

**FINAL DESIGN ONSITE DRAINAGE STUDY
FOR HARMONY GROVE VILLAGE**

(PHASE 1, VTM 5365)

Job Number 16412-W

October 13, 2011

Revised: January 30, 2012

Revised: April 30, 2012

Revised: August 1, 2012

Revised: August 23, 2012

Revised: September 20, 2012

RICK
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RICK ENGINEERING CO

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Prepared For:



Standard Pacific Homes
26 Technology Drive
Irvine, CA 92618
Mr. Tim Wellman
(949) 789-1733

Prepared By:

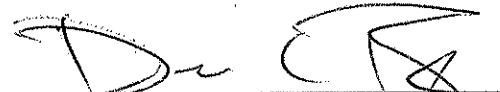


Rick Engineering Company
Water Resources Division
5620 Friars Road
San Diego, California 92110-2596
(619) 291-0707
www.rickengineering.com

DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the engineer of work for this project, that I have exercised responsible charge over the design of this drainage report as defined in Section 6703 of the Business and Professions Code, and opine that the design is consistent with current standards.

I understand that the check of the drainage report by the County of San Diego is confined to a review only and does not relieve me, as the engineer of work, of any responsibilities for the project design.


Dennis C. Bowling, M.S.
RCE # 32838, Exp. 06/14
Principal



Job Number 16412-W

**Table 3: Summary of HEC-1 Results for the 2-, 10-, and 100-Year
Pre- and Post-Project Peak Discharge Rates
For Harmony Grove Village/Eden Valley Creek**

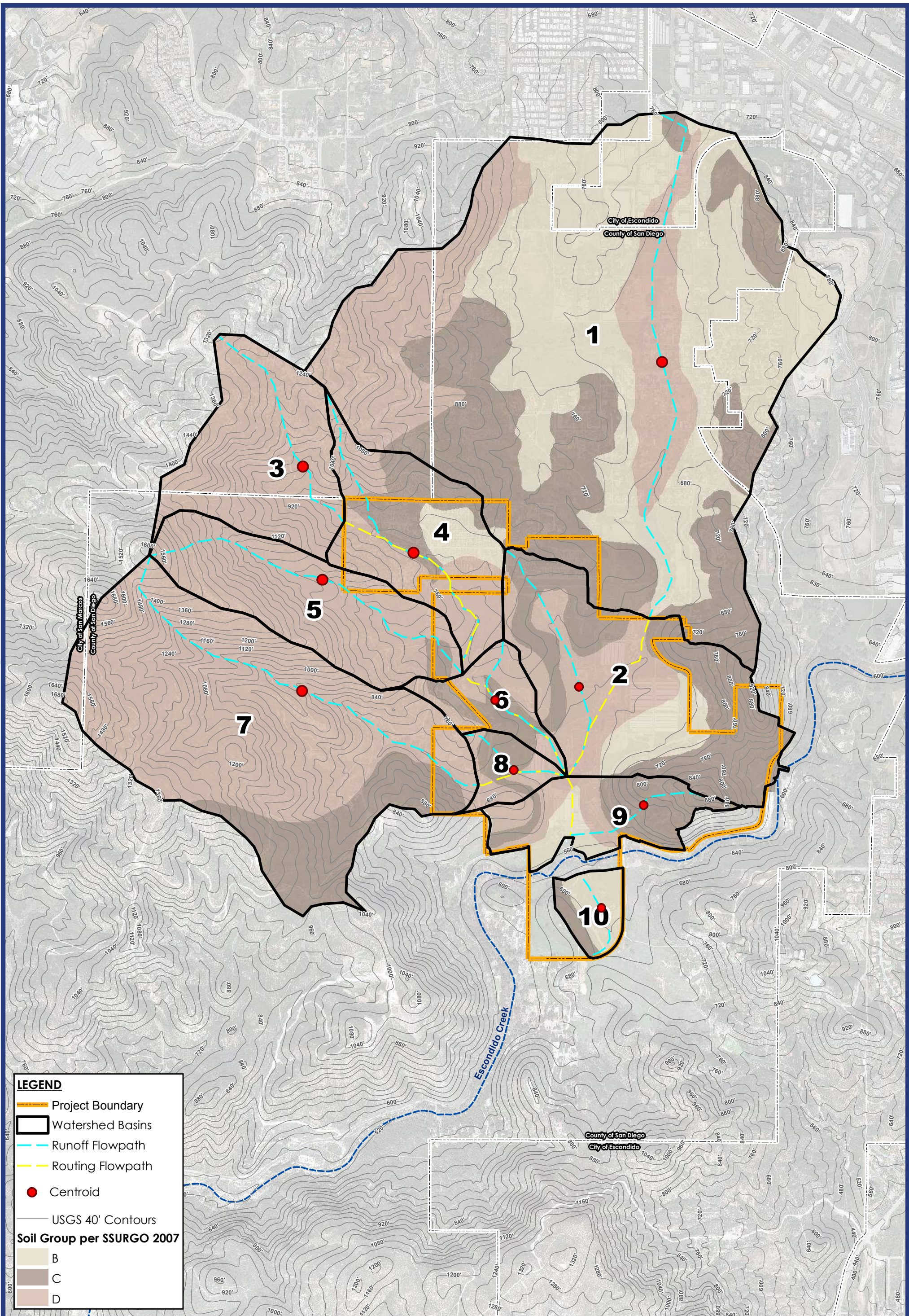
Watersheds North of Escondido Creek

Drainage Basin	Drainage Basin Area (sq mi)	2-Year Storm Event (cfs) ⁽¹⁾	10-Year Storm Event (cfs)	100-Year Storm Event (cfs)	100-year Storage Volume (ac-ft)
Pre-Project North ⁽²⁾	1.27	390	749	1636	--
Post-Project North (Detained)	1.3	347	672	1383	20.0
Pre-Project West ⁽³⁾	0.56	312	541	1056	--
Post-Project West (Detained)	0.56	301	510	901	5.4
Pre-Project Total ⁽⁴⁾	2.92	1047	1906	3918	--
Post-Project Total (Detained)	2.92	1006	1741	3404	--

Watershed South of Escondido Creek

Drainage Basin	Drainage Basin Area (sq mi)	2-Year Storm Event (cfs) ⁽¹⁾	10-Year Storm Event (cfs)	100-Year Storm Event (cfs)	100-year Storage Volume (ac-ft)
Pre-Project South	0.01	6.8	9.8	16.0	--
Post-Project South (Detained)	0.01	4.4	6.4	10.5	0.434

HEC-1 Workmaps



LEGEND

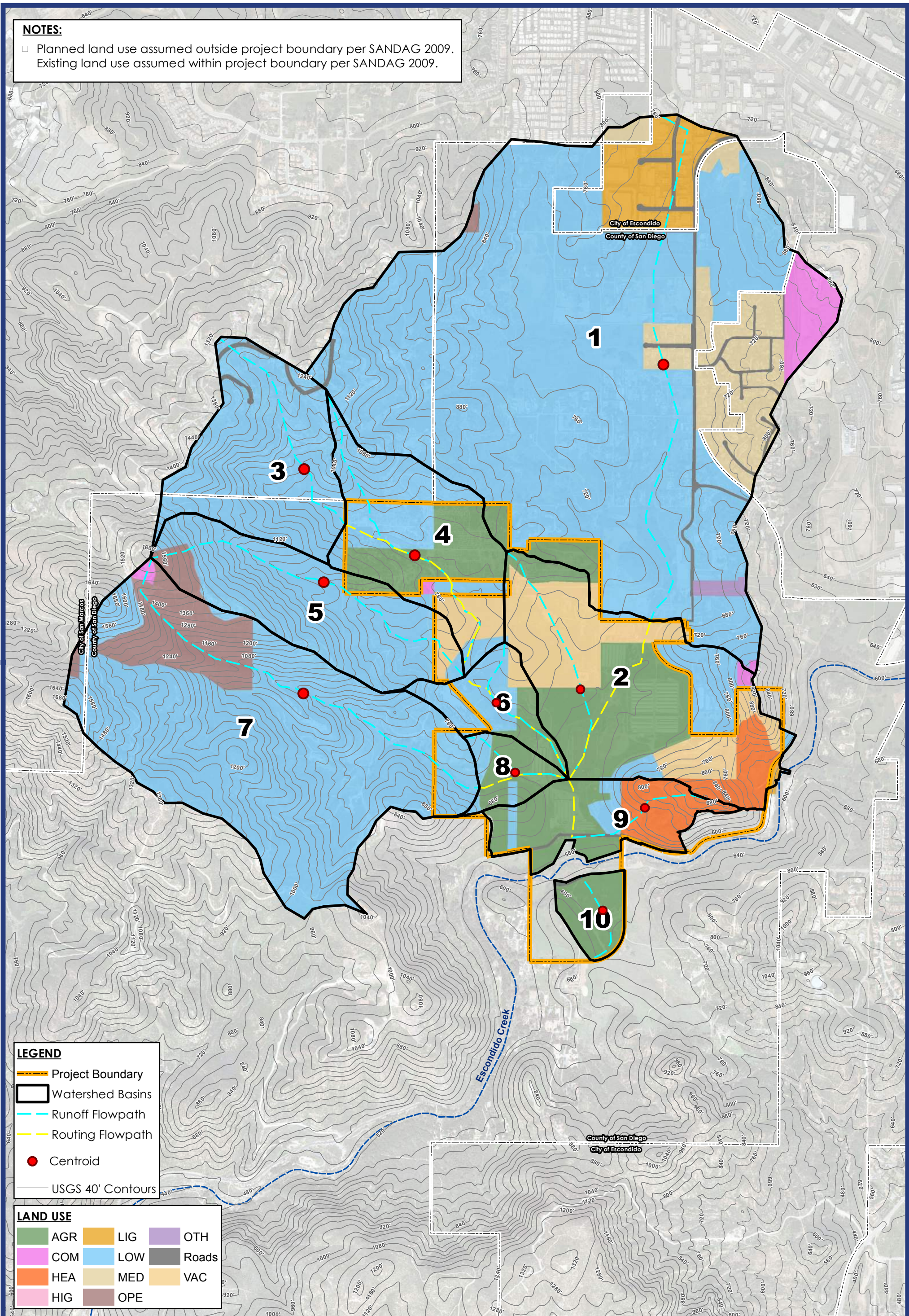
- Project Boundary
- Watershed Basins
- Runoff Flowpath
- Routing Flowpath
- Centroid
- USGS 40' Contours

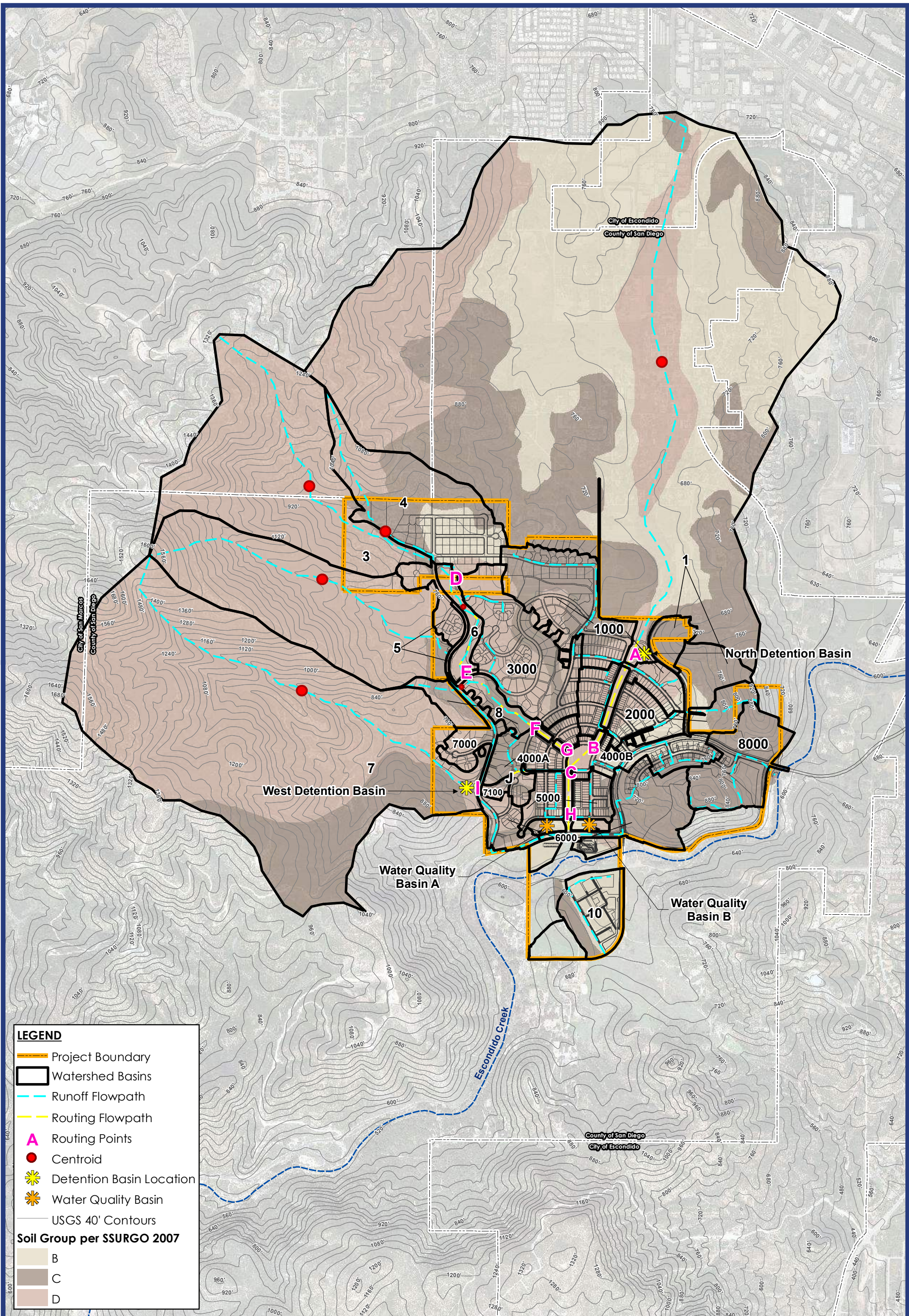
Soil Group per SSURGO 2007

- B
- C
- D

NOTES:

- Planned land use assumed outside project boundary per SANDAG 2009.
- Existing land use assumed within project boundary per SANDAG 2009.





