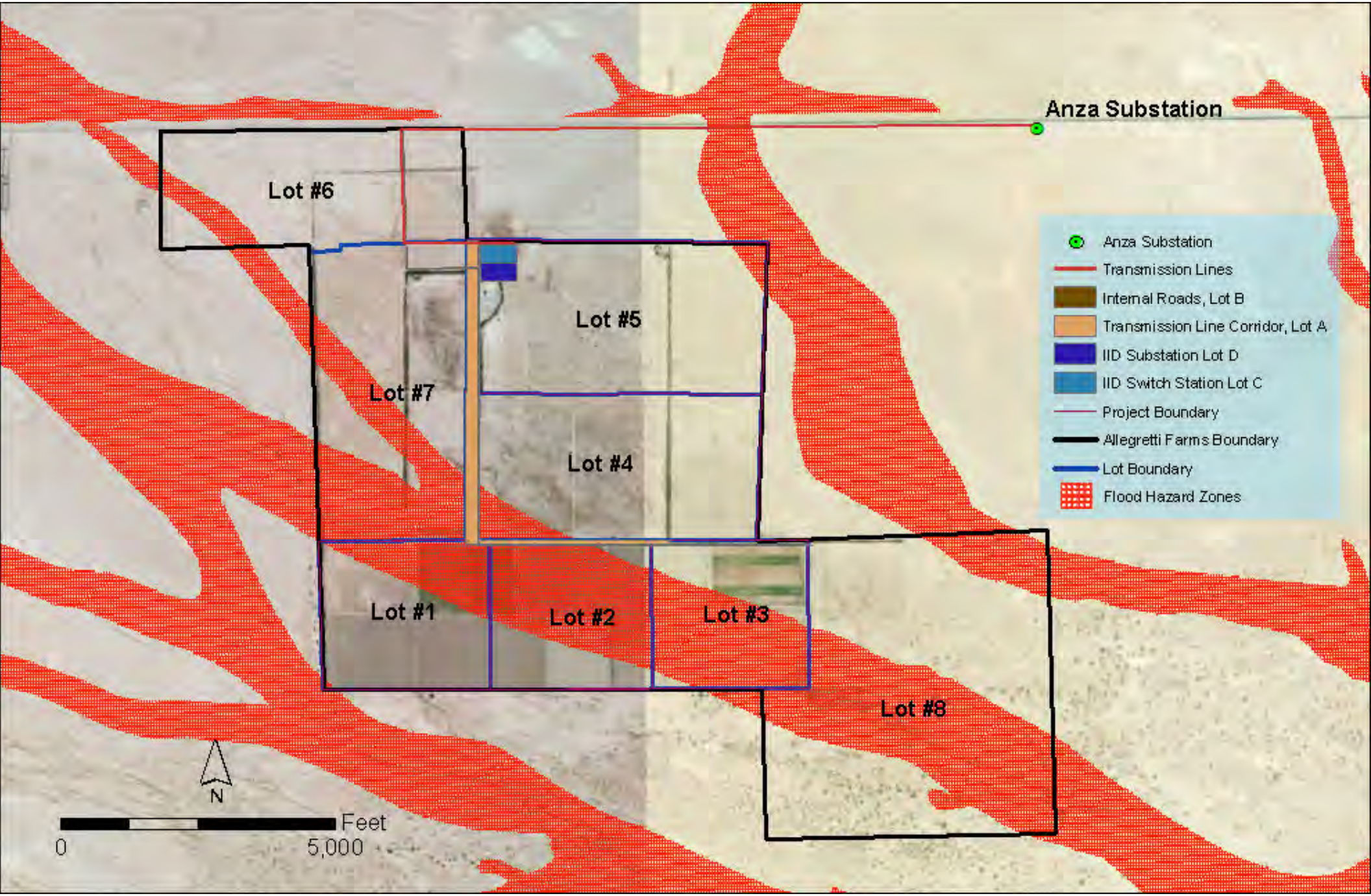
APPENDIX J
HYDROLOGY REPORTS

THIS PAGE INTENTIONALLY LEFT BLANK.

FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD HAZARD MAP

THIS PAGE INTENTIONALLY LEFT BLANK.


Anza Substation
Lot #6
Lot #5
Lot #7
Lot #4
Lot #1
Lot #2
Lot #3
Lot #8
Anza Substation
Transmission Lines
Internal Roads, Lot B
Transmission Line Corridor, Lot A
IID Substation Lot D
IID Switch Station Lot C
Project Boundary
Allegretti Farms Boundary
Lot Boundary
Flood Hazard Zones
N
0
5,000
Feet

THIS PAGE INTENTIONALLY LEFT BLANK.

PRELIMINARY ON-SITE AND OFF-SITE HYDROLOGY AND FLOOD HAZARD ANALYSIS

THIS PAGE INTENTIONALLY LEFT BLANK.

PRELIMINARY
ON-SITE AND OFF-SITE
HYDROLOGY AND FLOOD HAZARD
ANALYSIS FOR
ALLEGRETTI FARMS
SOLAR PROJECT SITE

SOUTH OF HIGHWAY 78,
9 MILES WEST OF HIGHWAY 86
UNINCORPORATED IMPERIAL COUNTY, CALIFORNIA

PREPARED FOR:

REGENERATE POWER, LLC
611 Santa Cruz Ave, Suite 201
Menlo Park, CA 94025

PREPARED BY:

AEI CASC engineering
1470 East Cooley Drive
Colton, CA 92324
(909) 783-0101 • Fax (909) 783-0108

MAY 22, 2013

THIS PAGE INTENTIONALLY LEFT BLANK.

A. EXISTING ON-SITE AND OFF-SITE HYDROLOGY ANALYSIS

On-site and off-site hydrology maps with peak flow rate calculations at critical nodal points have been developed for the Allegretti Farms Solar Project Site (Site).

On-Site Hydrology - The on-site hydrology map (Attachment A) and calculations were determined using the Riverside County Rational Method, analyzing the main watercourses throughout the Site at various concentration points.

Off-Site Hydrology - The off-site hydrology map (Attachment B) and calculations were determined using the Riverside County Unit Hydrograph Method for four (4) of the five (5) off-site areas (Areas B, C, D, and E) in order to determine the 100-year, 1-hour peak flows along the upstream boundary of the Site.

The fifth off-site area (Area A) is significantly larger (approximately 400,000 acres) than the aforementioned off-site areas and exceeds the limitations of many traditional hydrologic computation methods. Due to its size, it was necessary to run a separate 100-year, 24-hr study on Area A to find its peak flow rate. Rather than generating a single unit hydrograph, similar to the other off-site areas, Area A was divided into eight (8) subareas, each with a separate set of parameters and its own computed unit hydrograph. These eight (8) unit hydrographs were then routed using the SCS Convex Channel Routing Method based on the parameters of each subarea in order to generate one inclusive unit hydrograph. This was used to determine the peak 100-yr, 24-hr flow rate for Area A.

Flows generated by off-site Area B concentrate at off-site Node 201 (see Off-site Hydrology Map – Attachment B), which is located along an existing natural watercourse that traverses around the northeast corner of the Site.

