 333.3	T20.11	334	TOT'(Q	333.44	134.14	330	140.03
151.7 335.44	7 335.91	152.42	335.9	166.66	335.68	168.69	335.64	180.39

183.48 335.39 212.35 334.98 216.01 334.89 220.32 334.78 225.53 334.65 230.05 334.59 234.72 334.53 239.35 334.42 242.63 334.39 247.74 334.31 248.01 334.3 253.7 334.26 259.16 334.22 277.03 334 312.77 334.21 314.04 334.33 316.53 334.64 318.99 334.93 321.02 335.16 329.71 335.83 330.22 335.88 330.47 335.91 331.97 336 341.96 336.37 349.34 336.76 357.03 337.15 360.29 337.37 365.52 337.52 366.9 337.63 368 337.71 368.92 337.76 373.25 338 432.96 339.01 448.76 340 458.82 340.32 491.34 341.34 513.06 342 544.49 342.78 563.66 343.26 598.15 344 808.65 345.76 810.45 345.77 816.29 346 877.95 346.51 878.74 346.59 879.53 346.73 881.53 346.95 882.54 347.12 888.48 348 890.22 348.1 350 905.34 351.91 905.68 352 909.62 353.27 911.72 898.3 354 912.89 354.45 916.98 356 926.01 356.42 Manning's n Values num= 4 Sta n Val Sta n Val Sta n Val Sta n Val .04 100.54 .035 127.23 .018 132.12 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 86 132.12 410.33 395.27 385.35 .1 .3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R 86 Ö F F 132.12 926.01 Blocked Obstructions num= 2 StaR Elev StaL StaR Elev Sta L 433.05 515.24 360 336.6 413.18 360 CROSS SECTION RIVER: Avarado Ck RS: 1897.670 REACH: Upper INPUT Description: 155 Station Elevation Data num= Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 375.06 1.5 374 3.11 372.85 4.3 372 6.33 370.55 7.1 370 7.55 369.79 11.35 368 14.21 366.7 15.72 366 19.52 364.27 20.12 364 23.9 362.28 24.52 362 24.63 361.95

28.93	360	29.87	359.58	33.36	358	34.75	357.36	37.56
356 40	354.7	41.43	354	43.95	352.66	45.28	352	47.88
350.61 49.11	350	51.79	348.58	52.94	348	55.68	346.54	56.76
346 59.56	344.51	60.58	344	62.09	343.25	64.64	342	68.83
341.05 73.08	340	94.71	339.87	98.75	339.89	102.49	340	113.39
341.51 114.24	342	122.4	342.23	124.88	342.26	127.41	342.78	129.99
343.2 131.34	343.51	137.82	344	138.79	344.11	139.23	344.16	140.86
344 143.14	343.81	143.66	343.72	147.06	343.37	150.64	342	150.96
341.88 151.36	341.72	153.81	340.79	155.86	340	156.96	339.58	158.44
339.01 160.34	338.27	161.02	338	163.87	336.88	166.13	336	166.97
335.67 167.91	335.3	169.86	334.54	171.23	334	173.09	333.27	176.16
332 177.75	331.34	178.78	330.86	179.76	330.41	180.39	330	180.67
329.81 182.7	328.44	183.35	328	184	325.84	205	325.84	212.15
328.86 212.26	328.94	213.11	329.59	213.63	330	214.45	330.73	216
332 217.37	333.26	218.15	334	281.89	334.6	291.52	334.69	294.54
334.72 299.5	334.76	300.49	334.77	304.09	334.81	309.86	334.87	317.13
334.94	335.28	376.63	335.32	384.58	335.4	387.54	335.42	388.98
335.44 391.52	335.46	439.05	335.11	441.03	334.99	442.89	334.88	444.37
334.79 445.18	334.74	446.08	334.68	447.07	334.62	448.18	334.57	450.14
453.2	334.42	460.27	334.03	460.91	334	520.63	334.92	524.57
529.48	337.11	534.66	338	539.55	338.45	544.97	338.91	554.54
558.74	340.08	583.12	340.51	610.25	341.05	636.17	341.55	639.13
659.54	342	675.97	342.47	694.81	343.02	699.45	343.14	709.92
714.55	343.41	718.52	343.52	739.32	343.71	741.92	343.76	743.78
752.4	343.9	775.83	344	837.31	343.9	864.6	343.73	883.59
987.66 346	343.97	987.85	343.98	988.73	344	1030.28	344.84	1032.62
1038.87	346.92	1045.1	348	1051.6	349.55	1053.43	350	1059.26
1062.42 354.97	352	1072.59	353.99	1072.65	354	1072.82	354.01	1095.66

num= Manning's n Values 4 Sta n Val n Val Sta n Val Sta n Val Sta .018 218.15 .025 .045 180.67 .035 213.11 0 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 469.57 465.05 461.75 137.82 218.15 .1 .3 Ineffective Flow 2 num= Sta L Sta R Elev Permanent 0 137.82 F 218.15 1095.66 F Blocked Obstructions 3 num= Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev 360 769.36 808.01 360 847.78 907.86 360 660.68 695.1 CROSS SECTION RIVER: Avarado Ck **REACH:** Upper RS: 1432.619 INPUT Description: Station Elevation Data រាររ៣= 141 Sta Elev Sta Sta Elev Sta Elev Sta Elev Elev 354.9 19.02 354.02 19.48 354 19.72 353.99 46.71 0 353.33 49.15 353.27 50.37 353.24 54.53 353.16 58.29 47.47 353.3 353.05 64.75 352.82 66.86 352.74 75.27 352.47 84.62 352.32 88.84 352.09 89.18 352.11 90.76 352 108.71 353.03 109.25 353.09 111.15 353.31 113.74 353.2 114.07 353.17 114.65 353.12 115.4 353.04 118.93 352.69 351.78 128.86 351.68 119.69 352.62 125.83 352 127.94 135.28 351 141.76 145.19 348.86 147.4 348 149.89 138.97 350.46 350 347.02 346 159.12 344.7 165.1 344 187.92 343.35 192.1 152.5 343.25 194.8 343.13 197.63 342.97 200.39 342.79 208.12 342.27 209.15 342.22 340.09 214.28 340 215.83 338.79 216.76 212.11 342 214.19 338.07 338 217.04 337.98 225.83 337.39 230.4 337.22 216.85 246.26 336.41 258.54 334.45 259.92 251.6 336.16 253.84 336 334 265.29 332.22 265.97 332 270.74 330.42 271.98 .330 272.18 329.93 277.9 328 279.21 327.55 281.05 326.93 283.79 326 287.35 324.99 290.43 324 330 323.28 336.19 325.98 336.23 290.5 323.28 326 336.25 326.02

339.1 327.83 339.37 328 339.66 328.18 342.52 336.71 326.31 330 334 364.84 343.53 330.64 345.66 332 348.32 333.69 348.77 335.75 336 384.32 336.44 393.3 336.84 402.63 335.9 368.11 366.23 337.16 338 439.23 339.05 457.12 340 473.52 337.3 419.79 406.41 340.89 556.37 344.92 582.7 493.94 342 513.92 342.98 534.12 344 346 344 628.46 342.15 628.97 342 629.54 622.44 344.01 622.46 341.87 633.24 341.02 639.24 340 641.39 339.67 645.57 338.93 655.27 338.24 656.9 338.07 659.82 656.06 338.14 656.43 338.11 656.69 338.09 338 696.6 338.63 704.11 339.04 709.79 339.33 722.31 689.49 338.31 340 762.36 340.92 766.54 341.55 766.8 341.57 769.87 342 778 343.4 781.79 344 783.64 344.39 791.78 346 794.24 780.44 343.81 346.85 802.12 349.59 803.3 350 808.59 351.78 809.21 797.54 348 352 819.76 352.52 825.72 352.81 829 352.97 832.85 353.14 833.66 353.18 354 851.54 Manning's n Values num= 5 Sta n Val Sta n Val Sta n Val Sta n Sta n Val Val 251.6 .045 281.05 .035 336.25 .045 364.84 0 .045 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 251.6 364.84 48.87 50.94 52.85 .1 .3 Ineffective Flow . 2 num= Sta L Sta R Elev Permanent 0 251.6 ਸ F 364.84 851.54 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 1381.67* INPUT Description: Station Elevation Data num= 244Elev Sta Elev Sta Elev Sta Elev Sta Sta Elev 0 355.13 6.43 354.87 12.88 354.62 16.02 354.46 18.35 354.32