LEGEND

- Project Boundary
- Watershed Basins
- Runoff Flowpath
- Routing Flowpath
- Routing Points
- Centroid
- Detention Basin Location
- Water Quality Basin
- USGS 40' Contours

Soil Group per SSURGO 2007

- B
- C
- D

0 625 1,250 2,500 3,750 Feet

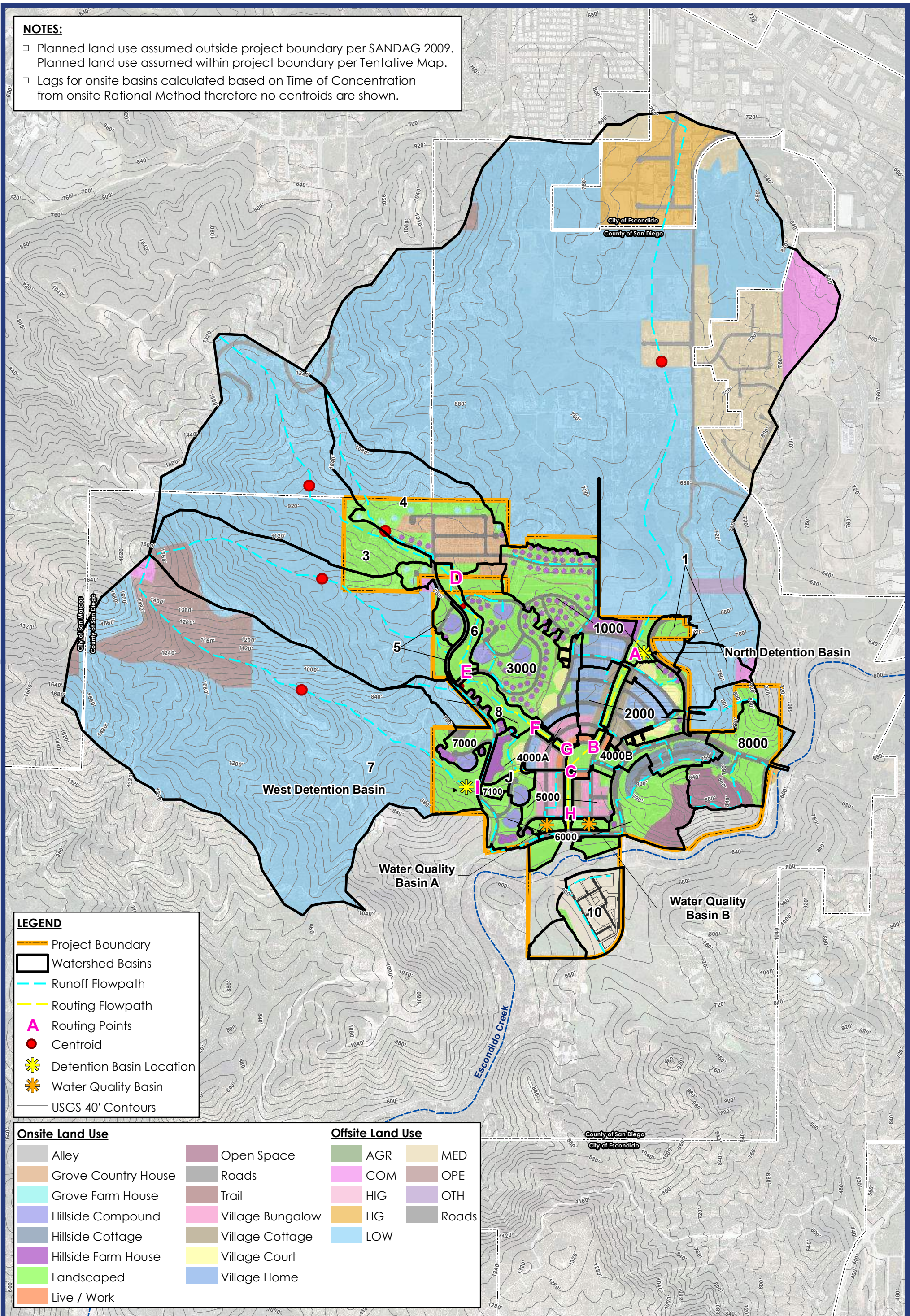
RICK
ENGINEERING COMPANY

REC JN: 16412
Exhibit Date: August 1, 2012
Path: H:\16412\GIS\16412_HEC-1_Post_Soils.mxd

Harmony Grove HEC-1 Soil Group Workmap

Post-Project Conditions

- NOTES:**
- Planned land use assumed outside project boundary per SANDAG 2009. Planned land use assumed within project boundary per Tentative Map.
 - Lags for onsite basins calculated based on Time of Concentration from onsite Rational Method therefore no centroids are shown.



- LEGEND**
- Project Boundary
 - Watershed Basins
 - Runoff Flowpath
 - Routing Flowpath
 - Routing Points
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Onsite Land Use			Offsite Land Use		
Alley	Open Space	AGR	MED		
Grove Country House	Roads	COM	OPE		
Grove Farm House	Trail	HIG	OTH		
Hillside Compound	Village Bungalow	LIG	Roads		
Hillside Cottage	Village Cottage	LOW			
Hillside Farm House	Village Court				
Landscaped	Village Home				
Live / Work					

Curve Number Backup



Watershed Basin	Hydrologic Soil Group	Hydrologic Land Use	Land Use Description	Area (ac)	Fraction of Watershed Basin Area (A/A)	NRCS Curve Number (CN) for PZ = 2.0, Soil B	NRCS Curve Number (CN) for PZ = 2.0, Soil C	NRCS Curve Number (CN) for PZ = 2.0, Soil D	Practical CN (CN2)(A/A)
1	B	AGR	Pasture or Range Land Fair	0.03	0.0000	69	79	84	0.0029
1	B	AGR	Pasture or Range Land Fair	0.01	0.0000	69	79	84	0.0007
1	B	AGR	Pasture or Range Land Fair	0.98	0.0012	69	79	84	0.0834
1	C	AGR	Pasture or Range Land Fair	2.95	0.0036	69	79	84	0.2870
1	C	AGR	Pasture or Range Land Fair	0.21	0.0003	69	79	84	0.0200
1	C	AGR	Pasture or Range Land Fair	9.66	0.0119	69	79	84	0.9384
1	B	COM	Urban District Com and Bus	4.80	0.0059	92	94	95	0.5434
1	B	COM	Urban District Com and Bus	15.10	0.0186	92	94	95	1.7076
1	B	COM	Urban District Com and Bus	1.72	0.0021	92	94	95	0.1945
1	C	COM	Urban District Com and Bus	0.63	0.0008	92	94	95	0.0733
1	C	COM	Urban District Com and Bus	0.02	0.0000	92	94	95	0.0027
1	C	COM	Urban District Com and Bus	0.12	0.0001	92	94	95	0.0134
1	B	HIG	Residential 1/8 ac or less	0.38	0.0005	85	90	92	0.0400
1	D	HIG	Residential 1/8 ac or less	0.02	0.0000	85	90	92	0.0021
1	D	HIG	Residential 1/8 ac or less	0.05	0.0001	85	90	92	0.0054
1	B	LIG	Urban District Industrial	0.29	0.0004	88	91	93	0.0314
1	B	LIG	Urban District Industrial	30.50	0.0375	88	91	93	3.3000
1	C	LIG	Urban District Industrial	3.55	0.0044	88	91	93	0.3972
1	D	LIG	Urban District Industrial	8.47	0.0104	88	91	93	0.9679
1	B	LOW	Residential 1 ac	41.78	0.0514	68	79	84	3.4931
1	B	LOW	Residential 1 ac	14.69	0.0181	68	79	84	1.2283
1	B	LOW	Residential 1 ac	6.80	0.0084	68	79	84	0.5682
1	B	LOW	Residential 1 ac	36.60	0.0450	68	79	84	3.0594
1	B	LOW	Residential 1 ac	8.94	0.0110	68	79	84	0.7471
1	B	LOW	Residential 1 ac	18.79	0.0231	68	79	84	1.5710
1	B	LOW	Residential 1 ac	17.16	0.0211	68	79	84	1.4345
1	B	LOW	Residential 1 ac	13.45	0.0165	68	79	84	1.1246
1	B	LOW	Residential 1 ac	3.84	0.0047	68	79	84	0.3209
1	B	LOW	Residential 1 ac	90.62	0.1114	68	79	84	7.5754
1	C	LOW	Residential 1 ac	12.72	0.0156	68	79	84	1.2351
1	C	LOW	Residential 1 ac	8.35	0.0103	68	79	84	0.8107
1	C	LOW	Residential 1 ac	39.63	0.0487	68	79	84	3.8489
1	C	LOW	Residential 1 ac	14.05	0.0173	68	79	84	1.3644
1	C	LOW	Residential 1 ac	72.49	0.0891	68	79	84	7.0401
1	C	LOW	Residential 1 ac	0.24	0.0003	68	79	84	0.0238
1	C	LOW	Residential 1 ac	1.55	0.0019	68	79	84	0.1505
1	C	LOW	Residential 1 ac	50.86	0.0625	68	79	84	4.9392
1	D	LOW	Residential 1 ac	2.72	0.0033	68	79	84	0.2807
1	D	LOW	Residential 1 ac	0.11	0.0001	68	79	84	0.0114
1	D	LOW	Residential 1 ac	13.88	0.0171	68	79	84	1.4338
1	D	LOW	Residential 1 ac	30.07	0.0370	68	79	84	3.1048
1	D	LOW	Residential 1 ac	6.15	0.0076	68	79	84	0.6353
1	D	LOW	Residential 1 ac	42.44	0.0522	68	79	84	4.3827
1	D	LOW	Residential 1 ac	73.93	0.0909	68	79	84	7.6347
1	D	LOW	Residential 1 ac	0.30	0.0004	68	79	84	0.0307
1	B	MED	Residential 1/4 ac	1.28	0.0016	75	83	87	0.1181
1	B	MED	Residential 1/4 ac	0.08	0.0001	75	83	87	0.0074
1	B	MED	Residential 1/4 ac	55.69	0.0685	75	83	87	5.1347
1	C	MED	Residential 1/4 ac	16.37	0.0201	75	83	87	1.6706
1	D	MED	Residential 1/4 ac	0.48	0.0006	75	83	87	0.0511
1	D	MED	Residential 1/4 ac	0.02	0.0000	75	83	87	0.0026

Watershed Basin	Hydrologic Land Use	Hydrologic Soil Group	Land Use Description	Area (ac)	Fraction of Watershed Basin Area (A/A)	NRCS Curve Number (CN) for PZ = 2.0, Soil B	NRCS Curve Number (CN) for PZ = 2.0, Soil C	NRCS Curve Number (CN) for PZ = 2.0, Soil D	Practical CN (CN2)(A/A)
1	COM	B	Urban District Com and Bus	4.8042	0.0058	92	94	95	0.5294
1	COM	B	Urban District Com and Bus	15.0974	0.0181	92	94	95	1.6638
1	COM	B	Urban District Com and Bus	1.7196	0.0021	92	94	95	0.1895
1	COM	C	Urban District Com and Bus	0.6339	0.0008	92	94	95	0.0714
1	COM	C	Urban District Com and Bus	0.0238	0.0000	92	94	95	0.0027
1	COM	C	Urban District Com and Bus	0.1162	0.0001	92	94	95	0.0131
1	Grove Country House	C	refer to attached table	0.0409	0.0000	85	89	92	0.0044
1	HIG	B	Residential 1/8 ac or less	0.3824	0.0005	85	90	92	0.0389
1	HIG	D	Residential 1/8 ac or less	0.0183	0.0000	85	90	92	0.0020
1	HIG	D	Residential 1/8 ac or less	0.0473	0.0001	85	90	92	0.0052
1	Hillside Farm House	C	refer to attached table	0.0004	0.0000	85	89	92	0.0000
1	Hillside Farm House	C	refer to attached table	0.2759	0.0003	85	89	92	0.0294
1	Hillside Farm House	C	refer to attached table	0.0038	0.0000	85	89	92	0.0004
1	Hillside Farm House	D	refer to attached table	0.5025	0.0006	85	89	92	0.0554
1	Hillside Farm House	D	refer to attached table	0.1361	0.0002	85	89	92	0.0150
1	Landscaped	B	Open Space Fair	0.0316	0.0000	69	79	84	0.0026
1	Landscaped	B	Open Space Fair	0.0076	0.0000	69	79	84	0.0006
1	Landscaped	B	Open Space Fair	0.1134	0.0001	69	79	84	0.0094
1	Landscaped	C	Open Space Fair	2.9323	0.0035	69	79	84	0.2775
1	Landscaped	C	Open Space Fair	0.0104	0.0000	69	79	84	0.0010
1	Landscaped	C	Open Space Fair	0.1751	0.0002	69	79	84	0.0166
1	Landscaped	C	Open Space Fair	0.0157	0.0000	69	79	84	0.0015
1	Landscaped	C	Open Space Fair	3.5757	0.0043	69	79	84	0.3384
1	Landscaped	C	Open Space Fair	0.8010	0.0010	69	79	84	0.0758
1	Landscaped	D	Open Space Fair	0.3866	0.0005	69	79	84	0.0389
1	Landscaped	D	Open Space Fair	1.7080	0.0020	69	79	84	0.1719
1	Landscaped	D	Open Space Fair	0.9615	0.0012	69	79	84	0.0967
1	LIG	B	Urban District Industrial	0.2903	0.0003	88	91	93	0.0306
1	LIG	B	Urban District Industrial	30.5037	0.0365	88	91	93	3.2154
1	LIG	C	Urban District Industrial	3.5501	0.0043	88	91	93	0.3870
1	LIG	D	Urban District Industrial	8.4661	0.0101	88	91	93	0.9431
1	LOW	B	Residential 1 ac	41.7841	0.0501	68	79	84	3.4034
1	LOW	B	Residential 1 ac	14.6930	0.0176	68	79	84	1.1968
1	LOW	B	Residential 1 ac	6.7938	0.0081	68	79	84	0.5534
1	LOW	B	Residential 1 ac	36.5962	0.0438	68	79	84	2.9809
1	LOW	B	Residential 1 ac	8.9370	0.0107	68	79	84	0.7279
1	LOW	B	Residential 1 ac	18.7914	0.0225	68	79	84	1.5306
1	LOW	B	Residential 1 ac	17.1597	0.0206	68	79	84	1.3977
1	LOW	B	Residential 1 ac	13.4529	0.0161	68	79	84	1.0958
1	LOW	B	Residential 1 ac	3.8390	0.0046	68	79	84	0.3127
1	LOW	B	Residential 1 ac	90.6176	0.1085	68	79	84	7.3811
1	LOW	C	Residential 1 ac	12.7169	0.0152	68	79	84	1.2034
1	LOW	C	Residential 1 ac	8.3144	0.0100	68	79	84	0.7868
1	LOW	C	Residential 1 ac	38.9817	0.0467	68	79	84	3.6888
1	LOW	C	Residential 1 ac	15.3705	0.0184	68	79	84	1.4545
1	LOW	C	Residential 1 ac	72.3237	0.0866	68	79	84	6.8440
1	LOW	C	Residential 1 ac	0.2446	0.0003	68	79	84	0.0231
1	LOW	C	Residential 1 ac	1.5999	0.0019	68	79	84	0.1514
1	LOW	C	Residential 1 ac	50.8559	0.0609	68	79	84	4.8125

