APPENDIX G
Preliminary Drainage Analysis for
Proposed Heacock Logistics Parking Lot (April 2022)

PRELIMINARY DRAINAGE ANALYSIS

FOR

PROPOSED HEACOCK LOGISTICS

PARKING LOT

LST21-0041

CITY OF MORENO VALLEY

RIVERSIDE COUNTY, CALIFORNIA

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APRIL 2022

This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein.

4/12/2022

Patrick C. Flanagan Jr., P.E.
Registered Civil Engineer

Date

Seal

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I. PURPOSE AND SCOPE

The purpose of this drainage analysis is to quantify the 100-year storm event runoff emanating from the on-site drainage areas for APN 316-211-014, City of Moreno Valley, Riverside County, California. The study will analyze the existing and proposed hydrologic conditions of the Project's drainage areas and determine the necessary drainage improvements to convey the 100-year Project flows.

The scope of this analysis includes the following:

1. Determination of points of flow concentration and drainage areas.
2. Determination of the on-site 100-year peak storm flows based upon the existing and proposed conditions utilizing the Civil Design Software, Rational Tabling program for Riverside County.
3. Preparation of hydrology maps.
4. Preparation of the drainage report.

II. PROJECT DESCRIPTION

The proposed Project is located in the City of Moreno Valley, County of Riverside, California. The site is located along the east side of Heacock Street, south of Nandina Avenue. It is bounded by vacant lots to the north (APN 316-211-013) and to the east (APN 316-211-015). The south is bounded by Perris Valley Channel – Lateral B and a small lot (APN 316-211-016), and the west is bounded by Heacock Street. The existing boundary area is approximately 9.13 acres in size. The Project proposes to develop the property with a paved truck/trailer parking/storage lot which will include associated landscaping and street improvements. The final boundary area will be 8.88 acres in size with an additional dedication of right-of-way across Heacock Street.

III. DRAINAGE AREA OVERVIEW

Existing Condition
The project site is currently undeveloped. Topographically, site elevations range from approximately 1487 feet to 1482 feet above Mean Sea Level (MSL). The project drains from the northwest to the southeast to the neighboring property to the east (APN 316-211-015) at an approximate grade of 0.60%.

Proposed Condition
Upon development, the proposed drainage patterns will mimic the existing condition by sheet flowing from the northwest corner of the site to the southeast corner to a proposed catch basin. The catch basin will direct flows to an underground storage basin designed to mitigate increased flow volumes. A proposed sump and pump will pump flows from the

proposed underground basin to a proposed modular wetlands system designed for water quality purposes. Flows from the modular wetland will discharge via a storm drain line to the Riverside County Flood Control Channel to the south of the property.

IV. HYDROLOGY

The Riverside County Hydrology Manual (RCF&WCD), (Reference 1) was used to develop the hydrologic parameters for the hydrology analysis. Pre-development pervious areas will be analyzed as the "Barren" cover type per Plate D-5.5 of the RCF&WCD. Post-development pervious areas will be analyzed as the "Residential or Commercial Landscaping" cover type. In addition, Hydrologic Soil Groups (HSG) were determined using the Natural Resources Conservation Service Web Soil Survey (Reference 3). The study area consists of both HSG "A" and "B" (see Appendix E).

The Rational Method was used to determine the peak flow rates and times of concentration under the existing and proposed conditions. Computations were performed using the RSBC computer program developed by Civil Cadd/Civil Design Engineering Software.

V. RESULTS

Proposed and existing rational method results are summarized in Tables 5-1 and 5-2. Proposed and existing unit hydrograph method results are summarized in Tables 5-3 and 5-4.

Existing Condition				
Node	Drainage Area		Q_{100}	TC_{100}
	(ft^2)	(ac)	(cfs)	(min)
102	387,027	8.88	13.38	22.15

Table 5-1: Existing Condition Rational Method Hydrology Results

Proposed Condition				
Node	Drainage Area		Q_{100}	TC_{100}
	(ft^2)	(ac)	(cfs)	(min)
102	387,027	8.88	20.0	11.25

Table 5-2: Proposed Condition Rational Method Hydrology Results

Event Freq./Duration		Existing Condition		
		Peak Flow Rate (cfs)	Flood Volume (cf)	Flood Volume (ac-ft)
100-yr	24-hr	4.23	61,505	1.41

Table 5-3: Existing Condition Unit Hydrograph Method Hydrology Results

Event Freq./Duration		Proposed Condition		
		Peak Flow Rate (cfs)	Flood Volume (cf)	Flood Volume (ac-ft)
100-yr	24-hr	5.65	132,948	3.05

Table 5-4: Proposed Condition Unit Hydrograph Method Hydrology Results

Proposed Catch Basin (Node 102)

A catch basin is proposed at Node 102, which will convey the 100-year peak flow rate of 20.0 cfs from site flows to the proposed underground storage basin. The basin is designed to retain the difference in pre and post-development project flood volumes for the 100-year, 24 hour storm event. The proposed basin has a volume of 72,314 CF. A proposed sump and pump will pump flows to a proposed modular wetland for water quality purposes. Flows from the modular wetland will be directed south via a proposed storm drain to the Riverside County Flood Control Channel.

VI. STUDY FINDINGS

Upon development, the Project will generate a 100-year peak flow rate of 20.0 cfs to the proposed underground basin before being outletted to the south. The proposed pump and modular wetland will reduce post-development flows to be less than pre-development flows.

VII. CONCLUSION

Based on the findings of this analysis, the proposed grading and drainage designs are anticipated to protect the proposed on-site improvements from the 100-year storm event without causing adverse impacts to downstream drainage conditions. The project will be treated by a modular wetland system for water quality. The proposed basin will dewater via the proposed sump and pump.

VIII. REFERENCES

1. Riverside County; *Riverside County Flood Control & Water Conservation District Hydrology Manual*, April 1978.
2. NOAA's National Weather Service; NOAA Atlas 14, Volume 6, Version 2. May 12, 2021.
3. National Resources Conservation Service; Web Soil Survey. May 27, 2020.

FIGURE 1: REGIONAL VICINITY MAP

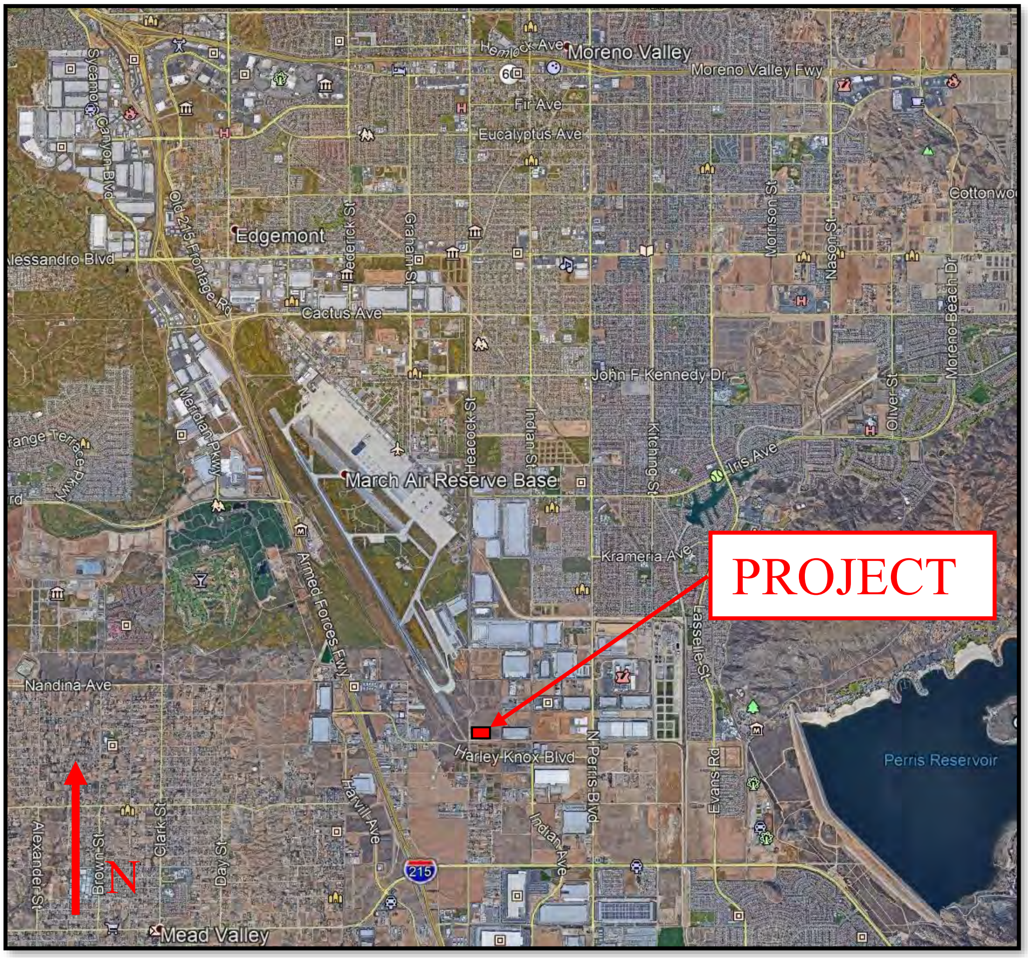
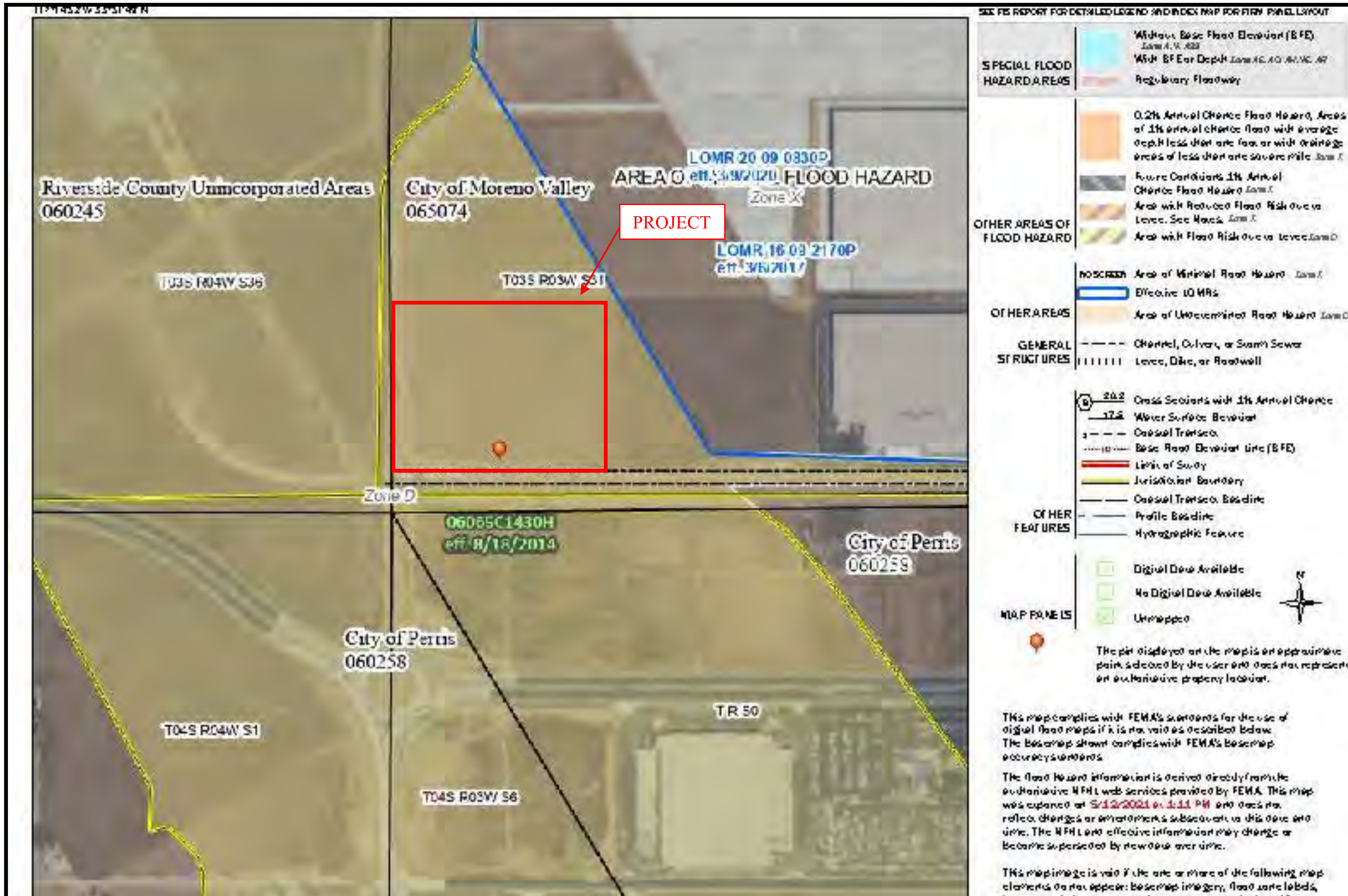


FIGURE 2: LOCAL VICINITY MAP

FIGURE 3: FEMA FLOODPLAIN MAP



APPENDIX A

ON-SITE HYDROLOGY BASED ON EXISTING CONDITION (RATIONAL METHOD)

APPENDIX A.1

100-YEAR HYDROLOGY CALCULATIONS (EXISTING)

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                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2004 Version 7.0
     Rational Hydrology Study        Date: 08/03/21  File:14820001pr.out
------------------------------------------------------------------------
PRE-DEVELOPMENT DRAINAGE STUDY
APN 316-211-014 - PROPOSED TRUCK/TRAILER PARKING/STORAGE LOT
100-YEAR STORM EVENT

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 *********  Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

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Program License Serial Number 4042

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Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [ Perris Valley ] area used.
10 year storm 10 minute intensity =  1.880(In/Hr)
10 year storm 60 minute intensity =  0.780(In/Hr)
100 year storm 10 minute intensity =  2.690(In/Hr)
100 year storm 60 minute intensity =  1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.120(In/Hr)
Slope of intensity duration curve = 0.4900




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Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance =   855.000(Ft.)
Top (of initial area) elevation =  1487.000(Ft.)
Bottom (of initial area) elevation =  1482.100(Ft.)
Difference in elevation =      4.900(Ft.)
Slope =    0.00573  s(percent)=       0.57
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   22.152 min.
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Rainfall intensity =      1.825(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.114
Decimal fraction soil group B = 0.886
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.05
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.383(CFS)
Total initial stream area =       8.880(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =           8.88 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  76.7
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APPENDIX B

ON-SITE HYDROLOGY BASED ON PROPOSED CONDITION (RATIONAL METHOD)

APPENDIX B.1

100-YEAR HYDROLOGY CALCULATIONS (PROPOSED)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2004 Version 7.0
Rational Hydrology Study Date: 05/12/21 File:14820001PO.out

POST-DEVELOPMENT DRAINAGE STUDY
APN 316-211-014 - PROPOSED TRUCK/TRAILER PARKING/STORAGE LOT
100-YEAR STORM EVENT

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4042

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 850.000(Ft.)
Top (of initial area) elevation = 1489.700(Ft.)
Bottom (of initial area) elevation = 1481.400(Ft.)
Difference in elevation = 8.300(Ft.)
Slope = 0.00976 s(percent)= 0.98
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.245 min.
Rainfall intensity = 2.544(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.114