20.22	354.22	20.71	354.2	20.97	354.18	24.08	354.07	27.44
353.87 30	353.51	30.21	353.48	30.47	353.44	32.98	353.09	34.36
352.9 35.77	352.71	37.33	352.5	38.62	352.32	39.4	352.21	41.51
351.93	251 21	46 27	351 76	49 67	351 67	50.48	351.63	52.26
351.59		E7 00	251 45	60.25	251 29	61 98	351 34	66 18
351.21	351.56	57.90	351.45	00.35	351.30		001.01	77 60
68.23 350.89	351.16	68.85	351.14	69.7	351.12	/1.1	351.07	77.09
78.27 350.66	350.87	79.04	350.85	79.28	350.84	80.04	350.81	84.83
89.98 350.19	350.54	94.26	350.31	94.47	350.29	94.83	350.31	96.51
110.89	350.67	113.35	350.76	115.6	350.82	116.17	350.86	118.19
120.95	350.88	121.3	350.85	121.91	350.8	122.71	350.72	126.46
127.27	350.3	130.71	349.97	133.8	349.68	134.5	349.61	136.04
137.02	349.38	143.85	348.77	147.77	348.29	150.74	347.89	154.39
156.74	346.18	159.39	345.35	160.42	345.02	162.16	344.48	164.8
344.06 169.2	343.35	171.37	343.13	175.56	342.73	175.77	342.72	181.61
342.55 182.49	342.51	193.74	341.99	195.9	341.88	198.4	341.8	199.82
341.76 204.27	341.63	207.14	341.51	210.15	341.35	213.08	341.17	220.24
340.73 221.3	340.67	222.4	340.62	225.55	340.41	227.76	338.8	227.85
338.72 229.5	337.7	230.49	337.09	230.59	337.03	230.79	337.01	230.83
337.01 232.06	336.93	234.2	336.8	238.38	336.54	240.14	336.43	245
336.24	335.4	267.54	335.13	269.37	335	269.74	334.95	270.05
334.85	334 49	. 274 37	333 4	274 8	333.25	275.73	332.95	275.77
332.93	221 20	201 01	2221 16	201 00	223 14	201 62	220 94	286 38
280.64 329.36	331.29	281.01	331.10	201.00	331.14	201.00	220.24	200.00
286.47 327.47	329.32	286.63	329.27	287.6	328.93	287.8	320.07	291.00
292.29 325.86	327.32	293.43	326.93	294.72	326.48	295.26	326.3	296.53
298.03 323	325.34	298.71	325.12	299.23	324.95	302.73	323.96	305.76
337.2 325.25	323	342.37	324.69	344.19	324.86	344.74	324.91	348.36
350.24	325.42	350.27	325.44	350.29	325.46	350.74	325.72	352.71
353.06 329.11	327.12	353.33	327.28	353.61	327.44	354.35	327.89	356.39

357.37	329.7	358.19	330.2	359.44	330.95	360.3	331.47	361.37	
332.12									
362.02	332.51	362.46	332.79	366.2	333.35	370	333.92	372.09	
334.23 376.35	334.87	378.08	335.12	379.34	335.25	381.05	335.34	395.78	
335.75 403.95	336.1	411.5	336.36	412.43	336.39	415.86	336.51	420.31	
336.73									
428.02	337.13	428.47	337.15	436.63	337.56	444.8	337.97	445.69	
338.02									
461.95	338.92	464.4	339.06	467.04	339.19	468.21	339.26	469.61	
339.35									
473.04	339.55	476.55	339.8	476.85	339.82	484.24	340.34	489.89	
340.72									
495.41	341.02	513.57	341.88	531.93	342.79	552.15	343.61	566.38	
344.19		<i>c</i>	~	~~~ ~~	.	<i>(14)</i>	242 25		
5/6.08	344.57	612.2	343	612.22	342.99	614.86	342.25	01/.0/	
341.54	343 43	C10 CF	3 4 1 3 A	COO 01	240 72	COD E7	340 53	626 02	
240 23	341.43	010.00	341,34	622.01	340.73	623.57	340.53	020.02	
540.23	240 04	629 42	220 02	630 43	330 60	633 18	330 33	633 22	
339 37	340.04	029,42	339.03	030.43	555.05	033.10	222.22	033.22	
637 17	229 18	641 32	239 04	642 04	339 01	642 75	338 95	643.09	
338.93	332.10	072.02	202.04	042.04	339.01	012.75	550.55	010100	
643 33	228 93	643 52	338.91	646.17	338,94	648.32	339.02	655.26	
339.3	000100	0.0.0.		• • • • • • • • •					
659.48	339.46	673.14	339.71	679.6	340.03	681.54	340.14	686.42	
340.43									
691.59	340.72	696.91	341.04	702.96	341.36	712.61	341.61	725.59	
341.94									
739.36	342.29	743.16	342.83	743.4	342.85	746.19	343.22	753.58	
344.42									
755.8	344.77	757.02	344.94	758.7	345.27	766.1	346.64	768.34	
347.36									
770.97	348.22	771.34	348.33	775.5	349.67	776.57	350.01	781.38	
351.51									
781.94	351.69	791.41	352.14	791.53	352.15	796.95	352.4	799.93	
352.54									
803.43	352.69	804.16	352.73	810.59	353.01	820.41	353.45	•	
	·- 7			-					
Manning's	n value	S	num=	8	""- "	Ct	· · · · · · · · · · · · · · · · · · ·	05-	
JUA J	n vai	Sta	n vai	Sca	II VAL	SLA	n var	Sca	11
var	040	067 E4	025	206 62	0.0 E	200 02	0.2 E	210 26	
025	.042	207.54	.035	290.03	.035	290.03	.035	340.30	
350 24	035	378 08	025	820 41	025				
330,24	.055	575.00	.025	020.41	.025				
Bank Sta	Teft	Right	Lenaths	· Left C	hannel	Right	Coeff	Contr.	
Expan.	Dere					101 9110	~~~~ <u>~</u>		
2.6	57.54 3	78.08		48.87	50,94	52.85		. 1	
.3									
Ineffectiv	ve Flow	num=	2						
Sta L	Sta R	Elev	Permane	nt					
026	57.5383		F			-			
378.08	820.41		F						

CROSS SECTION

RIVER: REACH:	Avarado Ck Upper		RS: 133	0.74*				
INPUT								
Descrip	tion:							
Station	Elevation	Data	num=	244				
St	a Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
	0 355.35	6.81	355.12	13.65	354.89	16.97	354.72	19.45
354.53								
21.4	3 354.42	21.95	354.39	22.22	354.38	25.51	354.23	29.08
353.89								
31.7	9 353.24	32.01	353.18	32.29	353.12	34.95	352.48	36.41
352.12								
37.9	91 351.77	39.55	351.38	40.92	351.06	41.75	350.86	43.99
350.35								
47.0	5 350.16	49.02	350.11	52.63	350	53.48	349.97	55.38
349.92								
56.7	5 349.88	61.44	349.75	63.94	349.66	65.68	349.62	70.12
349.5								
72.2	9 349.47	72.95	349.46	73.85	349.45	75.33	349.4	82.32
349.23								
82.9	4 349.22	83.75	349.19	84.01	349.18	84.81	349.14	89.89
348.93								
95.3	4 348.76	99.88	348.51	100.1	348.5	100.48	348.5	102.26
348.39								
117.	5 348 56	120.11	348.61	122.48	348.62	123.09	348.64	125.23
348.72	0 0 10 0 00							
128.1	5 348.56	128.52	348.53	129.18	348.48	130.02	348.4	134
348 04	510.50		010100	100110	0			
134 8	15 347 97	138.5	347.65	141.77	347.36	142.52	347.29	144.15
347 17		20010						
145 1	9 347 09	152.42	346.54	156.58	346.13	159.72	345.78	163.58
344 97			0.0.0.		010110		0.01.0	
166 (17 344 37	168 88	343.68	169.98	343.41	171.82	342.96	174.62
342 61	, 211.0,	100.00	515.00	202120	010,12			
179.5	8 342	181.58	341.8	186.02	341.46	186.24	341,45	192.42
341.25		202.00		100,00	0			
192 2	16 341 21	205.28	340.48	207.57	340.3	210.22	340.21	211.73
340.16								
216.4	4 340.02	219.48	339.89	222.67	339.73	225.78	339.56	233.36
229 12		222.20			000000			
222.12	19 339 07	235 65	339 02	238 98	338 81	241.33	337.5	241.43
337 //		200.00	000.02	230.90	000102		00110	
007.44 042 1	7 336 61	244 22	336 11	244 32	336 06	244 54	336.04	244.58
275 04	L/ 330.01	411.24	330	277.32	550.00	ZII.JI	220.04	211.00
550.04 54E 0	0 335 07	248 15	335 84	252 58	335 58	254 44	235 47	259 59
240.0	56 555.91	240.15	333.04	232.30	333.30	201.11	JJJ.#/	~~~~~~
333.20	15 221 20	202 10	22/ 11	285 28	333 97	285 65	333 91	285 95
277 01	10 334.32	205.40		200.20	555.27	203.05	555.7T	200.00
222.01 2077 /	3 333 14	290 2	330 3 m	290 63	220 0	291 54	221 80	291 58
20/.1		220.2		220.00	2.200	ムンエ・ンネ		<i></i>
JJJ.00 702 1	27 220 22	296 74	220 1	296 81	330 08	297 /	329 88	302 02
270.3	51 330.43	420.14	يلا و ∨ د د	20.01	220.00	<i>∞ - / •</i> *	522,00	500.00
220.22								