Off-site Area E, the smallest of the off-site watersheds, drains onto the site at off-site Node 501 via sheet flow. Since off-site Area E is relatively flat and smaller in size, there exists no defined watercourse at the outlet location along the northern boundary of the Site.

Flows generated by off-site Area D are directed via an existing levee along the northern side of Highway 78 to a break location where runoff crosses the highway via surface flow. From here, flows continue southerly approximately 2,100 feet before flowing across the northern boundary of the site.

Flows generated by off-site Areas A and C are concentrated along the western boundary of the site where there is an existing 7-foot-high (approximate) earthen berm that extends from the northwest corner of the site to the southwest corner of the site. The structural integrity of the earthen berm has not been verified.

B. EXISTING EARTHEN BERM ALONG WESTERLY BOUNDARY

AEI-CASC prepared a preliminary hydraulic (normal depth) analysis of the flows impacting the northerly and southerly sections of the earthen berm along the westerly project boundary. The analysis assumed that the berm is structurally sound and capable of withholding the off-site flows. Further studies, including a scour analysis and geotechnical investigation, will likely be required to confirm the structural integrity of the earthen berm.

Northerly Berm Section (off-site Area C and Node 301) - Using United States Geological Survey (USGS) maps and digital aerial topography of the Site, cross sections at critical locations along the earthen berm were generated and analyzed for capacity using the Normal Depth Method. The channel created by the berm has an approximate capacity of 25,740 cfs at off-site Node 301, the concentration point of off-site Area C. Since Area C generates a computed 100-yr, 1-hr peak flow rate of approximately 2,557 cfs, flows are assumed to be fully contained off-site by the earthen berm at this location and subsequently directed southerly via surface flow toward the southwest corner of the Site.

Southerly Berm Section (off-site Area A and Node 108) - Using the Normal Depth Method again, this time at the concentration point of off-site Area A, the cross section of the channel created by the earthen berm at off-site Node 108 was generated and analyzed, and found to have an approximate capacity of 173,496 cfs. Since Area A generates a 100-yr, 24-hr peak flow rate of approximately 68,100 cfs at this location, flows generated by both Area A and Area C are assumed to be fully contained off-site by the berm at this location and directed around the southwest corner of the site. From the southwest corner of the site, runoff continues downstream via surface flow following the existing natural watercourse.

C. PRELIMINARY SAN FELIPE CREEK FLOOD HAZARD ANALYSIS

The FEMA map covering the project area does not recognize the berm and depicts a flood zone traversing the southwesterly corner of the site.

At the client's request, AEI-CASC prepared a preliminary flood hazard analysis assuming the earthen berm along the westerly property line will not prevent off-site flood flows from entering the property. The purpose of the analysis is to determine a preliminary understanding of potential channel flow velocities and flood depths across the site.

The flood hazard analysis was based upon the preliminary off-site hydrologic analysis that was developed to determine peak flow rates impacting the site during a 100-year storm event. The off-site hydrologic analysis covered an offsite tributary area of nearly 400,000 acres, and resulted in a peak 100-year flow rate of 68,100 cfs that would impact the southwesterly boundary of the site.

This flood hazard study utilized the Normal-Depth Method to determine the flooding limits and depths. Two (2) stream cross-sections (Cross-Section 2 and 5, see Table 1) were

developed within the project site (perpendicular to the subject watershed flow line) and were analyzed based upon an assumed Manning's n-value of 0.030 (typical for earthen/sandy bottom floodplains). The results of the analysis are shown in Table 1 (below). Approximate flood depths were determined for Cross-Sections 1, 3, 4, 6 and 7 by interpolating and projecting the results from Cross-Sections 2 and 5. The average flood velocities determined from Cross-Sections 2 and 5 were applied to Cross-Sections 1, 3, 4, 6 and 7. While the flow velocities are estimated to be approximately 4.5 feet/sec in the deepest section of the flood plain, the velocities along the fringe (shallower edges) of the floodplain are expected to be somewhat lower.

TABLE 1: PRELIMINARY HYDRAULIC RESULTS (BASED ON NORMAL DEPTH METHOD)

CROSS-SECTION	FLOOD DEPTH (FT)	FLOOD TOP WIDTH (FT)	FLOOD VELOCITY (FPS)
2	4.61	7,538	4.53
5	5.83	8,022	4.48

As shown on Exhibit "C", the computed flood hazard area encompasses a larger area than FEMA's current floodplain area. In particular, the majority of the southwest corner of the project site is located within the computed flood hazard area. The difference between AEI-CASC's computed flood hazard area and FEMA's floodplain area may be attributed to the topographic mapping and 100-year flow rate used in the analysis. It is assumed that FEMA utilized United States Geological Survey (USGS) maps consisting of 10-foot contour intervals while AEI-CASC used a more detailed topographic mapping consisting of 2-foot contour intervals. AEI-CASC was not able to determine the 100-year flow rate that FEMA used as the basis for their floodplain analysis. However, if FEMA used a significantly lower 100-year flow rate in its study, then this might explain the difference between AEI-CASC's and FEMA's studies.

Limitations: The normal depth methodology used in the analysis is intended to be used for preliminary planning purposes and should not be used for final engineering design. Detailed hydraulic modeling using the Hydrologic Engineering Centers River Analysis System (HEC-RAS) may be performed to determine more accurate modeling of the flood plain limits, velocities and depths across the site.