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Decimal fraction soil group B = 0.886
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  72.61
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     19.997(CFS)
Total initial stream area =        8.880(Ac.)
Pervious area fraction = 0.100
End of computations, total study area =             8.88 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  53.3
```

APPENDIX C

ON-SITE HYDROLOGY BASED ON EXISTING CONDITION (UNIT HYDROGRAPH)

APPENDIX C.1

100-YEAR UNIT HYDROGRAPH CALCULATIONS (EXISTING)

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 08/03/21 File: 14820001prun24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4042

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PRE-DEVELOPMENT
APN 316-211-014 - PROPOSED TRUCK/TRAILER PARKING/STORAGE LOT
100-YEAR STORM EVENT

Drainage Area = 8.88(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 8.88(Ac.) =
0.014 Sq. Mi.
Length along longest watercourse = 855.00(Ft.)
Length along longest watercourse measured to centroid = 88.00(Ft.)
Length along longest watercourse = 0.162 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 4.90(Ft.)
Slope along watercourse = 30.2596 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.040 Hr.
Lag time = 2.39 Min.
25% of lag time = 0.60 Min.
40% of lag time = 0.96 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.88	1.89	16.78

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.88	4.82	42.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.890(In)
Area Averaged 100-Year Rainfall = 4.820(In)

Point rain (area averaged) = 4.820(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.820(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.870	86.00	0.000
1.010	78.00	0.000

Total Area Entered = 8.88(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	94.4	0.073	0.000	0.073	0.886	0.065
78.0	89.8	0.132	0.000	0.132	0.114	0.015
					Sum (F) =	0.080

Area averaged mean soil loss (F) (In/Hr) = 0.213
Minimum soil loss rate ((In/Hr)) = 0.106
(for 24 hour storm duration)
Note: User entry of the f value
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	209.412	44.982		4.026
2	0.167	418.824	42.716		3.823
3	0.250	628.236	8.423		0.754
4	0.333	837.648	3.879		0.347
			Sum = 100.000	Sum=	8.949

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.039	0.378	0.035	0.00
2	0.17	0.07	0.039	0.376	0.035	0.00
3	0.25	0.07	0.039	0.375	0.035	0.00

4	0.33	0.10	0.058	0.373	0.052	0.01
5	0.42	0.10	0.058	0.372	0.052	0.01
6	0.50	0.10	0.058	0.370	0.052	0.01
7	0.58	0.10	0.058	0.369	0.052	0.01
8	0.67	0.10	0.058	0.367	0.052	0.01
9	0.75	0.10	0.058	0.366	0.052	0.01
10	0.83	0.13	0.077	0.364	0.069	0.01
11	0.92	0.13	0.077	0.363	0.069	0.01
12	1.00	0.13	0.077	0.362	0.069	0.01
13	1.08	0.10	0.058	0.360	0.052	0.01
14	1.17	0.10	0.058	0.359	0.052	0.01
15	1.25	0.10	0.058	0.357	0.052	0.01
16	1.33	0.10	0.058	0.356	0.052	0.01
17	1.42	0.10	0.058	0.355	0.052	0.01
18	1.50	0.10	0.058	0.353	0.052	0.01
19	1.58	0.10	0.058	0.352	0.052	0.01
20	1.67	0.10	0.058	0.350	0.052	0.01
21	1.75	0.10	0.058	0.349	0.052	0.01
22	1.83	0.13	0.077	0.347	0.069	0.01
23	1.92	0.13	0.077	0.346	0.069	0.01
24	2.00	0.13	0.077	0.345	0.069	0.01
25	2.08	0.13	0.077	0.343	0.069	0.01
26	2.17	0.13	0.077	0.342	0.069	0.01
27	2.25	0.13	0.077	0.340	0.069	0.01
28	2.33	0.13	0.077	0.339	0.069	0.01
29	2.42	0.13	0.077	0.338	0.069	0.01
30	2.50	0.13	0.077	0.336	0.069	0.01
31	2.58	0.17	0.096	0.335	0.087	0.01
32	2.67	0.17	0.096	0.334	0.087	0.01
33	2.75	0.17	0.096	0.332	0.087	0.01
34	2.83	0.17	0.096	0.331	0.087	0.01
35	2.92	0.17	0.096	0.329	0.087	0.01
36	3.00	0.17	0.096	0.328	0.087	0.01
37	3.08	0.17	0.096	0.327	0.087	0.01
38	3.17	0.17	0.096	0.325	0.087	0.01
39	3.25	0.17	0.096	0.324	0.087	0.01
40	3.33	0.17	0.096	0.323	0.087	0.01
41	3.42	0.17	0.096	0.321	0.087	0.01
42	3.50	0.17	0.096	0.320	0.087	0.01
43	3.58	0.17	0.096	0.319	0.087	0.01
44	3.67	0.17	0.096	0.317	0.087	0.01
45	3.75	0.17	0.096	0.316	0.087	0.01
46	3.83	0.20	0.116	0.315	0.104	0.01
47	3.92	0.20	0.116	0.313	0.104	0.01
48	4.00	0.20	0.116	0.312	0.104	0.01
49	4.08	0.20	0.116	0.311	0.104	0.01
50	4.17	0.20	0.116	0.309	0.104	0.01
51	4.25	0.20	0.116	0.308	0.104	0.01
52	4.33	0.23	0.135	0.307	0.121	0.01
53	4.42	0.23	0.135	0.305	0.121	0.01
54	4.50	0.23	0.135	0.304	0.121	0.01
55	4.58	0.23	0.135	0.303	0.121	0.01
56	4.67	0.23	0.135	0.302	0.121	0.01
57	4.75	0.23	0.135	0.300	0.121	0.01

58	4.83	0.27	0.154	0.299	0.139	0.02
59	4.92	0.27	0.154	0.298	0.139	0.02
60	5.00	0.27	0.154	0.296	0.139	0.02
61	5.08	0.20	0.116	0.295	0.104	0.01
62	5.17	0.20	0.116	0.294	0.104	0.01
63	5.25	0.20	0.116	0.292	0.104	0.01
64	5.33	0.23	0.135	0.291	0.121	0.01
65	5.42	0.23	0.135	0.290	0.121	0.01
66	5.50	0.23	0.135	0.289	0.121	0.01
67	5.58	0.27	0.154	0.287	0.139	0.02
68	5.67	0.27	0.154	0.286	0.139	0.02
69	5.75	0.27	0.154	0.285	0.139	0.02
70	5.83	0.27	0.154	0.284	0.139	0.02
71	5.92	0.27	0.154	0.282	0.139	0.02
72	6.00	0.27	0.154	0.281	0.139	0.02
73	6.08	0.30	0.174	0.280	0.156	0.02
74	6.17	0.30	0.174	0.279	0.156	0.02
75	6.25	0.30	0.174	0.277	0.156	0.02
76	6.33	0.30	0.174	0.276	0.156	0.02
77	6.42	0.30	0.174	0.275	0.156	0.02
78	6.50	0.30	0.174	0.274	0.156	0.02
79	6.58	0.33	0.193	0.272	0.174	0.02
80	6.67	0.33	0.193	0.271	0.174	0.02
81	6.75	0.33	0.193	0.270	0.174	0.02
82	6.83	0.33	0.193	0.269	0.174	0.02
83	6.92	0.33	0.193	0.268	0.174	0.02
84	7.00	0.33	0.193	0.266	0.174	0.02
85	7.08	0.33	0.193	0.265	0.174	0.02
86	7.17	0.33	0.193	0.264	0.174	0.02
87	7.25	0.33	0.193	0.263	0.174	0.02
88	7.33	0.37	0.212	0.262	0.191	0.02
89	7.42	0.37	0.212	0.260	0.191	0.02
90	7.50	0.37	0.212	0.259	0.191	0.02
91	7.58	0.40	0.231	0.258	0.208	0.02
92	7.67	0.40	0.231	0.257	0.208	0.02
93	7.75	0.40	0.231	0.256	0.208	0.02
94	7.83	0.43	0.251	0.254	0.226	0.03
95	7.92	0.43	0.251	0.253	0.226	0.03
96	8.00	0.43	0.251	0.252	0.226	0.03
97	8.08	0.50	0.289	0.251	---	0.04
98	8.17	0.50	0.289	0.250	---	0.04
99	8.25	0.50	0.289	0.249	---	0.04
100	8.33	0.50	0.289	0.247	---	0.04
101	8.42	0.50	0.289	0.246	---	0.04
102	8.50	0.50	0.289	0.245	---	0.04
103	8.58	0.53	0.308	0.244	---	0.06
104	8.67	0.53	0.308	0.243	---	0.07
105	8.75	0.53	0.308	0.242	---	0.07
106	8.83	0.57	0.328	0.240	---	0.09
107	8.92	0.57	0.328	0.239	---	0.09
108	9.00	0.57	0.328	0.238	---	0.09
109	9.08	0.63	0.366	0.237	---	0.13
110	9.17	0.63	0.366	0.236	---	0.13
111	9.25	0.63	0.366	0.235	---	0.13

112	9.33	0.67	0.386	0.234	---	0.15
113	9.42	0.67	0.386	0.233	---	0.15
114	9.50	0.67	0.386	0.231	---	0.15
115	9.58	0.70	0.405	0.230	---	0.17
116	9.67	0.70	0.405	0.229	---	0.18
117	9.75	0.70	0.405	0.228	---	0.18
118	9.83	0.73	0.424	0.227	---	0.20
119	9.92	0.73	0.424	0.226	---	0.20
120	10.00	0.73	0.424	0.225	---	0.20
121	10.08	0.50	0.289	0.224	---	0.07
122	10.17	0.50	0.289	0.223	---	0.07
123	10.25	0.50	0.289	0.222	---	0.07
124	10.33	0.50	0.289	0.221	---	0.07
125	10.42	0.50	0.289	0.219	---	0.07
126	10.50	0.50	0.289	0.218	---	0.07
127	10.58	0.67	0.386	0.217	---	0.17
128	10.67	0.67	0.386	0.216	---	0.17
129	10.75	0.67	0.386	0.215	---	0.17
130	10.83	0.67	0.386	0.214	---	0.17
131	10.92	0.67	0.386	0.213	---	0.17
132	11.00	0.67	0.386	0.212	---	0.17
133	11.08	0.63	0.366	0.211	---	0.16
134	11.17	0.63	0.366	0.210	---	0.16
135	11.25	0.63	0.366	0.209	---	0.16
136	11.33	0.63	0.366	0.208	---	0.16
137	11.42	0.63	0.366	0.207	---	0.16
138	11.50	0.63	0.366	0.206	---	0.16
139	11.58	0.57	0.328	0.205	---	0.12
140	11.67	0.57	0.328	0.204	---	0.12
141	11.75	0.57	0.328	0.203	---	0.12
142	11.83	0.60	0.347	0.202	---	0.15
143	11.92	0.60	0.347	0.201	---	0.15
144	12.00	0.60	0.347	0.200	---	0.15
145	12.08	0.83	0.482	0.199	---	0.28
146	12.17	0.83	0.482	0.198	---	0.28
147	12.25	0.83	0.482	0.197	---	0.29
148	12.33	0.87	0.501	0.196	---	0.31
149	12.42	0.87	0.501	0.195	---	0.31
150	12.50	0.87	0.501	0.194	---	0.31
151	12.58	0.93	0.540	0.193	---	0.35
152	12.67	0.93	0.540	0.192	---	0.35
153	12.75	0.93	0.540	0.191	---	0.35
154	12.83	0.97	0.559	0.190	---	0.37
155	12.92	0.97	0.559	0.189	---	0.37
156	13.00	0.97	0.559	0.188	---	0.37
157	13.08	1.13	0.656	0.187	---	0.47
158	13.17	1.13	0.656	0.186	---	0.47
159	13.25	1.13	0.656	0.185	---	0.47
160	13.33	1.13	0.656	0.184	---	0.47
161	13.42	1.13	0.656	0.183	---	0.47
162	13.50	1.13	0.656	0.182	---	0.47
163	13.58	0.77	0.443	0.181	---	0.26
164	13.67	0.77	0.443	0.181	---	0.26
165	13.75	0.77	0.443	0.180	---	0.26

166	13.83	0.77	0.443	0.179	---	0.26
167	13.92	0.77	0.443	0.178	---	0.27
168	14.00	0.77	0.443	0.177	---	0.27
169	14.08	0.90	0.521	0.176	---	0.34
170	14.17	0.90	0.521	0.175	---	0.35
171	14.25	0.90	0.521	0.174	---	0.35
172	14.33	0.87	0.501	0.173	---	0.33
173	14.42	0.87	0.501	0.172	---	0.33
174	14.50	0.87	0.501	0.172	---	0.33
175	14.58	0.87	0.501	0.171	---	0.33
176	14.67	0.87	0.501	0.170	---	0.33
177	14.75	0.87	0.501	0.169	---	0.33
178	14.83	0.83	0.482	0.168	---	0.31
179	14.92	0.83	0.482	0.167	---	0.31
180	15.00	0.83	0.482	0.166	---	0.32
181	15.08	0.80	0.463	0.165	---	0.30
182	15.17	0.80	0.463	0.165	---	0.30
183	15.25	0.80	0.463	0.164	---	0.30
184	15.33	0.77	0.443	0.163	---	0.28
185	15.42	0.77	0.443	0.162	---	0.28
186	15.50	0.77	0.443	0.161	---	0.28
187	15.58	0.63	0.366	0.160	---	0.21
188	15.67	0.63	0.366	0.160	---	0.21
189	15.75	0.63	0.366	0.159	---	0.21
190	15.83	0.63	0.366	0.158	---	0.21
191	15.92	0.63	0.366	0.157	---	0.21
192	16.00	0.63	0.366	0.156	---	0.21
193	16.08	0.13	0.077	0.156	0.069	0.01
194	16.17	0.13	0.077	0.155	0.069	0.01
195	16.25	0.13	0.077	0.154	0.069	0.01
196	16.33	0.13	0.077	0.153	0.069	0.01
197	16.42	0.13	0.077	0.152	0.069	0.01
198	16.50	0.13	0.077	0.152	0.069	0.01
199	16.58	0.10	0.058	0.151	0.052	0.01
200	16.67	0.10	0.058	0.150	0.052	0.01
201	16.75	0.10	0.058	0.149	0.052	0.01
202	16.83	0.10	0.058	0.149	0.052	0.01
203	16.92	0.10	0.058	0.148	0.052	0.01
204	17.00	0.10	0.058	0.147	0.052	0.01
205	17.08	0.17	0.096	0.146	0.087	0.01
206	17.17	0.17	0.096	0.146	0.087	0.01
207	17.25	0.17	0.096	0.145	0.087	0.01
208	17.33	0.17	0.096	0.144	0.087	0.01
209	17.42	0.17	0.096	0.143	0.087	0.01
210	17.50	0.17	0.096	0.143	0.087	0.01
211	17.58	0.17	0.096	0.142	0.087	0.01
212	17.67	0.17	0.096	0.141	0.087	0.01
213	17.75	0.17	0.096	0.141	0.087	0.01
214	17.83	0.13	0.077	0.140	0.069	0.01
215	17.92	0.13	0.077	0.139	0.069	0.01
216	18.00	0.13	0.077	0.139	0.069	0.01
217	18.08	0.13	0.077	0.138	0.069	0.01
218	18.17	0.13	0.077	0.137	0.069	0.01
219	18.25	0.13	0.077	0.136	0.069	0.01

220	18.33	0.13	0.077	0.136	0.069	0.01
221	18.42	0.13	0.077	0.135	0.069	0.01
222	18.50	0.13	0.077	0.135	0.069	0.01
223	18.58	0.10	0.058	0.134	0.052	0.01
224	18.67	0.10	0.058	0.133	0.052	0.01
225	18.75	0.10	0.058	0.133	0.052	0.01
226	18.83	0.07	0.039	0.132	0.035	0.00
227	18.92	0.07	0.039	0.131	0.035	0.00
228	19.00	0.07	0.039	0.131	0.035	0.00
229	19.08	0.10	0.058	0.130	0.052	0.01
230	19.17	0.10	0.058	0.129	0.052	0.01
231	19.25	0.10	0.058	0.129	0.052	0.01
232	19.33	0.13	0.077	0.128	0.069	0.01
233	19.42	0.13	0.077	0.128	0.069	0.01
234	19.50	0.13	0.077	0.127	0.069	0.01
235	19.58	0.10	0.058	0.126	0.052	0.01
236	19.67	0.10	0.058	0.126	0.052	0.01
237	19.75	0.10	0.058	0.125	0.052	0.01
238	19.83	0.07	0.039	0.125	0.035	0.00
239	19.92	0.07	0.039	0.124	0.035	0.00
240	20.00	0.07	0.039	0.124	0.035	0.00
241	20.08	0.10	0.058	0.123	0.052	0.01
242	20.17	0.10	0.058	0.123	0.052	0.01
243	20.25	0.10	0.058	0.122	0.052	0.01
244	20.33	0.10	0.058	0.122	0.052	0.01
245	20.42	0.10	0.058	0.121	0.052	0.01
246	20.50	0.10	0.058	0.120	0.052	0.01
247	20.58	0.10	0.058	0.120	0.052	0.01
248	20.67	0.10	0.058	0.119	0.052	0.01
249	20.75	0.10	0.058	0.119	0.052	0.01
250	20.83	0.07	0.039	0.118	0.035	0.00
251	20.92	0.07	0.039	0.118	0.035	0.00
252	21.00	0.07	0.039	0.118	0.035	0.00
253	21.08	0.10	0.058	0.117	0.052	0.01
254	21.17	0.10	0.058	0.117	0.052	0.01
255	21.25	0.10	0.058	0.116	0.052	0.01
256	21.33	0.07	0.039	0.116	0.035	0.00
257	21.42	0.07	0.039	0.115	0.035	0.00
258	21.50	0.07	0.039	0.115	0.035	0.00
259	21.58	0.10	0.058	0.114	0.052	0.01
260	21.67	0.10	0.058	0.114	0.052	0.01
261	21.75	0.10	0.058	0.114	0.052	0.01
262	21.83	0.07	0.039	0.113	0.035	0.00
263	21.92	0.07	0.039	0.113	0.035	0.00
264	22.00	0.07	0.039	0.112	0.035	0.00
265	22.08	0.10	0.058	0.112	0.052	0.01
266	22.17	0.10	0.058	0.112	0.052	0.01
267	22.25	0.10	0.058	0.111	0.052	0.01
268	22.33	0.07	0.039	0.111	0.035	0.00
269	22.42	0.07	0.039	0.111	0.035	0.00
270	22.50	0.07	0.039	0.110	0.035	0.00
271	22.58	0.07	0.039	0.110	0.035	0.00
272	22.67	0.07	0.039	0.110	0.035	0.00
273	22.75	0.07	0.039	0.109	0.035	0.00

274	22.83	0.07	0.039	0.109	0.035	0.00
275	22.92	0.07	0.039	0.109	0.035	0.00
276	23.00	0.07	0.039	0.109	0.035	0.00
277	23.08	0.07	0.039	0.108	0.035	0.00
278	23.17	0.07	0.039	0.108	0.035	0.00
279	23.25	0.07	0.039	0.108	0.035	0.00
280	23.33	0.07	0.039	0.108	0.035	0.00
281	23.42	0.07	0.039	0.107	0.035	0.00
282	23.50	0.07	0.039	0.107	0.035	0.00
283	23.58	0.07	0.039	0.107	0.035	0.00
284	23.67	0.07	0.039	0.107	0.035	0.00
285	23.75	0.07	0.039	0.107	0.035	0.00
286	23.83	0.07	0.039	0.107	0.035	0.00
287	23.92	0.07	0.039	0.107	0.035	0.00
288	24.00	0.07	0.039	0.106	0.035	0.00
	Sum =	100.0			Sum =	22.9