302.11	328.26	302.27	328.2	303.22	327.87	303.41	327.8	307.43	
326.4	326.26	308.95	325.87	310.22	325.42	310.76	325.23	312.01	
324.8	520.20		040107	0					
313.48	324.28	314.16	324.07	314.66	323.91	318.11	322.93	321.09	
322									
351.62	323.03	356.64	323.75	358.41	324.01	358.94	324.09	362.46	
324.6					204 0	264 87	20F 14	266 69	
364.28	324.86	364.32	324.88	364.34	324.9	364.77	325.14	300.00	
326.22	206 41	267 20	206 EE	267 56	326 71	368 27	327.11	370.25	•
30/.03	320.41	307.20	520.55	307.30	520.71	500.27	<i></i>	5,0,00	
371.21	328.76	372.01	329.22	373.22	329.9	374.05	330.37	375.1	
330.97							÷		
375.73	331.32	376.15	331.58	379.79	332.28	383.48	332.99	385.51	
333.39									
389.64	334.19	391.32	334.5	392.46	334.61	393.99	334.68	407.25	
335.05						405 D3	-	100 01	
414.59	335.36	421.39	335.59	422.22	335.62	425.31	335./2	429.31	
335.9	226 25	120 00	226 27	A A A	226 61	451 35	336 94	452 15	
430.25	330.40	430.00	330.41	777	330.0T	401.00	000.Ja	402.10	
466 78	337 85	468.98	337.98	471.36	338.08	472.41	338.16	473.67	
338.24	557.05	-100.00	557.50	1.2.00					
476.76	338.44	479.92	338.72	480.19	338.75	486.83	339.34	491.92	
339.78									
496.88	340.03	513.22	340.79	529.74	341.57	547.93	342.3	560.73	
342.81						~~ ~ ~ ~ ~	0 4 1 4	606 00	
569.46	343.15	601.96	341.99	601.97	341.99	604.36	341.4	606.88	
340.93	240.00	C07 7C	340 01	610 79	340 44	612 19	340 34	614.39	
607.3 240 19	340.86	607.76	340.01	010.19	340.44	014.20	340.34	0	
615.69	340.09	617.45	339.98	618.36	339.91	620.83	339.72	620.87	
339.72									
624.42	339.75	628.16	339.78	628.8	339.78	629.45	339.76	629.75	
339.76									
629.96	339.76	630.13	339.76	632.52	339.87	634.46	340.02	640.7	
340.49					D 4 1 4 D	664 DE	D 4 1 ⊏ 4	669 74	
644.49	340.77	656.78	341.1	662.6	341.43	664.35	341.34	000./4	
341.83	240 10	679 17	349 43	683 62	342 72	692.3	342.97	703.98	
343.31	342.12	0/0.1/	912.19	000.02	5.5175				
716.37	343.66	719.79	344.12	720	344.13	722.51	344.44	729.16	
345.44									
731.15	345.74	732.26	345.88	733.77	346.15	740.42	347.29	742.44	
347.88									
744.8	348.57	745.13	348.67	748.88	349.75	749.84	350.03	754.17	
351.23		762 10	3 E 1 777	763 3	251 77	760 10	251 99	770 86	
754.68	351.38	/63.19	351.//	/03.3	331.77	/00.10	201.02	//0.00	
352.11 774 01	352 24	774.67	352.27	780.45	352.52	789.29	352.9		
77 4 ,01	JJ2.27	, /4.0/	552.21	,00.10	00				
Manninq's	n Value	s	num=	8					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n
Val							_		
0	.038	283.48	.035	311.52	.035	311.83	.035	359.11	
.035									

364.09 .034 391.32 .025 789.29 .025 Right Coeff Contr. Right Lengths: Left Channel Bank Sta: Left Expan. 52.85 283.48 391.32 48.87 50.94 .1 .3 Ineffective Flow num≖ 2 Sta L Sta R Elev Permanent 0283.4767 F F 391.32 789.29 CROSS SECTION RIVER: Avarado Ck RS: 1279.8* REACH: Upper INPUT Description: Station Elevation Data num= 244 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 17.93 354.98 20.54 0 355.58 7.19 355.37 14.42 355.17 354.75 22.63 354.62 23.18 354.59 23.47 354.57 26.95 354.38 30.71 353.92 33.58 352.97 33.81 352.89 34.1 352.79 36.91 351.86 38.46 351.34 41.78 350.26 43.22 349.79 44.1 349.51 46.46 40.04 350.82 348.76 348.3 49.69 348.52 51.78 348.46 55.59 348.34 56.49 58.49 348.24 67.54 347.95 69.37 347.91 74.06 59.94 348.19 64.89 348.04 347.8 77.06 347.78 78 347.77 79.57 347.74 86.95 76.36 347.79 347.58 87.6 347.56 88.46 347.54 88.73 347.53 89.57 347.48 94.94 347.2 105.49 346.72 105.72 346.7 106.13 346.7 108.01 100.7 346.98 346.58 346.41 130.01 346.41 124.1 346.46 126.86 346.45 129.37 132.27 346.43 136.44 346.15 137.33 346.08 135.36 346.24 135.75 346.21 141.53 345.72 142.44 345.65 146.29 345.32 149.74 345.03 150.53 344.97 152.25 344.86 153.35 344.79 160.99 344.31 165.38 343.96 168.7 343.67 172.78 343.03 179.54 341.79 181.48 341.45 342.01 184.44 175.41 342.55 178.38 341.16 340.47 196.48 340.19 196.72 340.18 203.24 189.36 340.64 191.79 339,96 204.23 339.91 216.82 338.96 219.24 338.73 222.04 338.62 223.63 338.57 338.4 231.82 338.27 235.19 338.11 238.47 337.94 246.48 228.61 337.53

