APPENDIX D
Hydrology Study and WQMP

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HYDROLOGY AND HYDRAULICS CALCULATION

FOR

BEWLEY STREET TOWNHOMES
1122 NORTH BEWLEY STREET

PREPARED
LINDA LA
13212 Bowen Street
Garden Grove, CA 92843
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Prepared by
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HYDROLOGY/HYDRAULICS CALCULATION

Reference:

- **WinTR-55/WinTR-20 Watershed Hydrology**
- **NOAA Atlas 14, Volume 6, Version 2**

Area = 0.87 Ac
Impervious Area = 0.68 Ac
Pervious Area = 0.19 Ac
Slope = 0.5%
L = 421 ft.
$Q_{50\text{-year}}$ = 2.97 cfs (WinTR-20 output)
$Q_{85\text{th percentile}}$ = 0.22 cfs (WinTR-20 output)

Hydraulics:

Inlet capacity of grate at sag for the to capture the flow (Q_{50})
Use Q_{design} = 2.97 cfs
Assume 36" x 36" Catch Basin
P = 3*4*0.50 = 6 (partial clogging)
Q/P = 0.495
Use $Q = 3P\ H^{3/2}$
H = 0.30 ft (at first 3.72 inches)

Use 36" x 36" Catch Basin
Qcap = 3.41 cfs > $Q_{50\text{-year}}$ = 2.97 cfs

PVC Pipe or HDPE (traffic rated) to junction structure
Assume 12"Ø PVC Pipe pipe or HDPE, slope = ±1.0%
Qcap = 3.56 cfs > Q= 2.97 cfs
Use 12"Ø (traffic rated) PVC Pipe or HDPE slope = ±1.0 %

PVC Pipe or HDPE (traffic rated) to infiltration trench to capture $Q_{85\text{th percentile}}$:
$Q_{85\text{th percentile}}$ = 0.22 cfs
Assume 6"Ø PVC Pipe or HDPE, slope = ±1.0%
Qcap = 0.56 cfs > $Q_{85\text{th percentile}}$ = 0.22 cfs
Use 6"Ø traffic rated PVC or HDPE, slope = ±1.0 %

Assume: Rectangular Parkway Drain 48" x 3", slope = ±1.2%
Q_{cap} = 3.0 cfs > Q_{50} =2.97 cfs
V = 3.0 f/s
Use Rectangular Parkway Drain 48" x 3", slope= ± 1.2%

NOAA Atlas 14, Volume 6, Version 2
Location name: Santa Ana, California, USA*
Latitude: 33.7549°, Longitude: -117.9185°
Elevation: 83.4 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	**0.120** (0.101-0.144)	**0.157** (0.131-0.189)	**0.206** (0.172-0.249)	**0.247** (0.204-0.301)	**0.303** (0.242-0.383)	**0.348** (0.272-0.450)	**0.394** (0.300-0.523)	**0.443** (0.327-0.605)	**0.510** (0.360-0.729)	**0.564** (0.384-0.836)
10-min	**0.172** (0.144-0.207)	**0.224** (0.188-0.271)	**0.295** (0.246-0.357)	**0.353** (0.293-0.431)	**0.435** (0.347-0.550)	**0.499** (0.389-0.645)	**0.565** (0.430-0.750)	**0.634** (0.469-0.868)	**0.731** (0.517-1.05)	**0.808** (0.550-1.20)
15-min	**0.208** (0.174-0.250)	**0.271** (0.227-0.327)	**0.357** (0.298-0.431)	**0.427** (0.354-0.521)	**0.526** (0.420-0.665)	**0.603** (0.471-0.780)	**0.683** (0.520-0.907)	**0.767** (0.567-1.05)	**0.884** (0.625-1.26)	**0.977** (0.666-1.45)
30-min	**0.288** (0.242-0.347)	**0.376** (0.315-0.454)	**0.494** (0.413-0.598)	**0.592** (0.490-0.723)	**0.728** (0.582-0.921)	**0.836** (0.653-1.08)	**0.947** (0.720-1.26)	**1.06** (0.785-1.45)	**1.23** (0.866-1.75)	**1.35** (0.922-2.01)
60-min	**0.402** (0.337-0.484)	**0.525** (0.440-0.633)	**0.690** (0.576-0.834)	**0.827** (0.685-1.01)	**1.02** (0.812-1.29)	**1.17** (0.911-1.51)	**1.32** (1.01-1.76)	**1.49** (1.10-2.03)	**1.71** (1.21-2.45)	**1.89** (1.29-2.81)
2-hr	**0.581** (0.487-0.699)	**0.761** (0.637-0.917)	**0.999** (0.834-1.21)	**1.20** (0.990-1.46)	**1.47** (1.17-1.85)	**1.68** (1.31-2.17)	**1.90** (1.44-2.52)	**2.13** (1.57-2.91)	**2.44** (1.73-3.49)	**2.69** (1.83-4.00)
3-hr	**0.720** (0.604-0.867)	**0.943** (0.790-1.14)	**1.24** (1.03-1.50)	**1.48** (1.23-1.81)	**1.81** (1.45-2.29)	**2.07** (1.62-2.68)	**2.34** (1.78-3.11)	**2.62** (1.94-3.59)	**3.01** (2.13-4.31)	**3.32** (2.26-4.93)
6-hr	**1.01** (0.848-1.22)	**1.32** (1.11-1.59)	**1.73** (1.45-2.09)	**2.07** (1.71-2.52)	**2.53** (2.02-3.20)	**2.89** (2.26-3.74)	**3.27** (2.49-4.34)	**3.66** (2.70-5.01)	**4.20** (2.97-6.01)	**4.63** (3.15-6.87)
12-hr	**1.32** (1.11-1.59)	**1.72** (1.44-2.07)	**2.26** (1.88-2.73)	**2.70** (2.23-3.29)	**3.31** (2.65-4.19)	**3.80** (2.97-4.91)	**4.30** (3.27-5.71)	**4.82** (3.56-6.60)	**5.55** (3.92-7.94)	**6.13** (4.18-9.10)
24-hr	**1.75** (1.54-2.02)	**2.28** (2.01-2.64)	**3.00** (2.64-3.48)	**3.60** (3.15-4.21)	**4.45** (3.76-5.36)	**5.12** (4.24-6.30)	**5.82** (4.71-7.33)	**6.55** (5.16-8.49)	**7.59** (5.74-10.2)	**8.41** (6.16-11.7)
2-day	**2.14** (1.89-2.47)	**2.82** (2.49-3.26)	**3.74** (3.30-4.34)	**4.51** (3.94-5.27)	**5.58** (4.72-6.74)	**6.43** (5.33-7.91)	**7.31** (5.92-9.21)	**8.23** (6.49-10.7)	**9.52** (7.21-12.8)	**10.5** (7.72-14.7)
3-day	**2.41** (2.13-2.78)	**3.21** (2.83-3.71)	**4.28** (3.77-4.96)	**5.18** (4.52-6.05)	**6.42** (5.43-7.74)	**7.40** (6.13-9.10)	**8.41** (6.81-10.6)	**9.47** (7.46-12.3)	**11.0** (8.29-14.8)	**12.1** (8.88-16.9)
4-day	**2.59** (2.29-3.00)	**3.47** (3.07-4.01)	**4.65** (4.10-5.39)	**5.64** (4.93-6.58)	**7.00** (5.93-8.45)	**8.08** (6.70-9.95)	**9.20** (7.45-11.6)	**10.4** (8.18-13.4)	**12.0** (9.09-16.2)	**13.3** (9.74-18.6)
7-day	**2.96** (2.61-3.41)	**3.96** (3.49-4.57)	**5.32** (4.68-6.16)	**6.46** (5.65-7.55)	**8.08** (6.83-9.74)	**9.37** (7.77-11.5)	**10.7** (8.68-13.5)	**12.2** (9.58-15.8)	**14.2** (10.7-19.1)	**15.8** (11.6-22.1)
10-day	**3.19** (2.82-3.68)	**4.27** (3.77-4.93)	**5.75** (5.06-6.66)	**7.01** (6.13-8.19)	**8.81** (7.45-10.6)	**10.3** (8.50-12.6)	**11.8** (9.54-14.9)	**13.4** (10.6-17.4)	**15.8** (11.9-21.3)	**17.7** (12.9-24.6)
20-day	**3.83** (3.39-4.42)	**5.17** (4.56-5.97)	**7.03** (6.19-8.14)	**8.62** (7.53-10.1)	**10.9** (9.24-13.2)	**12.8** (10.6-15.8)	**14.8** (12.0-18.6)	**17.0** (13.4-22.0)	**20.1** (15.2-27.1)	**22.6** (16.6-31.5)
30-day	**4.51** (3.99-5.21)	**6.11** (5.39-7.06)	**8.34** (7.34-9.66)	**10.3** (8.96-12.0)	**13.0** (11.0-15.7)	**15.3** (12.7-18.8)	**17.7** (14.4-22.4)	**20.4** (16.0-26.4)	**24.2** (18.3-32.6)	**27.3** (20.0-38.0)
45-day	**5.29** (4.68-6.11)	**7.17** (6.33-8.28)	**9.78** (8.61-11.3)	**12.0** (10.5-14.1)	**15.3** (12.9-18.5)	**18.0** (14.9-22.1)	**20.8** (16.9-26.3)	**23.9** (18.9-31.0)	**28.4** (21.5-38.3)	**32.1** (23.5-44.8)
60-day	**6.17** (5.46-7.13)	**8.32** (7.35-9.62)	**11.3** (9.97-13.1)	**13.9** (12.1-16.2)	**17.6** (14.9-21.3)	**20.7** (17.2-25.5)	**24.0** (19.4-30.2)	**27.5** (21.7-35.6)	**32.6** (24.7-44.0)	**36.8** (26.9-51.3)