1	D	MED	Residential 1/4 ac	0.04	0.0001	75	83	87	0.0045
1	D	MED	Residential 1/4 ac	7.38	0.0091	75	83	87	0.7894
1	D	OPE	Open Brush Fair	1.42	0.0017	66	77	83	0.1445
1	B	OTH	Narrowleaf Chaparral Fair	1.20	0.0015	72	81	86	0.1061
1	C	OTH	Narrowleaf Chaparral Fair	2.77	0.0034	72	81	86	0.2761
1	C	OTH	Narrowleaf Chaparral Fair	0.08	0.0001	72	81	86	0.0079
1	B	Road	Road	1.71	0.0021	98	98	98	0.2057
1	B	Road	Road	0.00	0.0000	98	98	98	0.0004
1	B	Road	Road	0.47	0.0006	98	98	98	0.0571
1	B	Road	Road	0.04	0.0001	98	98	98	0.0051
1	B	Road	Road	14.43	0.0177	98	98	98	1.7386
1	C	Road	Road	0.11	0.0001	98	98	98	0.0137
1	C	Road	Road	2.08	0.0026	98	98	98	0.2502
1	D	Road	Road	4.12	0.0051	98	98	98	0.4958
1	B	VAC	Annual Grass Dryland Pasture Poor	0.01	0.0000	78	86	89	0.0006
1	C	VAC	Annual Grass Dryland Pasture Poor	0.04	0.0000	78	86	89	0.0041
1	C	VAC	Annual Grass Dryland Pasture Poor	0.56	0.0007	78	86	89	0.0587
1	C	VAC	Annual Grass Dryland Pasture Poor	1.36	0.0017	78	86	89	0.1436
1	C	VAC	Annual Grass Dryland Pasture Poor	0.03	0.0000	78	86	89	0.0029
1	C	VAC	Annual Grass Dryland Pasture Poor	0.01	0.0000	78	86	89	0.0007
1	D	VAC	Annual Grass Dryland Pasture Poor	0.00	0.0000	78	86	89	0.0000
1	D	VAC	Annual Grass Dryland Pasture Poor	0.00	0.0000	78	86	89	0.0001

Total Area 813.42
acres 1.271
sq mi

78 PZN 2.0
79 PZN Condition 2,10-year
85 PZN Condition 100-year

1	LOW	D	Residential 1 ac	2.7178	0.0033	68	79	84	0.2735
1	LOW	D	Residential 1 ac	0.1107	0.0001	68	79	84	0.0111
1	LOW	D	Residential 1 ac	14.1137	0.0169	68	79	84	1.4201
1	LOW	D	Residential 1 ac	30.0653	0.0360	68	79	84	3.0251
1	LOW	D	Residential 1 ac	6.1522	0.0074	68	79	84	0.6190
1	LOW	D	Residential 1 ac	42.4404	0.0508	68	79	84	4.2703
1	LOW	D	Residential 1 ac	73.9309	0.0886	68	79	84	7.4388
1	LOW	D	Residential 1 ac	0.2969	0.0004	68	79	84	0.0299
1	MED	B	Residential 1/4 ac	1.2813	0.0015	75	83	87	0.1151
1	MED	B	Residential 1/4 ac	0.0798	0.0001	75	83	87	0.0072
1	MED	B	Residential 1/4 ac	55.6891	0.0667	75	83	87	5.0030
1	MED	C	Residential 1/4 ac	16.3726	0.0196	75	83	87	1.6278
1	MED	D	Residential 1/4 ac	0.4779	0.0006	75	83	87	0.0498
1	MED	D	Residential 1/4 ac	0.0248	0.0000	75	83	87	0.0026
1	MED	D	Residential 1/4 ac	0.0418	0.0001	75	83	87	0.0044
1	MED	D	Residential 1/4 ac	7.3804	0.0088	75	83	87	0.7691
1	OPE	D	Open Brush Fair	1.4159	0.0017	66	77	83	0.1408
1	OTH	B	Narrowleaf Chaparral Fair	1.1982	0.0014	72	81	86	0.1033
1	OTH	C	Narrowleaf Chaparral Fair	2.7727	0.0033	72	81	86	0.2690
1	OTH	C	Narrowleaf Chaparral Fair	0.0797	0.0001	72	81	86	0.0077
1	Road	B	Road	1.7070	0.0020	98	98	98	0.2004
1	Road	B	Road	0.0037	0.0000	98	98	98	0.0004
1	Road	B	Road	0.4743	0.0006	98	98	98	0.0557
1	Road	B	Road	0.0427	0.0001	98	98	98	0.0050
1	Road	B	Road	14.4303	0.0173	98	98	98	1.6940
1	Road	C	Road	0.0570	0.0001	98	98	98	0.0067
1	Road	C	Road	2.0766	0.0025	98	98	98	0.2438
1	Road	D	Road	4.1150	0.0049	98	98	98	0.4831
1	Road	D	Road	0.0027	0.0000	98	98	98	0.0003
1	Trail	B	Gravel	0.0046	0.0000	85	89	91	0.0005
1	Trail	B	Gravel	0.0078	0.0000	85	89	91	0.0008
1	Trail	C	Gravel	0.0892	0.0001	85	89	91	0.0095
1	Trail	C	Gravel	0.0002	0.0000	85	89	91	0.0000
1	Trail	C	Gravel	0.0326	0.0000	85	89	91	0.0035
1	Trail	C	Gravel	0.0002	0.0000	85	89	91	0.0000
1	Trail	C	Gravel	0.0021	0.0000	85	89	91	0.0002
1	Trail	C	Gravel	0.0298	0.0000	85	89	91	0.0032
1	Trail	D	Gravel	0.0014	0.0000	85	89	91	0.0002
1	Trail	D	Gravel	0.0728	0.0001	85	89	91	0.0079
1	Village Court	D	refer to attached table	0.0045	0.0000	89	92	94	0.0005
1	Village Court	D	refer to attached table	0.0152	0.0000	89	92	94	0.0017
1000B	COM	C	Urban District Com and Bus	1.0285	0.0012	92	94	95	0.1158
1000B	COM	C	Urban District Com and Bus	0.3759	0.0005	92	94	95	0.0423
1000B	Landscaped	B	Open Space Fair	0.1234	0.0001	69	79	84	0.0102
1000B	Landscaped	C	Open Space Fair	0.2831	0.0003	69	79	84	0.0268
1000B	LOW	B	Residential 1 ac	0.0504	0.0001	68	79	84	0.0041
1000B	LOW	B	Residential 1 ac	1.4561	0.0017	68	79	84	0.1186
1000B	LOW	C	Residential 1 ac	8.5514	0.0102	68	79	84	0.8092
1000B	LOW	C	Residential 1 ac	2.8256	0.0034	68	79	84	0.2674
1000B	LOW	C	Residential 1 ac	0.0046	0.0000	68	79	84	0.0004
1000B	Road	B	Road	1.1989	0.0014	98	98	98	0.1407
1000B	Road	B	Road	0.0277	0.0000	98	98	98	0.0033
1000B	Road	C	Road	0.0279	0.0000	98	98	98	0.0033
1000B	Trail	B	Gravel	0.3756	0.0004	85	89	91	0.0382
1000B	Trail	B	Gravel	0.0013	0.0000	85	89	91	0.0001

[illegible]

A graphic scale bar is shown below the map. It is a horizontal line with tick marks at 40, 20, 0, 40, 80, and 120 feet. Below the bar, the text "GRAPHIC SCALE 1"= 40'" is printed.

_____ Existing Floodplain
 _____ 1234.567 HEC-RAS Cross Section

EXISTING CONDITION
SHEET 2 OF 3

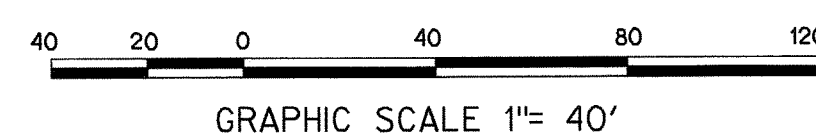
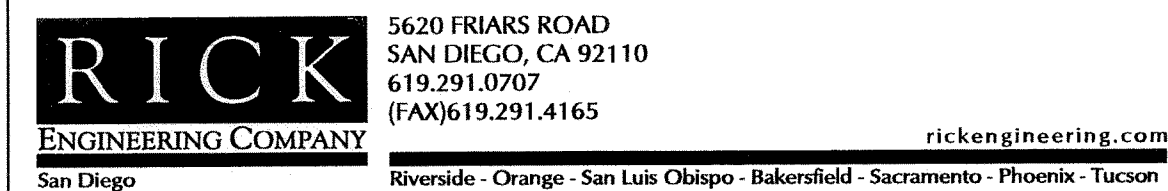
This topographic map illustrates a residential development with various terrain features and infrastructure. The map includes contour lines and spot elevations for numerous points. Three specific points are highlighted with their elevations:

- 1575.429**: Located near the top center of the map, near a 'DIRT' area.
- 1434.583**: Located in the middle left section, near a 'DIRT' area.
- 1219.919**: Located in the bottom left section, near a 'DIRT' area.

The map also shows several 'DENSE TREES' areas, 'DIRT' paths, and 'ASPH' (asphalt) roads. There are also 'TANKS' indicated in the lower right section. The map is oriented with North at the top.

 Existing Floodplain
 1234.567 HEC-RAS Cross Section

EXISTING CONDITION
SHEET 3 OF 3



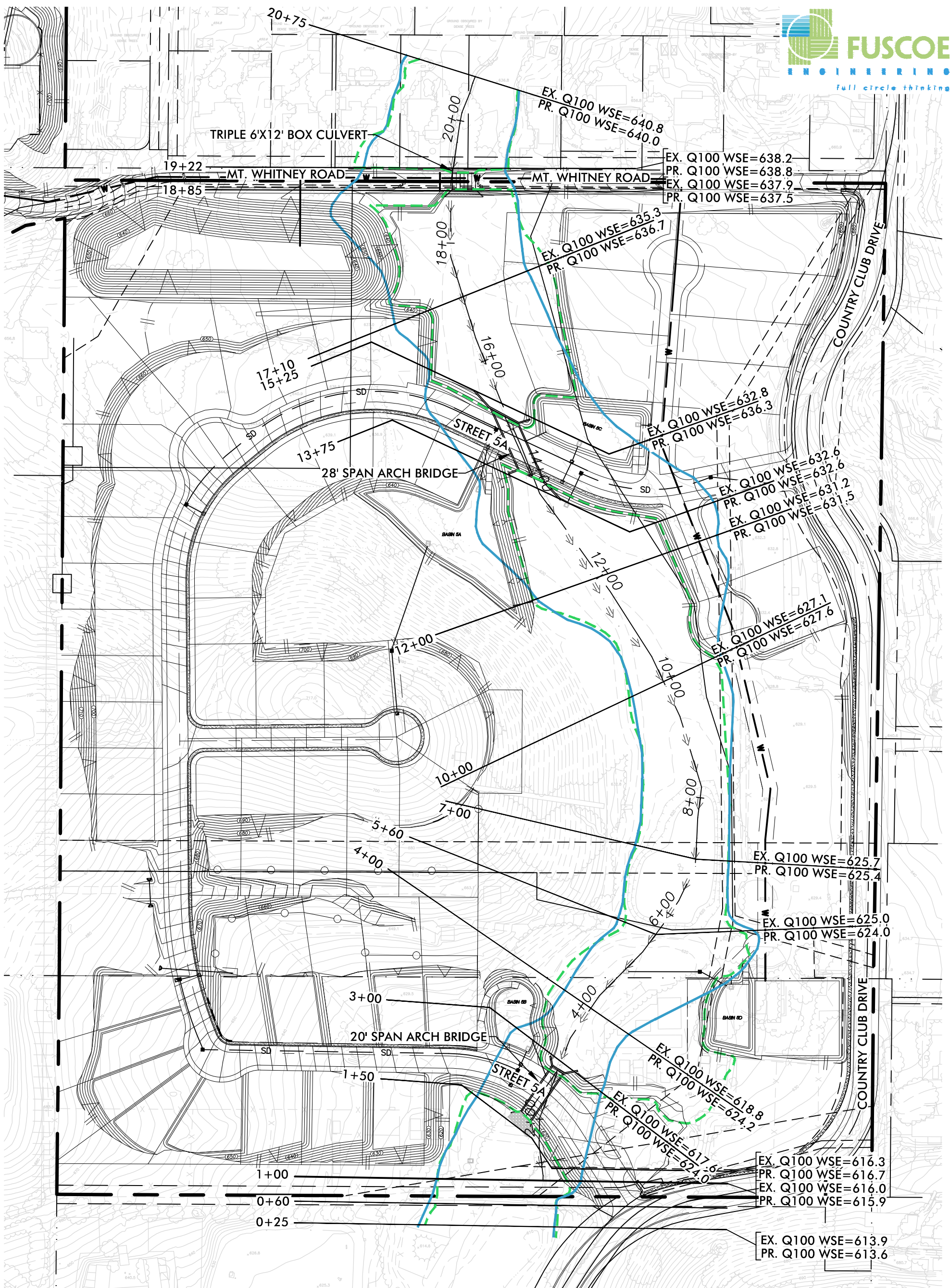
**HEC-RAS
Eden Valley Creek Upper East
Computer Output and Workmaps
Pre-project**