247.67	337.47	248.9	337.41	252.42	337.22	254.9	336.21	255
336.16								
256.85	335.51	257.95	335.13	258.06	335.09	258.29	335.08	258.34
335.07								074 10
259.71	335	262.1	334.88	266.79	334.62	268.75	334.51	2/4.19
334.28	<u>,,,,,,,,</u>	200 12	222 09	201 10	222 94	301 55	332 86	301 84
233.00	222.21	299.42	555.00	301.13	JJ&, JI	501.55	552.00	001.01
302.91	332.4	306.03	331.3	306.45	331.15	307.35	330.84	307.39
330.83								
312.1	329.17	312.46	329.04	312.53	329.02	313.11	328.82	317.66
327.23								
317.75	327.19	317.9	327.14	318.84	326.8	319.03	326.74	322.98
325.34		201 10	204 0	205 53		226 25	204 17	207 40
323.38	325.19	324.48	324.8	323.13	324.35	320.23	324.1/	34/.40
378 94	373 71	329 6	323 01	330 1	322.86	333,49	321.89	336.42
321	J. J. J. L. L. L.	525.0	J20.01	330. x	002.00	555115		
366.04	321.84	370.91	322.81	372.63	323.16	373.15	323.26	376.56
323.95								
378.33	324.3	378.36	324.32	378.38	324.33	378.8	324.55	380.66
325.53								
380,99	325.7	381.24	325.83	381.5	325.97	382.2	326.33	384.12
327.34		205 00	220 24	207	220 05	207 01	270 78	288 82
303.03	341.03	303.04	320.24	507	520.00	201.01	527.20	300.02
389.43	330.14	389.85	330.37	393.37	331.21	396.95	332.07	398.92
332.54								
402.93	333.5	404.56	333.88	405.57	333.96	406.94	334.02	418.71
334.36								
425.24	334.62	431.28	334.82	432.02	334.84	434.76	334.93	438.32
335.08		444 04	225 20	451 37	22E CC	457 0	วว ⊑ 0,1	150 61
444.40	335.30	444.04	222.22	431.37	222.00	407.9	222+2T	#20.01
471.6	336.77	473.56	336.89	475.68	336.97	476.61	337.05	477.73
337.13		1.0.00						
480,47	337.33	483.28	337.65	483.52	337.68	489.42	338.35	493.94
338.83								
498.36	339.05	512.87	339.69	527.55	340.36	543.71	340.99	555.09
341.43	241 20		240.00	ro1 70	240 00	F02 0F	340 EE	E06 00
562.84	341.72	591.72	340.99	591.73	340.98	593.05	340.55	270.02
596 46	340 29	596 87	340.27	599.56	340.15	600.81	340.14	602.76
340.14	940.22	0.00.07	510.07	000.00	010110			
603.92	340.13	605.48	340.14	606.29	340.13	608.49	340.11	608.52
340.11								
611.68	340.31	615	340.52	615.57	340.55	616.14	340.57	616.41
340.58								<i></i>
616.6	340.6	616.75	340.6	618.87	340.81	620.59	341.01	626.14
341.68	240 00	640 43	212 E	615 6	342 83	647 15	340 93	651 05
343.22	J¥2.00	040.43	5-12.5	040.0	749.03	0.41.479	J-10, JJ	~~
655.18	343.51	659.43	343.82	664.27	344.08	671.99	344.34	682.36
344.68		-						
693.37	345.04	696.41	345.4	696.6	345.41	698.83	345.67	704.74
346.47								

346.7 707.49 346.81 708.83 347.03 714.75 347.93 716.53 706.51 348.39 722.26 349.83 723.12 350.04 726.96 718.64 348.93 718.93 349 350.96 727.41 351.08 734.98 351.4 739.41 351.58 741.79 351.4 735.08 351.68 744.59 351.79 745.17 351.82 750.31 352.03 758.16 352.35 Manning's n Values 8 num= n Val Sta n Val Sta n Sta Sta n Val Sta n Val Val .035 327.06 .035 373.15 .035 326.76 .035 299.42 0 .035 .034 404.56 .025 758.16 .025 378.01 Coeff Contr. Lengths: Left Channel Right Bank Sta: Left Right Expan. 48.87 50.94 52.85 .1 299.42 404.56 .3 Ineffective Flow num= 2 Sta L Sta R Elev Permanent 0 299.415 F F 404.56 758.16 CROSS SECTION RIVER: Avarado Ck RS: 1228.86* REACH: Upper INPUT Description: 244 Station Elevation Data num= Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 18.88 355.24 21.63 7.57 355.62 15.19 355.45 0 355.81 354.97 24.42 354.78 32.35 24.72 354.76 28.38 354.54 23.84 354.82 353.95 35.92 352.46 38.88 351.24 40.51 35.37 352.69 35.61 352.59 350.56 48.93 349.14 45.52 348.53 46.45 348.16 44 349.88 42.17 347.17 59.5 346.64 61.6 52.34 346.88 54.54 346.82 58.55 346.67 346.57 71.13 346.23 73.06 346.2 78.01 68.35 346.33 63,13 346.51 346.1 346.1 83.8 346.07 91.57 346.1 82.16 80.42 346.1 81.16 345.92 93.45 345.87 94.34 345.81 99.99 92.26 345.91 93.17 345.88 345.47 345.2 111.11 344.92 111.35 344.91 111.78 344.9 113.76 106.06 344.78 130.71 344.35 133.61 344.3 136.26 344.2 136.93 344.18 139.31 344.13 143.7 343.83 144.64 343.75 149.07 142.56 343.92 142.97 343.89 343.4

150.02	343.32	154.08	343	157.71	342.71	158.54	342.64	160.36
342.55								
161.51	342.49	169.56	342.08	174.18	341.79	177.68	341.56	181.98
341.08								
184.75	340.73	187.87	340.33	189.1	340.18	191.14	339.93	194.25
339.71								
199.44	339.29	202	339.14	206.93	338.92	207.19	338.91	214.06
338.67	220 6	000 07	2277 44	220 01	300 1E	222 06	227 04	22E E4
213.11 226 07	330.0	220.37	337.44	230.91	331.13	200.00	337.04	235.54
2/0 78	336 79	244 16	336 65	247 71	336 49	251 17	736 33	259 6
2320.70	550.75	~~ T . T O	550.05	277.71	990. 4 9	201.1/	330.33	232.0
260.86	335.87	262.15	335.81	265.86	335.63	268.46	334.92	268.58
334.88								
270.52	334.42	271.69	334.15	271.8	334.12	272.04	334.11	272.09
334.11								
273.53	334.04	276.06	333.92	280.99	333.66	283.05	333.55	288.78
333.3								
308.66	332.36	315.35	332.05	317.1	331.91	317.45	331.82	317.74
331.72								
318.79	331.35	321.86	330.25	322.27	330.1	323.15	329.79	323.19
329.78								
327.83	328.12	328.19	327.98	328.25	327.96	328.83	327.76	333.3
326.16			206 07	224 46		004 CC		
333.38	326.13	333.54	326.07	334.40	325.74	334.65	325.67	338.54
324.2/	22/ 12	240 01	222 74	2/1 7/	222 29	241 75	303 1	342 96
322 66	J2*±.1J	5#0.01	323.17	747.24	121.21	541.75	323.I	542.50
344.39	322.14	345.04	321,96	345.53	321.81	348.87	320.86	351.76
320								
380.47	320.65	385.18	321.88	386.85	322.31	387.35	322.44	390.66
323.3								
392.37	323.75	392.41	323.76	392.42	323.77	392.83	323.97	394.63
324.84								
394.95	324.99	395.19	325.11	395.45	325.23	396.13	325.55	397.99
326.46								
398.89	326.89	399.64	327.25	400.78	327.81	401.56	328.19	402.54
328.67	220 00	100 54	200 10	400 05	000 14	410 40	331 34	410 00
403.14	328.96	403.54	329.10	406.95	330.14	410.42	331.14	412.33
416 22	332 82	417 8	333 25	418 68	222 21	419 88	223 26	430 18
333.66	552.02	117.0	~~~	110.00	000.01	119.00	333.30	100110
435.88	333,88	441.16	334.06	441.81	334.07	444.21	334.14	447.32
334.25								
452.71	334.5	453.03	334.52	458.74	334.7	464.44	334.88	465.07
334.92								
476.43	335.69	478.14	335.81	480	335.85	480.81	335.94	481.79
336.02								
484.19	336.22	486.64	336.58	486.85	336.61	492.01	337.36	495.97
337.89			D DD - -					
499.83	338.06	512.52	338.59	525.36	339.14	539.49	339.68	549.44
540.05	240 20	501 47	220 00	501 40	220 07	E93 34	220 77	EQE O
339 72	コマレ・ムブ	001.4/	222.20	JU1.47	555.21	JUJ.J#	532.1	202.2
585.62	339.72	585.99	339.74	588.34	339.86	589.42	339.95	591.13
340.09					-			