[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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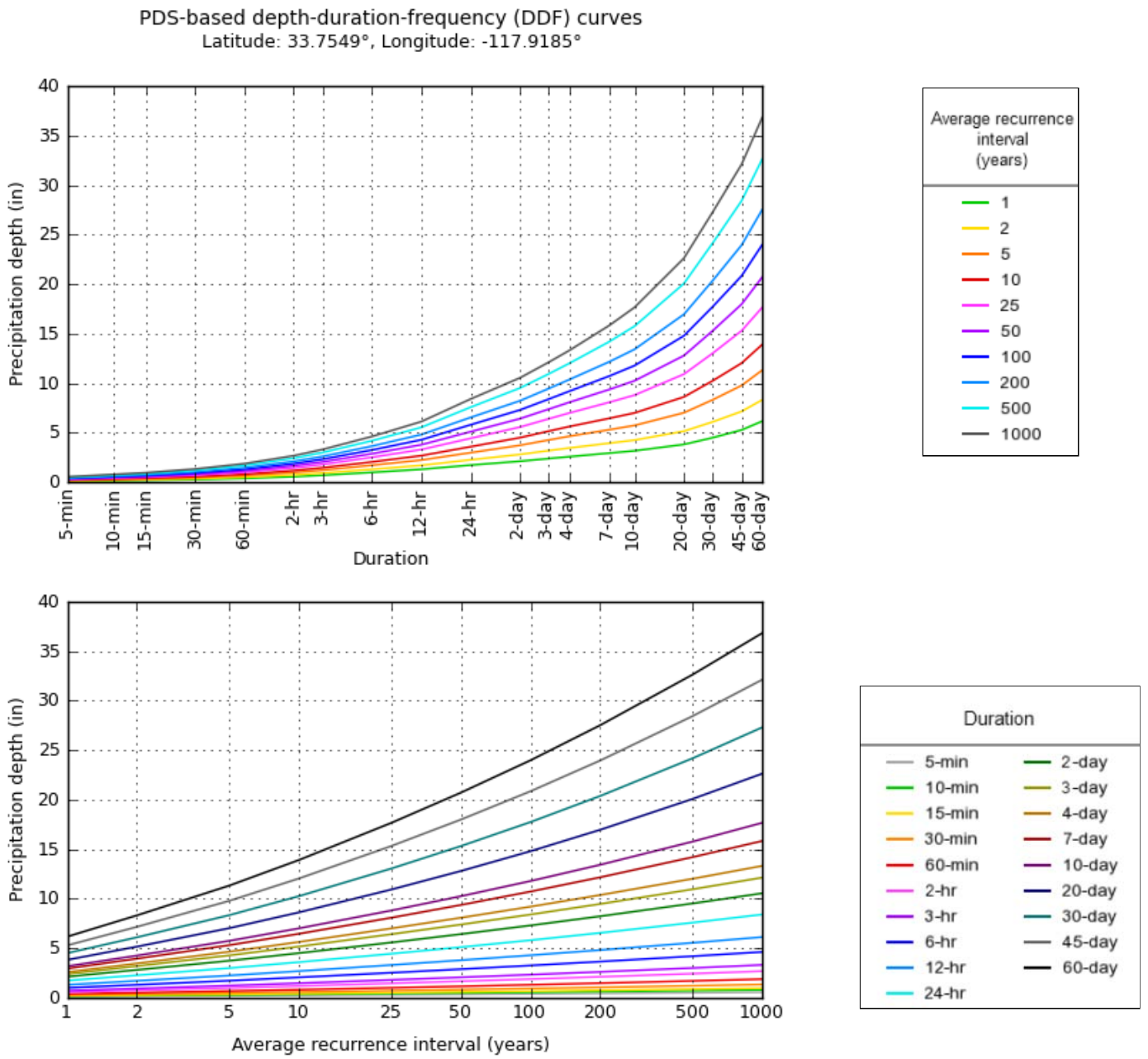
PF graphical



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Created (GMT): Thu Jun 14 17:12:07 2018

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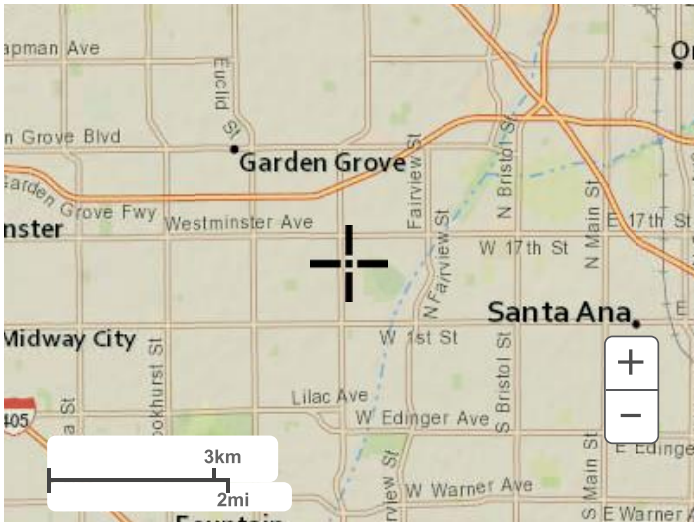
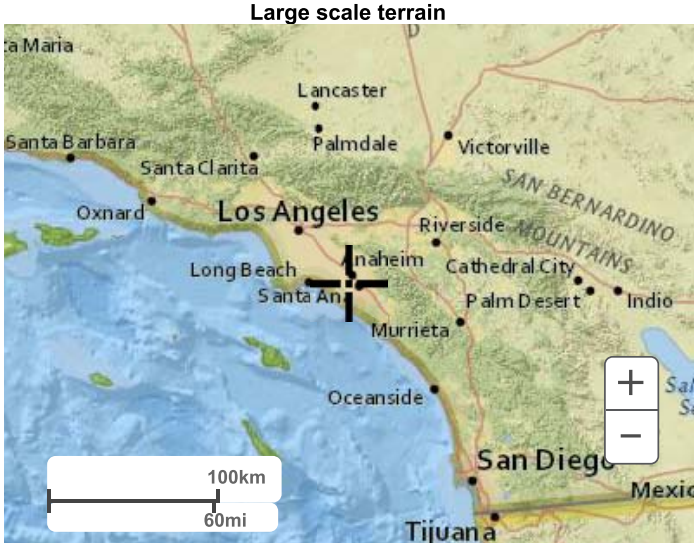
Maps & aerials