HEC-RAS Plan: Existing River: Harmony Grove Reach: East Profile: 100-yr												
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
East	2937.501	100-yr	1636.00	614.21	616.45	616.49	619.66	0.041434	6.91	193.53	79.21	1.02
East	2750.696	100-yr	1636.00	611.59	615.80	614.70	616.10	0.007000	4.51	379.03	161.04	0.44
East	2644.651	100-yr	1636.00	609.97	615.47	614.59	615.69	0.002186	4.14	449.65	209.07	0.36
East	2625.030 Upper Equestrian	Culvert										
East	2605.763	100-yr	1636.00	609.17	615.10		615.29	0.001966	3.60	461.41	196.61	0.35
East	2546.672	100-yr	1636.00	608.52	615.05	613.18	615.17	0.001076	3.05	561.29	210.97	0.27
East	2526.845 Lower Equestrian	Culvert										
East	2507.611	100-yr	1636.00	606.96	613.86		613.66	0.003290	3.90	444.86	173.30	0.37
East	2346.065	100-yr	1636.00	607.36	613.39		613.46	0.001460	2.34	677.02	162.41	0.16
East	2199.354	100-yr	1636.00	606.20	613.27	609.20	613.32	0.000713	1.78	902.11	220.49	0.13
East	2180.166	Culvert										
East	2127.463	100-yr	1636.00	603.76	606.64		609.20	0.009426	6.15	276.52	106.31	0.61
East	2005.146	100-yr	1636.00	601.74	606.04	606.04	607.22	0.027160	10.19	193.44	76.33	1.20
East	1906.173	100-yr	1636.00	599.45	604.21	602.51	604.43	0.004709	3.80	442.33	162.64	0.37
East	1575.429	100-yr	1636.00	596.46	601.76	601.51	602.71	0.011940	7.84	212.21	68.64	0.64
East	1434.663	100-yr	1636.00	595.74	600.34		601.17	0.009566	7.33	223.43	77.94	0.76
East	1219.919	100-yr	1636.00	594.17	599.20	596.95	599.60	0.005001	5.62	357.26	246.22	0.56

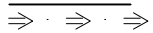
**HEC-RAS
Eden Valley Creek Upper East
Computer Output and Workmaps
Post-project**

HEC-RAS Plan: add 1-24in River: Harmony Grove Reach: East Profile: 100-yr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
East	2937.501	100-yr	1629.00	614.21	618.43	618.47	619.67	0.041969	8.94	182.19	77.44	1.03
East	2750.696	100-yr	1629.00	611.59	615.79	614.89	616.09	0.006898	4.51	378.00	180.94	0.44
East	2644.651	100-yr	1629.00	609.97	615.46	614.58	615.88	0.002189	4.13	448.38	209.03	0.38
East	2625.030 Upper Equestrian	Culvert										
East	2605.783	100-yr	1629.00	609.17	615.07		615.26	0.002060	3.64	475.05	198.59	0.38
East	2546.672	100-yr	1629.00	608.52	615.01	613.17	615.14	0.001108	3.07	574.20	209.96	0.27
East	2528.845 Lower Equestrian	Culvert										
East	2507.611	100-yr	1629.00	608.98	614.88		614.96	0.001005	2.63	663.28	188.83	0.21
East	2346.095	100-yr	1629.00	607.38	614.74		614.81	0.000789	2.01	774.17	144.79	0.14
East	2199.354	100-yr	1629.00	606.20	614.67	609.19	614.72	0.000421	1.56	988.34	151.40	0.10
East	2180.188	Culvert										
East	2127.483	100-yr	1629.00	606.00	614.46		614.54	0.003805	2.32	753.76	129.88	0.15
East	2005.148	100-yr	1629.00	605.40	614.41		614.42	0.002283	0.72	2345.86	284.04	0.04
East	1808.173	100-yr	1383.00	604.80	614.31	606.74	614.33	0.000780	1.20	1219.22	151.43	0.07



LEGEND



CHANNEL FLOW LINE

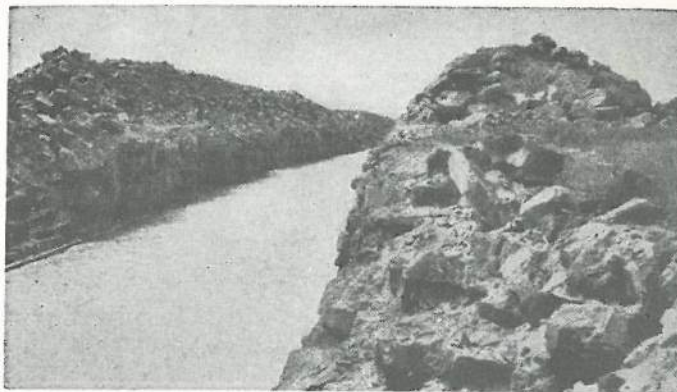
100 YEAR STORM INUNDATION LIMITS (EXISTING CHANNEL)

100 YEAR STORM INUNDATION LIMITS (PROPOSED CHANNEL)

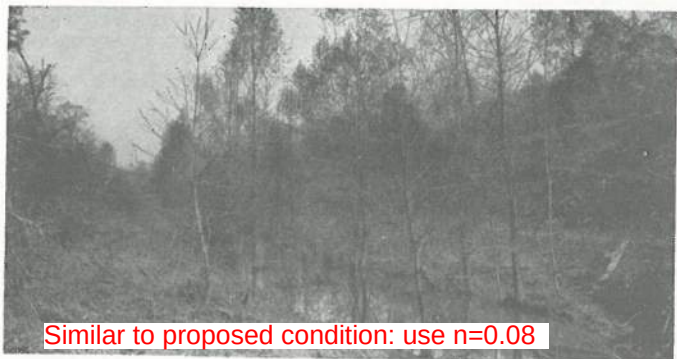
**VALIANO NEIGHBORHOOD 5
100-YEAR STORM INUNDATION EXHIBIT
SCALE: 1"=150'**



(19)



(20)



Similar to proposed condition: use $n=0.08$

(21)



FIG. 5-5 (19-21)

19. $n = 0.050$. Dredge channel with very irregular side slopes and bottom, in dark-colored waxy clay, with growth of weeds and grass. Slight variation in shape of cross section for variation in size.

20. $n = 0.060$. Ditch in heavy silty clay; irregular side slopes and bottom; practically entire section filled with large-size growth of trees, principally willows and cottonwoods. Quite uniform cross section.

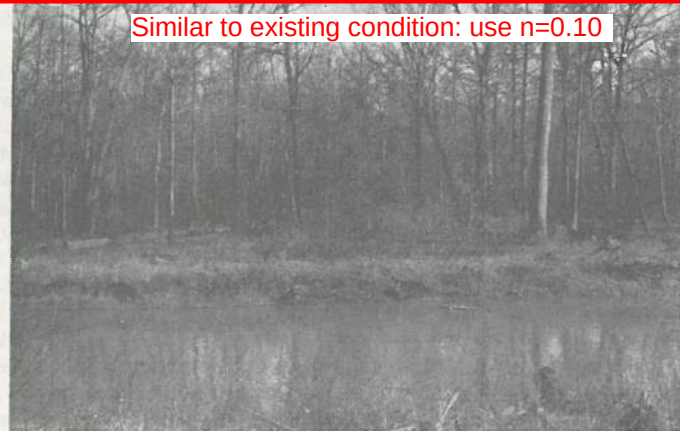
21. $n = 0.080$. Dredge channel in black slippery clay and gray silty clay loam, irregular wide slopes and bottom, covered with dense growth of bushy willows, some in bottom; remainder of both slopes covered with weeds and a scattering growth of willows and poplars, no foliage; some silting on bottom.

(22)



Similar to existing condition: use $n=0.10$

(23)



(24)



FIG. 5-5 (22-24)

22. $n = 0.110$. Same as (21), but with much foliage and covered for about 40 ft with growth resembling smart weed.

23. $n = 0.125$. Natural channel floodway in median fine sand to fine clay, none side slopes; fairly even and regular bottom with occasional flat bottom sloughs; variation in depth; practically virgin timber, very little undergrowth except occasional dense patches of bushed and small trees, some logs and dead fallen trees.

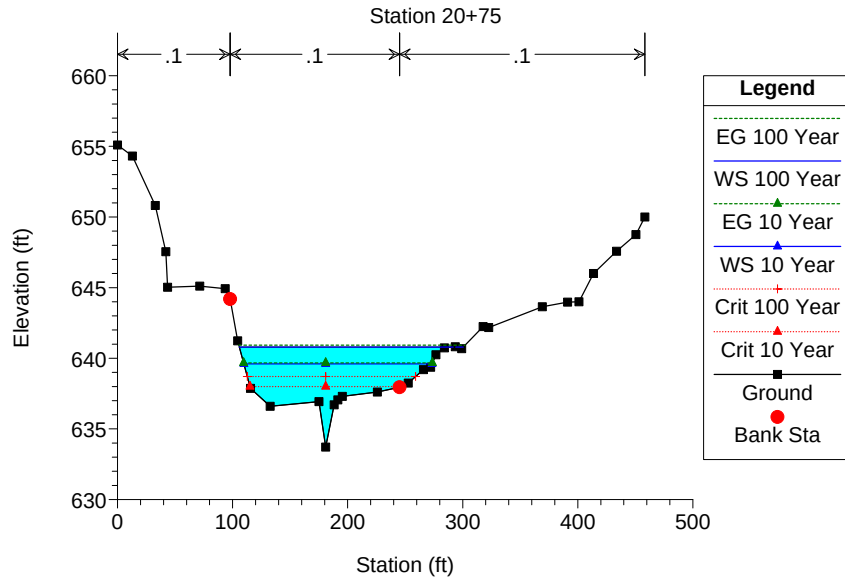
24. $n = 0.150$. Natural river in sandy clay soil. Very crooked course, irregular side slopes and uneven bottom. Many roots, trees and bushes, large logs and other drift on bottom; trees continually falling into channel due to bank caving.

Existing Conditions

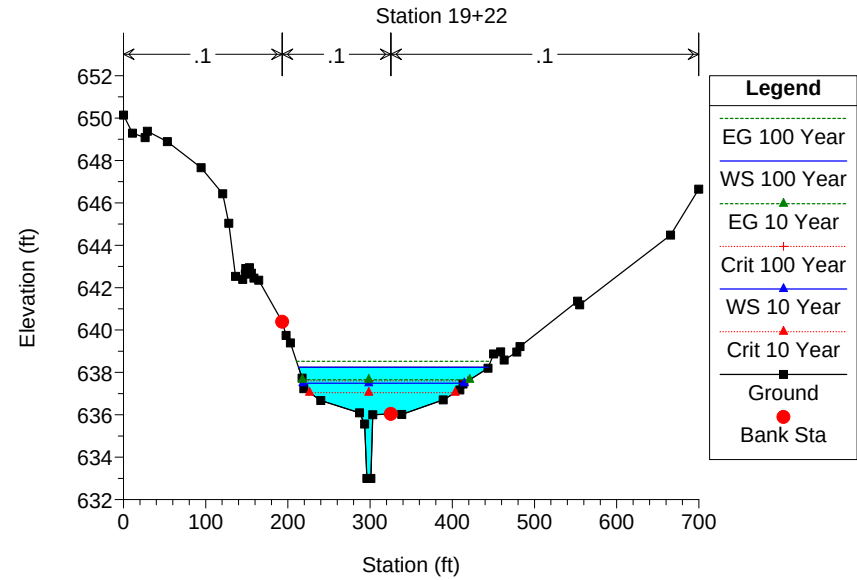
HEC-RAS Plan: Plan 02 River: Eden Hills Chann Reach: 48 Acre Parcel

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
48 Acre Parcel	2075	100 Year	1636.00	633.72	640.80	638.71	640.93	0.007594	3.03	570.28	192.34	0.28
48 Acre Parcel	2075	10 Year	749.00	633.72	639.60	637.99	639.67	0.006015	2.12	366.22	163.48	0.23
48 Acre Parcel	1922	100 Year	1636.00	633.00	638.24	637.60	638.52	0.038069	4.55	392.88	230.86	0.57
48 Acre Parcel	1922	10 Year	749.00	633.00	637.49	637.04	637.66	0.037350	3.45	232.56	196.39	0.52
48 Acre Parcel	1906		Culvert									
48 Acre Parcel	1885	100 Year	1636.00	632.30	637.89		638.05	0.015348	3.31	536.90	284.06	0.37
48 Acre Parcel	1885	10 Year	749.00	632.30	636.91		637.02	0.020687	2.72	286.01	230.41	0.40
48 Acre Parcel	1710	100 Year	1636.00	631.10	635.28		635.43	0.013725	3.04	537.83	232.69	0.35
48 Acre Parcel	1710	10 Year	749.00	631.10	634.28		634.36	0.011296	2.29	327.36	187.62	0.31
48 Acre Parcel	1525	100 Year	1636.00	629.20	632.78		632.88	0.013633	2.51	652.50	375.49	0.34
48 Acre Parcel	1525	10 Year	749.00	629.20	631.72		631.80	0.017300	2.37	315.65	235.88	0.36
48 Acre Parcel	1375	100 Year	1636.00	627.90	632.00		632.04	0.002945	1.46	1120.66	460.18	0.16
48 Acre Parcel	1375	10 Year	749.00	627.90	630.81		630.83	0.003248	1.20	624.75	370.86	0.16
48 Acre Parcel	1200	100 Year	1636.00	626.40	631.23	629.08	631.30	0.006332	2.15	760.91	310.13	0.24
48 Acre Parcel	1200	10 Year	749.00	626.40	630.06		630.11	0.005564	1.69	442.26	234.00	0.22
48 Acre Parcel	1000	100 Year	1636.00	624.40	627.09	627.09	627.82	0.133264	6.89	237.61	165.97	1.01
48 Acre Parcel	1000	10 Year	749.00	624.40	626.45	626.45	626.92	0.153130	5.52	135.67	146.55	1.01
48 Acre Parcel	700	100 Year	1636.00	618.29	625.74	620.36	625.79	0.001520	1.81	906.34	162.78	0.13
48 Acre Parcel	700	10 Year	749.00	618.29	624.42	619.54	624.44	0.000588	1.06	709.46	139.72	0.08
48 Acre Parcel	560	100 Year	1636.00	622.01	625.03		625.23	0.024684	3.61	453.67	236.18	0.46
48 Acre Parcel	560	10 Year	749.00	622.01	624.00		624.16	0.035194	3.21	233.17	188.42	0.51
48 Acre Parcel	400	100 Year	1636.00	613.19	618.83		619.36	0.059324	5.85	279.58	134.99	0.72
48 Acre Parcel	400	10 Year	749.00	613.19	617.04		617.54	0.048974	5.63	133.01	58.71	0.66
48 Acre Parcel	300	100 Year	1636.00	612.00	617.56		617.69	0.006989	2.79	586.88	174.12	0.27
48 Acre Parcel	300	10 Year	749.00	612.00	616.19		616.25	0.005037	2.02	371.02	139.73	0.22
48 Acre Parcel	150	100 Year	1636.00	612.00	616.31		616.44	0.010113	2.83	578.65	222.07	0.31
48 Acre Parcel	150	10 Year	749.00	612.00	615.22		615.29	0.008385	2.11	355.24	183.97	0.27
48 Acre Parcel	100	100 Year	1636.00	609.44	615.96	613.58	616.05	0.005938	2.39	685.35	226.80	0.24
48 Acre Parcel	100	10 Year	749.00	609.44	614.98	612.83	615.02	0.003647	1.58	474.64	202.77	0.18
48 Acre Parcel	60		Culvert									
48 Acre Parcel	25	100 Year	1636.00	608.29	613.88	611.72	614.02	0.013018	3.06	534.46	219.46	0.35
48 Acre Parcel	25	10 Year	749.00	608.29	612.18	610.84	612.31	0.013012	2.90	257.87	114.33	0.34