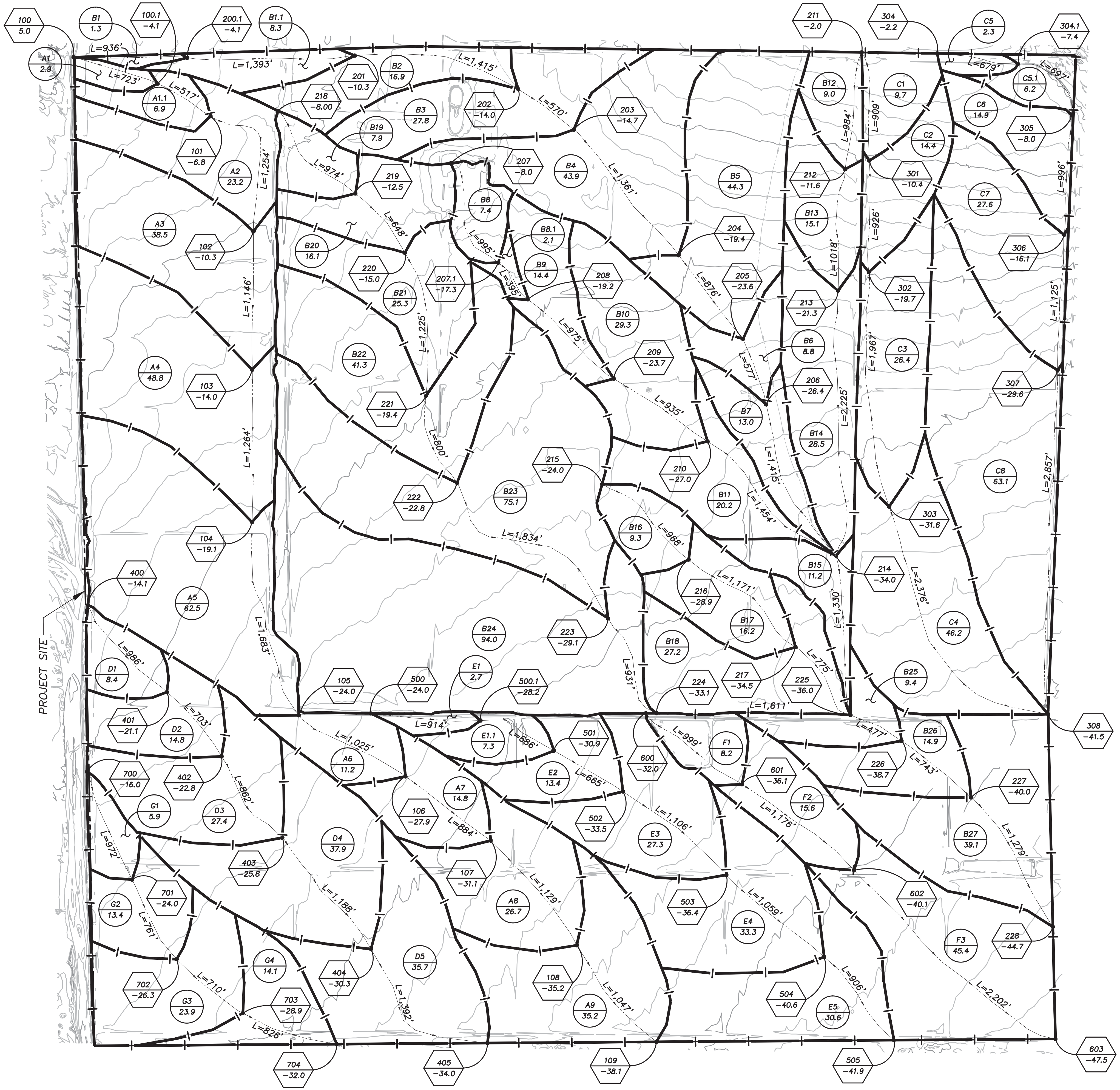
Attachments:

A. Existing On-site Hydrology Map
B. Existing Off-Site Hydrology Map
C. Preliminary 100-year Flood Hazard Map for Allegretti Farms Tract Map
D. Preliminary Hydraulic Analysis (Normal Depth Method) for Cross-Sections 2 and 5

THIS PAGE INTENTIONALLY LEFT BLANK.

ATTACHMENT A
EXISTING ON-SITE HYDROLOGY MAP

THIS PAGE INTENTIONALLY LEFT BLANK.



HYDROLOGY DATA		
NODAL POINT	10-YR, 1-HR (CFS)	100-YR, 1-HR (CFS)
109	340	742
214	342	744
225	696	1,512
228	749	1,636
308	263	563
405	182	381
505	149	317
603	96	201
704	94	194

LEGEND

XXX / XXXX	NODE/CONCENTRATION POINT / ELEVATION
XX / XX	SUB AREA / ACRES
L=XXX'	MAIN FLOW PATH
L_{CA}=XXX'	FLOW DISTANCE MEASURED UPSTREAM TO POINT OF CENTROID
	FLOW PATH
	FLOW PATH (ALTERNATE ROUTE)
	WATERSHED BOUNDARY
	PROJECT BOUNDARY

SCALE: 1" = 400'

0 200 400 800 1200

SCALE IN FEET

HYDROLOGY MAP FOR ONSITE WATERSHED AREAS (EXISTING CONDITION)

AEI CASC ENGINEERING
1470 EAST COOLEY DRIVE
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

Drawing Name: Q:\1330-001\Master_Drainage\Exhibits\Hydrology Map On-Site (Existing Condition).dwg
Last Opened: Jan 30, 2013 - 11:50am by amistretta

THIS PAGE INTENTIONALLY LEFT BLANK.

ATTACHMENT B
EXISTING OFF-SITE HYDROLOGY MAP

THIS PAGE INTENTIONALLY LEFT BLANK.

N.A.P.

N.A.P.

N.A.P.

N.A.P.

FOR SUBAREA A SEE BELOW LEFT

FOR SUBAREA B SEE BELOW LEFT

FOR SUB AREAS C, D, & E SEE ABOVE RIGHT

PROJECT SITE

PROJECT SITE

100 8500.0

101 1760.0

102 960.0

103 2886.0

104 460.0

105 2719.0

106 720.0

107 400.0

108 -30.0

200 330.0

201 -13.0

300 184.0

301 -10.0

400 5.0

401 -13.0

501 -5.0

A1 67,341

A2 34,886

A3 90,785

A4 14,355

A5 8,432

A6 38,110

A7 60,112

A8 55,463

B 10,702

C 909

D 1,096

E 29

L=112,078'
La=5,400'

L=35,887'
La=10,196'

L=69,345'
La=26,541'

L=40,811'
La=6,573'

L=22,801'
La=5,217'

L=91,976'
La=4,372'

L=85,857'
La=6,573'

L=86,911'
La=11,999'

L=49,834'
La=20,785'

L=15,940'
La=8,143'

L=12,842'
La=5,492'

L=1,200'
La=496'
(SUBAREA E)

C.G.

LEVEE

BM 26

BM 22

BM 5

SEA LEVEL

Well

Tarantula Wash

Creek

San Felipe Creek

SCALE IN FEET

0 3000 6000 12000 18000

SCALE IN FEET

0 500 1000 2000 3000

LEGEND

XXX / XXXX — NODE/CONCENTRATION POINT ELEVATION

XX / XX — SUB AREA ACRES

L=XXX' — MAIN FLOW PATH

La=XXX' — FLOW DISTANCE MEASURED UPSTREAM TO POINT OF CENTROID

C.G. — MAIN CENTROID

FLOW PATH

FLOW PATH (ALTERNATE ROUTE)