```
Flood volume = Effective rainfall      1.91(In)
 times area       8.9(Ac.)/[(In)/(Ft.)] =        1.4(Ac.Ft)
Total soil loss =       2.91(In)
Total soil loss =      2.155(Ac.Ft)
Total rainfall =       4.82(In)
Flood volume =        61504.9 Cubic Feet
Total soil loss =        93862.2 Cubic Feet
------------------------------------------------------------------
 Peak flow rate of this hydrograph =       4.230(CFS)
------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                  24 - H O U R    S T O R M
              R u n o f f     H y d r o g r a p h
------------------------------------------------------------------
             Hydrograph in   5   Minute intervals ((CFS))
------------------------------------------------------------------
```

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q	|	|	|	|
0+10	0.0003	0.03	Q	|	|	|	|
0+15	0.0005	0.03	Q	|	|	|	|
0+20	0.0008	0.04	Q	|	|	|	|
0+25	0.0012	0.05	Q	|	|	|	|
0+30	0.0015	0.05	Q	|	|	|	|
0+35	0.0019	0.05	Q	|	|	|	|
0+40	0.0022	0.05	Q	|	|	|	|
0+45	0.0026	0.05	Q	|	|	|	|
0+50	0.0030	0.06	Q	|	|	|	|
0+55	0.0035	0.07	Q	|	|	|	|
1+ 0	0.0039	0.07	Q	|	|	|	|
1+ 5	0.0044	0.06	Q	|	|	|	|
1+10	0.0047	0.05	Q	|	|	|	|
1+15	0.0051	0.05	Q	|	|	|	|
1+20	0.0055	0.05	Q	|	|	|	|
1+25	0.0058	0.05	Q	|	|	|	|
1+30	0.0062	0.05	Q	|	|	|	|
1+35	0.0065	0.05	Q	|	|	|	|

1+40	0.0069	0.05	Q				
1+45	0.0072	0.05	Q				
1+50	0.0076	0.06	Q				
1+55	0.0081	0.07	Q				
2+ 0	0.0086	0.07	Q				
2+ 5	0.0091	0.07	Q				
2+10	0.0095	0.07	Q				
2+15	0.0100	0.07	Q				
2+20	0.0105	0.07	Q				
2+25	0.0110	0.07	Q				
2+30	0.0114	0.07	Q				
2+35	0.0120	0.08	Q				
2+40	0.0125	0.08	Q				
2+45	0.0131	0.09	Q				
2+50	0.0137	0.09	Q				
2+55	0.0143	0.09	Q				
3+ 0	0.0149	0.09	Q				
3+ 5	0.0155	0.09	Q				
3+10	0.0161	0.09	Q				
3+15	0.0167	0.09	Q				
3+20	0.0173	0.09	Q				
3+25	0.0179	0.09	Q				
3+30	0.0185	0.09	Q				
3+35	0.0191	0.09	Q				
3+40	0.0197	0.09	Q				
3+45	0.0203	0.09	Q				
3+50	0.0209	0.09	Q				
3+55	0.0216	0.10	Q				
4+ 0	0.0223	0.10	Q				
4+ 5	0.0230	0.10	Q				
4+10	0.0237	0.10	Q				
4+15	0.0245	0.10	Q				
4+20	0.0252	0.11	Q				
4+25	0.0260	0.12	Q				
4+30	0.0269	0.12	Q				
4+35	0.0277	0.12	Q				
4+40	0.0285	0.12	Q				
4+45	0.0294	0.12	Q				
4+50	0.0303	0.13	Q				
4+55	0.0312	0.14	Q				
5+ 0	0.0321	0.14	Q				
5+ 5	0.0330	0.12	Q				
5+10	0.0337	0.11	Q				
5+15	0.0344	0.10	Q				
5+20	0.0352	0.11	Q				
5+25	0.0360	0.12	QV				
5+30	0.0369	0.12	QV				
5+35	0.0377	0.13	QV				
5+40	0.0387	0.14	QV				
5+45	0.0396	0.14	QV				
5+50	0.0406	0.14	QV				
5+55	0.0415	0.14	QV				
6+ 0	0.0425	0.14	QV				
6+ 5	0.0435	0.15	QV				

6+10	0.0445	0.15	QV
6+15	0.0456	0.15	QV
6+20	0.0467	0.16	QV
6+25	0.0477	0.16	QV
6+30	0.0488	0.16	QV
6+35	0.0499	0.16	QV
6+40	0.0511	0.17	QV
6+45	0.0523	0.17	QV
6+50	0.0535	0.17	QV
6+55	0.0547	0.17	QV
7+ 0	0.0559	0.17	QV
7+ 5	0.0571	0.17	QV
7+10	0.0582	0.17	QV
7+15	0.0594	0.17	QV
7+20	0.0607	0.18	QV
7+25	0.0620	0.19	QV
7+30	0.0633	0.19	QV
7+35	0.0646	0.20	QV
7+40	0.0660	0.21	QV
7+45	0.0675	0.21	QV
7+50	0.0689	0.21	QV
7+55	0.0705	0.22	QV
8+ 0	0.0720	0.22	Q V
8+ 5	0.0739	0.28	QV
8+10	0.0762	0.33	QV
8+15	0.0787	0.35	QV
8+20	0.0812	0.37	QV
8+25	0.0838	0.38	QV
8+30	0.0865	0.39	QV
8+35	0.0897	0.48	QV
8+40	0.0936	0.56	Q
8+45	0.0976	0.58	Q
8+50	0.1023	0.68	Q
8+55	0.1075	0.76	Q
9+ 0	0.1130	0.79	Q
9+ 5	0.1196	0.96	Q
9+10	0.1273	1.12	VQ
9+15	0.1352	1.16	VQ
9+20	0.1439	1.26	VQ
9+25	0.1531	1.34	VQ
9+30	0.1626	1.37	VQ
9+35	0.1726	1.46	VQ
9+40	0.1832	1.54	VQ
9+45	0.1940	1.57	VQ
9+50	0.2055	1.66	VQ
9+55	0.2175	1.75	Q
10+ 0	0.2297	1.77	VQ
10+ 5	0.2383	1.24	Q V
10+10	0.2434	0.74	Q V
10+15	0.2478	0.64	Q V
10+20	0.2520	0.61	Q V
10+25	0.2562	0.62	Q V
10+30	0.2605	0.63	Q V
10+35	0.2676	1.02	Q V

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10+40       0.2773      1.40  |    Q V  |         |         |         |
10+45       0.2875      1.49  |    Q  V |         |         |         |
10+50       0.2980      1.53  |     Q V |         |         |         |
10+55       0.3086      1.54  |     Q V |         |         |         |
11+ 0       0.3193      1.55  |     Q  V|         |         |         |
11+ 5       0.3294      1.48  |    Q   V|         |         |         |
11+10       0.3392      1.41  |    Q   V|         |         |         |
11+15       0.3489      1.41  |    Q   V|         |         |         |
11+20       0.3586      1.41  |    Q    V         |         |         |
11+25       0.3684      1.42  |    Q    V         |         |         |
11+30       0.3782      1.43  |    Q    V         |         |         |
11+35       0.3871      1.28  |    Q    V         |         |         |
11+40       0.3950      1.15  |   Q     |V        |         |         |
11+45       0.4027      1.13  |   Q     |V        |         |         |
11+50       0.4110      1.20  |   Q     |V        |         |         |
11+55       0.4198      1.28  |    Q    |V        |         |         |
12+ 0       0.4288      1.31  |    Q    | V       |         |         |
12+ 5       0.4416      1.86  |      Q  | V       |         |         |
12+10       0.4581      2.39  |        Q| V       |         |         |
12+15       0.4753      2.50  |         Q  V      |         |         |
12+20       0.4935      2.63  |         Q  V      |         |         |
12+25       0.5122      2.72  |         Q   V     |         |         |
12+30       0.5310      2.74  |         Q    V    |         |         |
12+35       0.5511      2.91  |         |Q   V    |         |         |
12+40       0.5722      3.07  |         | Q   V   |         |         |
12+45       0.5936      3.10  |         | Q   V   |         |         |
12+50       0.6156      3.20  |         | Q    V  |         |         |
12+55       0.6383      3.29  |         |  Q    V |         |         |
13+ 0       0.6611      3.31  |         |  Q    V |         |         |
13+ 5       0.6866      3.71  |         |   Q    V|         |         |
13+10       0.7148      4.09  |         |     Q   V         |         |
13+15       0.7435      4.17  |         |     Q   |V        |         |
13+20       0.7726      4.21  |         |     Q   |V        |         |
13+25       0.8016      4.22  |         |     Q   | V       |         |
13+30       0.8308      4.23  |         |     Q   |  V      |         |
13+35       0.8541      3.38  |         |  Q      |   V     |         |
13+40       0.8719      2.58  |         Q         |   V     |         |
13+45       0.8886      2.43  |        Q|         |    V    |         |
13+50       0.9049      2.36  |        Q|         |    V    |         |
13+55       0.9212      2.37  |        Q|         |     V   |         |
14+ 0       0.9376      2.38  |        Q|         |     V   |         |
14+ 5       0.9562      2.70  |         Q         |      V  |         |
14+10       0.9769      3.00  |         | Q       |      V  |         |
14+15       0.9980      3.07  |         | Q       |       V |         |
14+20       1.0189      3.03  |         | Q       |       V |         |
14+25       1.0392      2.96  |         |Q        |        V|         |
14+30       1.0596      2.95  |         |Q        |         V         |
14+35       1.0799      2.95  |         |Q        |         V         |
14+40       1.1003      2.96  |         |Q        |         |V        |
14+45       1.1208      2.97  |         |Q        |         |V        |
14+50       1.1408      2.90  |         |Q        |         | V       |
14+55       1.1603      2.83  |         |Q        |         | V       |
15+ 0       1.1798      2.83  |         |Q        |         |  V      |
15+ 5       1.1987      2.75  |         |Q        |         |  V      |
```

```
 15+10      1.2172      2.68  |           Q          |          |  V     |
 15+15      1.2356      2.68  |           Q          |          |   V    |
 15+20      1.2536      2.60  |           Q          |          |   V    |
 15+25      1.2710      2.53  |           Q          |          |    V   |
 15+30      1.2884      2.53  |           Q          |          |    V   |
 15+35      1.3037      2.22  |         Q |          |          |    V   |
 15+40      1.3170      1.93  |        Q  |          |          |     V  |
 15+45      1.3299      1.88  |        Q  |          |          |     V  |
 15+50      1.3427      1.86  |        Q  |          |          |      V |
 15+55      1.3556      1.87  |        Q  |          |          |      V |
 16+ 0      1.3685      1.87  |        Q  |          |          |      V |
 16+ 5      1.3758      1.06  |    Q      |          |          |      V |
 16+10      1.3778      0.29  |Q          |          |          |       V|
 16+15      1.3788      0.14  Q           |          |          |       V|
 16+20      1.3793      0.07  Q           |          |          |       V|
 16+25      1.3798      0.07  Q           |          |          |       V|
 16+30      1.3802      0.07  Q           |          |          |       V|
 16+35      1.3807      0.06  Q           |          |          |       V|
 16+40      1.3810      0.05  Q           |          |          |       V|
 16+45      1.3814      0.05  Q           |          |          |       V|
 16+50      1.3817      0.05  Q           |          |          |       V|
 16+55      1.3821      0.05  Q           |          |          |       V|
 17+ 0      1.3825      0.05  Q           |          |          |       V|
 17+ 5      1.3829      0.07  Q           |          |          |       V|
 17+10      1.3835      0.08  Q           |          |          |       V|
 17+15      1.3841      0.08  Q           |          |          |       V|
 17+20      1.3847      0.09  Q           |          |          |       V|
 17+25      1.3853      0.09  Q           |          |          |       V|
 17+30      1.3859      0.09  Q           |          |          |       V|
 17+35      1.3864      0.09  Q           |          |          |       V|
 17+40      1.3870      0.09  Q           |          |          |       V|
 17+45      1.3876      0.09  Q           |          |          |       V|
 17+50      1.3882      0.08  Q           |          |          |       V|
 17+55      1.3887      0.07  Q           |          |          |       V|
 18+ 0      1.3891      0.07  Q           |          |          |       V|
 18+ 5      1.3896      0.07  Q           |          |          |       V|
 18+10      1.3901      0.07  Q           |          |          |       V|
 18+15      1.3906      0.07  Q           |          |          |       V|
 18+20      1.3911      0.07  Q           |          |          |       V|
 18+25      1.3915      0.07  Q           |          |          |       V|
 18+30      1.3920      0.07  Q           |          |          |       V|
 18+35      1.3924      0.06  Q           |          |          |       V|
 18+40      1.3928      0.05  Q           |          |          |       V|
 18+45      1.3932      0.05  Q           |          |          |       V|
 18+50      1.3935      0.04  Q           |          |          |       V|
 18+55      1.3937      0.04  Q           |          |          |       V|
 19+ 0      1.3940      0.04  Q           |          |          |       V|
 19+ 5      1.3942      0.04  Q           |          |          |       V|
 19+10      1.3946      0.05  Q           |          |          |       V|
 19+15      1.3949      0.05  Q           |          |          |       V|
 19+20      1.3954      0.06  Q           |          |          |       V|
 19+25      1.3958      0.07  Q           |          |          |       V|
 19+30      1.3963      0.07  Q           |          |          |       V|
 19+35      1.3967      0.06  Q           |          |          |       V|
```