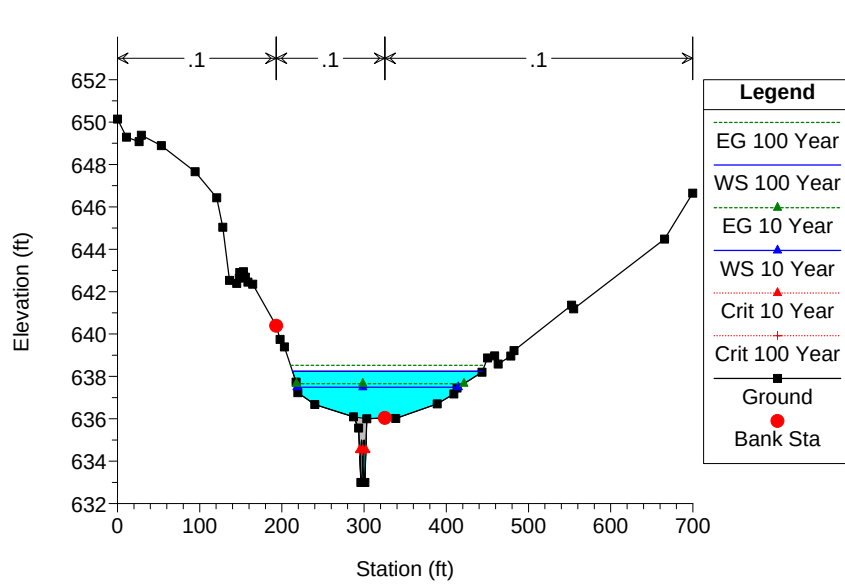
Valiano - Existing Condition Plan: Plan 02 1/21/2015



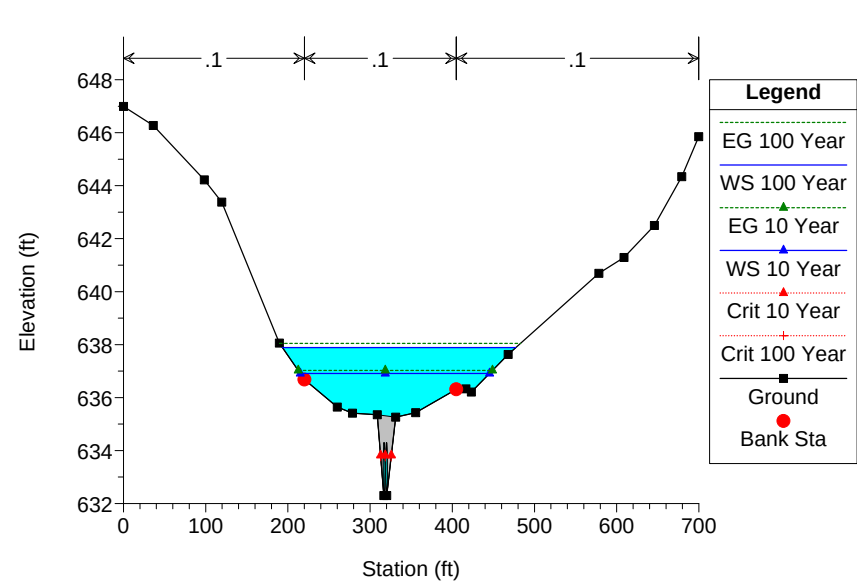
Valiano - Existing Condition Plan: Plan 02 1/21/2015



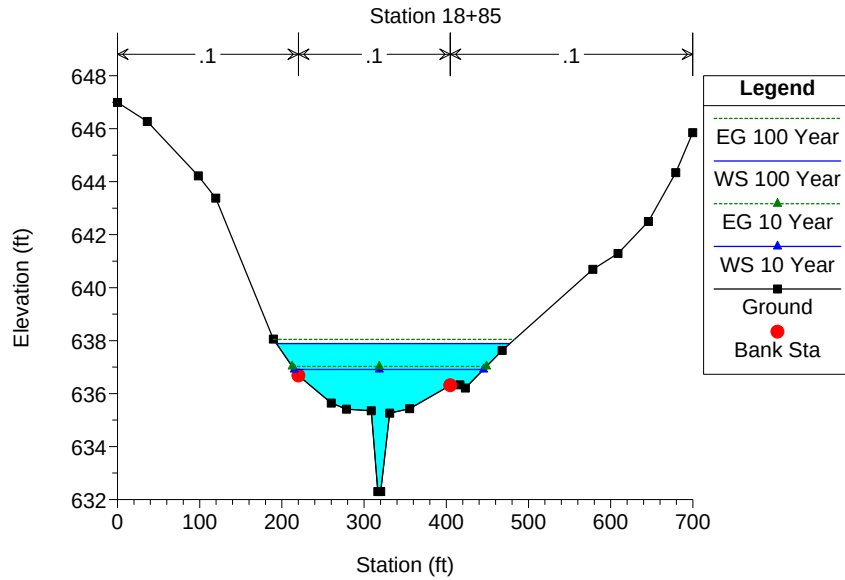
Valiano - Existing Condition Plan: Plan 02 1/21/2015



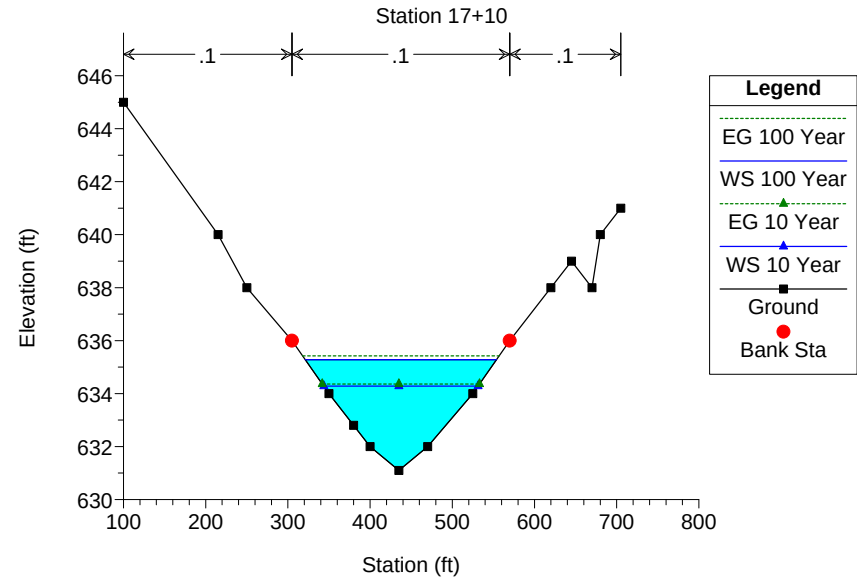
Valiano - Existing Condition Plan: Plan 02 1/21/2015



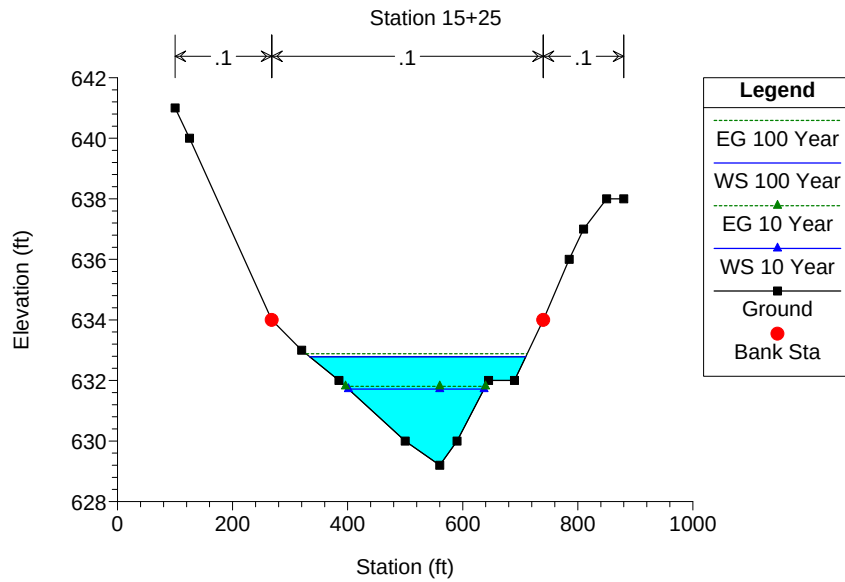
Valiano - Existing Condition Plan: Plan 02 1/21/2015



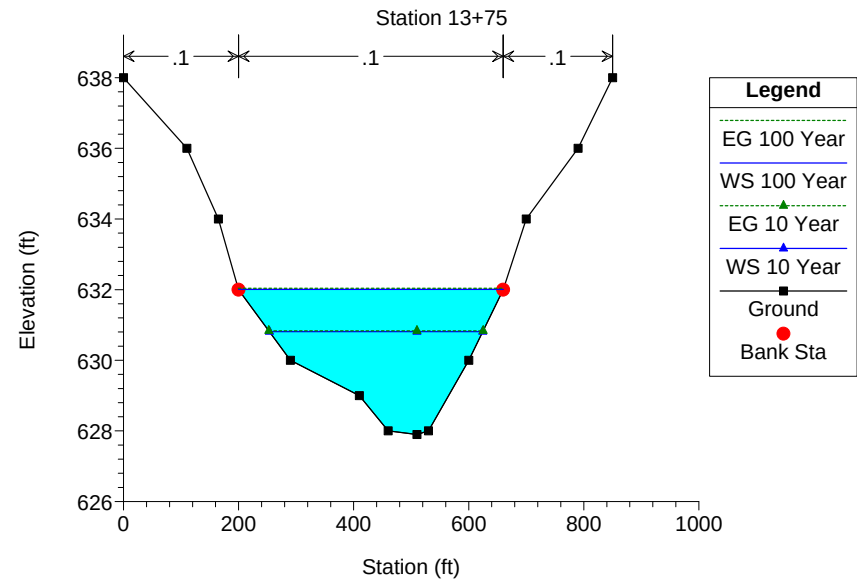
Valiano - Existing Condition Plan: Plan 02 1/21/2015



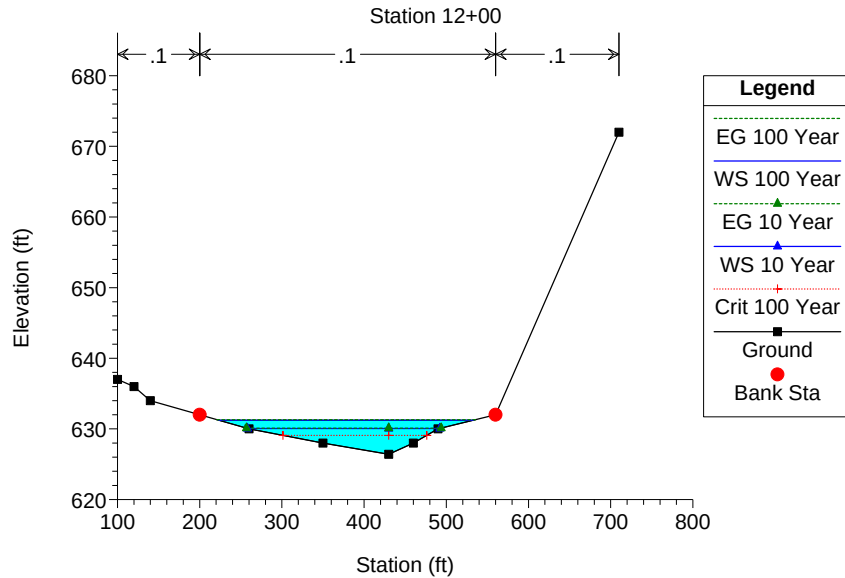
Valiano - Existing Condition Plan: Plan 02 1/21/2015



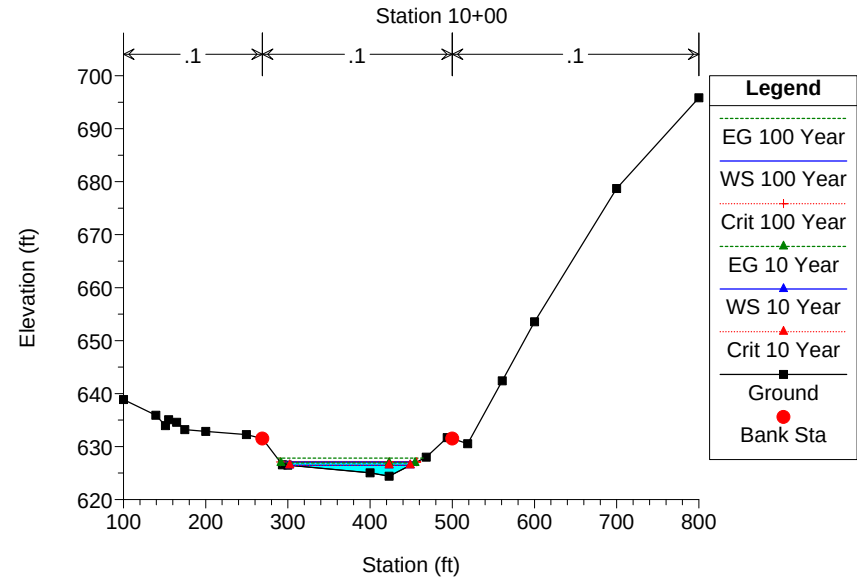
Valiano - Existing Condition Plan: Plan 02 1/21/2015



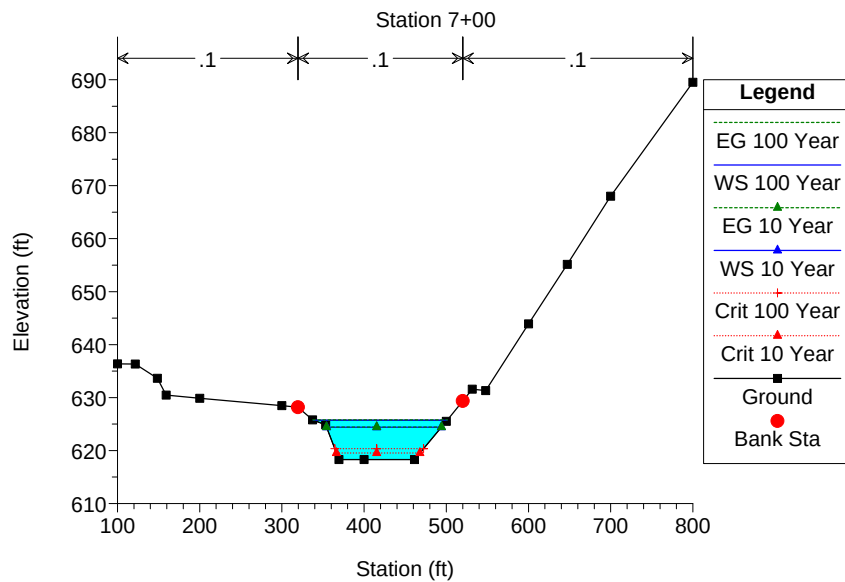
Valiano - Existing Condition Plan: Plan 02 1/21/2015