WATERSHED BOUNDARY

PROJECT BOUNDARY

HYDROLOGY MAP FOR OFFSITE WATERSHED AREAS

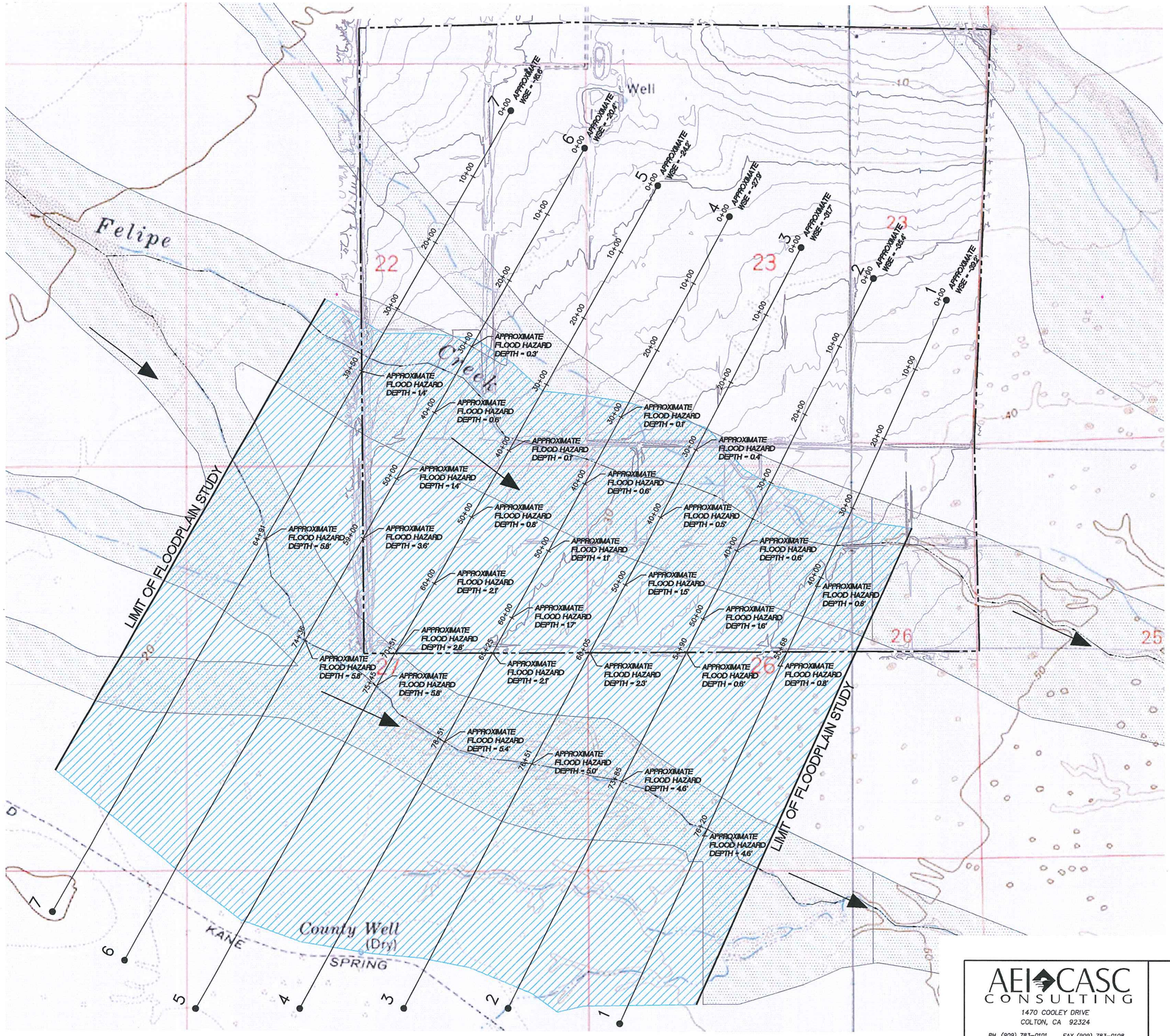
AEI CASC ENGINEERING
1470 EAST COOLEY DRIVE
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

Drawing Name: Q:\1330-001\Master_Drainage\Exhibits\Hydrology Map Off-Site (Existing Condition).dwg
Last Opened: Jan 31, 2013 - 7:32am by genaherrera

THIS PAGE INTENTIONALLY LEFT BLANK.

ATTACHMENT C
PRELIMINARY 100-YEAR FLOOD HAZARD MAP

THIS PAGE INTENTIONALLY LEFT BLANK.



HYDRAULIC SUMMARY (EXISTING CONDITION)
(ASSUMMING NO LEVEE ALONG WESTERLY PROPERTY LINE)

CROSS-SECTION	*APPROXIMATE CHANNEL INVERT (FT)	100-YEAR			
		FLOW RATE (CFS)	WATER SURFACE ELEVATION W.S.E (FT)	*DEPTH (FT)	*VELOCITY (FPS)
1	-48.3	68,100	-39.2	4.6	4.5
2	-40.0	68,100	-35.4	4.6	4.5
3	-36.7	68,100	-31.7	5.0	4.5
4	-33.3	68,100	-27.9	5.4	4.5
5	-30.0	68,100	-24.2	5.8	4.5
6	-26.2	68,100	-20.4	5.8	4.5
7	-22.4	68,100	-16.6	5.8	4.5

*NOTE: VALUES IN THE ABOVE TABLE FOR FLOODPLAIN FLOW VELOCITIES, FLOW DEPTHS AND APPROXIMATE CHANNEL INVERTS ONLY CORRELATE TO THE CHANNEL FLOW LINE SOUTH OF THE PROPERTY. FLOW VELOCITIES ALONG THE FRINGE (SHALLOWER EDGES) OF THE FLOODPLAIN ARE EXPECTED TO BE SOMEWHAT REDUCED.

ADDITIONAL NOTE: PRELIMINARY FLOODPLAIN ANALYSIS NORMAL DEPTH METHODOLOGY IS BASED ON MULTIPLE ASSUMPTIONS. APPROXIMATE FLOOD HAZARD DEPTHS AND VELOCITIES SHOULD NOT BE USED FOR DESIGN PURPOSES. THIS EXHIBIT SHOULD BE USED FOR PLANNING PURPOSES ONLY.

LEGEND:

- 1 — 1 : CROSS-SECTION
- STREAM 100-YR FLOODPLAIN
- FEMA 100-YR FLOODPLAIN ZONE A
- PROJECT BOUNDARY
- FLOW DIRECTION
- FLOW LINE

N

GRAPHIC SCALE
600 0 300 600 1200
1" = 600'

EXHIBIT "A"

AEI CASC CONSULTING
1470 COOLEY DRIVE
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

PRELIMINARY 100-YEAR FLOOD HAZARD MAP FOR ALLEGRETTI FARMS TRACT MAP (NORMAL DEPTH METHOD)

G:\2031-0032 Allegretti Farms\Master Drainage\Additional Services_Allegretti Flood Hazard Map.dwg 05/17/13 09:40

THIS PAGE INTENTIONALLY LEFT BLANK.

ATTACHMENT D
PRELIMINARY HYDRAULIC ANALYSIS FOR CROSS SECTIONS 2 AND 5

THIS PAGE INTENTIONALLY LEFT BLANK.

Worksheet for Irregular Section - 2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00334	ft/ft
Discharge	68100.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
7+33	-29.67
8+49	-33.20
9+57	-34.00
11+47	-34.00
12+67	-33.75
13+89	-33.33
15+04	-33.74
16+36	-34.32
17+42	-34.55
18+49	-34.52
19+79	-34.38
21+18	-34.43
22+20	-33.99
23+25	-34.00
24+37	-34.43
25+53	-35.93
26+74	-35.25
27+76	-35.64
28+82	-35.70
30+01	-35.74
31+06	-35.93
32+31	-35.97
33+41	-36.00
34+48	-36.00
35+54	-36.00
36+78	-36.00
37+79	-36.00

Worksheet for Irregular Section - 2

Input Data

Station (ft)	Elevation (ft)
38+79	-36.02
40+19	-36.30
41+27	-36.51
42+54	-36.54
43+73	-36.60
44+98	-36.85
46+02	-36.99
47+26	-37.20
48+40	-37.25
49+53	-37.27
50+63	-37.49
51+93	-37.84
53+00	-38.00
54+03	-36.08
54+67	-36.03
67+02	-37.00
69+43	-40.00
70+62	-37.00
71+96	-37.00
73+41	-40.00
74+58	-38.00
75+83	-40.00
81+25	-38.00
83+99	-38.00
87+38	-40.00
90+79	-38.00
95+71	-38.00
97+54	-40.00
105+28	-30.00