19+40	1.3971	0.05	Q	|	|	|	V|
19+45	1.3974	0.05	Q	|	|	|	V|
19+50	1.3977	0.04	Q	|	|	|	V|
19+55	1.3980	0.04	Q	|	|	|	V|
20+ 0	1.3982	0.04	Q	|	|	|	V|
20+ 5	1.3985	0.04	Q	|	|	|	V|
20+10	1.3989	0.05	Q	|	|	|	V|
20+15	1.3992	0.05	Q	|	|	|	V|
20+20	1.3996	0.05	Q	|	|	|	V|
20+25	1.3999	0.05	Q	|	|	|	V|
20+30	1.4003	0.05	Q	|	|	|	V|
20+35	1.4006	0.05	Q	|	|	|	V|
20+40	1.4010	0.05	Q	|	|	|	V|
20+45	1.4014	0.05	Q	|	|	|	V|
20+50	1.4017	0.04	Q	|	|	|	V|
20+55	1.4019	0.04	Q	|	|	|	V|
21+ 0	1.4022	0.04	Q	|	|	|	V|
21+ 5	1.4024	0.04	Q	|	|	|	V|
21+10	1.4028	0.05	Q	|	|	|	V|
21+15	1.4031	0.05	Q	|	|	|	V|
21+20	1.4034	0.04	Q	|	|	|	V|
21+25	1.4037	0.04	Q	|	|	|	V|
21+30	1.4039	0.04	Q	|	|	|	V|
21+35	1.4042	0.04	Q	|	|	|	V|
21+40	1.4046	0.05	Q	|	|	|	V|
21+45	1.4049	0.05	Q	|	|	|	V|
21+50	1.4052	0.04	Q	|	|	|	V|
21+55	1.4055	0.04	Q	|	|	|	V|
22+ 0	1.4057	0.04	Q	|	|	|	V|
22+ 5	1.4060	0.04	Q	|	|	|	V|
22+10	1.4064	0.05	Q	|	|	|	V|
22+15	1.4067	0.05	Q	|	|	|	V|
22+20	1.4070	0.04	Q	|	|	|	V|
22+25	1.4073	0.04	Q	|	|	|	V|
22+30	1.4075	0.04	Q	|	|	|	V|
22+35	1.4077	0.03	Q	|	|	|	V|
22+40	1.4080	0.03	Q	|	|	|	V|
22+45	1.4082	0.03	Q	|	|	|	V|
22+50	1.4085	0.03	Q	|	|	|	V|
22+55	1.4087	0.03	Q	|	|	|	V|
23+ 0	1.4089	0.03	Q	|	|	|	V|
23+ 5	1.4092	0.03	Q	|	|	|	V|
23+10	1.4094	0.03	Q	|	|	|	V|
23+15	1.4096	0.03	Q	|	|	|	V|
23+20	1.4099	0.03	Q	|	|	|	V|
23+25	1.4101	0.03	Q	|	|	|	V|
23+30	1.4104	0.03	Q	|	|	|	V|
23+35	1.4106	0.03	Q	|	|	|	V|
23+40	1.4108	0.03	Q	|	|	|	V|
23+45	1.4111	0.03	Q	|	|	|	V|
23+50	1.4113	0.03	Q	|	|	|	V|
23+55	1.4116	0.03	Q	|	|	|	V|
24+ 0	1.4118	0.03	Q	|	|	|	V|
24+ 5	1.4119	0.02	Q	|	|	|	V|

```
 24+10       1.4119      0.00  Q       |       |       |      V|
 24+15       1.4120      0.00  Q       |       |       |      V|
-----------------------------------------------------------------------
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APPENDIX D

ON-SITE HYDROLOGY BASED ON PROPOSED CONDITION (UNIT HYDROGRAPH)

APPENDIX D.1

100-YEAR UNIT HYDROGRAPH CALCULATIONS (PROPOSED)

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 05/13/21 File: 14820001POUN24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4042

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

POST-DEVELOPMENT
APN 316-211-014 - PROPOSED TRUCK/TRAILER PARKING/STORAGE LOT
100-YEAR STORM EVENT

Drainage Area = 8.88(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 8.88(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 850.00(Ft.)
Length along longest watercourse measured to centroid = 148.00(Ft.)
Length along longest watercourse = 0.161 Mi.
Length along longest watercourse measured to centroid = 0.028 Mi.
Difference in elevation = 8.30(Ft.)
Slope along watercourse = 51.5576 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.022 Hr.
Lag time = 1.31 Min.
25% of lag time = 0.33 Min.
40% of lag time = 0.52 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.88	1.89	16.78

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.88	4.82	42.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.890(In)
Area Averaged 100-Year Rainfall = 4.820(In)

Point rain (area averaged) = 4.820(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.820(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
8.060	98.00	1.000
0.820	56.00	0.000

Total Area Entered = 8.88(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
98.0	99.2	0.010	1.000	0.001	0.908	0.001
56.0	74.8	0.305	0.000	0.305	0.092	0.028
					Sum (F) =	0.029

Area averaged mean soil loss (F) (In/Hr) = 0.029
Minimum soil loss rate ((In/Hr)) = 0.015
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit	time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	381.219	63.745	5.705
2	0.167	762.439	33.028	2.956
3	0.250	1143.658	3.227	0.289
			Sum = 100.000	Sum= 8.949

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.039	0.052	0.035	0.00
2	0.17	0.07	0.039	0.051	0.035	0.00
3	0.25	0.07	0.039	0.051	0.035	0.00
4	0.33	0.10	0.058	0.051	---	0.01
5	0.42	0.10	0.058	0.051	---	0.01
6	0.50	0.10	0.058	0.051	---	0.01
7	0.58	0.10	0.058	0.050	---	0.01
8	0.67	0.10	0.058	0.050	---	0.01
9	0.75	0.10	0.058	0.050	---	0.01
10	0.83	0.13	0.077	0.050	---	0.03
11	0.92	0.13	0.077	0.050	---	0.03
12	1.00	0.13	0.077	0.049	---	0.03
13	1.08	0.10	0.058	0.049	---	0.01
14	1.17	0.10	0.058	0.049	---	0.01
15	1.25	0.10	0.058	0.049	---	0.01
16	1.33	0.10	0.058	0.049	---	0.01
17	1.42	0.10	0.058	0.049	---	0.01

18	1.50	0.10	0.058	0.048	---	0.01
19	1.58	0.10	0.058	0.048	---	0.01
20	1.67	0.10	0.058	0.048	---	0.01
21	1.75	0.10	0.058	0.048	---	0.01
22	1.83	0.13	0.077	0.048	---	0.03
23	1.92	0.13	0.077	0.047	---	0.03
24	2.00	0.13	0.077	0.047	---	0.03
25	2.08	0.13	0.077	0.047	---	0.03
26	2.17	0.13	0.077	0.047	---	0.03
27	2.25	0.13	0.077	0.047	---	0.03
28	2.33	0.13	0.077	0.046	---	0.03
29	2.42	0.13	0.077	0.046	---	0.03
30	2.50	0.13	0.077	0.046	---	0.03
31	2.58	0.17	0.096	0.046	---	0.05
32	2.67	0.17	0.096	0.046	---	0.05
33	2.75	0.17	0.096	0.045	---	0.05
34	2.83	0.17	0.096	0.045	---	0.05
35	2.92	0.17	0.096	0.045	---	0.05
36	3.00	0.17	0.096	0.045	---	0.05
37	3.08	0.17	0.096	0.045	---	0.05
38	3.17	0.17	0.096	0.045	---	0.05
39	3.25	0.17	0.096	0.044	---	0.05
40	3.33	0.17	0.096	0.044	---	0.05
41	3.42	0.17	0.096	0.044	---	0.05
42	3.50	0.17	0.096	0.044	---	0.05
43	3.58	0.17	0.096	0.044	---	0.05
44	3.67	0.17	0.096	0.043	---	0.05
45	3.75	0.17	0.096	0.043	---	0.05
46	3.83	0.20	0.116	0.043	---	0.07
47	3.92	0.20	0.116	0.043	---	0.07
48	4.00	0.20	0.116	0.043	---	0.07
49	4.08	0.20	0.116	0.043	---	0.07
50	4.17	0.20	0.116	0.042	---	0.07
51	4.25	0.20	0.116	0.042	---	0.07
52	4.33	0.23	0.135	0.042	---	0.09
53	4.42	0.23	0.135	0.042	---	0.09
54	4.50	0.23	0.135	0.042	---	0.09
55	4.58	0.23	0.135	0.041	---	0.09
56	4.67	0.23	0.135	0.041	---	0.09
57	4.75	0.23	0.135	0.041	---	0.09
58	4.83	0.27	0.154	0.041	---	0.11
59	4.92	0.27	0.154	0.041	---	0.11
60	5.00	0.27	0.154	0.041	---	0.11
61	5.08	0.20	0.116	0.040	---	0.08
62	5.17	0.20	0.116	0.040	---	0.08
63	5.25	0.20	0.116	0.040	---	0.08
64	5.33	0.23	0.135	0.040	---	0.10
65	5.42	0.23	0.135	0.040	---	0.10
66	5.50	0.23	0.135	0.040	---	0.10
67	5.58	0.27	0.154	0.039	---	0.11
68	5.67	0.27	0.154	0.039	---	0.12
69	5.75	0.27	0.154	0.039	---	0.12
70	5.83	0.27	0.154	0.039	---	0.12
71	5.92	0.27	0.154	0.039	---	0.12
72	6.00	0.27	0.154	0.038	---	0.12
73	6.08	0.30	0.174	0.038	---	0.14
74	6.17	0.30	0.174	0.038	---	0.14
75	6.25	0.30	0.174	0.038	---	0.14
76	6.33	0.30	0.174	0.038	---	0.14
77	6.42	0.30	0.174	0.038	---	0.14

78	6.50	0.30	0.174	0.037	---	0.14
79	6.58	0.33	0.193	0.037	---	0.16
80	6.67	0.33	0.193	0.037	---	0.16
81	6.75	0.33	0.193	0.037	---	0.16
82	6.83	0.33	0.193	0.037	---	0.16
83	6.92	0.33	0.193	0.037	---	0.16
84	7.00	0.33	0.193	0.036	---	0.16
85	7.08	0.33	0.193	0.036	---	0.16
86	7.17	0.33	0.193	0.036	---	0.16
87	7.25	0.33	0.193	0.036	---	0.16
88	7.33	0.37	0.212	0.036	---	0.18
89	7.42	0.37	0.212	0.036	---	0.18
90	7.50	0.37	0.212	0.035	---	0.18
91	7.58	0.40	0.231	0.035	---	0.20
92	7.67	0.40	0.231	0.035	---	0.20
93	7.75	0.40	0.231	0.035	---	0.20
94	7.83	0.43	0.251	0.035	---	0.22
95	7.92	0.43	0.251	0.035	---	0.22
96	8.00	0.43	0.251	0.034	---	0.22
97	8.08	0.50	0.289	0.034	---	0.25
98	8.17	0.50	0.289	0.034	---	0.26
99	8.25	0.50	0.289	0.034	---	0.26
100	8.33	0.50	0.289	0.034	---	0.26
101	8.42	0.50	0.289	0.034	---	0.26
102	8.50	0.50	0.289	0.034	---	0.26
103	8.58	0.53	0.308	0.033	---	0.28
104	8.67	0.53	0.308	0.033	---	0.28
105	8.75	0.53	0.308	0.033	---	0.28
106	8.83	0.57	0.328	0.033	---	0.29
107	8.92	0.57	0.328	0.033	---	0.30
108	9.00	0.57	0.328	0.033	---	0.30
109	9.08	0.63	0.366	0.032	---	0.33
110	9.17	0.63	0.366	0.032	---	0.33
111	9.25	0.63	0.366	0.032	---	0.33
112	9.33	0.67	0.386	0.032	---	0.35
113	9.42	0.67	0.386	0.032	---	0.35
114	9.50	0.67	0.386	0.032	---	0.35
115	9.58	0.70	0.405	0.032	---	0.37
116	9.67	0.70	0.405	0.031	---	0.37
117	9.75	0.70	0.405	0.031	---	0.37
118	9.83	0.73	0.424	0.031	---	0.39
119	9.92	0.73	0.424	0.031	---	0.39
120	10.00	0.73	0.424	0.031	---	0.39
121	10.08	0.50	0.289	0.031	---	0.26
122	10.17	0.50	0.289	0.030	---	0.26
123	10.25	0.50	0.289	0.030	---	0.26
124	10.33	0.50	0.289	0.030	---	0.26
125	10.42	0.50	0.289	0.030	---	0.26
126	10.50	0.50	0.289	0.030	---	0.26
127	10.58	0.67	0.386	0.030	---	0.36
128	10.67	0.67	0.386	0.030	---	0.36
129	10.75	0.67	0.386	0.029	---	0.36
130	10.83	0.67	0.386	0.029	---	0.36
131	10.92	0.67	0.386	0.029	---	0.36
132	11.00	0.67	0.386	0.029	---	0.36
133	11.08	0.63	0.366	0.029	---	0.34
134	11.17	0.63	0.366	0.029	---	0.34
135	11.25	0.63	0.366	0.029	---	0.34
136	11.33	0.63	0.366	0.028	---	0.34
137	11.42	0.63	0.366	0.028	---	0.34

138	11.50	0.63	0.366	0.028	---	0.34
139	11.58	0.57	0.328	0.028	---	0.30
140	11.67	0.57	0.328	0.028	---	0.30
141	11.75	0.57	0.328	0.028	---	0.30
142	11.83	0.60	0.347	0.028	---	0.32
143	11.92	0.60	0.347	0.027	---	0.32
144	12.00	0.60	0.347	0.027	---	0.32
145	12.08	0.83	0.482	0.027	---	0.45
146	12.17	0.83	0.482	0.027	---	0.45
147	12.25	0.83	0.482	0.027	---	0.46
148	12.33	0.87	0.501	0.027	---	0.47
149	12.42	0.87	0.501	0.027	---	0.47
150	12.50	0.87	0.501	0.027	---	0.47
151	12.58	0.93	0.540	0.026	---	0.51
152	12.67	0.93	0.540	0.026	---	0.51
153	12.75	0.93	0.540	0.026	---	0.51
154	12.83	0.97	0.559	0.026	---	0.53
155	12.92	0.97	0.559	0.026	---	0.53
156	13.00	0.97	0.559	0.026	---	0.53
157	13.08	1.13	0.656	0.026	---	0.63
158	13.17	1.13	0.656	0.025	---	0.63
159	13.25	1.13	0.656	0.025	---	0.63
160	13.33	1.13	0.656	0.025	---	0.63
161	13.42	1.13	0.656	0.025	---	0.63
162	13.50	1.13	0.656	0.025	---	0.63
163	13.58	0.77	0.443	0.025	---	0.42
164	13.67	0.77	0.443	0.025	---	0.42
165	13.75	0.77	0.443	0.025	---	0.42
166	13.83	0.77	0.443	0.024	---	0.42
167	13.92	0.77	0.443	0.024	---	0.42
168	14.00	0.77	0.443	0.024	---	0.42
169	14.08	0.90	0.521	0.024	---	0.50
170	14.17	0.90	0.521	0.024	---	0.50
171	14.25	0.90	0.521	0.024	---	0.50
172	14.33	0.87	0.501	0.024	---	0.48
173	14.42	0.87	0.501	0.024	---	0.48
174	14.50	0.87	0.501	0.023	---	0.48
175	14.58	0.87	0.501	0.023	---	0.48
176	14.67	0.87	0.501	0.023	---	0.48
177	14.75	0.87	0.501	0.023	---	0.48
178	14.83	0.83	0.482	0.023	---	0.46
179	14.92	0.83	0.482	0.023	---	0.46
180	15.00	0.83	0.482	0.023	---	0.46
181	15.08	0.80	0.463	0.023	---	0.44
182	15.17	0.80	0.463	0.023	---	0.44
183	15.25	0.80	0.463	0.022	---	0.44
184	15.33	0.77	0.443	0.022	---	0.42
185	15.42	0.77	0.443	0.022	---	0.42
186	15.50	0.77	0.443	0.022	---	0.42
187	15.58	0.63	0.366	0.022	---	0.34
188	15.67	0.63	0.366	0.022	---	0.34
189	15.75	0.63	0.366	0.022	---	0.34
190	15.83	0.63	0.366	0.022	---	0.34
191	15.92	0.63	0.366	0.022	---	0.34
192	16.00	0.63	0.366	0.021	---	0.34
193	16.08	0.13	0.077	0.021	---	0.06
194	16.17	0.13	0.077	0.021	---	0.06
195	16.25	0.13	0.077	0.021	---	0.06
196	16.33	0.13	0.077	0.021	---	0.06
197	16.42	0.13	0.077	0.021	---	0.06

198	16.50	0.13	0.077	0.021	---	0.06
199	16.58	0.10	0.058	0.021	---	0.04
200	16.67	0.10	0.058	0.021	---	0.04
201	16.75	0.10	0.058	0.020	---	0.04
202	16.83	0.10	0.058	0.020	---	0.04
203	16.92	0.10	0.058	0.020	---	0.04
204	17.00	0.10	0.058	0.020	---	0.04
205	17.08	0.17	0.096	0.020	---	0.08
206	17.17	0.17	0.096	0.020	---	0.08
207	17.25	0.17	0.096	0.020	---	0.08
208	17.33	0.17	0.096	0.020	---	0.08
209	17.42	0.17	0.096	0.020	---	0.08
210	17.50	0.17	0.096	0.020	---	0.08
211	17.58	0.17	0.096	0.019	---	0.08
212	17.67	0.17	0.096	0.019	---	0.08
213	17.75	0.17	0.096	0.019	---	0.08
214	17.83	0.13	0.077	0.019	---	0.06
215	17.92	0.13	0.077	0.019	---	0.06
216	18.00	0.13	0.077	0.019	---	0.06
217	18.08	0.13	0.077	0.019	---	0.06
218	18.17	0.13	0.077	0.019	---	0.06
219	18.25	0.13	0.077	0.019	---	0.06
220	18.33	0.13	0.077	0.019	---	0.06
221	18.42	0.13	0.077	0.018	---	0.06
222	18.50	0.13	0.077	0.018	---	0.06
223	18.58	0.10	0.058	0.018	---	0.04
224	18.67	0.10	0.058	0.018	---	0.04
225	18.75	0.10	0.058	0.018	---	0.04
226	18.83	0.07	0.039	0.018	---	0.02
227	18.92	0.07	0.039	0.018	---	0.02
228	19.00	0.07	0.039	0.018	---	0.02
229	19.08	0.10	0.058	0.018	---	0.04
230	19.17	0.10	0.058	0.018	---	0.04
231	19.25	0.10	0.058	0.018	---	0.04
232	19.33	0.13	0.077	0.018	---	0.06
233	19.42	0.13	0.077	0.017	---	0.06
234	19.50	0.13	0.077	0.017	---	0.06
235	19.58	0.10	0.058	0.017	---	0.04
236	19.67	0.10	0.058	0.017	---	0.04
237	19.75	0.10	0.058	0.017	---	0.04
238	19.83	0.07	0.039	0.017	---	0.02
239	19.92	0.07	0.039	0.017	---	0.02
240	20.00	0.07	0.039	0.017	---	0.02
241	20.08	0.10	0.058	0.017	---	0.04
242	20.17	0.10	0.058	0.017	---	0.04
243	20.25	0.10	0.058	0.017	---	0.04
244	20.33	0.10	0.058	0.017	---	0.04
245	20.42	0.10	0.058	0.017	---	0.04
246	20.50	0.10	0.058	0.016	---	0.04
247	20.58	0.10	0.058	0.016	---	0.04
248	20.67	0.10	0.058	0.016	---	0.04
249	20.75	0.10	0.058	0.016	---	0.04
250	20.83	0.07	0.039	0.016	---	0.02
251	20.92	0.07	0.039	0.016	---	0.02
252	21.00	0.07	0.039	0.016	---	0.02
253	21.08	0.10	0.058	0.016	---	0.04
254	21.17	0.10	0.058	0.016	---	0.04
255	21.25	0.10	0.058	0.016	---	0.04
256	21.33	0.07	0.039	0.016	---	0.02
257	21.42	0.07	0.039	0.016	---	0.02

258	21.50	0.07	0.039	0.016	---	0.02
259	21.58	0.10	0.058	0.016	---	0.04
260	21.67	0.10	0.058	0.016	---	0.04
261	21.75	0.10	0.058	0.016	---	0.04
262	21.83	0.07	0.039	0.015	---	0.02
263	21.92	0.07	0.039	0.015	---	0.02
264	22.00	0.07	0.039	0.015	---	0.02
265	22.08	0.10	0.058	0.015	---	0.04
266	22.17	0.10	0.058	0.015	---	0.04
267	22.25	0.10	0.058	0.015	---	0.04
268	22.33	0.07	0.039	0.015	---	0.02
269	22.42	0.07	0.039	0.015	---	0.02
270	22.50	0.07	0.039	0.015	---	0.02
271	22.58	0.07	0.039	0.015	---	0.02
272	22.67	0.07	0.039	0.015	---	0.02
273	22.75	0.07	0.039	0.015	---	0.02
274	22.83	0.07	0.039	0.015	---	0.02
275	22.92	0.07	0.039	0.015	---	0.02
276	23.00	0.07	0.039	0.015	---	0.02
277	23.08	0.07	0.039	0.015	---	0.02
278	23.17	0.07	0.039	0.015	---	0.02
279	23.25	0.07	0.039	0.015	---	0.02
280	23.33	0.07	0.039	0.015	---	0.02
281	23.42	0.07	0.039	0.015	---	0.02
282	23.50	0.07	0.039	0.015	---	0.02
283	23.58	0.07	0.039	0.015	---	0.02
284	23.67	0.07	0.039	0.015	---	0.02
285	23.75	0.07	0.039	0.015	---	0.02
286	23.83	0.07	0.039	0.015	---	0.02
287	23.92	0.07	0.039	0.015	---	0.02
288	24.00	0.07	0.039	0.015	---	0.02
Sum =		100.0			Sum =	49.5

Flood volume = Effective rainfall 4.12(In)
times area 8.9(Ac.)/[(In)/(Ft.)] = 3.1(Ac.Ft)
Total soil loss = 0.70(In)
Total soil loss = 0.515(Ac.Ft)
Total rainfall = 4.82(In)
Flood volume = 132947.3 Cubic Feet
Total soil loss = 22419.9 Cubic Feet

Peak flow rate of this hydrograph = 5.645(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0002	0.02	Q	|	|	|	|
0+10	0.0004	0.03	Q	|	|	|	|
0+15	0.0006	0.03	Q	|	|	|	|
0+20	0.0010	0.05	Q	|	|	|	|
0+25	0.0014	0.06	Q	|	|	|	|
0+30	0.0018	0.06	Q	|	|	|	|
0+35	0.0023	0.07	Q	|	|	|	|
0+40	0.0027	0.07	Q	|	|	|	|
0+45	0.0032	0.07	Q	|	|	|	|

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 0+50      0.0045     0.18  Q          |          |          |          |
 0+55      0.0061     0.24  Q          |          |          |          |
 1+ 0      0.0078     0.25  Q          |          |          |          |
 1+ 5      0.0088     0.14  Q          |          |          |          |
 1+10      0.0093     0.08  Q          |          |          |          |
 1+15      0.0099     0.08  Q          |          |          |          |
 1+20      0.0104     0.08  Q          |          |          |          |
 1+25      0.0110     0.08  Q          |          |          |          |
 1+30      0.0116     0.08  Q          |          |          |          |
 1+35      0.0122     0.09  Q          |          |          |          |
 1+40      0.0128     0.09  Q          |          |          |          |
 1+45      0.0134     0.09  Q          |          |          |          |
 1+50      0.0148     0.20  Q          |          |          |          |
 1+55      0.0166     0.26  VQ         |          |          |          |
 2+ 0      0.0184     0.27  VQ         |          |          |          |
 2+ 5      0.0203     0.27  VQ         |          |          |          |
 2+10      0.0222     0.27  VQ         |          |          |          |
 2+15      0.0240     0.27  VQ         |          |          |          |
 2+20      0.0259     0.27  VQ         |          |          |          |
 2+25      0.0278     0.28  VQ         |          |          |          |
 2+30      0.0297     0.28  VQ         |          |          |          |
 2+35      0.0324     0.39  VQ         |          |          |          |
 2+40      0.0355     0.45  VQ         |          |          |          |
 2+45      0.0386     0.46  VQ         |          |          |          |
 2+50      0.0418     0.46  VQ         |          |          |          |
 2+55      0.0449     0.46  VQ         |          |          |          |
 3+ 0      0.0481     0.46  VQ         |          |          |          |
 3+ 5      0.0513     0.46  VQ         |          |          |          |
 3+10      0.0545     0.46  VQ         |          |          |          |
 3+15      0.0577     0.47  VQ         |          |          |          |
 3+20      0.0609     0.47  VQ         |          |          |          |
 3+25      0.0641     0.47  VQ         |          |          |          |
 3+30      0.0674     0.47  VQ         |          |          |          |
 3+35      0.0706     0.47  VQ         |          |          |          |
 3+40      0.0739     0.47  VQ         |          |          |          |
 3+45      0.0772     0.48  |Q         |          |          |          |
 3+50      0.0812     0.59  |VQ        |          |          |          |
 3+55      0.0857     0.65  |VQ        |          |          |          |
 4+ 0      0.0902     0.65  |VQ        |          |          |          |
 4+ 5      0.0947     0.65  |VQ        |          |          |          |
 4+10      0.0992     0.66  |VQ        |          |          |          |
 4+15      0.1037     0.66  |VQ        |          |          |          |
 4+20      0.1090     0.77  |V Q       |          |          |          |
 4+25      0.1147     0.83  |V Q       |          |          |          |
 4+30      0.1205     0.84  |V Q       |          |          |          |
 4+35      0.1262     0.84  |V Q       |          |          |          |
 4+40      0.1320     0.84  |V Q       |          |          |          |
 4+45      0.1378     0.84  |V Q       |          |          |          |
 4+50      0.1443     0.95  |V Q       |          |          |          |
 4+55      0.1513     1.01  |V  Q      |          |          |          |
 5+ 0      0.1583     1.02  | V Q      |          |          |          |
 5+ 5      0.1638     0.80  | VQ       |          |          |          |
 5+10      0.1685     0.69  | Q        |          |          |          |
 5+15      0.1732     0.68  | Q        |          |          |          |
 5+20      0.1786     0.79  | VQ       |          |          |          |
 5+25      0.1845     0.85  | VQ       |          |          |          |
 5+30      0.1903     0.85  | VQ       |          |          |          |
 5+35      0.1970     0.97  | VQ       |          |          |          |
 5+40      0.2040     1.02  | V Q      |          |          |          |
 5+45      0.2112     1.03  | V Q      |          |          |          |
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 5+50      0.2183      1.03  | V Q     |          |         |          |
 5+55      0.2254      1.03  | V Q     |          |         |          |
 6+ 0      0.2325      1.04  |  VQ     |          |         |          |
 6+ 5      0.2404      1.15  |  VQ     |          |         |          |
 6+10      0.2487      1.21  |  VQ     |          |         |          |
 6+15      0.2571      1.21  |  VQ     |          |         |          |
 6+20      0.2655      1.21  |  VQ     |          |         |          |
 6+25      0.2738      1.22  |  VQ     |          |         |          |
 6+30      0.2822      1.22  |  VQ     |          |         |          |
 6+35      0.2914      1.33  |  V Q    |          |         |          |
 6+40      0.3009      1.39  |  V Q    |          |         |          |
 6+45      0.3105      1.39  |   VQ    |          |         |          |
 6+50      0.3202      1.40  |   VQ    |          |         |          |
 6+55      0.3298      1.40  |   VQ    |          |         |          |
 7+ 0      0.3394      1.40  |   VQ    |          |         |          |
 7+ 5      0.3491      1.40  |   VQ    |          |         |          |
 7+10      0.3587      1.40  |   VQ    |          |         |          |
 7+15      0.3684      1.40  |   VQ    |          |         |          |
 7+20      0.3788      1.52  |   V Q   |          |         |          |
 7+25      0.3897      1.57  |    VQ   |          |         |          |
 7+30      0.4006      1.58  |    VQ   |          |         |          |
 7+35      0.4122      1.69  |    VQ   |          |         |          |
 7+40      0.4243      1.75  |    V Q  |          |         |          |
 7+45      0.4364      1.76  |    V Q  |          |         |          |
 7+50      0.4493      1.87  |    V Q  |          |         |          |
 7+55      0.4625      1.93  |     VQ  |          |         |          |
 8+ 0      0.4759      1.93  |     VQ  |          |         |          |
 8+ 5      0.4907      2.16  |     V Q |          |         |          |
 8+10      0.5064      2.27  |     V  Q|          |         |          |
 8+15      0.5221      2.28  |     V  Q|          |         |          |
 8+20      0.5378      2.29  |      V Q|          |         |          |
 8+25      0.5536      2.29  |      V Q|          |         |          |
 8+30      0.5693      2.29  |      V Q|          |         |          |
 8+35      0.5859      2.40  |      V Q|          |         |          |
 8+40      0.6028      2.46  |      V Q|          |         |          |
 8+45      0.6198      2.47  |       VQ|          |         |          |
 8+50      0.6375      2.58  |       V Q          |         |          |
 8+55      0.6557      2.64  |       V Q          |         |          |
 9+ 0      0.6739      2.64  |       V Q          |         |          |
 9+ 5      0.6936      2.86  |        V|Q         |         |          |
 9+10      0.7141      2.98  |        V|Q         |         |          |
 9+15      0.7347      2.99  |        V|Q         |         |          |
 9+20      0.7561      3.10  |        V|  Q       |         |          |
 9+25      0.7779      3.16  |         V  Q       |         |          |
 9+30      0.7997      3.17  |         V  Q       |         |          |
 9+35      0.8223      3.28  |         V   Q      |         |          |
 9+40      0.8453      3.34  |         |V  Q      |         |          |
 9+45      0.8683      3.35  |         |V  Q      |         |          |
 9+50      0.8921      3.46  |         |V  Q      |         |          |
 9+55      0.9163      3.51  |         |  V Q     |         |          |
10+ 0      0.9406      3.52  |         |  V Q     |         |          |
10+ 5      0.9595      2.75  |         |QV        |         |          |
10+10      0.9757      2.36  |        Q|  V       |         |          |
10+15      0.9917      2.32  |        Q|  V       |         |          |
10+20      1.0077      2.32  |        Q|   V      |         |          |
10+25      1.0237      2.32  |        Q|   V      |         |          |
10+30      1.0396      2.32  |        Q|   V      |         |          |
10+35      1.0594      2.87  |         |Q  V      |         |          |
10+40      1.0812      3.16  |         |  Q V     |         |          |
10+45      1.1031      3.19  |         |  Q V     |         |          |
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10+50       1.1251      3.19  |         | Q V     |         |         |
10+55       1.1471      3.19  |         | Q  V    |         |         |
11+ 0       1.1691      3.19  |         | Q  V    |         |         |
11+ 5       1.1903      3.08  |         | Q  V    |         |         |
11+10       1.2112      3.03  |         | Q  V    |         |         |
11+15       1.2320      3.02  |         | Q   V   |         |         |
11+20       1.2528      3.02  |         | Q   V   |         |         |
11+25       1.2737      3.03  |         | Q   V   |         |         |
11+30       1.2945      3.03  |         | Q   V   |         |         |
11+35       1.3138      2.81  |         |Q     V  |         |         |
11+40       1.3324      2.70  |         Q      V  |         |         |
11+45       1.3509      2.69  |         Q      V  |         |         |
11+50       1.3702      2.80  |         |Q     V  |         |         |
11+55       1.3898      2.86  |         |Q      V |         |         |
12+ 0       1.4095      2.86  |         |Q      V |         |         |
12+ 5       1.4346      3.63  |         |   Q   V |         |         |
12+10       1.4624      4.03  |         |     Q  V|         |         |
12+15       1.4904      4.07  |         |     Q  V|         |         |
12+20       1.5192      4.19  |         |     Q  V|         |         |
12+25       1.5485      4.24  |         |     Q   V         |         |
12+30       1.5777      4.25  |         |      Q  V         |         |
12+35       1.6085      4.47  |         |      Q  |V        |         |
12+40       1.6401      4.59  |         |       Q |V        |         |
12+45       1.6718      4.60  |         |       Q |V        |         |
12+50       1.7042      4.71  |         |       Q | V       |         |
12+55       1.7371      4.77  |         |        Q| V       |         |
13+ 0       1.7700      4.78  |         |        Q|  V      |         |
13+ 5       1.8067      5.33  |         |         |Q V      |         |
13+10       1.8453      5.61  |         |         | Q V     |         |
13+15       1.8842      5.64  |         |         | Q V     |         |
13+20       1.9230      5.64  |         |         | Q  V    |         |
13+25       1.9619      5.64  |         |         | Q  V    |         |
13+30       2.0008      5.65  |         |         | Q   V   |         |
13+35       2.0313      4.44  |         |      Q  |     V   |         |
13+40       2.0576      3.81  |         |    Q    |     V   |         |
13+45       2.0834      3.75  |         |   Q     |      V  |         |
13+50       2.1092      3.75  |         |    Q    |      V  |         |
13+55       2.1351      3.75  |         |    Q    |      V  |         |
14+ 0       2.1609      3.75  |         |    Q    |       V |         |
14+ 5       2.1898      4.19  |         |     Q   |       V |         |
14+10       2.2203      4.42  |         |      Q  |        V|         |
14+15       2.2509      4.45  |         |      Q  |        V|         |
14+20       2.2808      4.34  |         |      Q  |        V|         |
14+25       2.3103      4.28  |         |      Q  |         V         |
14+30       2.3397      4.28  |         |      Q  |         V         |
14+35       2.3692      4.28  |         |      Q  |         |V        |
14+40       2.3987      4.28  |         |      Q  |         |V        |
14+45       2.4282      4.28  |         |      Q  |         |V        |
14+50       2.4569      4.17  |         |     Q   |         | V       |
14+55       2.4853      4.12  |         |     Q   |         | V       |
15+ 0       2.5136      4.11  |         |     Q   |         | V       |
15+ 5       2.5411      4.00  |         |     Q   |         |  V      |
15+10       2.5683      3.95  |         |    Q    |         |  V      |
15+15       2.5955      3.94  |         |    Q    |         |   V     |
15+20       2.6219      3.83  |         |    Q    |         |   V     |
15+25       2.6479      3.78  |         |    Q    |         |   V     |
15+30       2.6739      3.77  |         |    Q    |         |    V    |
15+35       2.6968      3.33  |         |  Q      |         |    V    |
15+40       2.7182      3.11  |         | Q       |         |    V    |
15+45       2.7395      3.08  |         | Q       |         |    V    |
```