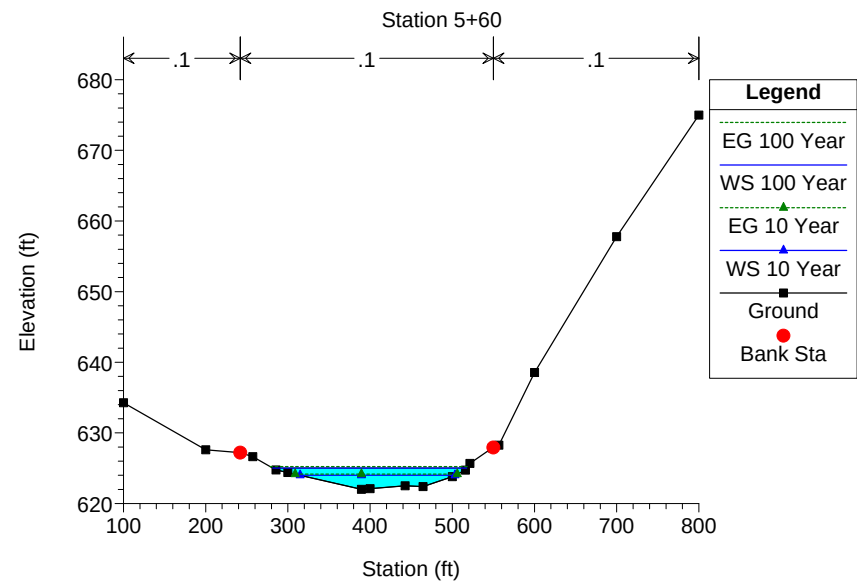
Valiano - Existing Condition Plan: Plan 02 1/21/2015



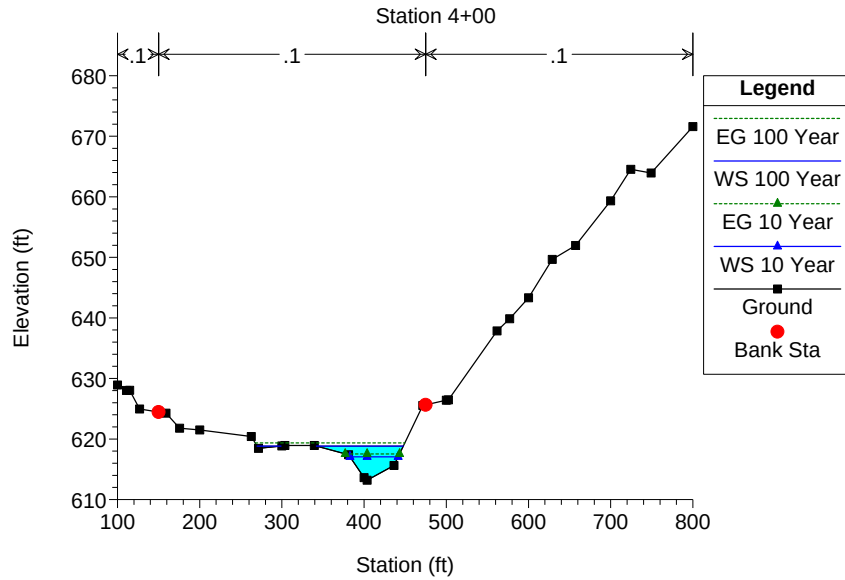
Valiano - Existing Condition Plan: Plan 02 1/21/2015



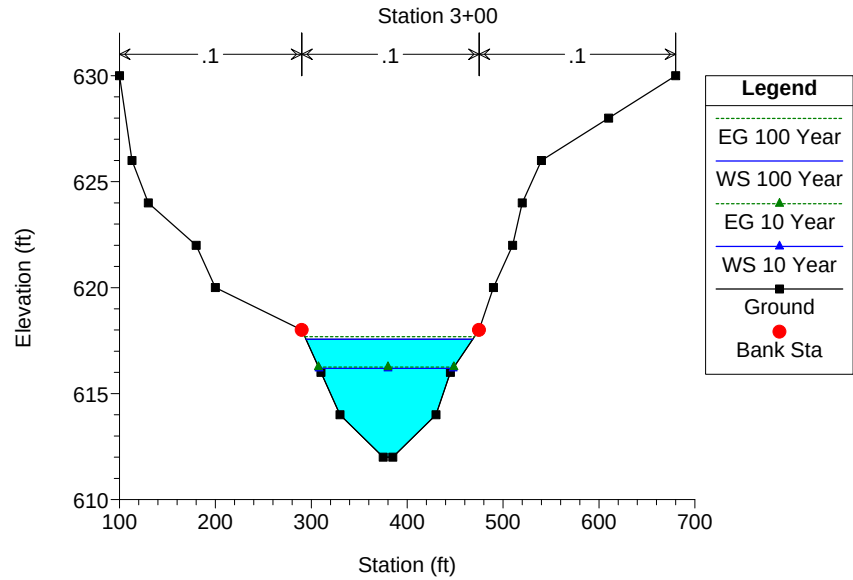
Valiano - Existing Condition Plan: Plan 02 1/21/2015



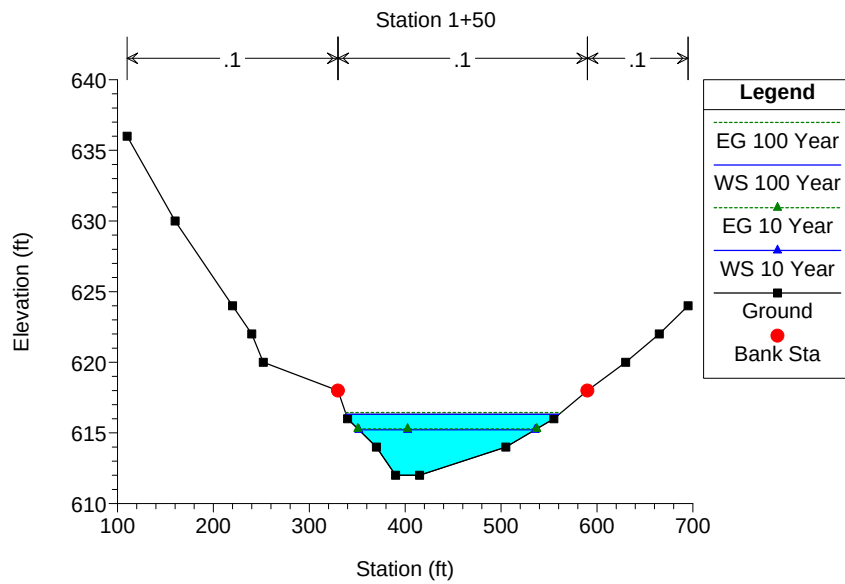
Valiano - Existing Condition Plan: Plan 02 1/21/2015



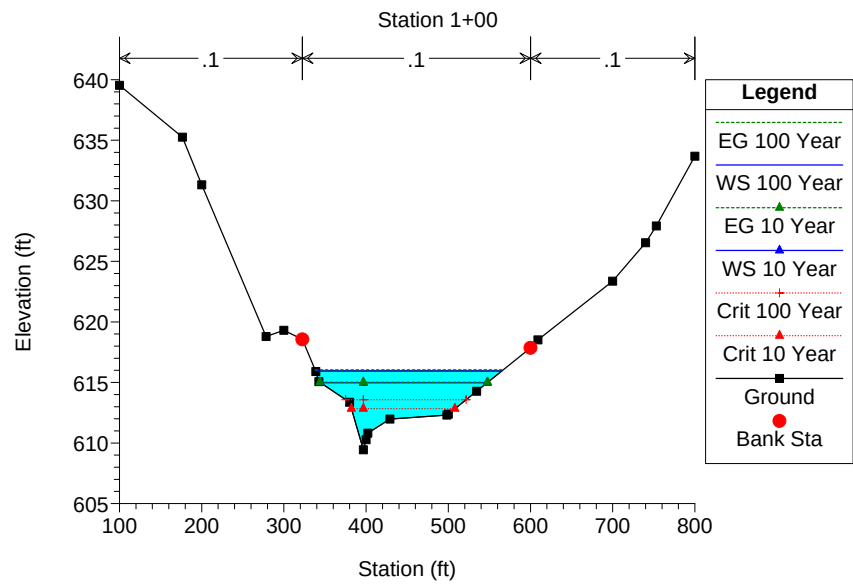
Valiano - Existing Condition Plan: Plan 02 1/21/2015



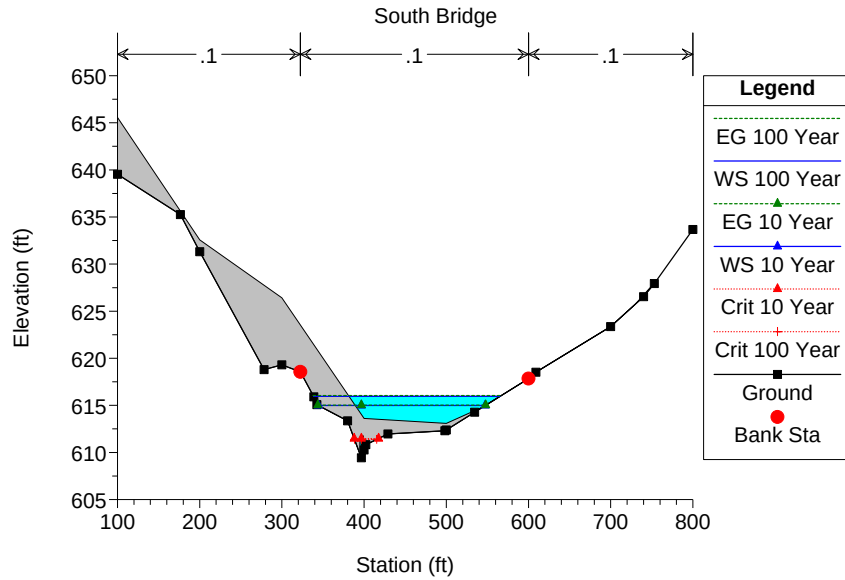
Valiano - Existing Condition Plan: Plan 02 1/21/2015



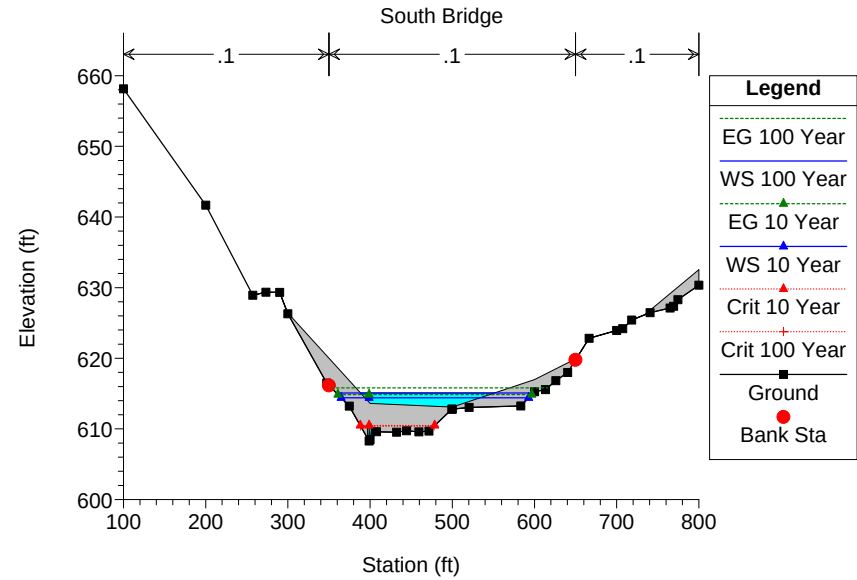
Valiano - Existing Condition Plan: Plan 02 1/21/2015



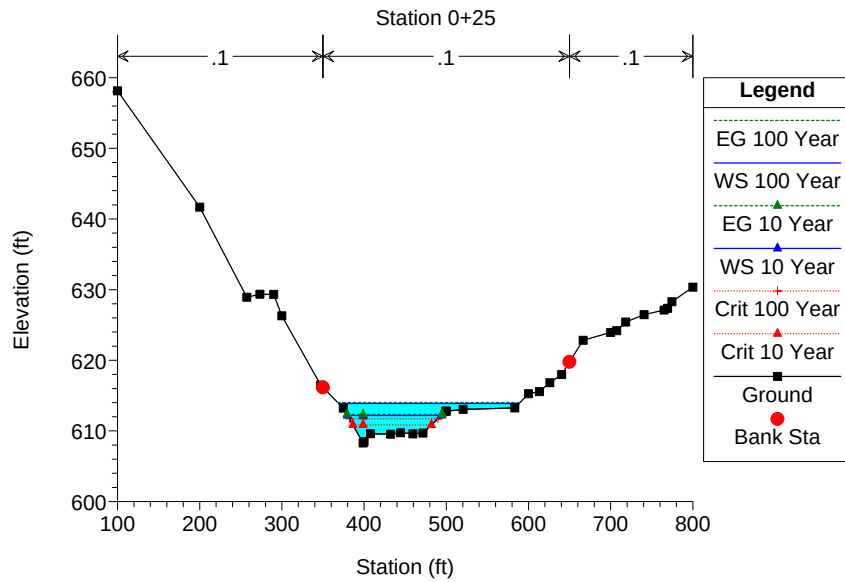
Valiano - Existing Condition Plan: Plan 02 1/21/2015