Small scale terrain



Large scale terrain



Large scale map

Large scale aerial

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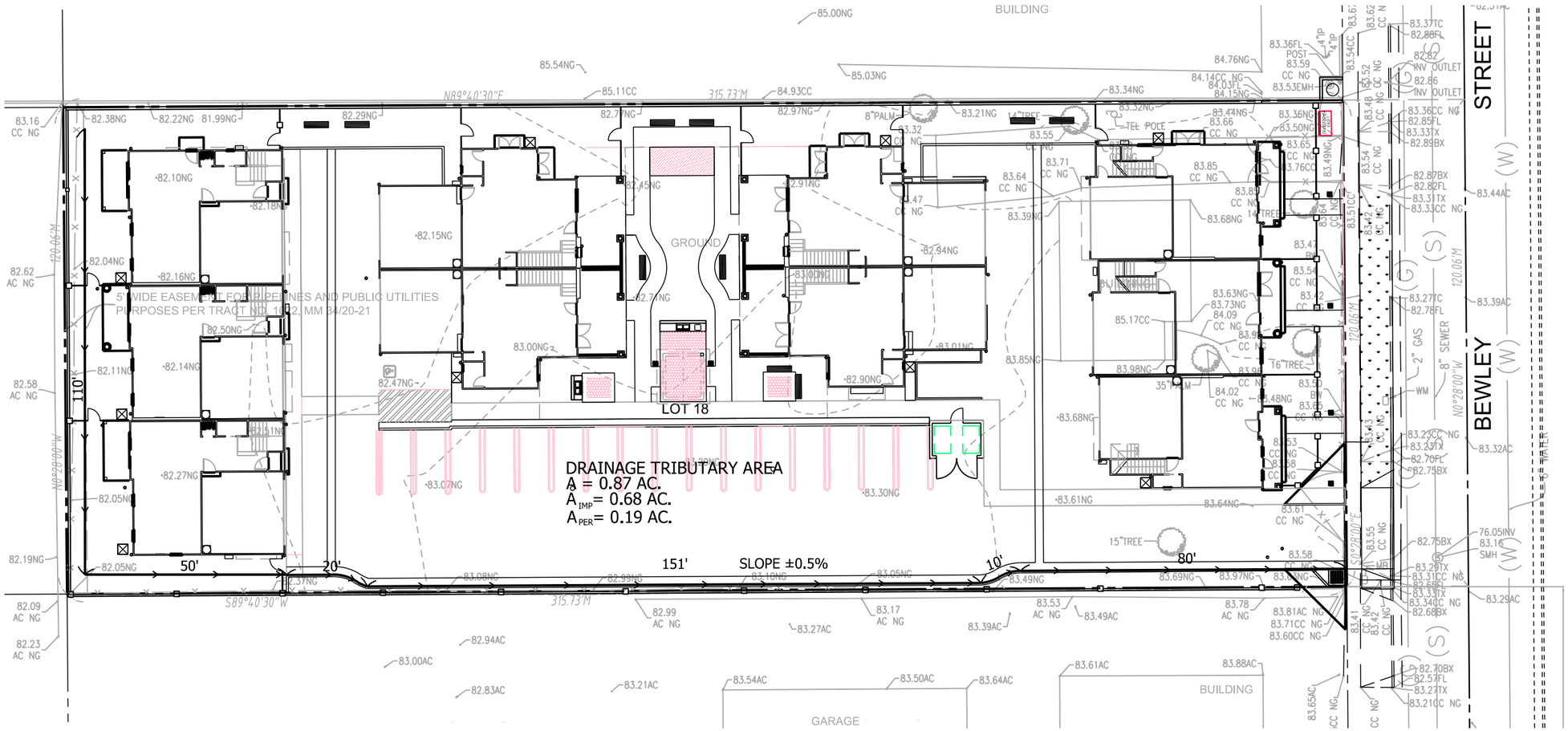
Disclaimer

HYDROLOGY MAP - POST DEVELOPMENT



FOR Q 50-YEARS/24-HOURS

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WinTR-20 Printed Page File      Beginning of Input Data List
TR20.inp

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1122 Bewley Street
Post-development

SUB-AREA:
          A1        Outlet              .00136    94.       .1

STREAM REACH:

STORM ANALYSIS:
          50-Yr                         5.12      Type I    2

STRUCTURE RATING:


GLOBAL OUTPUT:
          2         0.05                YYYYN     YYYYNN


WinTR-20 Printed Page File      End of Input Data List

                                1122 Bewley Street
                                 Post-development

                           Name of printed page file:
                                TR20.out

                                          STORM 50-Yr

Area or    Drainage  Rain Gage     Runoff   ------------ Peak Flow ------------
 Reach       Area      ID or       Amount   Elevation   Time      Rate      Rate
Identifier  (sq mi)   Location     (in)      (ft)      (hr)     (cfs)     (csm)

A1            0.001                4.354                9.93      2.97   2182.32

   Line
Start Time   ------------ Flow Values @ time increment of  0.006 hr ------------
      (hr)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)