15+50	2.7607	3.09		Q		V
15+55	2.7820	3.09		Q		V
16+ 0	2.8032	3.09		Q		V
16+ 5	2.8131	1.44	Q			V
16+10	2.8172	0.58	Q			V
16+15	2.8206	0.50	Q			V
16+20	2.8241	0.50	Q			V
16+25	2.8275	0.50	Q			V
16+30	2.8310	0.50	Q			V
16+35	2.8337	0.40	Q			V
16+40	2.8361	0.34	Q			V
16+45	2.8384	0.33	Q			V
16+50	2.8407	0.34	Q			V
16+55	2.8430	0.34	Q			V
17+ 0	2.8453	0.34	Q			V
17+ 5	2.8492	0.56	Q			V
17+10	2.8538	0.67	Q			V
17+15	2.8585	0.69	Q			V
17+20	2.8633	0.69	Q			V
17+25	2.8680	0.69	Q			V
17+30	2.8727	0.69	Q			V
17+35	2.8775	0.69	Q			V
17+40	2.8822	0.69	Q			V
17+45	2.8870	0.69	Q			V
17+50	2.8910	0.58	Q			V
17+55	2.8946	0.53	Q			V
18+ 0	2.8982	0.52	Q			V
18+ 5	2.9018	0.52	Q			V
18+10	2.9054	0.52	Q			V
18+15	2.9090	0.52	Q			V
18+20	2.9126	0.52	Q			V
18+25	2.9162	0.52	Q			V
18+30	2.9198	0.53	Q			V
18+35	2.9227	0.42	Q			V
18+40	2.9251	0.36	Q			V
18+45	2.9276	0.36	Q			V
18+50	2.9293	0.25	Q			V
18+55	2.9306	0.19	Q			V
19+ 0	2.9319	0.18	Q			V
19+ 5	2.9339	0.30	Q			V
19+10	2.9363	0.35	Q			V
19+15	2.9388	0.36	Q			V
19+20	2.9421	0.47	Q			V
19+25	2.9457	0.53	Q			V
19+30	2.9494	0.53	Q			V
19+35	2.9523	0.43	Q			V
19+40	2.9548	0.37	Q			V
19+45	2.9573	0.36	Q			V
19+50	2.9591	0.25	Q			V
19+55	2.9605	0.20	Q			V
20+ 0	2.9618	0.19	Q			V
20+ 5	2.9639	0.30	Q			V
20+10	2.9664	0.36	Q			V
20+15	2.9689	0.37	Q			V
20+20	2.9715	0.37	Q			V
20+25	2.9740	0.37	Q			V
20+30	2.9766	0.37	Q			V
20+35	2.9791	0.37	Q			V
20+40	2.9817	0.37	Q			V
20+45	2.9842	0.37	Q			V