Valiano - Existing Condition Plan: Plan 02 1/21/2015



Valiano - Existing Condition Plan: Plan 02 1/21/2015



Proposed Conditions

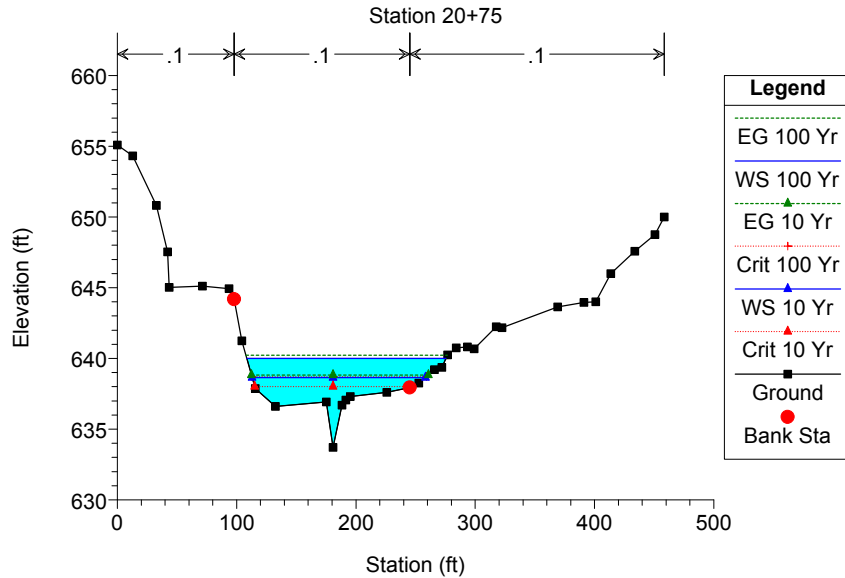
HEC-RAS Plan: Plan 02 River: Eden Hills Chann Reach: 48 Acre Parcel

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
48 Acre Parcel	2075	100 Yr	1636.00	633.72	639.99	638.71	640.22	0.017420	3.94	430.89	166.82	0.41
48 Acre Parcel	2075	10 Yr	749.00	633.72	638.65	638.00	638.83	0.029000	3.46	219.46	145.26	0.48
48 Acre Parcel	1922	100 Yr	1636.00	631.60	638.68	635.22	638.78	0.005259	2.72	693.38	244.16	0.24
48 Acre Parcel	1922	10 Yr	749.00	631.60	635.94	633.82	636.15	0.011644	3.68	203.58	56.74	0.34
48 Acre Parcel	1906		Culvert									
48 Acre Parcel	1885	100 Yr	1636.00	631.00	637.46		637.79	0.010235	4.61	359.84	106.16	0.41
48 Acre Parcel	1885	10 Yr	749.00	631.00	635.66		635.85	0.006013	3.47	216.05	55.65	0.31
48 Acre Parcel	1710	100 Yr	1636.00	631.50	636.71		636.80	0.003201	2.43	676.69	202.46	0.23
48 Acre Parcel	1710	10 Yr	749.00	631.50	634.08		634.25	0.015459	3.28	228.67	135.19	0.44
48 Acre Parcel	1525	100 Yr	1636.00	629.20	636.26	631.76	636.37	0.001713	2.72	600.55	183.71	0.19
48 Acre Parcel	1525	10 Yr	749.00	629.20	632.87	630.87	632.97	0.003804	2.53	295.82	147.97	0.25
48 Acre Parcel	1440		Culvert									
48 Acre Parcel	1375	100 Yr	1636.00	627.50	632.63	630.05	632.84	0.007894	3.69	443.80	279.01	0.30
48 Acre Parcel	1375	10 Yr	749.00	627.50	631.21	629.19	631.30	0.005519	2.42	309.20	269.35	0.24
48 Acre Parcel	1200	100 Yr	1636.00	627.00	631.52	629.28	631.61	0.005942	2.33	701.01	240.08	0.24
48 Acre Parcel	1200	10 Yr	749.00	627.00	630.31	628.63	630.35	0.005170	1.77	423.94	198.89	0.21
48 Acre Parcel	1000	100 Yr	1636.00	625.50	627.55	627.55	628.32	0.128797	7.07	231.54	151.64	1.01
48 Acre Parcel	1000	10 Yr	749.00	625.50	626.87	626.87	627.37	0.150291	5.63	133.15	137.92	1.01
48 Acre Parcel	700	100 Yr	1636.00	618.30	625.42	620.35	625.48	0.001584	1.85	883.84	157.81	0.14
48 Acre Parcel	700	10 Yr	749.00	618.30	624.15	619.54	624.17	0.000647	1.08	693.46	141.93	0.09
48 Acre Parcel	560	100 Yr	1636.00	622.00	624.02	624.02	624.69	0.133939	6.60	248.03	185.61	1.01
48 Acre Parcel	560	10 Yr	749.00	622.00	623.33	623.33	623.81	0.150855	5.55	134.96	143.07	1.01
48 Acre Parcel	400	100 Yr	1636.00	614.00	624.23	617.50	624.24	0.000395	0.93	1759.18	317.68	0.07
48 Acre Parcel	400	10 Yr	749.00	614.00	619.22	616.43	619.27	0.003365	1.65	454.55	171.34	0.18
48 Acre Parcel	300	100 Yr	1636.00	612.00	624.03	615.82	624.16	0.001499	2.87	570.12	134.01	0.15
48 Acre Parcel	300	10 Yr	749.00	612.00	618.90	614.41	618.99	0.002309	2.39	313.37	83.38	0.17

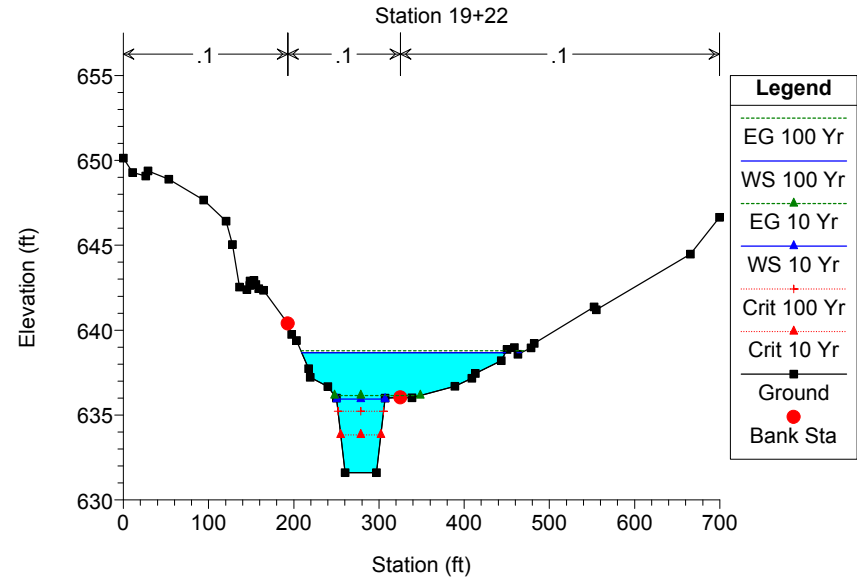
HEC-RAS Plan: Plan 02 River: Eden Hills Chann Reach: 48 Acre Parcel (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
48 Acre Parcel	250		Culvert									
48 Acre Parcel	150	100 Yr	1636.00	612.00	616.69	616.69	618.41	0.061672	10.53	155.32	195.58	1.00
48 Acre Parcel	150	10 Yr	749.00	612.00	615.29	615.29	616.31	0.072400	8.09	92.63	161.46	0.99
48 Acre Parcel	100	100 Yr	1636.00	611.50	615.94	614.02	616.06	0.005637	2.77	591.28	211.06	0.29
48 Acre Parcel	100	10 Yr	749.00	611.50	614.93	613.27	614.99	0.003895	1.91	391.63	184.50	0.23
48 Acre Parcel	60		Culvert									
48 Acre Parcel	25	100 Yr	1636.00	608.29	613.55	611.72	613.74	0.013007	3.53	462.86	213.94	0.42
48 Acre Parcel	25	10 Yr	749.00	608.29	611.86	610.84	612.04	0.013009	3.37	222.00	109.88	0.42

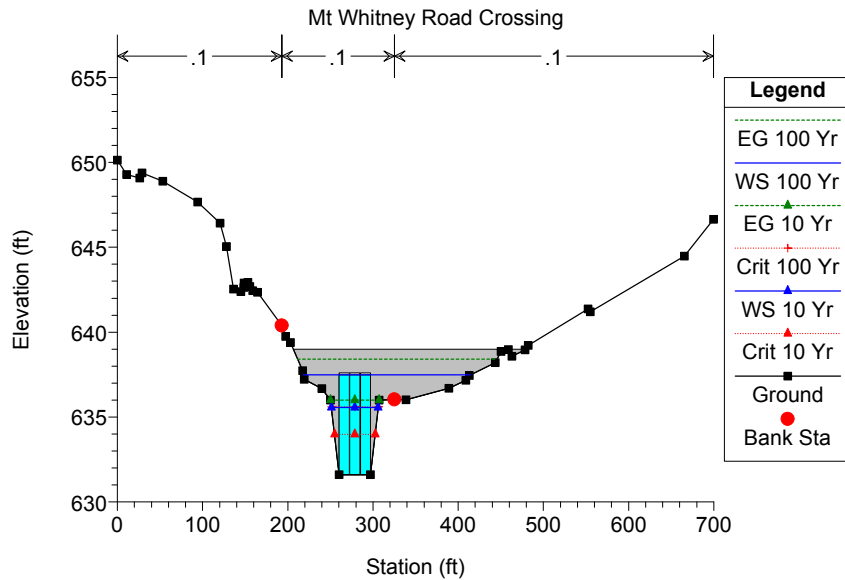
Valiano - Proposed Condition Plan: Plan 02 10/19/2015



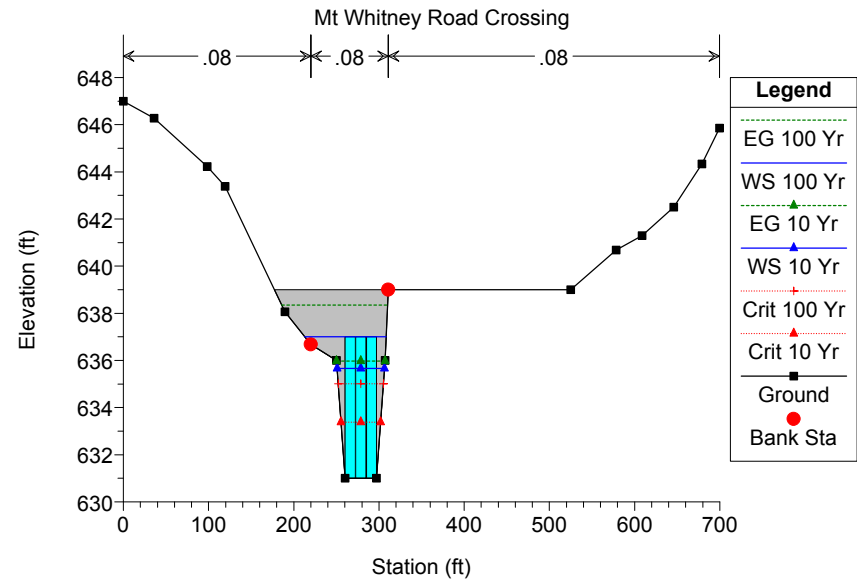
Valiano - Proposed Condition Plan: Plan 02 10/19/2015



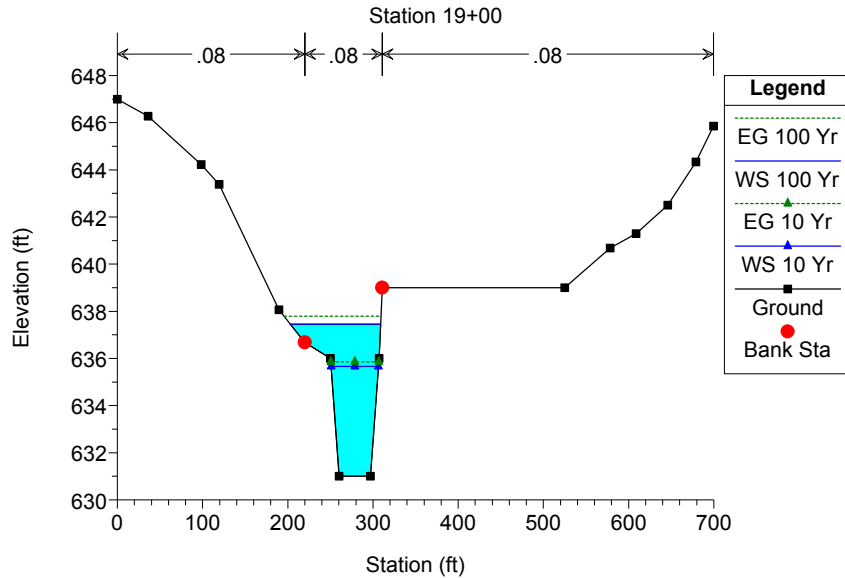
Valiano - Proposed Condition Plan: Plan 02 10/19/2015



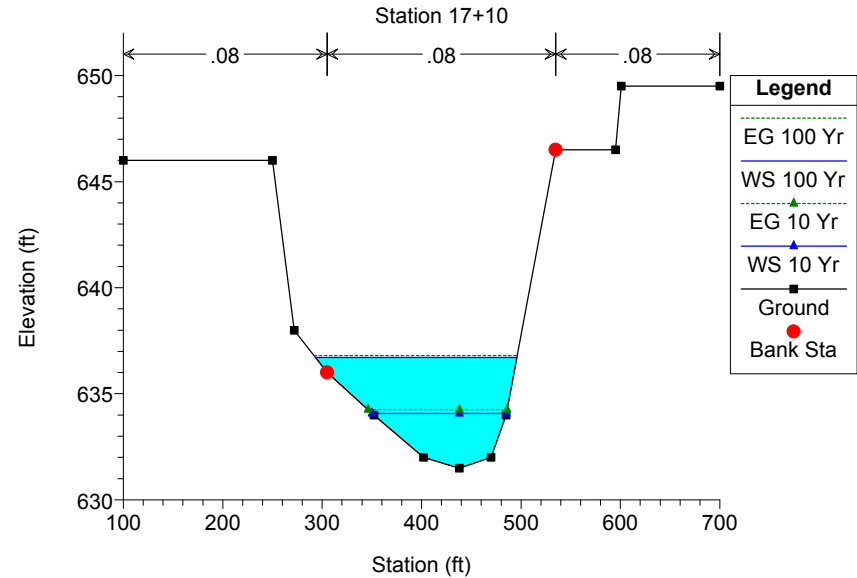
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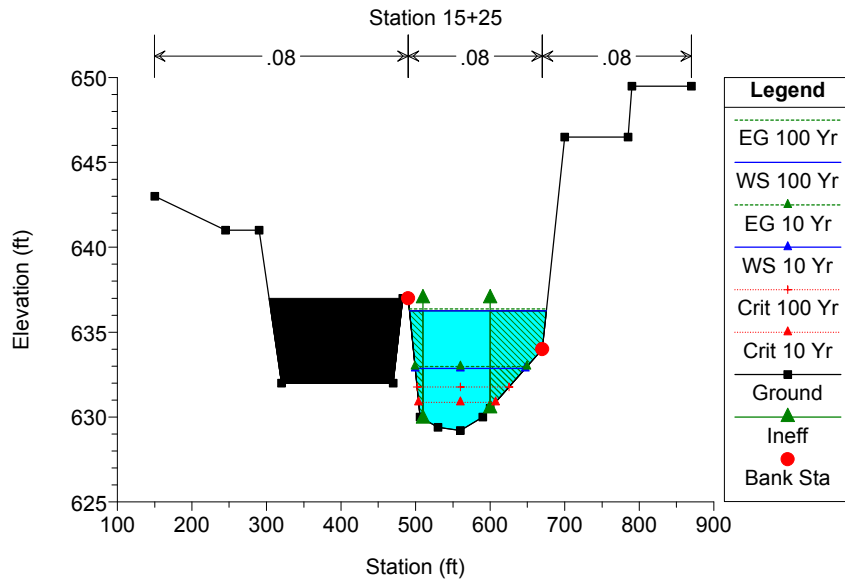
Valiano - Proposed Condition Plan: Plan 02 10/19/2015