     3.972      0.05      0.05      0.05      0.05      0.05      0.05      0.05
     4.017      0.05      0.05      0.05      0.05      0.05      0.05      0.05
     4.061      0.05      0.05      0.05      0.05      0.05      0.05      0.05
     4.105      0.05      0.05      0.05      0.05      0.05      0.05      0.05
     4.149      0.05      0.05      0.05      0.05      0.05      0.05      0.05
     4.193      0.05      0.05      0.05      0.05      0.05      0.05      0.05
     4.238      0.05      0.05      0.05      0.06      0.06      0.06      0.06
     4.282      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.326      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.370      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.414      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.459      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.503      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.547      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.591      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.635      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.680      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.724      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.768      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.812      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.857      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     4.901      0.06      0.06      0.07      0.07      0.07      0.07      0.07
     4.945      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     4.989      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.033      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.078      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.122      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.166      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.210      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.254      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.299      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.343      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.387      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.431      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     5.475      0.07      0.07      0.07      0.07      0.07      0.07      0.07
```

5.520	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.564	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.608	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.652	0.07	0.07	0.07	0.07	0.07	0.07	0.08
5.697	0.08	0.08	0.08	0.08	0.08	0.08	0.08

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
5.741	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.785	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.829	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.873	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.918	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.962	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.006	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.050	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.094	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.139	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.183	0.08	0.08	0.08	0.09	0.09	0.09	0.09
6.227	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.271	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.315	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.360	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.404	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.448	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6.492	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6.537	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6.581	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6.625	0.10	0.10	0.10	0.10	0.10	0.10	0.11
6.669	0.11	0.11	0.11	0.11	0.11	0.11	0.11
6.713	0.11	0.11	0.11	0.11	0.11	0.11	0.11
6.758	0.11	0.11	0.11	0.11	0.11	0.11	0.11
6.802	0.11	0.11	0.11	0.11	0.11	0.11	0.11
6.846	0.11	0.11	0.11	0.11	0.11	0.12	0.12
6.890	0.12	0.12	0.12	0.12	0.12	0.12	0.12
6.934	0.12	0.12	0.12	0.12	0.12	0.12	0.12
6.979	0.12	0.12	0.12	0.12	0.12	0.12	0.12
7.023	0.12	0.12	0.12	0.12	0.12	0.12	0.12
7.067	0.12	0.12	0.12	0.12	0.12	0.12	0.13
7.111	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.155	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.200	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.244	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.288	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.332	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.377	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.421	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.465	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.509	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.553	0.13	0.14	0.14	0.14	0.14	0.14	0.14
7.598	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.642	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.686	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.730	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.774	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.819	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.863	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.907	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.951	0.14	0.14	0.14	0.14	0.14	0.14	0.14

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)						
7.995	0.14	0.14	0.14	0.14	0.14	0.15	0.15
8.040	0.15	0.15	0.15	0.15	0.15	0.15	0.15
8.084	0.15	0.15	0.15	0.15	0.15	0.15	0.15
8.128	0.15	0.15	0.16	0.16	0.16	0.16	0.16
8.172	0.16	0.16	0.16	0.17	0.17	0.17	0.17
8.217	0.17	0.17	0.17	0.17	0.17	0.17	0.17
8.261	0.18	0.18	0.18	0.18	0.18	0.18	0.18
8.305	0.18	0.18	0.18	0.19	0.19	0.19	0.19
8.349	0.19	0.19	0.19	0.19	0.20	0.20	0.20
8.393	0.20	0.20	0.20	0.20	0.20	0.20	0.20
8.438	0.20	0.21	0.21	0.21	0.21	0.21	0.21
8.482	0.21	0.22	0.22	0.22	0.22	0.22	0.22
8.526	0.22	0.22	0.22	0.22	0.22	0.23	0.23
8.570	0.23	0.23	0.23	0.23	0.23	0.23	0.23
8.614	0.24	0.24	0.24	0.24	0.24	0.24	0.24
8.659	0.24	0.24	0.25	0.25	0.25	0.25	0.25
8.703	0.25	0.25	0.25	0.25	0.25	0.25	0.26
8.747	0.26	0.26	0.26	0.26	0.26	0.26	0.26
8.791	0.27	0.27	0.27	0.27	0.27	0.27	0.27
8.835	0.27	0.27	0.27	0.28	0.28	0.28	0.28
8.880	0.28	0.28	0.28	0.28	0.28	0.28	0.29
8.924	0.29	0.29	0.29	0.29	0.29	0.29	0.29
8.968	0.29	0.30	0.30	0.30	0.30	0.30	0.30
9.012	0.30	0.30	0.30	0.30	0.31	0.31	0.31
9.057	0.31	0.31	0.32	0.32	0.32	0.32	0.32
9.101	0.32	0.32	0.33	0.33	0.33	0.33	0.33
9.145	0.33	0.34	0.34	0.34	0.34	0.35	0.35
9.189	0.35	0.35	0.35	0.35	0.36	0.36	0.36
9.233	0.36	0.36	0.36	0.37	0.37	0.37	0.37
9.278	0.38	0.38	0.38	0.38	0.38	0.39	0.39

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

9.322	0.39	0.39	0.39	0.39	0.40	0.40	0.40
9.366	0.40	0.41	0.41	0.41	0.41	0.42	0.42
9.410	0.42	0.42	0.42	0.42	0.42	0.43	0.43
9.454	0.43	0.43	0.44	0.44	0.44	0.44	0.45
9.499	0.45	0.45	0.45	0.46	0.46	0.47	0.48
9.543	0.49	0.51	0.52	0.54	0.56	0.57	0.58
9.587	0.60	0.61	0.62	0.63	0.64	0.65	0.66
9.631	0.68	0.70	0.73	0.76	0.79	0.82	0.85
9.675	0.88	0.91	0.93	0.96	0.97	0.99	1.01
9.720	1.03	1.06	1.09	1.13	1.18	1.23	1.29
9.764	1.34	1.40	1.45	1.50	1.54	1.57	1.61
9.808	1.64	1.67	1.71	1.77	1.84	1.92	2.02
9.852	2.13	2.24	2.35	2.46	2.56	2.65	2.74
9.897	2.81	2.87	2.91	2.95	2.96	2.97	2.95
9.941	2.92	2.88	2.82	2.76	2.70	2.64	2.59
9.985	2.53	2.48	2.44	2.41	2.37	2.33	2.28
10.029	2.22	2.14	2.05	1.94	1.82	1.70	1.58
10.073	1.47	1.37	1.28	1.19	1.12	1.06	1.01
10.118	0.97	0.94	0.90	0.87	0.85	0.82	0.80
10.162	0.78	0.77	0.75	0.74	0.73	0.72	0.71
10.206	0.70	0.70	0.69	0.68	0.68	0.67	0.66

1122 Bewley Street
Post-development

Line Start Time (hr) — Flow Values @ time increment of 0.006 hr (cfs)

10.250	0.66	0.65	0.64	0.63	0.63	0.62	0.62
10.294	0.61	0.61	0.60	0.60	0.60	0.59	0.59
10.339	0.59	0.58	0.57	0.57	0.56	0.55	0.55
10.383	0.54	0.54	0.53	0.53	0.53	0.52	0.52
10.427	0.52	0.51	0.51	0.50	0.49	0.49	0.48
10.471	0.48	0.47	0.46	0.46	0.46	0.45	0.45
10.515	0.45	0.44	0.44	0.44	0.43	0.43	0.42

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

10.560	0.42	0.42	0.41	0.41	0.40	0.40	0.40
10.604	0.40	0.40	0.39	0.39	0.39	0.39	0.39
10.648	0.39	0.38	0.38	0.38	0.38	0.38	0.37
10.692	0.37	0.37	0.37	0.37	0.37	0.37	0.37
10.737	0.37	0.37	0.36	0.36	0.36	0.36	0.36
10.781	0.36	0.35	0.35	0.35	0.35	0.35	0.35
10.825	0.35	0.35	0.35	0.35	0.34	0.34	0.34
10.869	0.34	0.34	0.34	0.34	0.33	0.33	0.33
10.913	0.33	0.33	0.33	0.33	0.33	0.33	0.33
10.958	0.32	0.32	0.32	0.32	0.32	0.32	0.32
11.002	0.31	0.31	0.31	0.31	0.31	0.31	0.31
11.046	0.31	0.31	0.31	0.31	0.30	0.30	0.30
11.090	0.30	0.30	0.30	0.30	0.30	0.30	0.30
11.134	0.30	0.30	0.30	0.30	0.30	0.29	0.29
11.179	0.29	0.29	0.29	0.29	0.29	0.29	0.29
11.223	0.29	0.29	0.29	0.29	0.29	0.29	0.29
11.267	0.29	0.29	0.29	0.29	0.29	0.29	0.29
11.311	0.29	0.28	0.28	0.28	0.28	0.28	0.28
11.355	0.28	0.28	0.28	0.28	0.28	0.28	0.28
11.400	0.28	0.28	0.28	0.28	0.28	0.28	0.28
11.444	0.28	0.28	0.28	0.27	0.27	0.27	0.27
11.488	0.27	0.27	0.27	0.27	0.27	0.27	0.27
11.532	0.27	0.27	0.27	0.27	0.27	0.27	0.27
11.577	0.27	0.27	0.27	0.27	0.26	0.26	0.26
11.621	0.26	0.26	0.26	0.26	0.26	0.26	0.26
11.665	0.26	0.26	0.26	0.26	0.26	0.26	0.26
11.709	0.26	0.26	0.26	0.26	0.26	0.26	0.26
11.753	0.25	0.25	0.25	0.25	0.25	0.25	0.25
11.798	0.25	0.25	0.25	0.25	0.25	0.25	0.25
11.842	0.25	0.25	0.25	0.25	0.25	0.25	0.25
11.886	0.25	0.24	0.24	0.24	0.24	0.24	0.24
11.930	0.24	0.24	0.24	0.24	0.24	0.24	0.24
11.974	0.24	0.24	0.24	0.24	0.24	0.24	0.24
12.019	0.24	0.24	0.24	0.24	0.24	0.23	0.23
12.063	0.23	0.23	0.23	0.23	0.23	0.23	0.23
12.107	0.23	0.23	0.23	0.23	0.23	0.23	0.23
12.151	0.23	0.23	0.23	0.23	0.23	0.23	0.23
12.195	0.23	0.23	0.23	0.23	0.23	0.23	0.23

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

12.240	0.23	0.23	0.22	0.22	0.22	0.22	0.22
12.284	0.22	0.22	0.22	0.22	0.22	0.22	0.22
12.328	0.22	0.22	0.22	0.22	0.22	0.22	0.22
12.372	0.22	0.22	0.22	0.22	0.22	0.22	0.22
12.417	0.22	0.22	0.22	0.22	0.22	0.22	0.22
12.461	0.22	0.22	0.21	0.21	0.21	0.21	0.21

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
12.505	0.21	0.21	0.21	0.21	0.21	0.21	0.21
12.549	0.21	0.21	0.21	0.21	0.21	0.21	0.21
12.593	0.21	0.21	0.21	0.21	0.21	0.21	0.21
12.638	0.21	0.21	0.21	0.21	0.21	0.21	0.21
12.682	0.21	0.21	0.21	0.21	0.20	0.20	0.20
12.726	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.770	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.814	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.859	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.903	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.947	0.19	0.19	0.19	0.19	0.19	0.19	0.19
12.991	0.19	0.19	0.19	0.19	0.19	0.19	0.19
13.035	0.19	0.19	0.19	0.19	0.19	0.19	0.19
13.080	0.19	0.19	0.19	0.19	0.19	0.19	0.19
13.124	0.19	0.19	0.19	0.19	0.19	0.19	0.19
13.168	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.212	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.257	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.301	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.345	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.389	0.18	0.17	0.17	0.17	0.17	0.17	0.17
13.433	0.17	0.17	0.17	0.17	0.17	0.17	0.17

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

13.478	0.17	0.17	0.17	0.17	0.17	0.17	0.17
13.522	0.17	0.17	0.17	0.17	0.17	0.17	0.17
13.566	0.17	0.17	0.17	0.17	0.17	0.17	0.17
13.610	0.17	0.17	0.17	0.17	0.16	0.16	0.16
13.654	0.16	0.16	0.16	0.16	0.16	0.16	0.16
13.699	0.16	0.16	0.16	0.16	0.16	0.16	0.16
13.743	0.16	0.16	0.16	0.16	0.16	0.16	0.16
13.787	0.16	0.16	0.16	0.16	0.16	0.16	0.16
13.831	0.16	0.16	0.16	0.16	0.15	0.15	0.15
13.875	0.15	0.15	0.15	0.15	0.15	0.15	0.15
13.920	0.15	0.15	0.15	0.15	0.15	0.15	0.15
13.964	0.15	0.15	0.15	0.15	0.15	0.15	0.15
14.008	0.15	0.15	0.15	0.15	0.15	0.15	0.15
14.052	0.15	0.15	0.15	0.15	0.15	0.15	0.15
14.097	0.15	0.15	0.15	0.15	0.15	0.15	0.15
14.141	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.185	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.229	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.273	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.318	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.362	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.406	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.450	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.494	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.539	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.583	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.627	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.671	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.715	0.14	0.14	0.14	0.14	0.14	0.14	0.14

1122 Bewley Street
Post-development

Line
Start Time ---------- Flow Values @ time increment of 0.006 hr ----------

(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

14.760	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.804	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.848	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.892	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.937	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.981	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.025	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.069	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.113	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.158	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.202	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.246	0.14	0.14	0.14	0.14	0.13	0.13	0.13
15.290	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.334	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.379	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.423	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.467	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.511	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.555	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.600	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.644	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.688	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.732	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.777	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.821	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.865	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.909	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.953	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.998	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.042	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.086	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.130	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.174	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.219	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.263	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.307	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.351	0.13	0.13	0.13	0.13	0.13	0.13	0.13

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

16.395	0.13	0.13	0.13	0.13	0.13	0.12	0.12
16.440	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.484	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.528	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.572	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.617	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.661	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.705	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.749	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.793	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.838	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.882	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.926	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.970	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Line Start Time (hr) — Flow Values @ time increment of 0.006 hr (cfs)

17.014	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.059	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.103	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.147	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.191	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.235	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.280	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.324	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.368	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.412	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.457	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.501	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.545	0.12	0.12	0.12	0.12	0.11	0.11	0.11
17.589	0.11	0.11	0.11	0.11	0.11	0.11	0.11

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

17.633	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.678	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.722	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.766	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.810	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.854	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.899	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.943	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.987	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.031	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.075	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.120	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.164	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.208	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.252	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.297	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.341	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.385	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.429	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.473	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.518	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.562	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.606	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.650	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.694	0.11	0.11	0.11	0.10	0.10	0.10	0.10