Worksheet for Irregular Section - 2

Input Data

Start Station	Ending Station	Roughness Coefficient
(7+33, -29.67)	(105+28, -30.00)	0.030

Options

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

Results

Normal Depth		4.61	ft
Elevation Range	-40.00 to -29.67 ft		
Flow Area		15025.15	ft²
Wetted Perimeter		7537.94	ft
Hydraulic Radius		1.99	ft
Top Width		7537.74	ft
Normal Depth		4.61	ft
Critical Depth		3.80	ft
Critical Slope		0.01115	ft/ft
Velocity		4.53	ft/s
Velocity Head		0.32	ft
Specific Energy		4.93	ft
Froude Number		0.57	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.61	ft

Worksheet for Irregular Section - 2

GVF Output Data

Critical Depth	3.80	ft
Channel Slope	0.00334	ft/ft
Critical Slope	0.01115	ft/ft

Messages

Notes

Slope = 6/1797.68 = 0.003338

Area A (Node 101) 100-Year Peak Flow = 68,093 CFC ~ 68,100 CFS

Worksheet for Irregular Section - 5

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00348	ft/ft
Discharge	68100.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	-20.00
1+00	-20.00
2+09	-20.00
3+63	-20.15
4+78	-20.37
5+93	-20.50
7+05	-20.50
8+21	-20.67
9+34	-20.75
10+59	-21.00
11+60	-21.22
12+89	-21.60
14+14	-21.85
16+03	-22.33
17+16	-22.41
18+17	-22.46
19+58	-23.20
20+65	-23.25
21+68	-23.27
23+04	-23.26
24+40	-23.30
25+49	-23.46
26+50	-23.73
27+89	-23.93
29+09	-23.99
30+16	-24.00
32+35	-24.49

Worksheet for Irregular Section - 5

Input Data

Station (ft)	Elevation (ft)
33+41	-24.73
34+78	-25.02
36+02	-25.37
37+06	-25.53
38+25	-26.00
39+37	-24.02
41+49	-24.30
42+57	-24.15
43+70	-24.38
45+03	-24.59
46+17	-24.69
47+21	-24.86
48+40	-24.82
49+61	-25.05
51+05	-25.35
52+67	-25.75
53+92	-25.76
54+95	-26.00
56+54	-26.12
57+54	-26.14
58+82	-26.13
60+09	-26.20
61+37	-26.31
62+56	-26.39
63+76	-26.33
65+07	-26.40
66+14	-26.46
67+16	-26.03
68+25	-26.04
69+27	-26.06
70+00	-27.05
75+16	-30.00
91+10	-26.00
114+77	-24.00
127+36	-20.00

Section Definitions

Worksheet for Irregular Section - 5

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+00, -20.00)	(127+36, -20.00)	0.030

Options

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

Results

Normal Depth		5.83	ft
Elevation Range	-30.00 to -20.00 ft		
Flow Area		15213.24	ft²
Wetted Perimeter		8022.17	ft
Hydraulic Radius		1.90	ft
Top Width		8022.13	ft
Normal Depth		5.83	ft
Critical Depth		4.97	ft
Critical Slope		0.01112	ft/ft
Velocity		4.48	ft/s
Velocity Head		0.31	ft
Specific Energy		6.14	ft
Froude Number		0.57	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		

Worksheet for Irregular Section - 5

GVF Output Data

Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	5.83	ft
Critical Depth	4.97	ft
Channel Slope	0.00348	ft/ft
Critical Slope	0.01112	ft/ft

Messages

Notes

Slope = 10/2873.59 = 0.00348

Area A (Node 101) 100-Year Peak Flow = 68,093 CFC ~ 68,100 CFS

RETENTION BASIN INFILTRATION TEST RESULTS

THIS PAGE INTENTIONALLY LEFT BLANK.

Riverside County / Environmental

40880-R County Center Drive
Temecula, CA 92591
T: 951.600.9271 F: 951.719.1499

PETRA

past + present + future
it's in our science

Engineers, Geologists
Environmental Scientists

December 5, 2012
J.N. 332-12

REGENERATE POWER
c/o Cameron Bucher
ZGlobal Engineering
604 Sutter Street, Suite 250
Folsom, CA 95630

Subject: Infiltration Test Results, Seville Solar Site, Ocotillo Wells Area of Imperial County, California

Dear Mr. Bucher,

Petra Geotechnical, Inc. (Petra) has completed infiltration rate testing of the Seville solar facility site near Ocotillo Wells in Imperial County. Testing was conducted using a dual-ring infiltrometer in accordance with ASTM Test Method D3385-09 at locations depicted in the Infiltration Test Location Map, Figure 1.

The tests were conducted at a depth of approximately 1 foot below existing grade. Soils encountered in tests DRI-1 and DRI-2, which were located along the center and eastern end of the southern project boundary respectively, were predominantly silt/clay, which proved to be relatively impermeable. The third test, DRI-3, conducted near the center of the eastern project boundary, encountered more permeable silty sand. Details of the individual test results are attached. The test results and their approximate locations are summarized in the following table:

Infiltration Test Results

Test No.	Approximate Test Location	Infiltration Rate
DRI-1	Center of southern project boundary	0.04 in/hr
DRI-2	East end of southern project boundary	0.00 in/hr
DRI-3	Center of eastern project boundary	2.28 in/hr

This opportunity to be of service is sincerely appreciated. If you have any questions, please contact this office.

Respectfully submitted,

PETRA GEOTECHNICAL, INC.

Grayson R. Walker, GE
Principal Engineer
GE 871

REGISTERED PROFESSIONAL ENGINEER
GRAYSON R. WALKER
GE 871
GEOTECHNICAL
STATE OF CALIFORNIA

Attachments: Infiltration Test Location Map, Figure 1
Infiltration Test Results

Distribution: (1) Addressee (electronic)
(1) AEI-CASC (electronic)
Attention: David Cooke

PETRA GEOTECHNICAL, INC.
40880 County Center Drive, Suite R
Temecula, California 92591
PHONE: (951) 600-9271
COSTA MESA TEMECULA PALM DESERT SAN DIEGO SANTA CLARITA

Infiltration Test Location Map

Proposed Seville Solar Site Project
Allegretii Farms Site
Ocotillo Wells Area, Imperial County, California