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  20+50       2.9860      0.26   |Q        |         |         |       V|
  20+55       2.9875      0.21   Q         |         |         |       V|
  21+ 0       2.9888      0.20   Q         |         |         |       V|
  21+ 5       2.9910      0.31   |Q        |         |         |       V|
  21+10       2.9935      0.37   |Q        |         |         |       V|
  21+15       2.9961      0.38   |Q        |         |         |       V|
  21+20       2.9979      0.27   |Q        |         |         |       V|
  21+25       2.9994      0.21   Q         |         |         |       V|
  21+30       3.0008      0.20   Q         |         |         |       V|
  21+35       3.0030      0.31   |Q        |         |         |       V|
  21+40       3.0055      0.37   |Q        |         |         |       V|
  21+45       3.0081      0.38   |Q        |         |         |       V|
  21+50       3.0100      0.27   |Q        |         |         |       V|
  21+55       3.0114      0.21   Q         |         |         |       V|
  22+ 0       3.0129      0.21   Q         |         |         |       V|
  22+ 5       3.0151      0.32   |Q        |         |         |       V|
  22+10       3.0176      0.38   |Q        |         |         |       V|
  22+15       3.0203      0.38   |Q        |         |         |       V|
  22+20       3.0221      0.27   |Q        |         |         |       V|
  22+25       3.0236      0.22   Q         |         |         |       V|
  22+30       3.0251      0.21   Q         |         |         |       V|
  22+35       3.0265      0.21   Q         |         |         |       V|
  22+40       3.0280      0.21   Q         |         |         |       V|
  22+45       3.0294      0.21   Q         |         |         |       V|
  22+50       3.0309      0.21   Q         |         |         |       V|
  22+55       3.0323      0.21   Q         |         |         |       V|
  23+ 0       3.0338      0.21   Q         |         |         |       V|
  23+ 5       3.0353      0.21   Q         |         |         |       V|
  23+10       3.0367      0.21   Q         |         |         |       V|
  23+15       3.0382      0.21   Q         |         |         |       V|
  23+20       3.0397      0.21   Q         |         |         |       V|
  23+25       3.0411      0.21   Q         |         |         |       V|
  23+30       3.0426      0.21   Q         |         |         |       V|
  23+35       3.0441      0.21   Q         |         |         |       V|
  23+40       3.0456      0.21   Q         |         |         |       V|
  23+45       3.0470      0.21   Q         |         |         |       V|
  23+50       3.0485      0.21   Q         |         |         |       V|
  23+55       3.0500      0.21   Q         |         |         |       V|
  24+ 0       3.0515      0.21   Q         |         |         |       V|
  24+ 5       3.0520      0.08   Q         |         |         |       V|
  24+10       3.0520      0.01   Q         |         |         |        V
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APPENDIX E

REFERENCES

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.
2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.
3. See Plate C-2 for a detailed description of cover types.
4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.
5. Reference Bibliography item 17.

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREA

NOAA Atlas 14, Volume 6, Version 2
Location name: Moreno Valley, California, USA*
Latitude: 33.8602°, Longitude: -117.2421°
Elevation: 1474.5 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.087 (0.073-0.105)	0.121 (0.101-0.147)	0.167 (0.139-0.203)	0.206 (0.170-0.252)	0.260 (0.207-0.330)	0.303 (0.236-0.393)	0.348 (0.265-0.463)	0.396 (0.292-0.542)	0.464 (0.328-0.663)	0.518 (0.353-0.767)
10-min	0.125 (0.104-0.151)	0.174 (0.145-0.210)	0.240 (0.199-0.291)	0.295 (0.243-0.361)	0.373 (0.297-0.472)	0.434 (0.339-0.563)	0.499 (0.379-0.663)	0.568 (0.419-0.777)	0.665 (0.470-0.950)	0.743 (0.506-1.10)
15-min	0.151 (0.126-0.183)	0.210 (0.175-0.254)	0.290 (0.241-0.352)	0.357 (0.294-0.437)	0.451 (0.359-0.571)	0.525 (0.410-0.681)	0.604 (0.459-0.802)	0.687 (0.507-0.940)	0.804 (0.568-1.15)	0.898 (0.612-1.33)
30-min	0.246 (0.206-0.298)	0.343 (0.286-0.415)	0.473 (0.393-0.574)	0.582 (0.480-0.712)	0.735 (0.585-0.931)	0.856 (0.668-1.11)	0.984 (0.748-1.31)	1.12 (0.826-1.53)	1.31 (0.926-1.87)	1.46 (0.998-2.17)
60-min	0.331 (0.277-0.401)	0.461 (0.384-0.558)	0.635 (0.529-0.771)	0.782 (0.645-0.957)	0.988 (0.787-1.25)	1.15 (0.897-1.49)	1.32 (1.00-1.76)	1.51 (1.11-2.06)	1.76 (1.25-2.52)	1.97 (1.34-2.92)
2-hr	0.496 (0.415-0.600)	0.658 (0.550-0.797)	0.875 (0.728-1.06)	1.05 (0.870-1.29)	1.30 (1.04-1.65)	1.50 (1.17-1.94)	1.70 (1.29-2.26)	1.91 (1.41-2.61)	2.20 (1.55-3.14)	2.42 (1.65-3.59)
3-hr	0.613 (0.513-0.742)	0.803 (0.670-0.972)	1.05 (0.877-1.28)	1.26 (1.04-1.54)	1.54 (1.23-1.96)	1.76 (1.38-2.29)	1.99 (1.51-2.65)	2.23 (1.64-3.05)	2.55 (1.80-3.64)	2.80 (1.91-4.15)
6-hr	0.860 (0.718-1.04)	1.12 (0.930-1.35)	1.45 (1.21-1.76)	1.72 (1.42-2.11)	2.09 (1.67-2.66)	2.38 (1.86-3.09)	2.67 (2.03-3.55)	2.97 (2.19-4.07)	3.38 (2.39-4.83)	3.70 (2.52-5.48)
12-hr	1.11 (0.924-1.34)	1.46 (1.22-1.76)	1.91 (1.59-2.32)	2.28 (1.88-2.79)	2.78 (2.22-3.53)	3.17 (2.47-4.10)	3.56 (2.70-4.73)	3.95 (2.92-5.41)	4.49 (3.17-6.42)	4.91 (3.35-7.27)
24-hr	1.40 (1.24-1.61)	1.89 (1.67-2.18)	2.53 (2.23-2.93)	3.05 (2.67-3.56)	3.75 (3.17-4.52)	4.28 (3.55-5.27)	4.82 (3.91-6.07)	5.37 (4.24-6.96)	6.12 (4.63-8.24)	6.69 (4.90-9.32)
2-day	1.61 (1.43-1.86)	2.22 (1.96-2.56)	3.01 (2.65-3.48)	3.65 (3.19-4.26)	4.52 (3.83-5.45)	5.19 (4.31-6.38)	5.87 (4.75-7.39)	6.56 (5.17-8.49)	7.50 (5.68-10.1)	8.23 (6.03-11.5)
3-day	1.71 (1.51-1.97)	2.38 (2.10-2.75)	3.25 (2.87-3.77)	3.97 (3.47-4.63)	4.94 (4.18-5.96)	5.69 (4.72-7.00)	6.45 (5.23-8.13)	7.24 (5.71-9.37)	8.31 (6.29-11.2)	9.15 (6.70-12.7)
4-day	1.85 (1.63-2.13)	2.58 (2.28-2.98)	3.56 (3.14-4.12)	4.36 (3.81-5.09)	5.45 (4.62-6.57)	6.30 (5.22-7.75)	7.16 (5.80-9.02)	8.05 (6.35-10.4)	9.27 (7.02-12.5)	10.2 (7.48-14.2)
7-day	1.97 (1.74-2.27)	2.81 (2.48-3.24)	3.93 (3.46-4.55)	4.85 (4.24-5.66)	6.12 (5.18-7.37)	7.10 (5.89-8.73)	8.11 (6.57-10.2)	9.16 (7.22-11.9)	10.6 (8.02-14.3)	11.7 (8.58-16.3)
10-day	1.99 (1.76-2.29)	2.87 (2.53-3.31)	4.05 (3.57-4.69)	5.03 (4.40-5.87)	6.39 (5.41-7.70)	7.45 (6.18-9.16)	8.54 (6.92-10.8)	9.68 (7.63-12.5)	11.3 (8.52-15.2)	12.5 (9.14-17.4)
20-day	2.21 (1.96-2.55)	3.24 (2.87-3.74)	4.67 (4.11-5.40)	5.87 (5.13-6.85)	7.57 (6.41-9.13)	8.93 (7.41-11.0)	10.4 (8.39-13.0)	11.9 (9.35-15.3)	13.9 (10.6-18.8)	15.6 (11.4-21.7)
30-day	2.44 (2.16-2.82)	3.59 (3.17-4.14)	5.20 (4.58-6.02)	6.59 (5.76-7.69)	8.59 (7.27-10.3)	10.2 (8.46-12.5)	11.9 (9.64-15.0)	13.7 (10.8-17.8)	16.3 (12.3-21.9)	18.3 (13.4-25.5)
45-day	2.81 (2.48-3.24)	4.08 (3.61-4.71)	5.91 (5.21-6.84)	7.51 (6.57-8.77)	9.88 (8.36-11.9)	11.8 (9.81-14.5)	13.9 (11.3-17.5)	16.2 (12.7-20.9)	19.4 (14.7-26.1)	22.0 (16.1-30.6)
60-day	3.13 (2.77-3.61)	4.48 (3.96-5.17)	6.46 (5.70-7.49)	8.23 (7.20-9.61)	10.9 (9.20-13.1)	13.1 (10.9-16.1)	15.5 (12.5-19.5)	18.1 (14.3-23.4)	21.9 (16.6-29.5)	25.0 (18.3-34.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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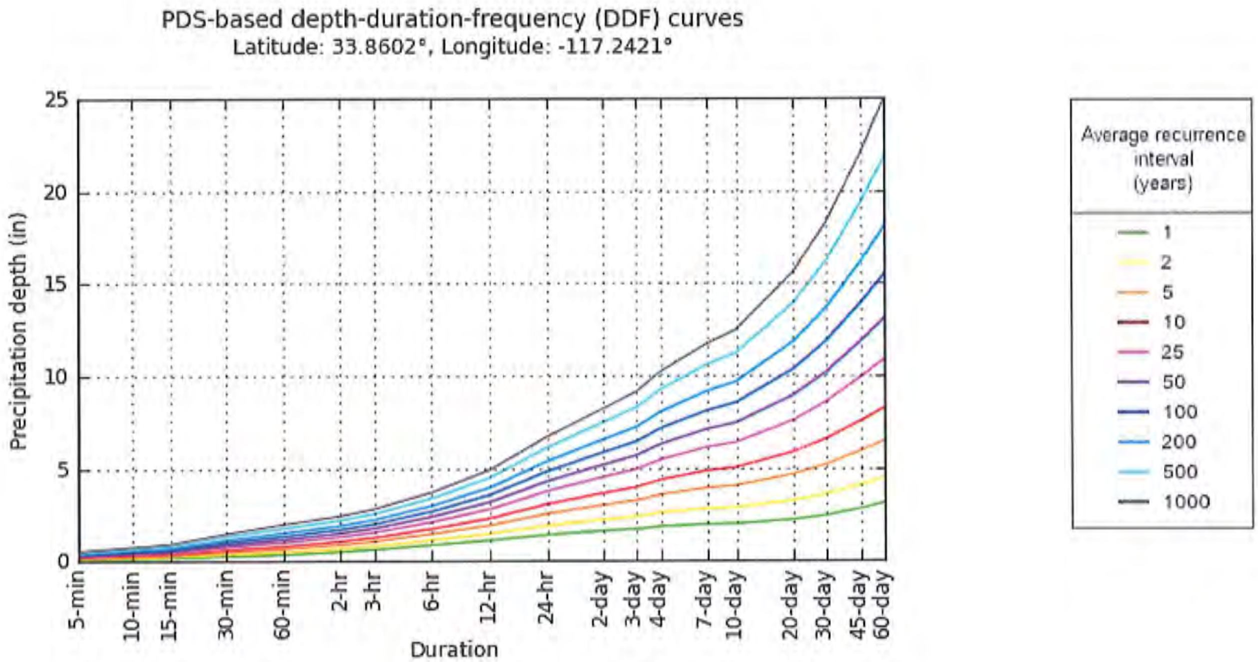
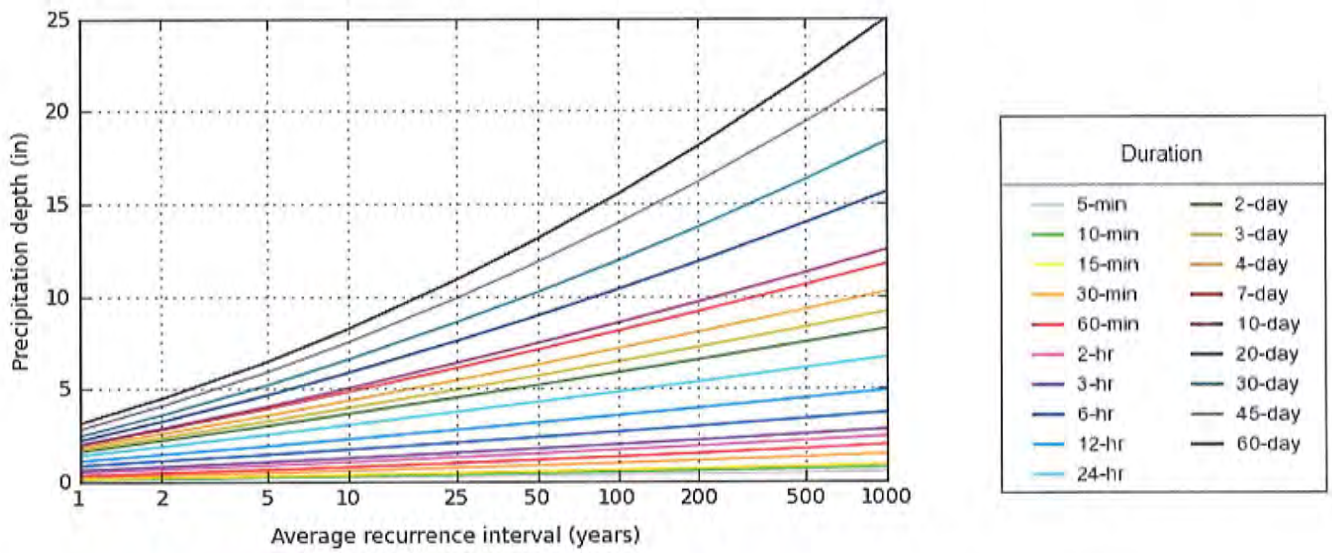
PF graphical





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Created (GMT): Wed May 12 14:24:52 2021