18.739	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.783	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.827	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.871	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.915	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.960	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.004	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.048	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.092	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.137	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.181	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.225	0.10	0.10	0.10	0.10	0.10	0.10	0.10

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)						
19.269	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.313	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.358	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.402	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.446	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.490	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.534	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.579	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.623	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.667	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.711	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.755	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.800	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.844	0.10	0.10	0.09	0.09	0.09	0.09	0.09
19.888	0.09	0.09	0.09	0.09	0.09	0.09	0.09
19.932	0.09	0.09	0.09	0.09	0.09	0.09	0.09
19.977	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.021	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.065	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.109	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.153	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.198	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.242	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.286	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.330	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.374	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.419	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.463	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.507	0.09	0.09	0.09	0.09	0.09	0.09	0.09

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

20.551	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.595	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.640	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.684	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.728	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.772	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.817	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.861	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.905	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.949	0.09	0.09	0.09	0.09	0.09	0.08	0.08
20.993	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.038	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.082	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.126	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.170	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.214	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.259	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.303	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.347	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.391	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.435	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.480	0.08	0.08	0.08	0.08	0.08	0.08	0.08

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)						
21.524	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.568	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.612	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.657	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.701	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.745	0.08	0.08	0.08	0.08	0.08	0.08	0.08

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

21.789	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.833	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.878	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.922	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.966	0.08	0.08	0.08	0.08	0.08	0.08	0.08
22.010	0.08	0.08	0.08	0.08	0.08	0.08	0.08
22.054	0.08	0.08	0.08	0.08	0.08	0.08	0.08
22.099	0.08	0.08	0.08	0.08	0.07	0.07	0.07
22.143	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.187	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.231	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.275	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.320	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.364	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.408	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.452	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.497	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.541	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.585	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.629	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.673	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.718	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.762	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.806	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.850	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.894	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.939	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.983	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.027	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.071	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.115	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.160	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.204	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.248	0.07	0.06	0.06	0.06	0.06	0.06	0.06
23.292	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.337	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.381	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.425	0.06	0.06	0.06	0.06	0.06	0.06	0.06

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:

A1	Outlet	.00136	94.	.1	

STREAM REACH:

23.469	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.513	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.558	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.602	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.646	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.690	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.734	0.06	0.06	0.06	0.06	0.06	0.06	0.06

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
23.779	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.823	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.867	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.911	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.955	0.06	0.06	0.06	0.06	0.06	0.06	0.06
24.000	0.06	0.06	0.06	0.06	0.06	0.05	0.05

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.001		4.354		9.93	2.97	2182.32

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.972	0.05	0.05	0.05	0.05	0.05	0.05	0.05
4.017	0.05	0.05	0.05	0.05	0.05	0.05	0.05
4.061	0.05	0.05	0.05	0.05	0.05	0.05	0.05
4.105	0.05	0.05	0.05	0.05	0.05	0.05	0.05

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

4.149	0.05	0.05	0.05	0.05	0.05	0.05	0.05
4.193	0.05	0.05	0.05	0.05	0.05	0.05	0.05
4.238	0.05	0.05	0.05	0.06	0.06	0.06	0.06
4.282	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.326	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.370	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.414	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.459	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.503	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.547	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.591	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.635	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.680	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.724	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.768	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.812	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.857	0.06	0.06	0.06	0.06	0.06	0.06	0.06
4.901	0.06	0.06	0.07	0.07	0.07	0.07	0.07
4.945	0.07	0.07	0.07	0.07	0.07	0.07	0.07
4.989	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.033	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.078	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.122	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.166	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.210	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.254	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.299	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.343	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.387	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.431	0.07	0.07	0.07	0.07	0.07	0.07	0.07

1122 Bewley Street
Post-development

Line
Start Time ---------- Flow Values @ time increment of 0.006 hr ----------

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
5.475	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.520	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.564	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.608	0.07	0.07	0.07	0.07	0.07	0.07	0.07
5.652	0.07	0.07	0.07	0.07	0.07	0.07	0.08
5.697	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.741	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.785	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.829	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.873	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.918	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5.962	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.006	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.050	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.094	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.139	0.08	0.08	0.08	0.08	0.08	0.08	0.08
6.183	0.08	0.08	0.08	0.09	0.09	0.09	0.09
6.227	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.271	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.315	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.360	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.404	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6.448	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6.492	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6.537	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6.581	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6.625	0.10	0.10	0.10	0.10	0.10	0.10	0.11
6.669	0.11	0.11	0.11	0.11	0.11	0.11	0.11
6.713	0.11	0.11	0.11	0.11	0.11	0.11	0.11
6.758	0.11	0.11	0.11	0.11	0.11	0.11	0.11
6.802	0.11	0.11	0.11	0.11	0.11	0.11	0.11
6.846	0.11	0.11	0.11	0.11	0.11	0.12	0.12
6.890	0.12	0.12	0.12	0.12	0.12	0.12	0.12
6.934	0.12	0.12	0.12	0.12	0.12	0.12	0.12
6.979	0.12	0.12	0.12	0.12	0.12	0.12	0.12
7.023	0.12	0.12	0.12	0.12	0.12	0.12	0.12

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

7.067	0.12	0.12	0.12	0.12	0.12	0.12	0.13
7.111	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.155	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.200	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.244	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.288	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.332	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.377	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.421	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.465	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.509	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7.553	0.13	0.14	0.14	0.14	0.14	0.14	0.14
7.598	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.642	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.686	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7.730	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.774	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.819	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.863	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.907	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.951	0.14	0.14	0.14	0.14	0.14	0.14	0.14
7.995	0.14	0.14	0.14	0.14	0.14	0.15	0.15
8.040	0.15	0.15	0.15	0.15	0.15	0.15	0.15
8.084	0.15	0.15	0.15	0.15	0.15	0.15	0.15
8.128	0.15	0.15	0.16	0.16	0.16	0.16	0.16
8.172	0.16	0.16	0.16	0.17	0.17	0.17	0.17
8.217	0.17	0.17	0.17	0.17	0.17	0.17	0.17
8.261	0.18	0.18	0.18	0.18	0.18	0.18	0.18

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

8.305	0.18	0.18	0.18	0.19	0.19	0.19	0.19
8.349	0.19	0.19	0.19	0.19	0.20	0.20	0.20
8.393	0.20	0.20	0.20	0.20	0.20	0.20	0.20
8.438	0.20	0.21	0.21	0.21	0.21	0.21	0.21
8.482	0.21	0.22	0.22	0.22	0.22	0.22	0.22
8.526	0.22	0.22	0.22	0.22	0.22	0.23	0.23
8.570	0.23	0.23	0.23	0.23	0.23	0.23	0.23
8.614	0.24	0.24	0.24	0.24	0.24	0.24	0.24
8.659	0.24	0.24	0.25	0.25	0.25	0.25	0.25
8.703	0.25	0.25	0.25	0.25	0.25	0.25	0.26
8.747	0.26	0.26	0.26	0.26	0.26	0.26	0.26
8.791	0.27	0.27	0.27	0.27	0.27	0.27	0.27
8.835	0.27	0.27	0.27	0.28	0.28	0.28	0.28
8.880	0.28	0.28	0.28	0.28	0.28	0.28	0.29
8.924	0.29	0.29	0.29	0.29	0.29	0.29	0.29
8.968	0.29	0.30	0.30	0.30	0.30	0.30	0.30
9.012	0.30	0.30	0.30	0.30	0.31	0.31	0.31
9.057	0.31	0.31	0.32	0.32	0.32	0.32	0.32
9.101	0.32	0.32	0.33	0.33	0.33	0.33	0.33
9.145	0.33	0.34	0.34	0.34	0.34	0.35	0.35
9.189	0.35	0.35	0.35	0.35	0.36	0.36	0.36
9.233	0.36	0.36	0.36	0.37	0.37	0.37	0.37
9.278	0.38	0.38	0.38	0.38	0.38	0.39	0.39
9.322	0.39	0.39	0.39	0.39	0.40	0.40	0.40
9.366	0.40	0.41	0.41	0.41	0.41	0.42	0.42
9.410	0.42	0.42	0.42	0.42	0.42	0.43	0.43
9.454	0.43	0.43	0.44	0.44	0.44	0.44	0.45
9.499	0.45	0.45	0.45	0.46	0.46	0.47	0.48
9.543	0.49	0.51	0.52	0.54	0.56	0.57	0.58
9.587	0.60	0.61	0.62	0.63	0.64	0.65	0.66
9.631	0.68	0.70	0.73	0.76	0.79	0.82	0.85
9.675	0.88	0.91	0.93	0.96	0.97	0.99	1.01
9.720	1.03	1.06	1.09	1.13	1.18	1.23	1.29
9.764	1.34	1.40	1.45	1.50	1.54	1.57	1.61
9.808	1.64	1.67	1.71	1.77	1.84	1.92	2.02
9.852	2.13	2.24	2.35	2.46	2.56	2.65	2.74
9.897	2.81	2.87	2.91	2.95	2.96	2.97	2.95
9.941	2.92	2.88	2.82	2.76	2.70	2.64	2.59

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.985	2.53	2.48	2.44	2.41	2.37	2.33	2.28
10.029	2.22	2.14	2.05	1.94	1.82	1.70	1.58
10.073	1.47	1.37	1.28	1.19	1.12	1.06	1.01
10.118	0.97	0.94	0.90	0.87	0.85	0.82	0.80
10.162	0.78	0.77	0.75	0.74	0.73	0.72	0.71
10.206	0.70	0.70	0.69	0.68	0.68	0.67	0.66
10.250	0.66	0.65	0.64	0.63	0.63	0.62	0.62
10.294	0.61	0.61	0.60	0.60	0.60	0.59	0.59
10.339	0.59	0.58	0.57	0.57	0.56	0.55	0.55
10.383	0.54	0.54	0.53	0.53	0.53	0.52	0.52
10.427	0.52	0.51	0.51	0.50	0.49	0.49	0.48
10.471	0.48	0.47	0.46	0.46	0.46	0.45	0.45
10.515	0.45	0.44	0.44	0.44	0.43	0.43	0.42
10.560	0.42	0.42	0.41	0.41	0.40	0.40	0.40
10.604	0.40	0.40	0.39	0.39	0.39	0.39	0.39
10.648	0.39	0.38	0.38	0.38	0.38	0.38	0.37
10.692	0.37	0.37	0.37	0.37	0.37	0.37	0.37
10.737	0.37	0.37	0.36	0.36	0.36	0.36	0.36
10.781	0.36	0.35	0.35	0.35	0.35	0.35	0.35
10.825	0.35	0.35	0.35	0.35	0.34	0.34	0.34
10.869	0.34	0.34	0.34	0.34	0.33	0.33	0.33
10.913	0.33	0.33	0.33	0.33	0.33	0.33	0.33
10.958	0.32	0.32	0.32	0.32	0.32	0.32	0.32
11.002	0.31	0.31	0.31	0.31	0.31	0.31	0.31
11.046	0.31	0.31	0.31	0.31	0.30	0.30	0.30
11.090	0.30	0.30	0.30	0.30	0.30	0.30	0.30
11.134	0.30	0.30	0.30	0.30	0.30	0.29	0.29
11.179	0.29	0.29	0.29	0.29	0.29	0.29	0.29

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

11.223	0.29	0.29	0.29	0.29	0.29	0.29	0.29
11.267	0.29	0.29	0.29	0.29	0.29	0.29	0.29
11.311	0.29	0.28	0.28	0.28	0.28	0.28	0.28
11.355	0.28	0.28	0.28	0.28	0.28	0.28	0.28
11.400	0.28	0.28	0.28	0.28	0.28	0.28	0.28
11.444	0.28	0.28	0.28	0.27	0.27	0.27	0.27
11.488	0.27	0.27	0.27	0.27	0.27	0.27	0.27
11.532	0.27	0.27	0.27	0.27	0.27	0.27	0.27
11.577	0.27	0.27	0.27	0.27	0.26	0.26	0.26
11.621	0.26	0.26	0.26	0.26	0.26	0.26	0.26
11.665	0.26	0.26	0.26	0.26	0.26	0.26	0.26
11.709	0.26	0.26	0.26	0.26	0.26	0.26	0.26
11.753	0.25	0.25	0.25	0.25	0.25	0.25	0.25
11.798	0.25	0.25	0.25	0.25	0.25	0.25	0.25
11.842	0.25	0.25	0.25	0.25	0.25	0.25	0.25
11.886	0.25	0.24	0.24	0.24	0.24	0.24	0.24
11.930	0.24	0.24	0.24	0.24	0.24	0.24	0.24
11.974	0.24	0.24	0.24	0.24	0.24	0.24	0.24
12.019	0.24	0.24	0.24	0.24	0.24	0.23	0.23
12.063	0.23	0.23	0.23	0.23	0.23	0.23	0.23
12.107	0.23	0.23	0.23	0.23	0.23	0.23	0.23
12.151	0.23	0.23	0.23	0.23	0.23	0.23	0.23
12.195	0.23	0.23	0.23	0.23	0.23	0.23	0.23

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)						
12.240	0.23	0.23	0.22	0.22	0.22	0.22	0.22
12.284	0.22	0.22	0.22	0.22	0.22	0.22	0.22
12.328	0.22	0.22	0.22	0.22	0.22	0.22	0.22
12.372	0.22	0.22	0.22	0.22	0.22	0.22	0.22
12.417	0.22	0.22	0.22	0.22	0.22	0.22	0.22

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

12.461	0.22	0.22	0.21	0.21	0.21	0.21	0.21
12.505	0.21	0.21	0.21	0.21	0.21	0.21	0.21
12.549	0.21	0.21	0.21	0.21	0.21	0.21	0.21
12.593	0.21	0.21	0.21	0.21	0.21	0.21	0.21
12.638	0.21	0.21	0.21	0.21	0.21	0.21	0.21
12.682	0.21	0.21	0.21	0.21	0.20	0.20	0.20