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592.15 340.17 593.51 340.3 594.22 340.35 596.14 340.5 596.17 340.5 598.93 340.87 601.84 341.26 602.33 341.33 602.84 341.38 603.07 341.41 605.22 341.74 606.73 342.01 611.58 603.24 341.43 603.37 341.45 342.87 343.9 628.59 344.22 629.95 344.33 633.37 614.53 343.38 624.08 344.61 640.7 345.21 644.93 345.44 651.68 345.7 660.75 636.97 344.91 346.04 670.38 346.41 673.03 346.68 673.2 346.7 675.15 346.89 680.31 347.49 683.9 347.91 689.07 348.58 690.63 681.86 347.66 682.72 347.75 348.9 695.64 349.9 696.39 350.05 699.75 692.47 349.29 692.73 349.34 350.69 700.14 350.77 706.76 351.02 706.85 351.03 710.63 351.18 712.72 351.26 715.16 351.35 715.68 351.37 720.17 351.53 727.04 351.79 Manning's n Values num= 8 Sta n Val 0 .032 315.35 .035 342 .035 342.29 .035 387.2 .035 .025 727.04 .034 417.8 .025 391.94 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 48.87 50.94 52.85 .1 315.35 417.8 .3 2 Ineffective Flow num= Elev Permanent Sta L Sta R 0315.3533 F 417.8 727.04 F CROSS SECTION RIVER: Avarado Ck RS: 1177.92* REACH: Upper INPUT Description: Station Elevation Data 244 num= Elev Sta Elev Sta Sta Elev Sta Elev Sta Elev 355.87 15.95 355.72 19.84 355.5 22.73 0 356.03 7.96 355.18 25.65 354.98 25.97 354.96 29.82 354.69 33.98 25.04 355.02 353.97 37.15 352.42 37.41 352.3 37.73 352.14 40.84 350.62 42.55 349.78 44.3 348.94 46.23 348.03 47.82 347.26 48.79 346.8 51.41 345.59 61.5 345.01 62.51 344.97 64.72 57.29 345.17 54.98 345.23 344.89

66.32	344.83	71.8	344.63	74.73	344.52	76.75	344.48	81.95
344.39		05 07	344 49	06 21	D 4 4 4 D	00 01	311 4	96.2
84.49	344.42	85.26	344.42	80.31	344.43	00.04	244.4	20.2
96.93	344.25	97.88	344.23	98.18	344.22	99.11	344.15	105.05
343.73								
111.42	343.42	116.72	343.13	116.98	343.11	117.43	343.09	119.51
342.97						140.05	241 00	140 20
137.31	342.25	140.37	342.15	143.14	341.99	143.85	341.96	140.30
341.84	241 6	150 2	341 57	150 96	341.51	151.95	341.43	156.6
341.08	247.0	100.2	JTL.J/	100.00			012.00	
157.6	341	161.86	340.67	165.69	340.39	166.56	340.32	168.46
340.24								
169.68	340.2	178.13	339.85	182.99	339.63	186.66	339.45	191.18
339.14		107 37	220 66	100 65	220 56	200 8	220 /1	204 07
194.09	338.92	197.37	330.00	190.05	220,20	200.0	220.41	204.07
209.52	337.94	212.21	337.81	217.39	337.65	217.66	337.64	224.88
337.37								
225.98	337.3	239.91	335.92	242.58	335.58	245.68	335.45	247.44
335.38						~~~ ~~	~~ 4 ~ 7 7	000 00
252.95	335.17	256.5	335.02	260.23	334.87	263.86	334.71	212.12
334.32	22/ 27	275 4	334 21	279.29	334.04	282.03	333.62	282.15
333.6	JJ7.2/	41912	JJ 1 . 2 1	2/2/42	001.01			
284.19	333.33	285.42	333.17	285.53	333.15	285.79	333.14	285.84
333.14								
287.36	333.07	290.01	332.96	295.19	332.7	297.36	332.59	303.38
332.32		<u></u>	221 02	222 A1	220 99	333 35	330 77	333 64
324.20	331.35	331.29	331.03	222.01	330.00	333,30		222.01
334.67	330.31	337.69	329.2	338.1	329.05	338.96	328.74	339
328.72								
343.56	327.06	343.91	326.92	343.98	326.9	344.54	326.7	348.94
325.1		240 18	205 01	250 00	224 67	250 26	224 61	25/ 09
349.02	325.06	349.17	325.UI	320.00	324.01	350.20	J24.01	304.02
354.47	323.06	355.54	322.67	356.74	322.22	357.25	322.04	358.44
321.59								
359.85	321.07	360.49	320.9	360.97	320.76	364.25	319.83	367.09
319		_					201 61	404 BC
394.89	319.47	399.46	320.94	401.07	321.46	401.56	321.61	404.76
322.65	323 19	406 45	202 0	406.47	323.21	406.86	323.38	408.61
324.15	727.17	100.10	J4J.4	100111				
408.92	324.29	409.15	324.39	409.4	324.49	410.05	324.78	411.86
325.57								
412.73	325.95	413.45	326.27	414.56	326.76	415.32	327.09	416.27
327.52	330 77	417 00	207 QE	420 54	300 07	123 9	330 22	425 75
±⊥0.04 330.85	221.11	421.23	561.70		525.01	- e	JJV + 444	
429.51	332.13	431.04	332.62	431.8	332.67	432.82	332.71	441.64
332.97								
446.53	333.14	451.05	333.29	451.61	333.3	453.66	333.35	456.33
333.43								

460.95 333.63 461.21 333.64 466.1 333.75 470.99 333.85 471.53 333.89 334.61 482.73 334.72 484.31 334.74 485.01 334.83 485.85 481.26 334.91 487.9 335.11 490.01 335.5 490.19 335.54 494.61 336.36 497.99 336.94 501.3 337.08 512.17 337.5 523.17 337.93 535.28 338.37 543.8 338.68 571.23 338.97 571.24 338.97 572.83 338.85 549.61 338.87 574.51 339.11 574.79 339.15 575.1 339.21 577.11 339.57 578.04 339.75 579.51 340.05 580.38 340.22 581.55 340.45 582.15 340.57 583.8 340.89 583.82 340.89 586.19 341.44 588.67 342 589.1 342.1 589.53 342.19 589.73 342.23 589.87 342.27 589.99 342.29 591.58 342.68 592.86 343 597.02 344.06 599.54 344.69 607.72 345.3 611.59 345.62 612.76 345.72 615.68 346.01 618.77 346.3 621.96 346.61 625.58 346.8 631.36 347.07 639.13 347.41 647.38 347.78 649.66 347.97 649.8 347.98 651.47 348.11 655.89 348.51 657.22 348.63 657.96 348.69 658.96 348.79 663.39 349.22 664.73 349.42 666.31 349.64 666.53 349.67 669.02 349.98 669.66 350.06 672.54 350.42 672.88 350.46 678.55 350.65 678.62 350.65 681.86 350.77 683.65 350.83 350.91 690.03 351.04 695.91 351.24 685.74 350.9 686.18 Manning's n Values num= 8 n Val Sta n Val Sta n Val Sta n Val Sta Sta n Val 0 .028 331.29 .035 357.23 .035 357.52 .035 401.24 .035 405.86 .034 431.04 .025 695.91 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 48.87 50.94 331.29 431.04 52.85 .1 .3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R 0331.2917 \mathbf{F} F 431.04 695.91 CROSS SECTION RIVER: Avarado Ck RS: 1126.981 REACH: Upper INPUT Description: Approx. local of old drop strucure (no plans available) Station Elevation Data num= 110