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Maps & aerials

Small scale terrain

Large scale terrain

Large scale map

Large scale aerial

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US Department of Commerce
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National Weather Service
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Silver Spring, MD 20910
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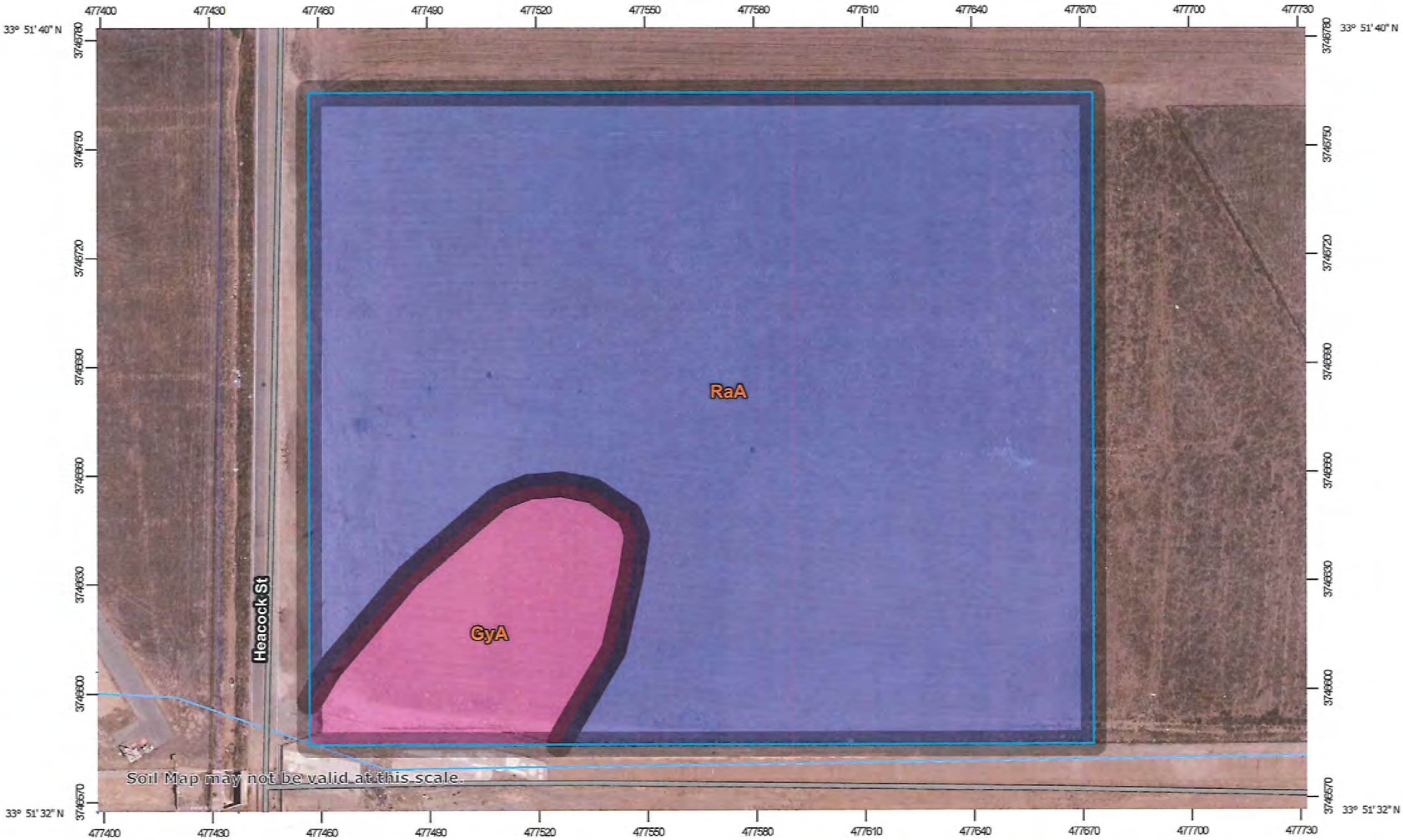

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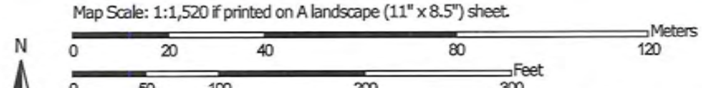

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 13, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
GyA	Greenfield sandy loam, 0 to 2 percent slopes	A	1.1	11.4%
RaA	Ramona sandy loam, 0 to 2 percent slopes, MLRA 19	B	8.5	88.6%
Totals for Area of Interest			**9.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

ADS
Advanced Drainage Systems, Inc.

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FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

1482-0001 HEACOCK PARKING LOT

MORENO VALLEY, CA

MC-4500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT

420	STORMTECH MC-4500 CHAMBERS
20	STORMTECH MC-4500 END CAPS
12	STONE ABOVE (in)
9	STONE BELOW (in)
40	STONE VOID
72316	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
16667	SYSTEM AREA (SF)
546.2	SYSTEM PERIMETER (ft)

CONCEPTUAL ELEVATIONS

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	12.75
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	8.25
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	7.75
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	7.75
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	7.75
TOP OF STONE:	6.75
TOP OF MC-4500 CHAMBER:	5.75
24" x 24" BOTTOM MANIFOLD INVERT:	0.94
24" ISOLATOR ROW PLUS INVERT:	0.94
24" BOTTOM CONNECTION INVERT:	0.94
BOTTOM OF MC-4500 CHAMBER:	0.75
BOTTOM OF STONE:	0.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM PARTIAL CUT END CAP, PART#: MC4500IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.26"	
FLAMP	B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC450024RAMP		
MANIFOLD	C	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
CONCRETE STRUCTURE	D	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		7.0 CFS OUT
CONCRETE STRUCTURE W/WEIR	E	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		41.5 CFS IN

ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 17.50' OF ADSPLUS175 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

1482-0001 HEACOCK PARKING LOT
MORENO VALLEY, CA

DATE:
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PROJECT #:
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REV	DRW	CHK	DESCRIPTION

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

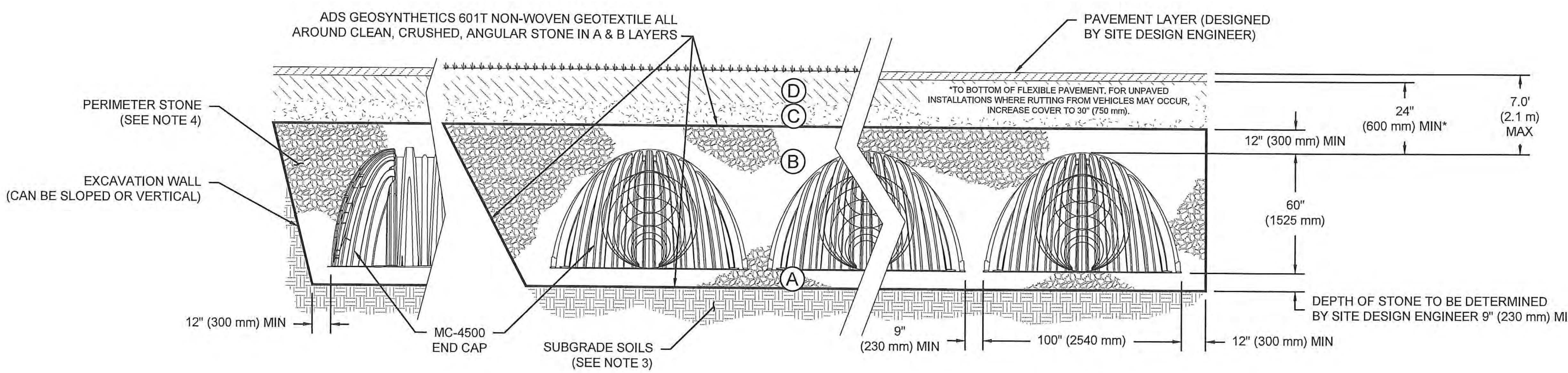
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

0 15' 30'

ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

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2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
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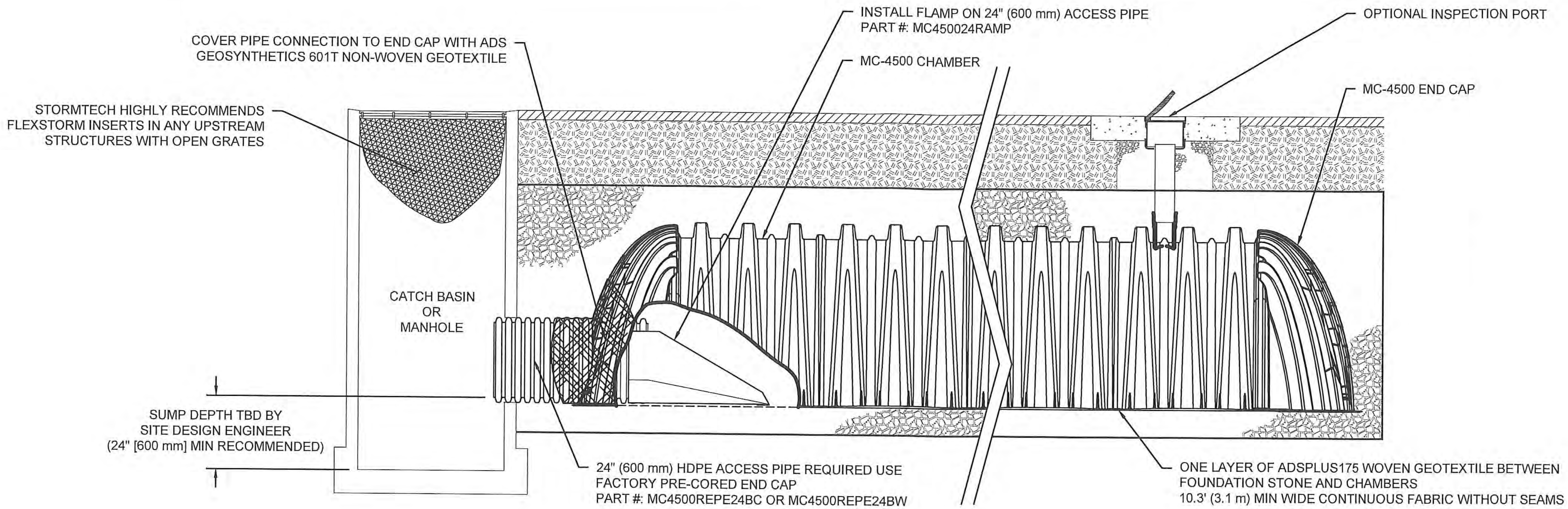
1482-0001 HEACOCK PARKING LOT
MORENO VALLEY, CA

DATE:
DRAWN: RU
PROJECT #:
CHECKED: N/A

REV	DRW	CHK	DESCRIPTION

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



MC-4500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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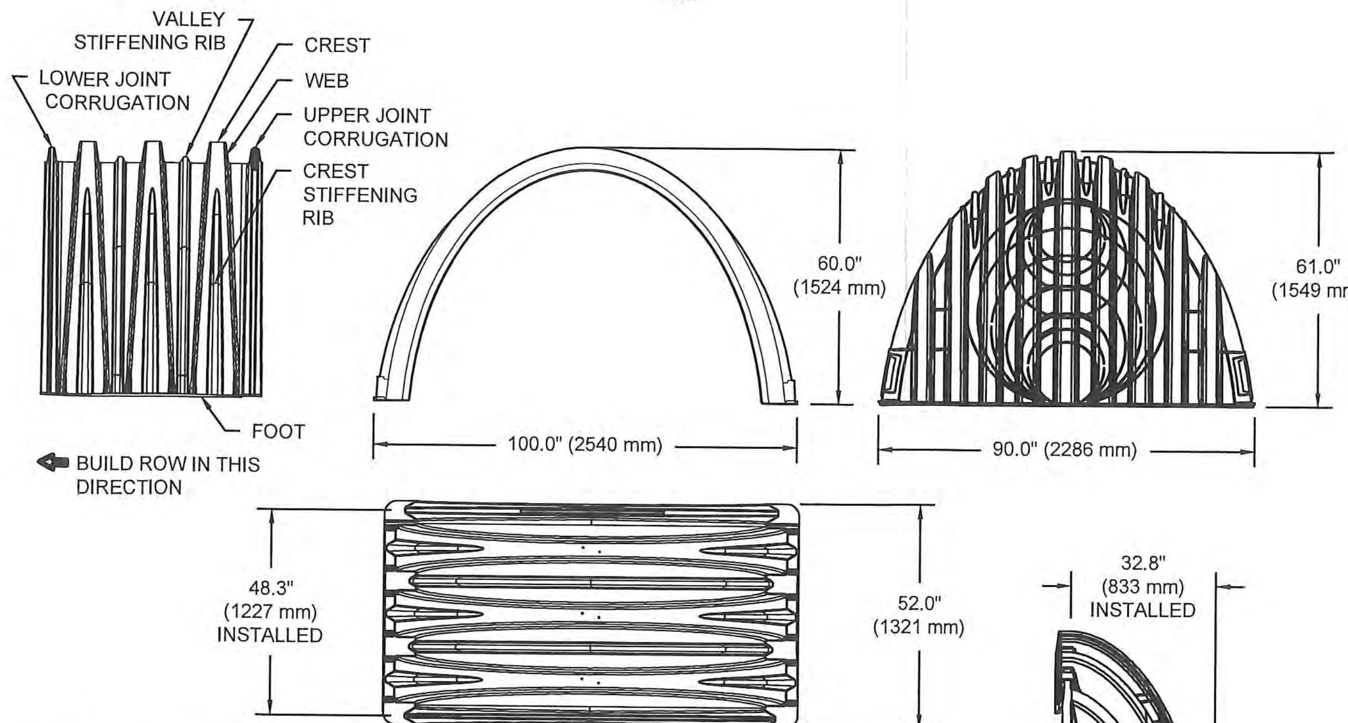
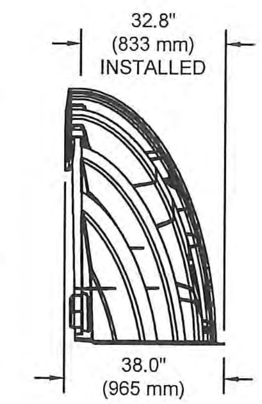
MC-4500 TECHNICAL SPECIFICATION

NTS





NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT (NOMINAL)	125.0 lbs.	(56.7 kg)

NOMINAL END CAP SPECIFICATIONS

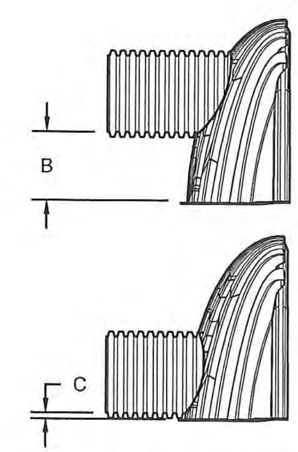
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC4500IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC4500IEPP06B		---	0.86" (22 mm)
MC4500IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC4500IEPP08B		---	1.01" (26 mm)
MC4500IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC4500IEPP10B		---	1.33" (34 mm)
MC4500IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC4500IEPP12B		---	1.55" (39 mm)
MC4500IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC4500IEPP15B		---	1.70" (43 mm)
MC4500IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC4500IEPP18TW			
MC4500IEPP18B		---	1.97" (50 mm)
MC4500IEPP18BW			
MC4500IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC4500IEPP24TW			
MC4500IEPP24B		---	2.26" (57 mm)
MC4500IEPP24BW			
MC4500IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC4500IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC4500IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

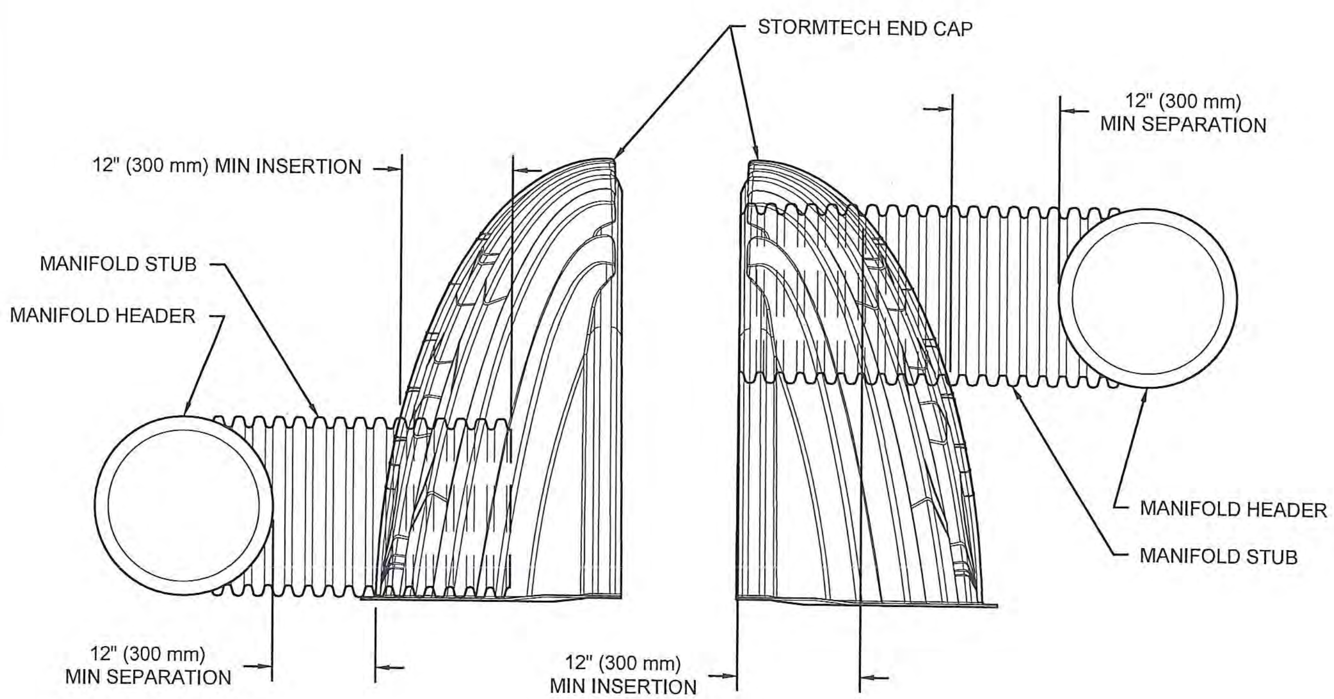
NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