12.726	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.770	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.814	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.859	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.903	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.947	0.19	0.19	0.19	0.19	0.19	0.19	0.19
12.991	0.19	0.19	0.19	0.19	0.19	0.19	0.19
13.035	0.19	0.19	0.19	0.19	0.19	0.19	0.19
13.080	0.19	0.19	0.19	0.19	0.19	0.19	0.19
13.124	0.19	0.19	0.19	0.19	0.19	0.19	0.19
13.168	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.212	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.257	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.301	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.345	0.18	0.18	0.18	0.18	0.18	0.18	0.18
13.389	0.18	0.17	0.17	0.17	0.17	0.17	0.17
13.433	0.17	0.17	0.17	0.17	0.17	0.17	0.17
13.478	0.17	0.17	0.17	0.17	0.17	0.17	0.17
13.522	0.17	0.17	0.17	0.17	0.17	0.17	0.17
13.566	0.17	0.17	0.17	0.17	0.17	0.17	0.17
13.610	0.17	0.17	0.17	0.17	0.16	0.16	0.16
13.654	0.16	0.16	0.16	0.16	0.16	0.16	0.16
13.699	0.16	0.16	0.16	0.16	0.16	0.16	0.16
13.743	0.16	0.16	0.16	0.16	0.16	0.16	0.16
13.787	0.16	0.16	0.16	0.16	0.16	0.16	0.16
13.831	0.16	0.16	0.16	0.16	0.15	0.15	0.15
13.875	0.15	0.15	0.15	0.15	0.15	0.15	0.15
13.920	0.15	0.15	0.15	0.15	0.15	0.15	0.15
13.964	0.15	0.15	0.15	0.15	0.15	0.15	0.15
14.008	0.15	0.15	0.15	0.15	0.15	0.15	0.15
14.052	0.15	0.15	0.15	0.15	0.15	0.15	0.15
14.097	0.15	0.15	0.15	0.15	0.15	0.15	0.15

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

14.141	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.185	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.229	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.273	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.318	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.362	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.406	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.450	0.14	0.14	0.14	0.14	0.14	0.14	0.14

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
14.494	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.539	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.583	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.627	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.671	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.715	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.760	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.804	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.848	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.892	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.937	0.14	0.14	0.14	0.14	0.14	0.14	0.14
14.981	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.025	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.069	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.113	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.158	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.202	0.14	0.14	0.14	0.14	0.14	0.14	0.14
15.246	0.14	0.14	0.14	0.14	0.13	0.13	0.13
15.290	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.334	0.13	0.13	0.13	0.13	0.13	0.13	0.13

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

15.379	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.423	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.467	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.511	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.555	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.600	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.644	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.688	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.732	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.777	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.821	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.865	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.909	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.953	0.13	0.13	0.13	0.13	0.13	0.13	0.13
15.998	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.042	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.086	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.130	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.174	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.219	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.263	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.307	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.351	0.13	0.13	0.13	0.13	0.13	0.13	0.13
16.395	0.13	0.13	0.13	0.13	0.13	0.12	0.12
16.440	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.484	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.528	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.572	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.617	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.661	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.705	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Line

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
16.749	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.793	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.838	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.882	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.926	0.12	0.12	0.12	0.12	0.12	0.12	0.12
16.970	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.014	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.059	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.103	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.147	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.191	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.235	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.280	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.324	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.368	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.412	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.457	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.501	0.12	0.12	0.12	0.12	0.12	0.12	0.12
17.545	0.12	0.12	0.12	0.12	0.11	0.11	0.11
17.589	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.633	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.678	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.722	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.766	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.810	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.854	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.899	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.943	0.11	0.11	0.11	0.11	0.11	0.11	0.11
17.987	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.031	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.075	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.120	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.164	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.208	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.252	0.11	0.11	0.11	0.11	0.11	0.11	0.11

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

18.297	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.341	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.385	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.429	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.473	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.518	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.562	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.606	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.650	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18.694	0.11	0.11	0.11	0.10	0.10	0.10	0.10
18.739	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.783	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.827	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.871	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.915	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18.960	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
19.004	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.048	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.092	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.137	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.181	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.225	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.269	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.313	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.358	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.402	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.446	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.490	0.10	0.10	0.10	0.10	0.10	0.10	0.10

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

19.534	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.579	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.623	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.667	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.711	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.755	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.800	0.10	0.10	0.10	0.10	0.10	0.10	0.10
19.844	0.10	0.10	0.09	0.09	0.09	0.09	0.09
19.888	0.09	0.09	0.09	0.09	0.09	0.09	0.09
19.932	0.09	0.09	0.09	0.09	0.09	0.09	0.09
19.977	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.021	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.065	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.109	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.153	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.198	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.242	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.286	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.330	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.374	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.419	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.463	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.507	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.551	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.595	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.640	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.684	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.728	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.772	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.817	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.861	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.905	0.09	0.09	0.09	0.09	0.09	0.09	0.09
20.949	0.09	0.09	0.09	0.09	0.09	0.08	0.08
20.993	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.038	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.082	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.126	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.170	0.08	0.08	0.08	0.08	0.08	0.08	0.08

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:
21.214 0.08 0.08 0.08 0.08 0.08 0.08 0.08

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
21.259	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.303	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.347	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.391	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.435	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.480	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.524	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.568	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.612	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.657	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.701	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.745	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.789	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.833	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.878	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.922	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21.966	0.08	0.08	0.08	0.08	0.08	0.08	0.08
22.010	0.08	0.08	0.08	0.08	0.08	0.08	0.08
22.054	0.08	0.08	0.08	0.08	0.08	0.08	0.08
22.099	0.08	0.08	0.08	0.08	0.07	0.07	0.07
22.143	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.187	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.231	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.275	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.320	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.364	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.408	0.07	0.07	0.07	0.07	0.07	0.07	0.07

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

22.452	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.497	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.541	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.585	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.629	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.673	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.718	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.762	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.806	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.850	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.894	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.939	0.07	0.07	0.07	0.07	0.07	0.07	0.07
22.983	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.027	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.071	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.115	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.160	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.204	0.07	0.07	0.07	0.07	0.07	0.07	0.07
23.248	0.07	0.06	0.06	0.06	0.06	0.06	0.06
23.292	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.337	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.381	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.425	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.469	0.06	0.06	0.06	0.06	0.06	0.06	0.06

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)						
23.513	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.558	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.602	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.646	0.06	0.06	0.06	0.06	0.06	0.06	0.06

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:

A1	Outlet	.00136	94.	.1	

STREAM REACH:

23.690	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.734	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.779	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.823	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.867	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.911	0.06	0.06	0.06	0.06	0.06	0.06	0.06
23.955	0.06	0.06	0.06	0.06	0.06	0.06	0.06
24.000	0.06	0.06	0.06	0.06	0.06	0.05	0.05

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

1122 Bewley Street
Post-development

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 50-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
A1	0.001		2.97				
OUTLET	0.001		2.97				

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 50-Yr

SUB-AREA:

	A1	Outlet	.00136	94.	.1

STREAM REACH:

For $Q_{85th\ percentile}$

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WinTR-20 Printed Page File      Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10                  0         0         0.05
1122 Bewley Street
Post-development 1 years

SUB-AREA:
          A1        Outlet              .00136    94.       .1

STREAM REACH:

STORM ANALYSIS:
          1-Yr                          .8        Type I    2

STRUCTURE RATING:


GLOBAL OUTPUT:
          2         0.05                YYYYN     YYYYNN


WinTR-20 Printed Page File      End of Input Data List

                              1122 Bewley Street
                           Post-development 1 years

                         Name of printed page file:
                                TR20.out

                                        STORM 1-Yr

Area or    Drainage  Rain Gage     Runoff   ------------ Peak Flow ------------
 Reach       Area      ID or       Amount   Elevation   Time      Rate      Rate
Identifier  (sq mi)   Location     (in)      (ft)      (hr)     (cfs)     (csm)

A1            0.001                0.085                9.93      0.22   159.46

   Line
Start Time   ------------ Flow Values @ time increment of  0.006 hr ------------
      (hr)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)

     9.693      0.05      0.05      0.05      0.06      0.06      0.06      0.06
     9.738      0.06      0.07      0.07      0.07      0.08      0.08      0.08
     9.782      0.09      0.09      0.09      0.10      0.10      0.10      0.11
     9.826      0.11      0.12      0.12      0.13      0.14      0.15      0.15
     9.870      0.16      0.17      0.18      0.19      0.19      0.20      0.21
     9.915      0.21      0.21      0.22      0.22      0.22      0.21      0.21
     9.959      0.21      0.21      0.20      0.20      0.20      0.19      0.19
    10.003      0.19      0.19      0.19      0.18      0.18      0.18      0.17
    10.047      0.16      0.15      0.14      0.13      0.12      0.12      0.11
    10.091      0.10      0.09      0.09      0.09      0.08      0.08      0.08
    10.136      0.07      0.07      0.07      0.07      0.07      0.07      0.07
    10.180      0.06      0.06      0.06      0.06      0.06      0.06      0.06
    10.224      0.06      0.06      0.06      0.06      0.06      0.06      0.06
    10.268      0.06      0.06      0.06      0.05      0.05      0.05      0.05
    10.312      0.05      0.05      0.05      0.05      0.05      0.05      0.05
    10.357      0.05      0.05

Area or    Drainage  Rain Gage     Runoff   ------------ Peak Flow ------------
```