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev	356 26	8 34	356 12	16 72	356	20.79	355.76	23.82	
355.4	550.20	0.54	550.42	20.72	550	<i>w</i> o. <i>1</i> 0	<i></i>		
31.25	354.85	35.62	354	38.94	352.15	39.21	352	39.55	
42.81	350	44.6	349	46.43	348	48.45	346.91	50.12	
346									
51.14	345.45	53.88	344	57.63	343.59	60.05	343.52	78.32	
85.89	342.69	88.55	342.73	90.46	342.76	100.83	342.61	101.59	
102.59	342.57	102.9	342.56	110.1	342	122.34	341.33	143.92	
147.12	340	169.65	338.35	174.57	338	208.21	336.95	213.89	
336.81									
222.42	336.48	228.13	336.37	235.7	336.08	236.85	336	251.45	
334.4 254.25	334	257.5	333.86	285.84	332.72	299.59	332.17	301.18	
332.11	222	200 20	221 74	217 22	220	240 00	220 85	349 54	
329.63	224	309.39	JJI./4	241.42	330	340.92	329.05	542.54	
350.55	329.26	353.92	328	354.81	327.67	359.29	326	359.7	
364.66	324	364.81	323.94	369.64	322.14	370.02	322	372.75	
320.97		255 00	210 OF	200 40	23.0	600 Di	230 20	113 73	
375.3	320	375.93	319.85	382.42	318	409.31	318.28	413.73	
415.29	320.61	415.76	320.79	418.86	322	422.58	323.46	423.98	
324	ວວະ ວດ	129 07	376	120 00	376 37	A24 10	378	437 37	
329.29	343.49	429.07	520	429.99	520.57	404.12	520		
439.16	330	442.8	331.45	444.28	332	460.94	332.52	465.33	
332.6	222 76	1772 17	222 0	A77 EA	222 02	107 21	222 61	188 63	
333.63	332.10	4/3.4/	552.0	·····	332.02	407.01	333.04	400.00	
489.21	333.72	489.91	333.8	491.62	334	493.37	334.43	497.2	
500.02	336	538.15	337.3	562.32	338	566.66	339.56	567.88	
340 570.08	340.79	571.45	341.28	573.44	342	575.51	342.74	579	
344									
582.46	345.25	584.56	346	595.56	347.12	603.22	348	611.05	
617.52	348.78	640.14	350	650.33	350.28	659.89	350.55	664.79	
350.69									
Manning's	n Value	a d	ກາ ເ m=	5					
Sta	n Val	 Sta	n Val	Sta	n Val	Sta	n Val	Sta	n
Val									
0 .025	.025	347.23	.035	372.75	.035	415.29	.035	444.28	
Dank Ota	Toft	Diabe	Tonath	. Loft	Channal	Diche	Cast	Contr	
Expan.	nerr	KTÂIIC	nendrus	. narr	CHAIIIICT	vrðir.	COELT	CUILL .	
3	47.23 4	44.28		215.16	233.86	259.36		.1	
.3									
Ineffecti	ve Flow	num=	2						
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Sta L	Sta R	Elev	Permane	nt					
0	347.23		F						
444.28	664.79		F						
CROSS SEC	TION		•						
אין איזעדע	arada Cla								
RIVER: AV			DC. 002	11077					
REACH: UP	per		KD: 075	.110/					
T NT TOT 107									
Dogorinti	$on \cdot u/c$	Entrance	into Da	rking Lo	t from A	lvarado	Road		
Description P	Jourstion	Data		115					
Station E	itevacion Blar	Dala	Elou	C+2	Flev	Sta	Rlev	Sta	
Sta	Elev	bla	FIEA	oca	10 T C A	Jua		Dea	
Elev		C 1		4 20	240 00	0 27	340 96	35 41	
0	341.07	.01	341.05	4.20	340.90	0.27	340.90	JJ	
340.58	210.00		240	40 77	220 40	E1 67	220	56 19	
42.9	340.06	43.69	340	49.77	338.48	51.67	220	50.19	
336.87				~~ ~~		67 60	7 7 4		
59.66	336	62.75	335.23	66.32	334.35	67.69	334	/5.11	
332.86									
80.74	332	84.11	331.89	85.87	331.83	112.84	330.97	115.86	
330.88									
125.01	330.59	127.52	330.52	131.75	330.39	139	330.16	139.98	
330.13									
142.53	330.08	143.04	330.09	145.27	330	155.28	329.62	160.35	
329.73									
164.89	329.74	165.91	329.52	168.88	329.36	170.54	329.17	172.21	
328.91									
173 36	328.79	176.53	328.57	177.33	328.52	178.07	328.51	182.26	
328 33	540.75								
192 77	328 34	188 66	328 25	189 44	328.26	192.99	328,17	195.25	
103.77	J20.J4	100.00		102111	000100				
328.09	200	100 64	227 00	107 1	227 67	197 75	377 37	198.21	
195.82	328	196.04	327.00	19/.1	527.07		327.32	10.44	
327.02		000 40	226	001 50	225 46	202 22	201 71	204 27	
198.98	326.67	200.42	326	201.52	343.40	203.22	524./4	204.27	
324.29						206 21	204 02	206 57	
204.58	324	206.21	322.11	206.25	322	206.31	321.83	206.57	
321.06						~~~ ~~		007 00	
206.94	320	207.14	319.28	207.49	318	207.55	317.65	207.92	
316									
207.94	315.91	208.06	315.25	208.3	314	237.41	315.82	237.57	
316	·								
238.09	316.62	238.61	317.21	239.1	317.78	239.29	318	239.83	
318.6									
241.08	320	241.77	320.75	243.11	322	243.86	322.66	244.94	
323.31									
245.44	323.62	245.94	324	247.56	325.25	248.53	326	248.91	
326.29									
250.97	328	251.9	328.77	253.38	330	255.09	331.42	255.78	
332									
267 66	332.51	299.68	334	308.07	334.78	314.73	335.51	319.19	
336	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					· · · · · ·			
301 AR	337 29	323.02	338	326.46	339.81	326.82	340	327.22	
340 21	~~, ~~~~		200						
سلىنىكە € ⊒ ~ ب									

342 331.45 342.44 332.97 343.23 334.42 344 343.82 330.62 344.63 345.2 344.72 345.73 344.75 346.14 344.78 346.4 344.55 344.68 344.79 346 398.47 347.31 415.46 348 416.2 358.71 345.53 366.61 348.02 Manning's n Values num= 5 n Val Sta Sta n Val Sta n Val Sta n Sta n Val Val .05 192.99 .025 207.94 .035 237.57 .035 255.78 0 .025 Lengths: Left Channel Right Coeff Contr. Bank Sta: Left Right Expan. 49.65 50.12 51.56 .1 164.89 255.78 .3 Ineffective Flow num= 2 Elev Permanent Sta L Sta R 0 164.89 F F 255.78 416.2 CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 843.0025 INPUT Description: d/s Entrance into Parking Lot from Alvarado Road Station Elevation Data num= 156 Elev Sta Elev Sta Elev Sta Elev Sta Sta Elev 2.76 12.36 343.22 12.94 343.2 16.73 0 343.42 343.4 343.21 24.77 343.07 30.96 342.92 49.04 342.66 19.9 343.22 53.21 342.53 67.44 64.01 342.14 342 73.11 340.59 75.5 340 82.22 338.32 91.1 336.11 91.52 336 91.58 335.98 99.41 83.53 338 334 332.6 107.01 332.15 107.77 332 100.38 333.75 105.16 113.88 332.03 129.28 332.35 133.87 332.5 135.07 120.46 332.21 128.03 332.41 332.59 144.21 332.87 144.92 332.89 145.97 140.71 332.75 143.64 332.84 332.94 148.3 332.98 149.8 332.99 150.42 333 151.43 333.01 152.47333.03 155.4 333.13 157.09 333.15 158.91 153.57 333.06 154.78 333.11 333.08 163.48 332.99 164.13 333.03 165.29 159.86 333.12 160.78 333.16 333.06 332.8 175.06 167.93 332.89 169.3 332.92 171.18 332.95 173.26 332.75 332.7 178.05 332.64 178.68 332.56 180.77 332.5 183.37 176.14 332

194	331.97	194.16	331.89	194.8	331.72	196.28	331.23	198.22	
330 199.21	329.16	199.4	329.08	199.71	328.96	199.85	328.9	200.2	
328.76			~~~ ~~			000 15		000 44	
200.51	328.64	201.11	328.39	201.7	328	202.15	327.69	202.44	
203.94	326	204.75	325.33	205.76	324.66	207.12	324	207.57	
323.78									
207.9	323.65	209.66	322.99	210.39	322	211.31	320.42	211.48	
211.76	318.94	212.01	318	212.28	316.86	212.47	316	212.56	
212.88	314	213.08	312.93	213.13	312.65	213.18	312.38	213.25	
231.31	312.59	231.8	312.68	234.12	313.1	239.04	314	239.96	
315.3									
240.47	316	240.86	316.54	241.46	317.38	241.92	318	243.26	
319.75 243.45	320	243.58	320.17	245.04	322	245.52	322.46	246.49	
323.24									
247.55	324	248.56	324.72	249.47	325.32	250.5	326	251.08	
326.38	226 01	n=n 00	227 52	252 62	220	254 96	220 70	256 81	
330	320.91	202.00	341.00	200.02	540	254.00	320.10	200.01	
257.02	330.13	257.52	330.44	259.27	331.67	259.76	332	263.82	
332.43									
264.57	332.49	265.21	332.53	265.61	332.56	270.08	333.03	270.29	
272.8	333.32	273.94	333.43	274,94	333.49	307.07	333.53	308.37	
333.58		2.3.31	000.10	2,11,2	000	•••••			
320.33	334	324.19	334.49	327.75	336	328.78	336.56	331.41	
338									
332.95	338.85	335	340	337.92	341.63	338.57	342	339.03	
347.36	344	349.55	344.09	351.48	344.18	367.08	344.83	382.17	
345.64									
385.33	345.8	388.81	346	400.98	346.51	410.17	346.87	422.67	
347.37	347 EE								
441.4	347.00								
Manning's	n Value	s	num=	5					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n
Val	00F	104	0.2 5	010 10	0.2 5	240.00	0.2.5	274 04	
.025	.025	194	.035	213.13	.035	240.86	.035	2/4.94	
			T (1)	T . C.	a l	D. J. alla de	G 6 6	Grander	
Bank Sta:	Lert	Right	Lengths	: Lert	Channel	Right	COEII	contr.	
Expan.	194 2	74.94		356.37	364.33	373.23		.1	
.3									
Ineffecti	ve Flow	num=	2						
Sta L	Sta R	Elev	Permane	nt					
274.94	194 427 2		<u>'ז</u> ד						
<u>.</u>	armer (9 Aul		-						
CROSS SEC	TION								