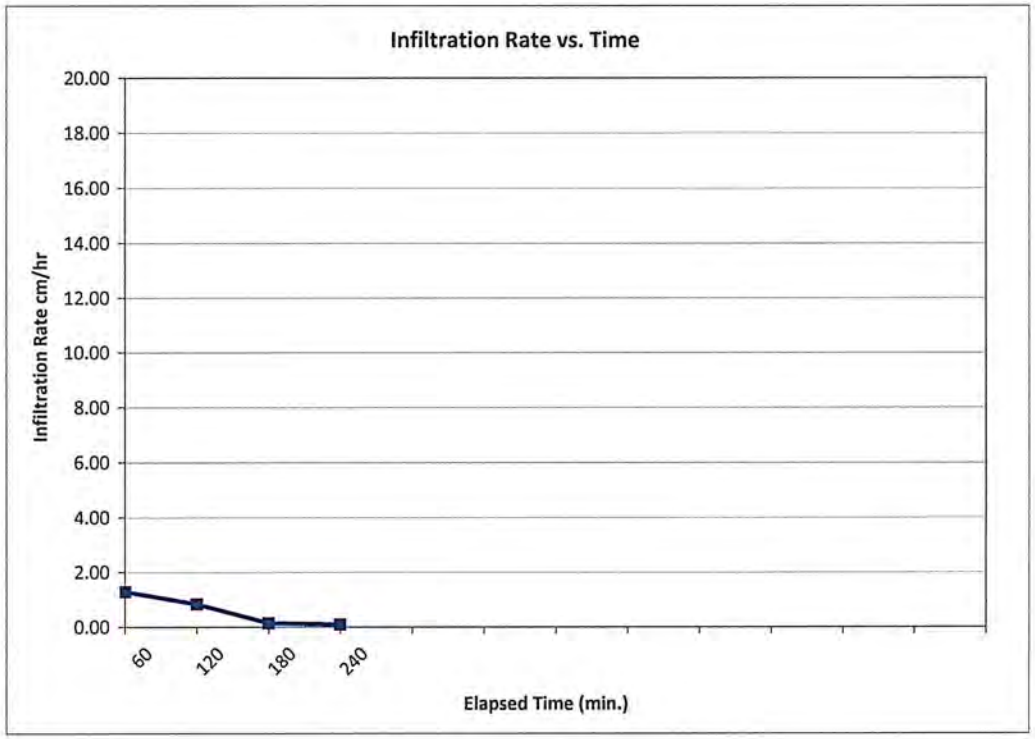
DATE: Dec. 2012	J.N.: 332-12	**Figure 1**
DWG BY: DLJ	SCALE: NTS	

Seville Site
JN 332-12
Tested by L. Holmes, November 14, 2012

Infiltration Test DRI-1

Double-Ring Infiltrometer Test, ASTM D3385-09

Time (m)	Δ Time (m)	Elapsed Time (m)	Inner Ring (cm)	Volume Inner (cm^3)	Rate Inner (cm/h)
9:15	60		58.8	901.2	1.30
10:15		60	53.7		
10:15	60		58.2	583.2	0.84
11:15		120	54.9		
11:15	60		59.4	106.0	0.15
12:15		180	58.8		
12:15	60		59.4	70.7	0.10
1:15		240	59.0		
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!



Area of Inner Ring (cm^2)
692.8

Area of Annular Space (cm^2)
2120.5

Infiltration Rate	**0.10**	**cm/hr**
	2.8E-05	**cm/sec**
	0.04	**in/hr**
	0.6	**gal/day/ft²**

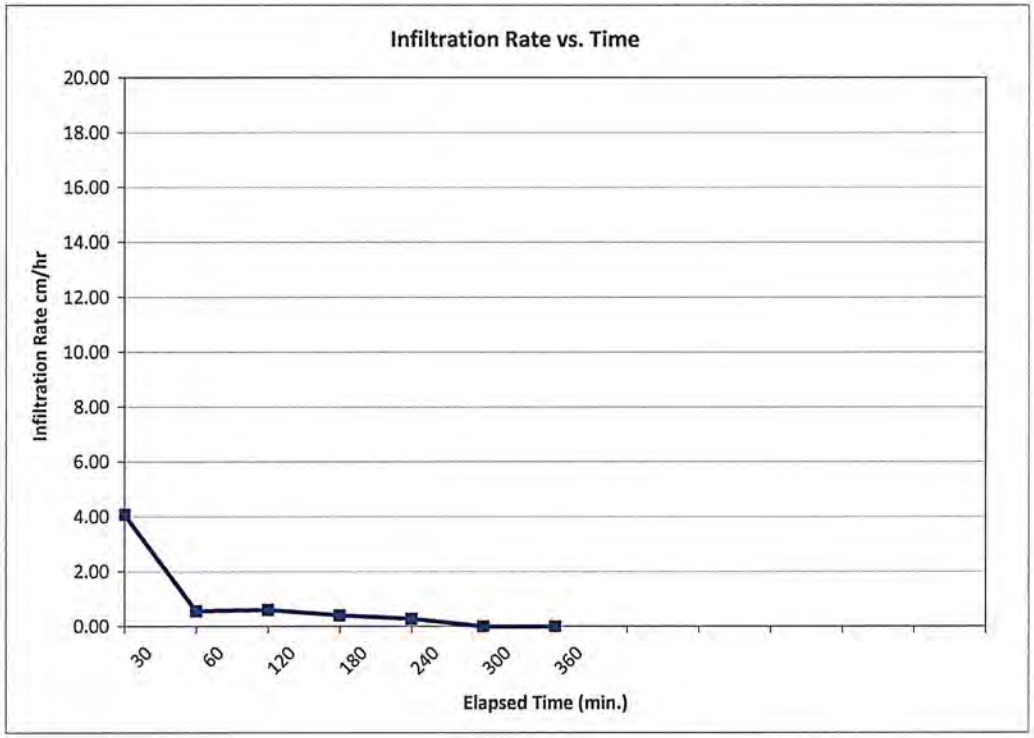
PETRA GEOTECHNICAL, INC.

Seville Site
JN 332-12
Tested by L. Holmes, November 15, 2012

Infiltration Test DRI-2

Double-Ring Infiltrometer Test, ASTM D3385-09

Time (m)	Δ Time (m)	Elapsed Time (m)	Inner Ring (cm)	Volume Inner (cm^3)	Rate Inner (cm/h)
9:25	30		58.9	1413.7	4.08
9:55		30	50.9		
9:55	30		59.0	194.4	0.56
10:25		60	57.9		
10:25	60		58.9	424.1	0.61
11:25		120	56.5		
11:25	60		58.8	282.7	0.41
12:25		180	57.2		
12:25	60		58.9	194.4	0.28
1:25		240	57.8		
1:25	60		58.8	0.0	0.00
2:25		300	58.8		
2:25	60		59.0	0.0	0.00
3:25		360	59.0		
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!
				0.0	#DIV/0!