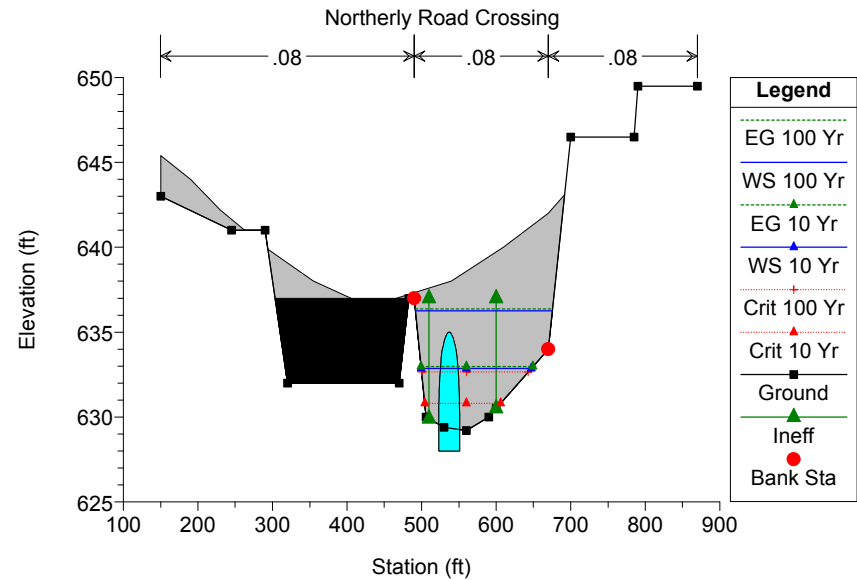
Valiano - Proposed Condition Plan: Plan 02 10/19/2015



Valiano - Proposed Condition Plan: Plan 02 10/19/2015

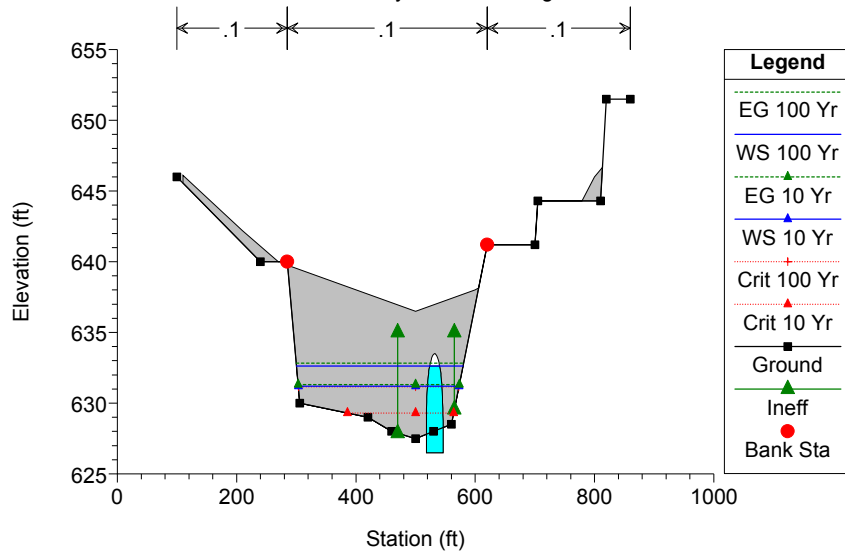


Valiano - Proposed Condition Plan: Plan 02 10/19/2015



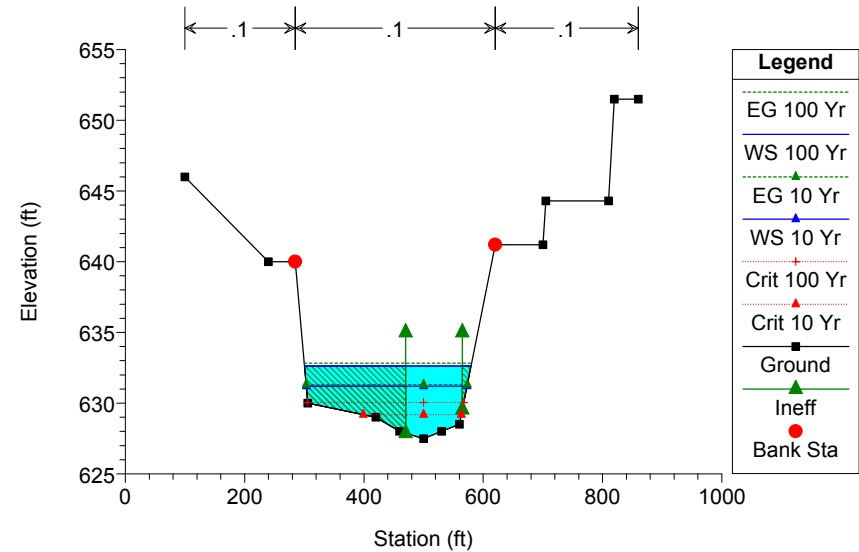
Valiano - Proposed Condition Plan: Plan 02 10/19/2015

Northerly Road Crossing



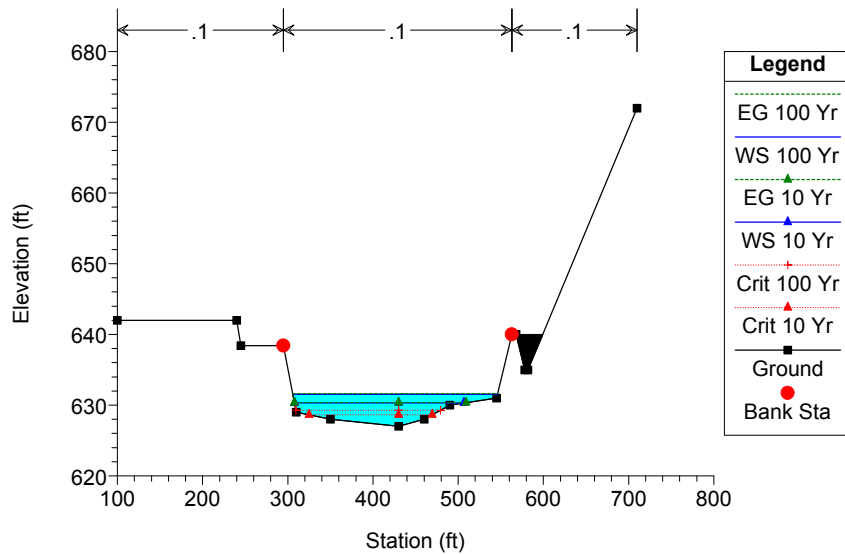
Valiano - Proposed Condition Plan: Plan 02 10/19/2015

Station 13+75



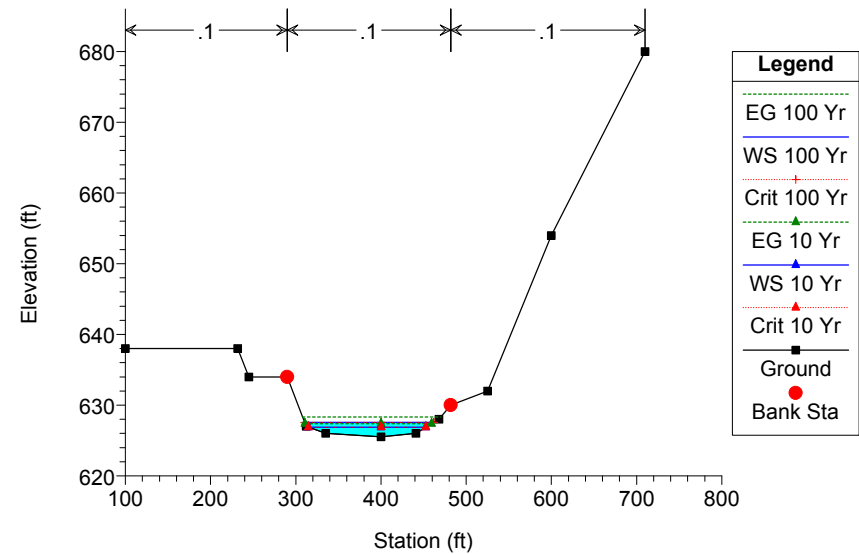
Valiano - Proposed Condition Plan: Plan 02 10/19/2015

Station 12+00

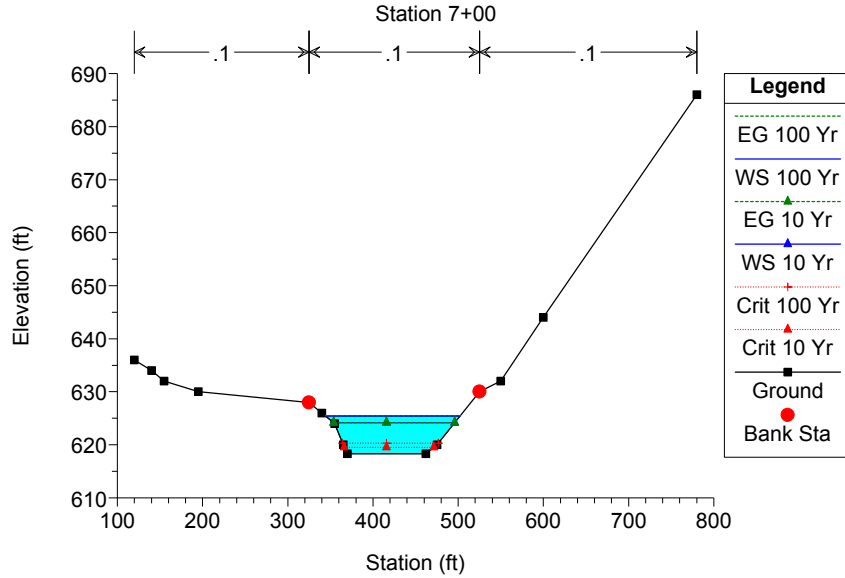


Valiano - Proposed Condition Plan: Plan 02 10/19/2015

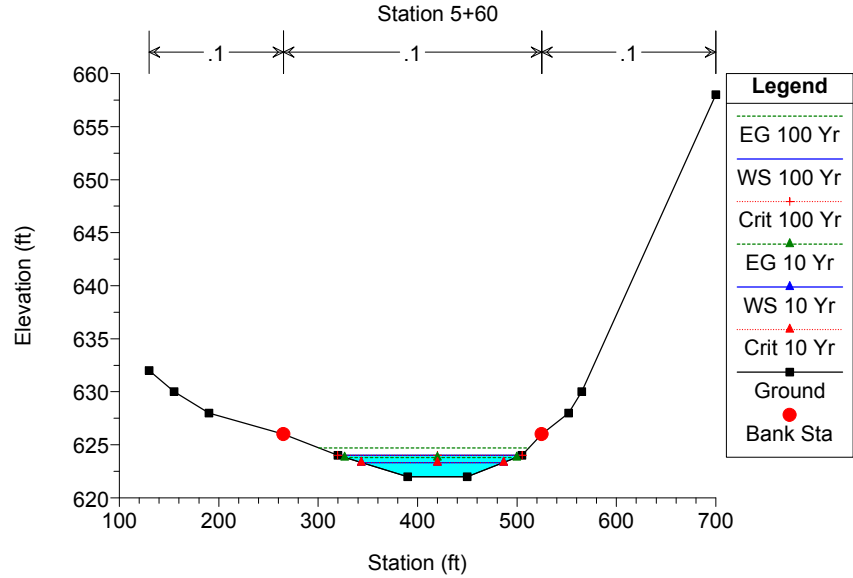
Station 10+00



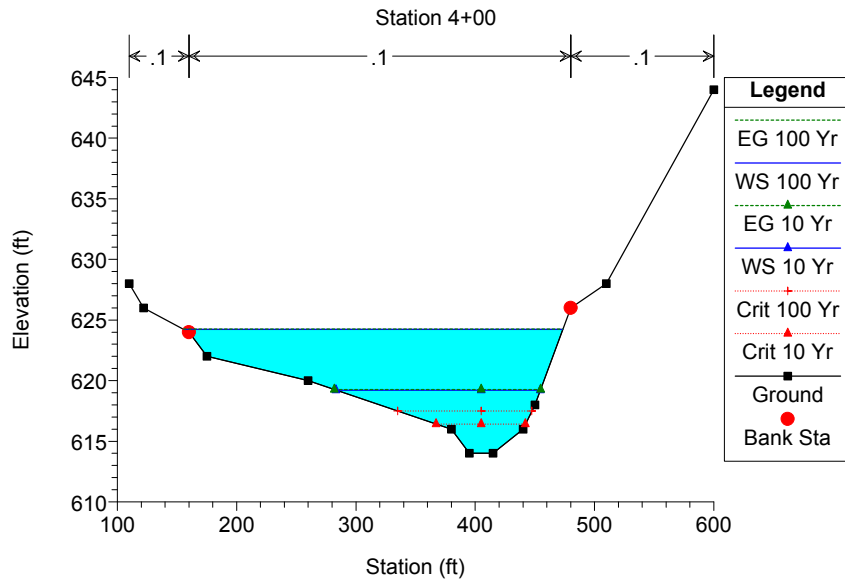
Valiano - Proposed Condition Plan: Plan 02 10/19/2015



Valiano - Proposed Condition Plan: Plan 02 10/19/2015



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Valiano - Proposed Condition Plan: Plan 02 10/19/2015