RIVER: REACH:	Avarado Ck Upper		RS: 478	.6733				
INPUT								
Descrip	tion:							
Station St	Elevation a Elev	Data Sta	num= Elev	121 Sta	Elev	Sta	Elev	Sta
Elev	0 358 87	47 84	358	56.98	357.46	60.13	356	61.62
355.3	0 550.07		550	50.90	00/110			
64.4 350	2 354	66.28	353.13	68.72	352	71.24	350.83	73.01
74.5	3 349.29	77.3	348	80.4	346.56	81.59	346	85.16
85.8	344	89.95	342.1	90.17	342	91.96	341.17	94.31
340.07 94.4	6 340	98.02	339.83	137.21	338	163.74	336.71	177.67
336 178 0	9 335 16	180.08	334.5	180.89	334	181,42	333.66	183.94
332		100.00		100.00	200.01	100 01	220	101 40
184.5 326.94	56 331.59	186.93	330	188.11	329.21	183.31	328	191.49
192.8	38 326	194.66	324.8	195.86	324	198.23	322.43	198.88
199.8	38 321.34	201.93	320	203.63	318.89	204.98	318	205.14
208.0)1 316	208.71	315.54	211.05	314	212.78	312.85	214.08
312 215.	.9 310.8	216.82	310.18	217.1	310	217.7	309.66	220.29
308	3 307 28	226.2	307.12	227.04	307	233.99	306	243.37
305.4					204	0.01 0.0		202 00
249.1 305.99	L5 305.07	255.69	304.67	267.57	304	301.99	305.35	303.99
304.(310	306	310.1	307.95	310.25	308	310.65	308.13	316.08
320.9	93 311.79	321.52	312	322	312.18	326.14	314	327.11
314.44 330.4	14 316	332.55	316.94	334.84	318	339.33	319.69	340.14
320 341.3	39 320.46	345.91	322	347.4	322.49	352.62	324	354.42
324.52	24 326	366.15	327	369.19	327.2	376.25	327.85	377.77
328				000 40	220 F	200 60	200 75	402 49
382.4 328.85	19 328.17	384.27	328.22	392.42	328.5	399.02	320.15	403.49
409.0	54 329.05	414.47	329.2	441.62	330	448.33	330.93	451.03
453.4	44 333.04	455.81	334	459.99	335.81	460.42	336	460.73
461.13 461.1	17 336.32	465.65	338	475.52	338.29	482.26	338.46	483.8
338.5 489.2	23 338.66	490.59	338.69	494.76	338.76	499.49	338.91	518.63
339.3 527.5	91 339.45	544.8	339.71	548.1	339.73	548.82	339.74	565.18
339.99								

566.16 340

Manning's n Values num= 5 Sta n Val Sta n Val Sta n Val Sta nVal Sta n Val .035 376.25 .025 177.67 .035 216.82 .035 303.99 0 .025 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 177.67 376.25 263.01 282.17 291.3 . 1 .3 Ineffective Flow 2 num= Elev Permanent Sta L Sta R 0 177.67 F 376.25 566.16 F CROSS SECTION RIVER: Avarado Ck REACH: Upper RS: 196.5054 INPUT Description: Station Elevation Data num= 148 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 361.57 13.89 360.66 20.01 360 22.8 358.47 23.36 358.18 358 24.06 357.81 27.45 356 29.87 354.71 31.2 23.7 354 34.95 38.53 350.09 38.7 350 39.78 32.34 353.39 352 349.42 348 347.9 46.29 346 345.9 50.12 42.46 42.66 46.47 34450.28 343.92 53.95 342 54.07 341.94 57.78 340 57.83 339.97 59.41 339.15 61.6 338 61.71 337.94 65.43 336 66.12 335.64 67.23 335.06 69.26 334 87.67 333.02 91.15 332.9 96.79 332.76 332.7 104.37 332.57 115.16 332.6 118.43 332.53 99.06 122.53 332.56 332.7 136.91 332.82 142.54 332.88 124.74 332.63 133.39 154.09 332 156.48 331.51 158.27 330.4 158.91 330 159.16 329.85 162.09 328 163.72 326.97 165.2 326 167.64 324.39 168.23 324 169.1 323.42 171.23 322 172.95 320.84 174.2 320 176.62 318.69 177.61 318.16 177.95 183.93 316.11 184.28 316 187.09 315.12 190.19 318 314.14 314 191.07 313.86 196.98 312 198.77 311.43 203.32 190.63 310

208.74	308.29	209.66	308	210.45	307.75	216.44	306	219.05	
219.58	305.47	228.46	304	249.87	302.01	249.97	302	311.64	
303.39 313.2	303.68	314.95	304	317.39	304.38	328.22	306	335.63	
307.21 340.86	308	344.52	309.88	344.74	310	344.93	310.1	348.49	
312	210.05	250 52	212 00	250 05	274		214 07	250	
348.58 316	312.05	350.53	313.08	354.45	314	352.38	314.07	350	
358.18 320	317.16	359.75	318	361.34	318.87	362.11	319.28	363.45	
364.29	320.52	364.86	320.89	366.56	322	368.37	323.18	369.63	
324 371.52	325.24	372.69	326	374.73	327.33	375.76	328	379.79	
328.4 380.58	328.42	382.12	328.46	385.05	328.55	410.07	329.71	415.78	
330 416.23	331.48	416.39	332	416.84	333.51	416.99	334	417.09	
334.32	336	418 15	337 87	418 19	338	418 68	339 69	418.77	
340		110.13	557.07	******		110.00			
419.27 344.29	341.68	419.36	342	419.78	343.3	420.01	344	430.88	
435.08 347 54	344.7	448.65	346	463.87	346.83	487.74	348	544.46	
548.06	347.24	556.42	346.5	559.66	346.24	562.4	346	564.14	
345.65 569.42	344.57	572.14	344	575.15	343.33	581.2	342	584.36	
341.28 588.47	340.35	590.08	340	592.51	339.4				
Manning!g	n Value	a		Ę					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n
Val 0	.025	20.01	.05	219.05	.035	313.2	.05	487.74	
.025									
Bank Sta:	Left	Right	Lengths	: Left C	hannel	Right	Coeff	Contr.	
Expan.	42.54 3	79.79		225.51	190.7	180.22		.1	
.3 Ineffecti	ve Flow	num=	2						
Sta L	Sta R	Elev	Permane	nt					
0 379.79	142.54 592.51		F						
CROSS SEC	TTON								
RIVER: Ava REACH: Upp	arado Ck per	:	RS: 5.8	02783					
INPUT	INPUT								
Description F	on: u/s levation	face of 2 Data	Alvarado	Road Cr	ossing				
		Luca		20 V J					