Area of Inner Ring (cm^2)
692.8

Area of Annular Space (cm^2)
2120.5

Infiltration Rate	**0.00**	**cm/hr**
	0.0E+00	**cm/sec**
	0.00	**in/hr**
	0.0	**gal/day/ft^2**

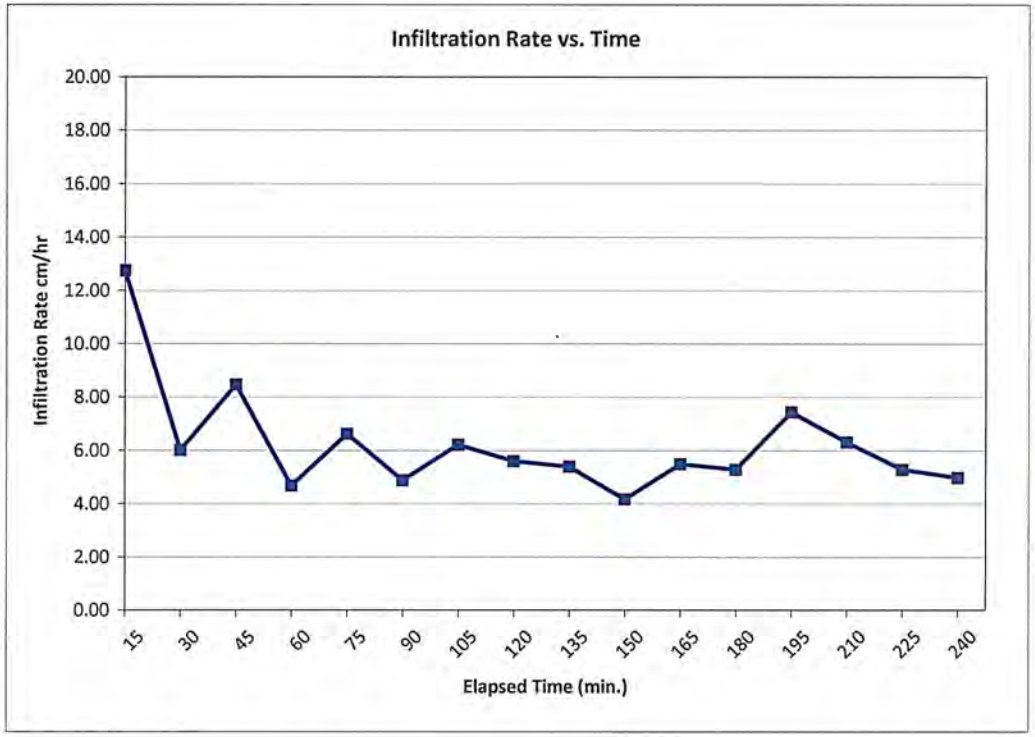
PETRA GEOTECHNICAL, INC.

Seville Site
JN 332-12
Tested by L. Holmes, November 16, 2012

Infiltration Test DRI-3

Double-Ring Infiltrometer Test, ASTM D3385-09

Time (m)	Δ Time (m)	Elapsed Time (m)	Inner Ring (cm)	Volume Inner (cm^3)	Rate Inner (cm/h)
8:55	15		58.7	2208.9	12.75
9:10		15	46.2		
9:10	15		59.3	1042.6	6.02
9:25		30	53.4		
9:25	15		59.3	1466.7	8.47
9:40		45	51.0		
9:40	15		58.7	812.9	4.69
9:55		60	54.1		
9:55	15		58.7	1148.6	6.63
10:10		75	52.2		
10:10	15		59.3	848.2	4.90
10:25		90	54.5		
10:25	15		59.3	1078.0	6.22
10:40		105	53.2		
10:40	15		58.9	971.9	5.61
10:55		120	53.4		
10:55	15		58.5	936.6	5.41
11:10		135	53.2		
11:10	15		58.7	724.5	4.18
11:25		150	54.6		
11:25	15		59.3	954.3	5.51
11:40		165	53.9		
11:40	15		59.3	918.9	5.31
11:55		180	54.1		
11:55	15		59.3	1290.0	7.45
12:10		195	52.0		
12:10	15		59	1095.6	6.33
12:25		210	52.8		
12:25	15		58.8	918.9	5.31
12:40		225	53.6		
12:40	15		59.3	865.9	5.00
12:55		240	54.4		



Area of Inner Ring (cm^2)
692.8

Area of Annular Space (cm^2)
2120.5

Infiltration Rate	**5.80**	**cm/hr**
	1.6E-03	**cm/sec**
	2.28	**in/hr**
	34.2	**gal/day/ft^2**

PETRA GEOTECHNICAL, INC.

Subject: preliminary basin design infiltration rate - Seville Solar Site
From: Grayson Walker <gwalker@petra-inc.com>
Date: 2/14/2013 11:28 AM
To: "'Cameron Bucher'" <cameron@zglobal.biz>
CC: "'David Cooke'" <dcooke@aei-casc.com>, "Grayson Walker" <gwalker@petra-inc.com>

Cameron,

I¹ve spoken to David Cooke about what would be an appropriate infiltration rate for preliminary sizing of the detention basins at the Seville site. While the infiltration tests yielded rates ranging from 0.00 to 2.28 inches per hour (see attached report), the tests were conducted at shallow, near surface depths. The soils on the site are predominately sandy with isolated layers of finer-grained silts and clays. I suggest using the 2.28 in/hr (to be factored per regulatory requirements) for preliminary basin sizing throughout the site with the understanding that there may be some remedial grading associated with the basin construction to remove exposed silts/clays and replace them with the sandy on-site soils. No import of select materials should be needed.

Please let me know if you have any questions.

Regards,
Grayson

Grayson R. Walker, GE
Vice President
Principal Engineer

PETRA GEOTECHNICAL, INC.
40880 County Center Drive, Suite R
Temecula, CA 92591
ofc 951.600.9271 x451
dir 951.253.4451
cell 909.772.3742
fax 951.719.1499
gwalker@petra-inc.com

Attachments:

332-12 Infiltration Test Results.pdf 2.8 MB

THIS PAGE INTENTIONALLY LEFT BLANK.

SUPPLEMENTAL MEMORANDUM TO PRELIMINARY ON-SITE AND OFF-SITE HYDROLOGY AND FLOOD HAZARD ANALYSIS

THIS PAGE INTENTIONALLY LEFT BLANK.

M E M O R A N D U M

DATE: JULY 8, 2013

FROM: RICK SIDOR, P.E., AEI-CASC

TO: DWIGHT CAREY, ENVIRONMENTAL MANAGEMENT ASSOCIATES, INC.

RE: San Felipe Creek/Seville Solar Complex response

This memorandum has been prepared to clarify the questions regarding AEI-CASC's preliminary analysis of flood depths which may impact the southerly section of the Seville Solar Complex Project during a major storm event assuming that the existing berm along the westerly project boundary does not exist. Exhibit A of the AEI-CASC flood hazard assessment "Preliminary On-Site and Off-Site Hydrology and Flood Hazard Analysis for Allegretti Farms Solar Project Site", dated May 22, 2013 depicts the flooding limits for the preliminary 100-year, 24-hour flood of through the southwestern corner of the site along San Felipe Creek (attached). The exhibit includes seven cross sections through the site. These cross sections, taken perpendicular to the direction of flow, indicate the estimated water surface elevations (WSE) based upon normal depth calculations. Along each cross section, at approximately 1,000 ft stations, the approximate flood hazard depth is shown. The flood hazard depths are also shown where the cross sections intersect the property boundary.

Subsequent to producing the report, AEI-CASC was asked by the Regenerate Power team to review the cross sections and underlying topographic information and confirm that two points, depicting depths of 3.6 ft and 2.8 ft, are not indicative of the depths within the area that would be utilized for the solar arrays. AEI-CASC was asked to supplement the flood hazard assessment by approximating flood hazard depths at points within the solar development area proximate to Cross Section 6, station 59+00, and Cross Section 5, Station 70+51.