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development 1 years

STORM 1-Yr

SUB-AREA:

A1	Outlet	.00136	94.	.1	

STREAM REACH:

Reach Identifier	Area (sq mi)	ID or Location	Amount (in)	Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.001		0.085		9.93	0.22	159.46

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)						
9.693	0.05	0.05	0.05	0.06	0.06	0.06	0.06
9.738	0.06	0.07	0.07	0.07	0.08	0.08	0.08
9.782	0.09	0.09	0.09	0.10	0.10	0.10	0.11
9.826	0.11	0.12	0.12	0.13	0.14	0.15	0.15
9.870	0.16	0.17	0.18	0.19	0.19	0.20	0.21
9.915	0.21	0.21	0.22	0.22	0.22	0.21	0.21
9.959	0.21	0.21	0.20	0.20	0.20	0.19	0.19
10.003	0.19	0.19	0.19	0.18	0.18	0.18	0.17
10.047	0.16	0.15	0.14	0.13	0.12	0.12	0.11
10.091	0.10	0.09	0.09	0.09	0.08	0.08	0.08
10.136	0.07	0.07	0.07	0.07	0.07	0.07	0.07
10.180	0.06	0.06	0.06	0.06	0.06	0.06	0.06
10.224	0.06	0.06	0.06	0.06	0.06	0.06	0.06

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)						
10.268	0.06	0.06	0.06	0.05	0.05	0.05	0.05
10.312	0.05	0.05	0.05	0.05	0.05	0.05	0.05
10.357	0.05	0.05					

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development 1 years

STORM 1-Yr

SUB-AREA:

	A1	Outlet	.00136	94.	.1

STREAM REACH:

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development 1 years

STORM 1-Yr

SUB-AREA:

	A1	Outlet	.00136	94.	.1

STREAM REACH:

1122 Bewley Street
Post-development 1 years

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 1-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
A1	0.001		0.22				
OUTLET	0.001		0.22				

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development 1 years

STORM 1-Yr

SUB-AREA:

	A1	Outlet	.00136	94.	.1

STREAM REACH:

Preliminary Water Quality Management Plan (PWQMP)

Project Name:

Bewley Street 10 Unit Condominium Development

Prepared for:

Linda La

13212 Bowen Street

Garden Grove, CA 92843

(251)888-1889

Prepared by:

P.A. Arca Engineering Inc.