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
0	342.76	1.15	342.36	1.9	342.17	2.32	342	16.02
340.49								
17.61	340.36	19.05	340	30.76	338.79	31.07	338.72	32.63
338.54								25.00
33.27	338.48	33.96	338.41	34.71	338.32	35.54	338.21	35.96
338.16							226	co` ac
37.07	338	49.83	336.52	51.17	336.24	52.37	336	62.46
334.46						m 4 0 0	220 4	#F 33
64.12	334	73.81	332.59	74.03	332.53	74.89	332.4	15.32
332.34			~~~ ~~			76 0	220 10	77 56
75.75	332.27	76.17	332.21	76.58	332.15	/6.8	332.12	11.50
332			~~~	100.00	200 21	110 44	220 16	110 OF
94.75	330.52	97.74	330	108.92	328.71	110.44	328.10	110.95
328.1				110 61	222 26	100 05	226 07	124 00
111.98	328	118.11	327.48	118.01	327.30	122.35	320.91	124.09
326.81			206 40	100 00	226 38	101 10	226	122 20
125.85	326.6	127.73	326.42	129.89	326.17	131.10	320	134.49
325.84			224 62	340 44	224	140 67	222 76	161 67
133.38	325.59	137.89	324.62	140.44	324	140.07	344.10	151.57
322			220 10	165 00	220	167 04	210 04	160 24
162.45	320.52	165.25	320.16	162.98	320	167.04	319.04	100.34
319.71	~~~ ~~	201 47	210 20	100 04	710	204 84	217 20	212 2
177.69	318.66	181.47	318.39	180.04	318	204.84	31/.20	414.3
317.06	216 46	224 20	01 <i>C</i> 4	336 7	216	222 62	215 27	240 21
221.66	316.46	224.29	316.4	228.7	310	233.05	272.21	240.31
314.71	214 4	244 07	214 27	240 AC	214	252 32	313 64	254 46
243.05	314.4	244.97	314.4/	240,40	Э.Т. 4	200.04	373.04	234.40
313.58	232 24	162 ED	212 11	267 01	212 02	270 54	312 76	272 63
201.21	313.24	203.52	272.11	207.01	212.22	270.54	312.10	2/2.00
276 07	212 4	001 AC	210	791 91	211 0	282 48	311 5	284 62
2/0.9/	312.4	201.40	2.44	201.71	J.T. 7	202.10	041.0	202.02
20E 74	200 06	295 79	308	285 82	307 93	286 93	306	287.26
203.74	308.00	205.70	500	205.02	507.25	200.00	500	101110
303.43 207 E1	305 03	288 09	304	288 89	302 65	289 29	302	289.61
207.51	305.02	200.09	50~±	200.02	302.03	202.22	502	202.01
201.31 201.51	200	291 66	298 35	291 91	298	292.07	297.77	292.1
290.00	500	291.00	220.33		200		237.77	
291.13	295	307 28	296 23	308 28	297 51	308.67	298	308.89
223.33	200	507.20	230.23	500.20		50010.		
310.28	300	310 44	300.2	311.76	301.84	311.89	302	312
302 14	200	270.44	500.2	922170	501101			
313 07	304	313 68	305 49	313,94	306	314.34	307.3	314.63
308	504	515.00	202.12	020172	000	521701		
314 97	209 13	315 16	309.75	315.22	310	315.5	310.49	316.4
312	000,20	010.10	000.00	020.000				
317 97	313 13	319,19	314	321.45	315.61	322	316	322.37
316.26	~~~	010.000						
324.82	318	327.16	319.66	327.65	320	328.35	320.5	330.47
322	510	~						
332.04	323 11	333.3	324	334.77	325.04	336.12	326	337.6
327,04								
338.91	328	341.25	329.73	341.63	330	343.48	331.42	344.25
332								

345.15	332.7	346.84	334	348.83	335.46	349.54	336	351.35
336.25								
353.83	336.45	362	337.3	368.9	337.75	369.76	337.82	372.93
338								
375.05	338.07	375.57	338.11	376.42	338.18	380.73	338.42	382
338.5	~~~ ~~							
385.92	338.73	396.28	340	396.64	340.53	397.6	342	397.91
342.49	744	200 10	244 47	41E D	246	492 01	347 63	176 02
398.85	344	399.12	344.41	415.3	340	4/3.91	347.62	4/0.03
34/.2/	2477 10	477 00	247 10	<u> </u>	247 00	A77 7	247 12	170 60
4//.UZ	347,17	4//.22	347.14	4//.4	547.00	4//./	241.12	4/0.00
482 66	346 63	484 13	346 55	484 71	346 49	490 41	346	493 45
345.96	540.05	201.13	540.55		540.42	10.11	540	*******
506.78	345.79	507.71	345.76	507.76	345.75	508.59	345.73	516.71
345.61	0.0000							
517.78	345.58	521.56	345.52	522.54	345.49	523.29	345.47	523.71
345.45								
524.12	345.44	524.46	345.43	524.83	345.42	524.95	345.41	525.61
345.39								
526.52	345.35	526.91	345.34	527.41	345.32	528.95	345.27	529.36
345.25								
535.06	345.09	539.77	344.87	542.14	344.81	543.79	344.77	555.55
344.13								
555.77	344.12	555.89	344.11	556.15	344.1	557.82	344	574.08
342.79								
579.5	342.38							
Manningla				4				
Manning's	n varue	28 Cto		4		0+	~ <u>V</u> ~]	
5LA A		202 07	11 Vai	210 44	II VAL	3LA 115 2	II Val	
0	.05	292.07	.035	310.44	.05	410.J	.025	
Bank Sta:	ī _e ft	Right	Lengths	: Left C	hannel	Right	Coeff	Contr.
Expan.	_~~~							
E ·	1.15	362		8.78	5.8	0		.1

SUMMARY OF MANNING'S N VALUES

River:Avarado Ck

]	Reach	River	Sta.	nl	n2	n3	n4
n5	n6	n7	n8				
Upper		3975	.018	.025	.018	.02	.018
Upper .025		3918	.558	.025	.018	.02	.018
Upper .025		3881	.736	.025	.018	.02	.018
Upper		3870	.768	.025	.018	.02	.018
Upper .025		3690	.298	.025	.018	.02	.018

Upper .025		3362.059	.025	.018	.02	.018
Upper .025		3046.513	.025	.018	.02	.018
Upper .025		2808.985	.018	.018	.035	.018
Upper		2292.941	.04	.035	.018	.025
reqU		1897.670	.045	.035	.018	.025
Upper .025		1432.619	.045	.045	.035	.045
Upper		1381.67*	.042	.035	.035	.035
.035	.035	.025 .025				
Upper		1330.74*	.038	.035	.035	.035
.035	.034	.025 .025				
Upper		1279.8*	.035	.035	.035	.035
.035	.034	.025 .025				
Upper		1228.86*	.032	.035	.035	.035
.035	.034	.025 .025				•
Upper		1177.92*	.028	.035	.035	.035
.035	.034	.025 .025				
Upper .025		1126.981	.025	.035	.035	.035
Upper .025		893.1187	.05	.025	.035	.035
Upper .025		843.0025	.025	.035	.035	.035
Upper .025		478.6733	.025	.035	.035	.035
Upper .025		196.5054	.025	.05	.035	.05
Upper		5.802783	.05	.035	.05	.025

SUMMARY OF REACH LENGTHS

River: Avarado Ck

Reach	River Sta.	Left	Channel	Right
Upper	3975.018	56.06	56.46	57.46
Upper	3918.558	36.89	36.82	36.86
Upper	3881.736	11.11	10.97	10.38
Upper	3870.768	179.97	180.47	180.91
Upper	3690.298	344.53	328.24	316.06
Upper	3362.059	323.3	315.55	308.79
Upper	3046.513	240.61	237.53	235.74
Upper	2808.985	519.53	516.04	514.95
Upper	2292.941	410.33	395.27	385.35
Upper	1897.670	469.57	465.05	461.75
Upper	1432.619	48.87	50.94	52.85
Upper	1381.67*	48.87	50.94	52.85
Upper	1330.74*	48.87	50.94	52.85
Upper	1279.8*	48.87	50.94	52.85
Upper	1228.86*	48.87	50.94	52.85
Upper	1177.92*	48.87	50.94	52.85

Upper	1126.981	215.16	233.86	259.36
Upper	893.1187	49.65	50.12	51.56
Upper	843.0025	356.37	364.33	373.23
Upper	478.6733	263.01	282.17	291.3
Upper	196.5054	225.51	190.7	180.22
Upper	5.802783	8.78	5.8	0

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SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: Avarado Ck

Reach	River Sta.	Contr.	Expan.
Upper	3975.018	.1	.3
Upper	3918.558	.1	.3
Upper	3881.736	.1	.3
Upper	3870.768	.1	.3
Upper	3690.298	.1	.3
Upper	3362.059	• .1	.3
Upper	3046.513	.1	.3
Upper	2808.985	.1	.3
Upper	2292.941	.1	.3
Upper	1897.670	.1	.3
Upper	1432.619	.1	.3
Upper	1381.67*	.1	.3
Upper	1330.74*	. 1	.3
Upper	1279.8*	.1	.3
Upper	1228.86*	.1	.3
Upper	1177.92*	.1	.3
Upper	1126.981	.1	.3
Upper	893.1187	.1	.3
Upper	843.0025	.1	.3
Upper	478.6733	.1	.3
Upper	196.5054	.1	.3
Upper	5.802783	.1	.3