In response to Regenerate's requests, AEI-CASC reviewed the cross sections and estimated the flood depths adjacent to the boundary but within the likely solar development area. On the attached close-up of the Exhibit A map we have labeled the contours and the estimated flood depth within the adjacent development area. The findings are summarized as follows:

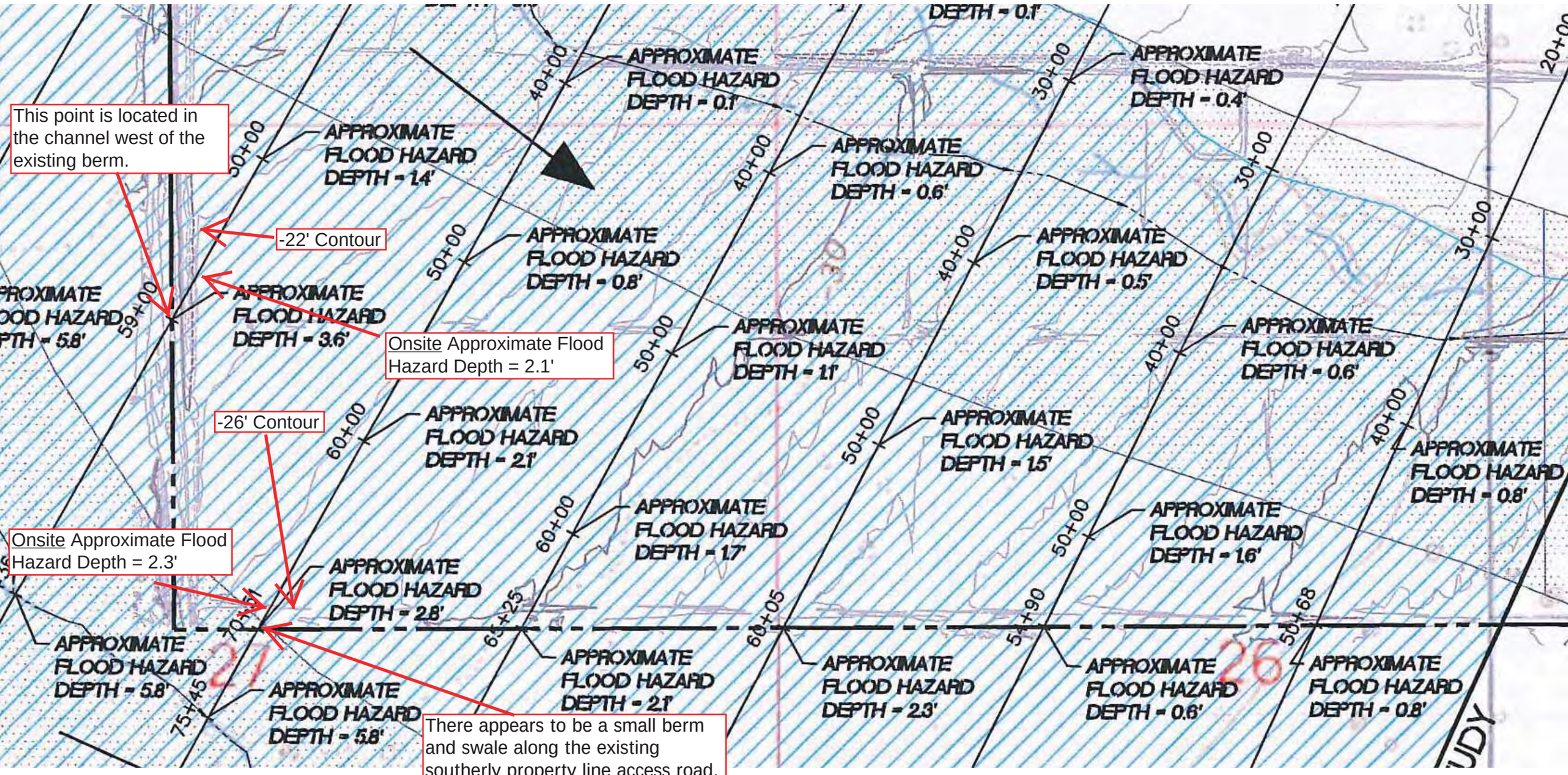
1. Cross Section 6, station 59+00, shows a depth of 3.6 ft. However, this point is located in the bottom of an existing swale along the west side of the earthen berm that has been graded along the western edge of the property. This is not indicative of the depth of flow within the proposed solar development area east of the berm. The depth of flow within the adjacent development area east of the berm appears to be approximately 2.1 ft and decreasing to the northeast.

2. Cross Section 5, Station 70+51, shows a depth 2.8 ft. However, this point appears to be located in a swale running adjacent to the south of the southern perimeter road. This area

also appears to be a small earthen berm adjacent to the swale. The 2.8ft depth is not indicative of the depth of flow in the solar development area to the north. Flood depths in the adjacent area appear to be closer to 2.3 ft in depth at the most, and decreasing northeasterly along the cross section.

As previously stated, it should be noted that this analysis is a planning level study. Detailed hydraulic analysis of the flood plain utilizing computer models will provide more accurate information.

Attachment: Modified Exhibit A


This point is located in the channel west of the existing berm.
-22' Contour
Onsite Approximate Flood Hazard Depth = 2.1'
-26' Contour
Onsite Approximate Flood Hazard Depth = 2.3'
There appears to be a small berm and swale along the existing southerly property line access road.
APPROXIMATE FLOOD HAZARD DEPTH - 0.1'
APPROXIMATE FLOOD HAZARD DEPTH - 0.4'
APPROXIMATE FLOOD HAZARD DEPTH - 1.4'
APPROXIMATE FLOOD HAZARD DEPTH - 0.6'
APPROXIMATE FLOOD HAZARD DEPTH - 0.8'
APPROXIMATE FLOOD HAZARD DEPTH - 0.5'
APPROXIMATE FLOOD HAZARD DEPTH - 3.6'
APPROXIMATE FLOOD HAZARD DEPTH - 1.1'
APPROXIMATE FLOOD HAZARD DEPTH - 0.6'
APPROXIMATE FLOOD HAZARD DEPTH - 2.1'
APPROXIMATE FLOOD HAZARD DEPTH - 1.5'
APPROXIMATE FLOOD HAZARD DEPTH - 0.8'
APPROXIMATE FLOOD HAZARD DEPTH - 1.7'
APPROXIMATE FLOOD HAZARD DEPTH - 1.6'
APPROXIMATE FLOOD HAZARD DEPTH - 2.8'
APPROXIMATE FLOOD HAZARD DEPTH - 5.8'
APPROXIMATE FLOOD HAZARD DEPTH - 2.1'
APPROXIMATE FLOOD HAZARD DEPTH - 2.3'
APPROXIMATE FLOOD HAZARD DEPTH - 0.6'
APPROXIMATE FLOOD HAZARD DEPTH - 0.8'
APPROXIMATE FLOOD HAZARD DEPTH - 5.8'
APPROXIMATE FLOOD HAZARD DEPTH - 5.8'
40+00
30+00
50+00
59+00
60+00
70+51
61+25
60+05
54+90
50+68
75+45
20+00
21
26

THIS PAGE INTENTIONALLY LEFT BLANK.