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Chamber System
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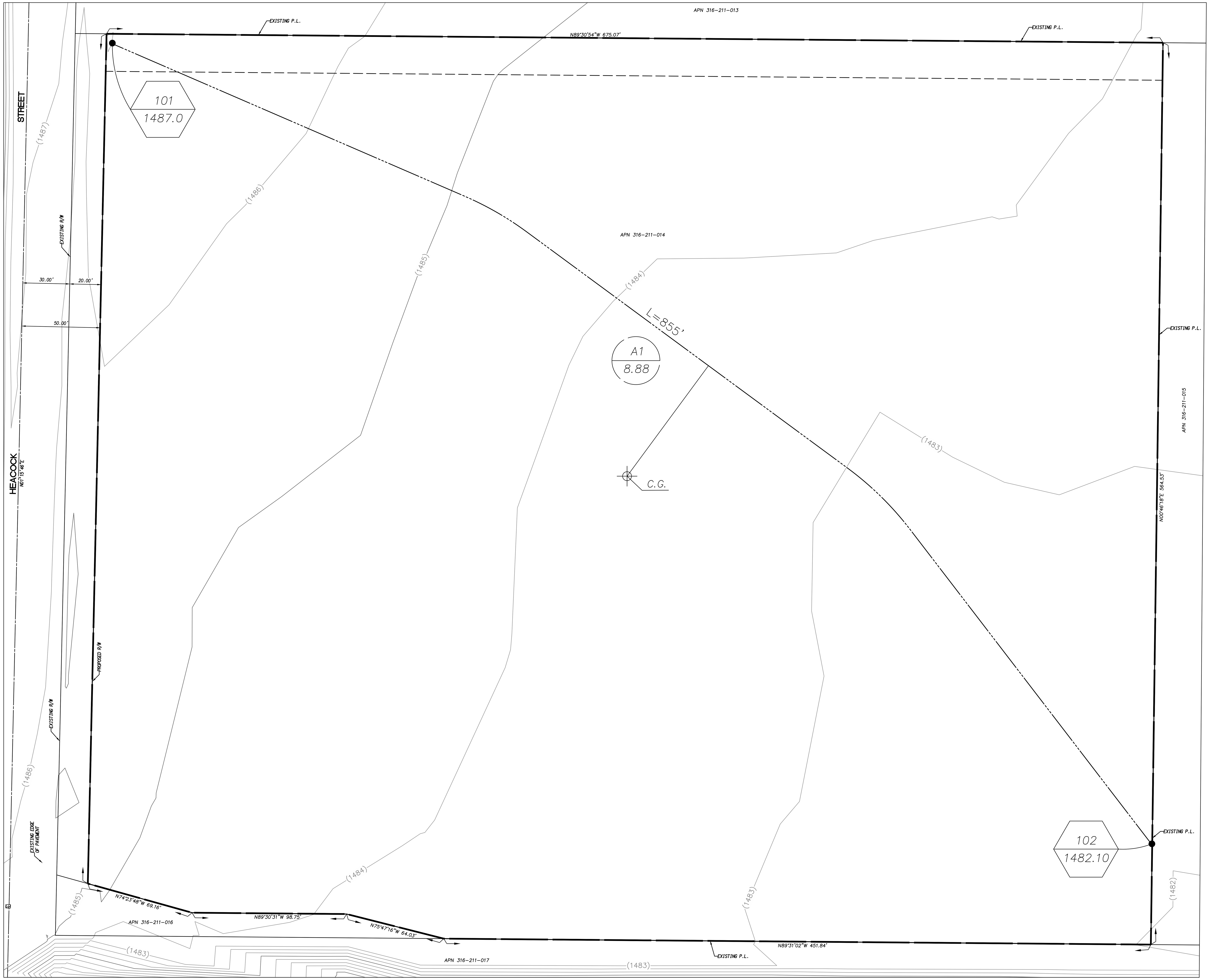
EXHIBIT A

HYDROLOGY MAP (EXISTING CONDITION; RATIONAL METHOD)



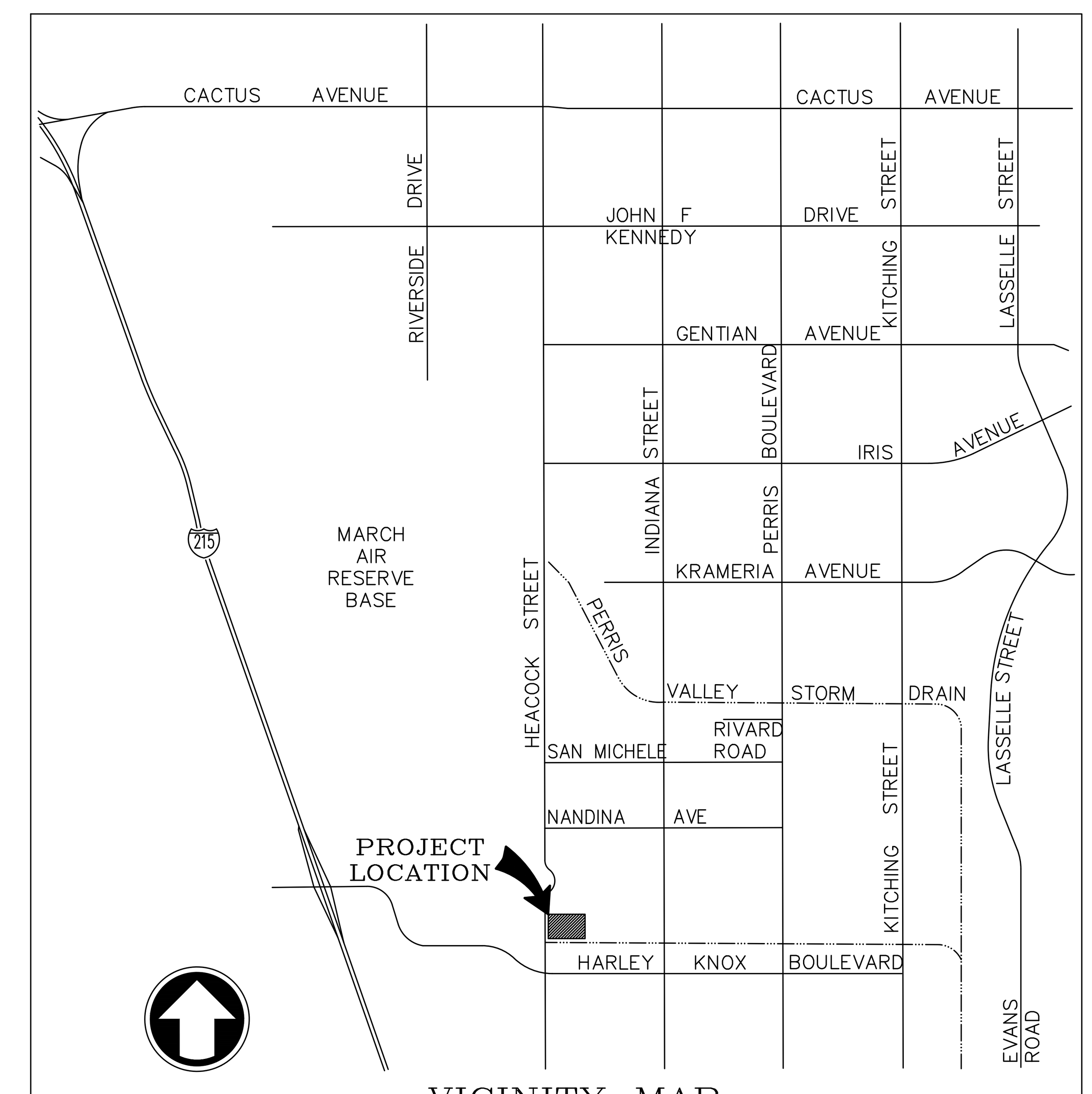
LEGEND

XXX / XXXX	NODE/CONCENTRATION POINT ELEVATION
XX / X.XX	SUBAREA ACRES
L=XXX'	MAIN FLOW PATH
——-·-·——	FLOW PATH
—— —— ——	WATERSHED BOUNDARY

FLOW DATA

Existing Condition				
Node	Drainage Area (ft^2)	Drainage Area (ac)	Q_{100} (cfs)	TC_{100} (min)
102	387,027	8.88	13.38	22.15

GRAPHIC SCALE
30 0 15 30 60
1" = 30'



VICINITY MAP
N.T.S.

EXHIBIT "A"
RATIONAL METHOD
HYDROLOGY MAP FOR PROPOSED TRUCK/TRAILER PARKING/STORAGE LOT
EXISTING CONDITION

CASC Engineering and Consulting
1470 EAST COOLEY DRIVE, COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108
www.cascinc.com

Drawing Name: C:\Users\PFLANA~1\AppData\Local\Temp\AcPublish_38492\1482-0001 HYDROLOGY MAP (EXISTING & PROPOSED CONDITION).dwg
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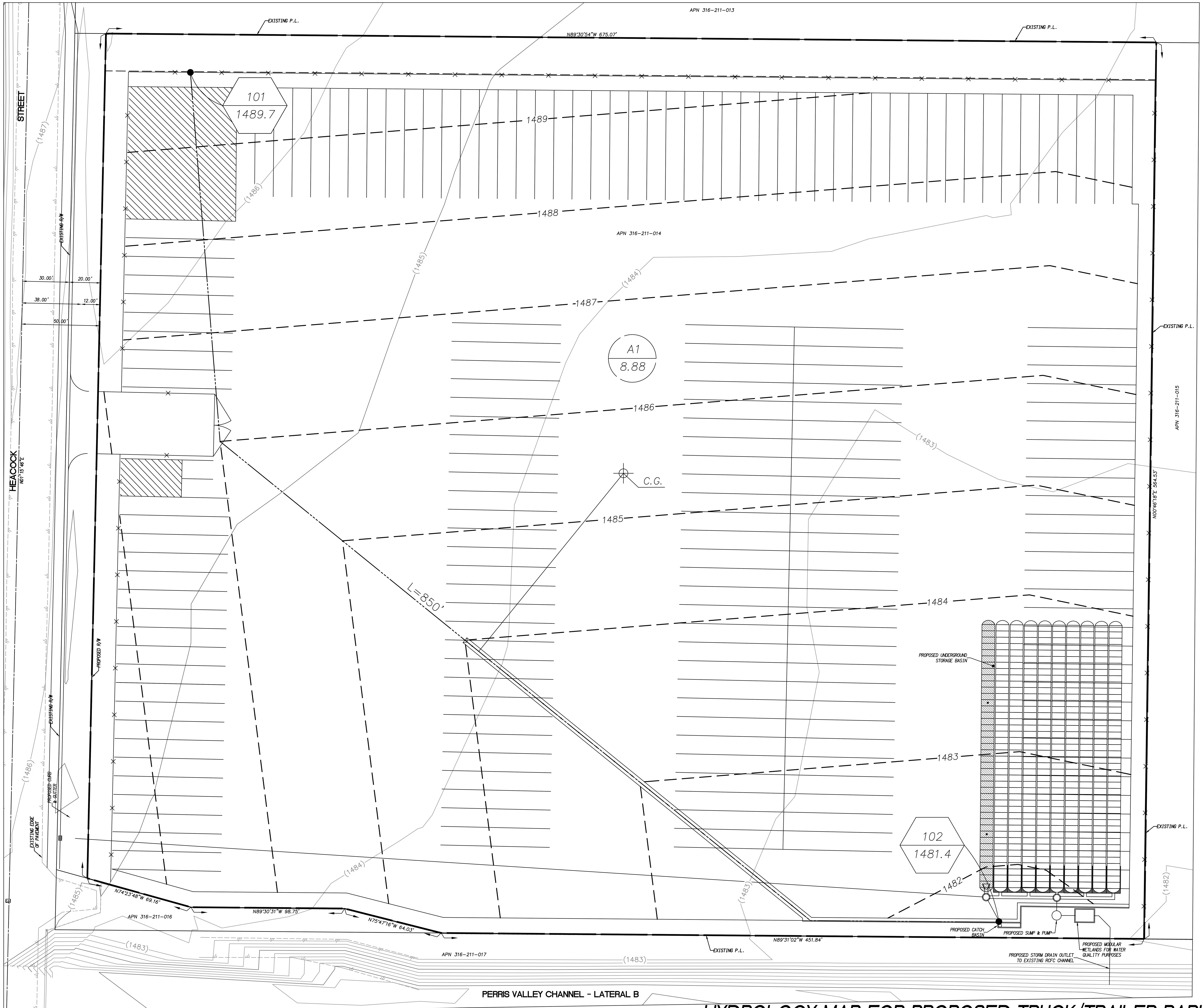
EXHIBIT B

HYDROLOGY MAP (PROPOSED CONDITION; RATIONAL METHOD)



LEGEND

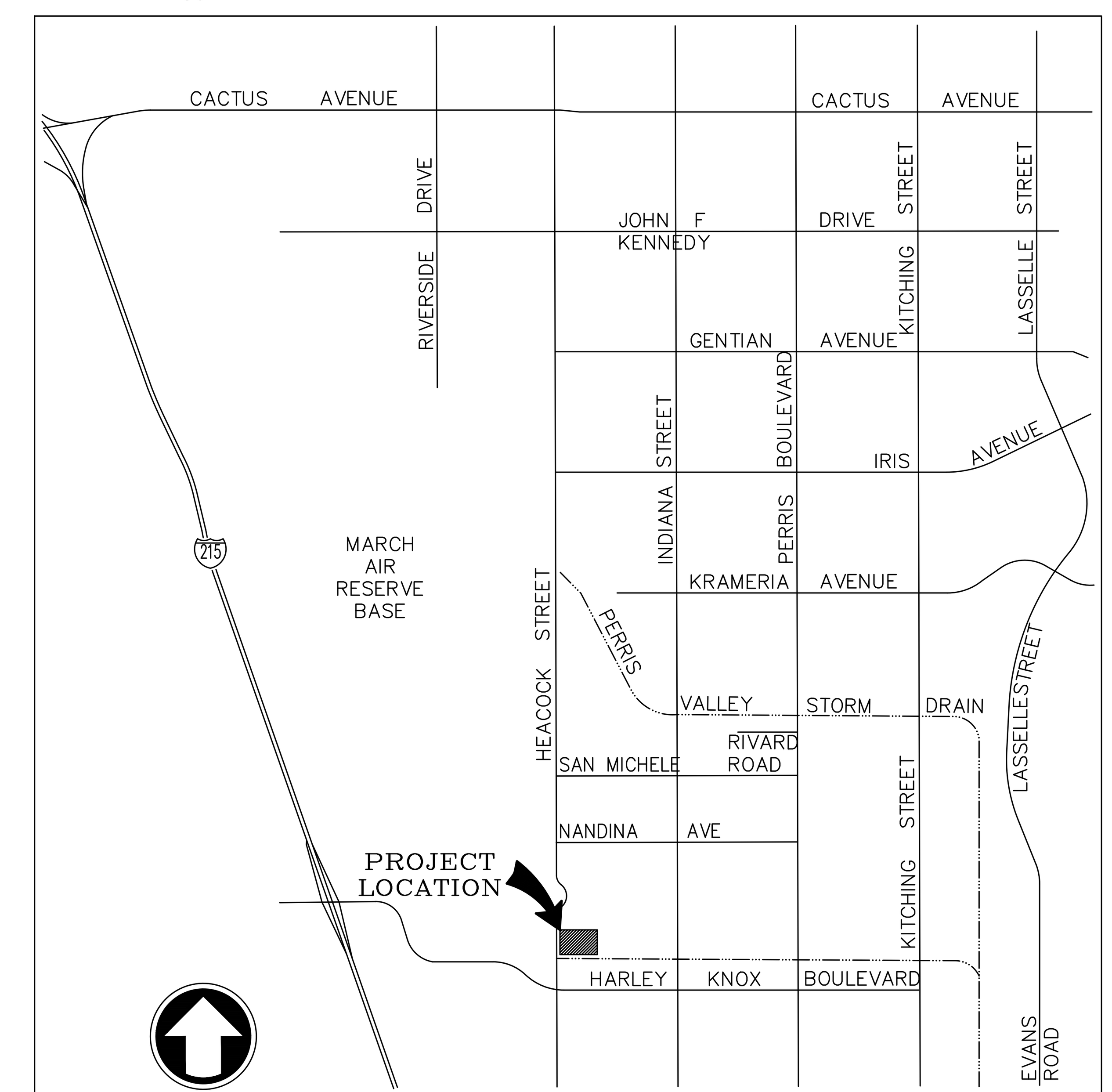
XXX / XXXX	NODE/CONCENTRATION POINT ELEVATION
XX / X.XX	SUBAREA ACRES
L=XXX'	MAIN FLOW PATH
—··—	FLOW PATH
— — —	WATERSHED BOUNDARY

FLOW DATA

Proposed Condition				
Node	Drainage Area		Q_{100}	TC_{100}
	(ft^2)	(ac)	(cfs)	(min)
102	387,027	8.88	20.0	11.25

Table 5-2: Proposed Condition Rational Method Hydrology Results

GRAPHIC SCALE
30 0 15 30 60
1" = 30'



VICINITY MAP
N.T.S.

EXHIBIT "B"
RATIONAL METHOD
HYDROLOGY MAP FOR PROPOSED TRUCK/TRAILER PARKING/STORAGE LOT
POST CONDITION

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