Engineer Perfecto A. Arca, PE Registration No. 28918

500 E. Carson Plaza Drive Suite 201

Carson, CA 90746

(310)768-3828

Prepared on:

November 11, 2019

Project Owner's Certification			
Permit/Application No.	DP NO 2017-35 (MASTER I.D. NO. 2017-139356), ER NO. 2017-161	Grading Permit No.	TBD
Tract/Parcel Map No.	1022	Building Permit No.	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			APN 198-101-07

This Preliminary Water Quality Management Plan (WQMP) has been prepared for Linda La by P.A. Arca Engineering Inc. The WQMP is intended to comply with the requirements of the local NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region or <San Diego Region>. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

Owner: Linda La			
Title	Owner		
Company			
Address	13212 Bowen Street Garden Grove, CA 92843		
Email	lindala251@gmail.com		
Telephone #	(251)888-1889		
Signature		Date	

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Attachments

Attachment A . .....WQMP Exhibit
Attachment B.....2-year Pre and Post Calculations for HCOC applicability
Attchement C.....Infiltration Trench Calculations and Worksheet
Attachment D.....Grading Plan
Attachment E.....Susceptibility Map Anaheim Bay – Huntington Harbour
Attachment G.....NCRS Soil Map
Attachment H.....Infiltration Test Report
Attachment I.....Topographic Survey
Attachment J.....Infiltration Trench Fact Sheet
Attachment K.....Educational Materials

Section I Discretionary Permit(s) and Water Quality Conditions

Provide discretionary permit and water quality information. *Refer to Section 2.1 in the Technical Guidance Document (TGD) available from the Orange County Stormwater Program (ocwatersheds.com).*

Project Infomation			
Permit/Application No.	DP No. 2017-35 (MASTER I.D. NO. 2017-139356), ER NO. 2017-161	Tract/Parcel Map No.	1022
Additional Information/ Comments:	1122 North Bewley Street , APN 198-107-07		
Water Quality Conditions			
Water Quality Conditions (list verbatim)	The preliminary WQMP is prepared for the preliminary stages to facilitate early quality planning and ensure that the water quality protection and LID principles are considered in the earliest phase of the project, the local jurisdiction will suggest that the project proponent prepare a conceptual or preliminary WQMP prior to a complete or final project WQMP for full review and approval. It will be used by the Local Jurisdiction as part of a project application for discretionary project approval. It should be circulated with the CEQA document or summarized within the circulated CEQA document.		
Watershed-Based Plan Conditions			
Provide applicable conditions from watershed - based plans including WIHMPs and TMDLS.	There is currently no approved WIHMP for Anaheim Bay Huntington-Harbor Watershed. TMDLs has not been established or not being developed for Anaheim Bay Huntington-Harbor Watershed.		

Section II Project Description

II.1 Project Description

Provide a detailed project description including:

- Project areas;
- Land uses;
- Land cover;
- Design elements;
- A general description not broken down by drainage management areas (DMAs).

Include attributes relevant to determining applicable source controls. *Refer to Section 2.2 in the TGD for information that must be included in the project description.*

Description of Proposed Project		
Development Category **(**Verbatim from WQMP):	The proposed project is to construct 10 Units Condominium in the Two-Family Residence (R2) zoning district and has Low Density Residential, seven dwelling units per acre (LR7) General Plan land use designation. A general plan amendment is required to change the General Plan land use designation from LR7 (Low Density Residential, 7 dwelling units per acre) to MR15 (Medium Density Residential, 15 dwelling units per acre). A tentative tract map is required to subdivide the air-rights 10 Unit Condominium.	
Project Area (ft^2): **37,907**	Number of Dwelling Units: **10**	SIC Code: **N/A**
Narrative Project Description:	The proposed 10 units Condominium project is located within Santa Ana Region North Orange County Permit areas, it is not in ESA. The site originally has residential houses as captured from the google.com /map/place/1122+N+Bewley+St+Santa+Ana+CA+92703 website prior to the demolition. The existing site has two existing driveway. The project is in special flood hazard area designated on the flood insurance rate map (FIRM) as zone. The annual 1% chance flood elevation (NAVD88) is 83.2 feet. The proposed redevelopment is to build 4 buildings with a total of 10 attached 2 Story Condominium. Each Unit has an attached 2 car garage on the first floor. There will be 20 off street surface parking spaces for guests. Four units will have 4 bedrooms, five units will have 3 bedrooms, and One unit will have 2 bedrooms and a den. The proposed Condominium will have Home Owner's Association Rules and Regulations for Homeowners to be prepared by the Board of Directors.	

Project Area	Pervious		Impervious	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	**35,288 ft²**	**93%**	**2,619 ft²**	**7%**
Post-Project Conditions	**8,307 ft²**	**22%**	**29,600 ft²**	**78%**
Drainage Patterns/Connections	See Section II.4 Post Development Drainage Characteristic			

II.2 Potential Stormwater Pollutants

Determine and list expected stormwater pollutants based on land uses and site activities. *Refer to Section 2.2.2 and Table 2.1 in the TGD for guidance.*

Pollutants of Concern			
Pollutant	Circle One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended-Solid/ Sediment	(E)	N	Consist of soils or other special materials that are eroded then transported or deposited by the wind, water or gravity. Excessive sedimentation can increase turbidity and clog fish gills, reduce spawning habitat, lower young aquatic organisms and suppress aquatic vegetation growth. Sediments in runoff also transport other pollutants that adhere to them, including trace metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCB)s and phosphorus. The largest source of suspended solids/sediment is typically erosion from disturbed soils.
Nutrients	(E)	N	It includes the macro-nutrients nitrogen phosphorus. They commonly exist in the form of mineral salts dissolved or suspended in water and as a particulate organic matter transported by stormwater. Excessive discharge of nutrients to water bodies and streams can cause eutrophication, including excessive aquatic algae and plant growth, loss of dissolved

			oxygen, release of toxins in sediment, and significant swings in hydrogen ion concentration (pH). Primary sources if nutrients in urban runoff are fertilizers, trach, debris, and eroded soils. Urban areas with improperly managed landscapes can be substantial sources.
Heavy Metals	(E)	N	It includes metals that can be toxic to aquatic life if concentrations become high enough to stress natural processes. Metals of concern include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors in primer coatings and also raw material components in non-metal products such as fuels, adhesives, paints and other coatings. Copper and zinc are typically associated with building materials, including galvanized metal and ornament copper and automotive products, including tires and brake pads. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish. Environmental concerns regarding the potential for release of metals to the environment have already led to restricted metals in urban stormwater is typically commercially available metal products and automobiles.
Pathogens (Bacteria/Virus)	(E)	N	It includes bacteria and viruses, which are ubiquitous microorganisms that thrive under a range of environmental conditions. Water containing excessive pathogenic bacteria and viruses is typically the transport of animal and human fecal wastes from the watershed, but pathogenic organisms do occur in the natural environment.
Pesticides	(E)	N	Included in the Toxic Organic Compounds
Oil and Grease	(E)	N	Are characterized as high modular weight organic compounds. Elevated oil and grease content can decrease the aesthetic value of water body as well as the water quality. Introduction to these pollutants to water bodies may occur due the wide uses and application of some of this products in municipal, residential, commercial, industrial, and construction areas. Primary source of oil and grease petroleum, hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-

			weight fatty acids.
Toxic Organic Compounds	(E)	N	It includes organic compounds (pesticides, solvents, hydrocarbons) which at toxic concentrations constitute a hazard to humans and aquatic organisms. Storm water coming into contact with organic compounds can transport excessive levels organics to receiving waters. Dirt, grease, and grime retained in cleaning fluid or rinse water may also absorb levels of organic compounds that harmful or hazardous to aquatic life. Sources of organic compounds include landscape and maintenance areas, waste handling areas, and potentially most other urban areas.
Trash and Debris	(E)	N	This includes trash, such as paper, plastic and various materials that can typically be found throughout the urban landscape, and debris which includes waste products of natural origin which are not naturally discharged to water bodies such as landscaping waste, woody debris, etc. The presence of trash and debris may have a significant impact on the recreational value of water body and upon the health of aquatic habitat.

II.3 Hydrologic Conditions of Concern

Determine if streams located downstream from the project area are determined to be potentially susceptible to hydromodification impacts. *Refer to Section 2.2.3.1 in the TGD for* NOC *or Section 2.2.3.2 for* <SOC>.

☒ No – Show map

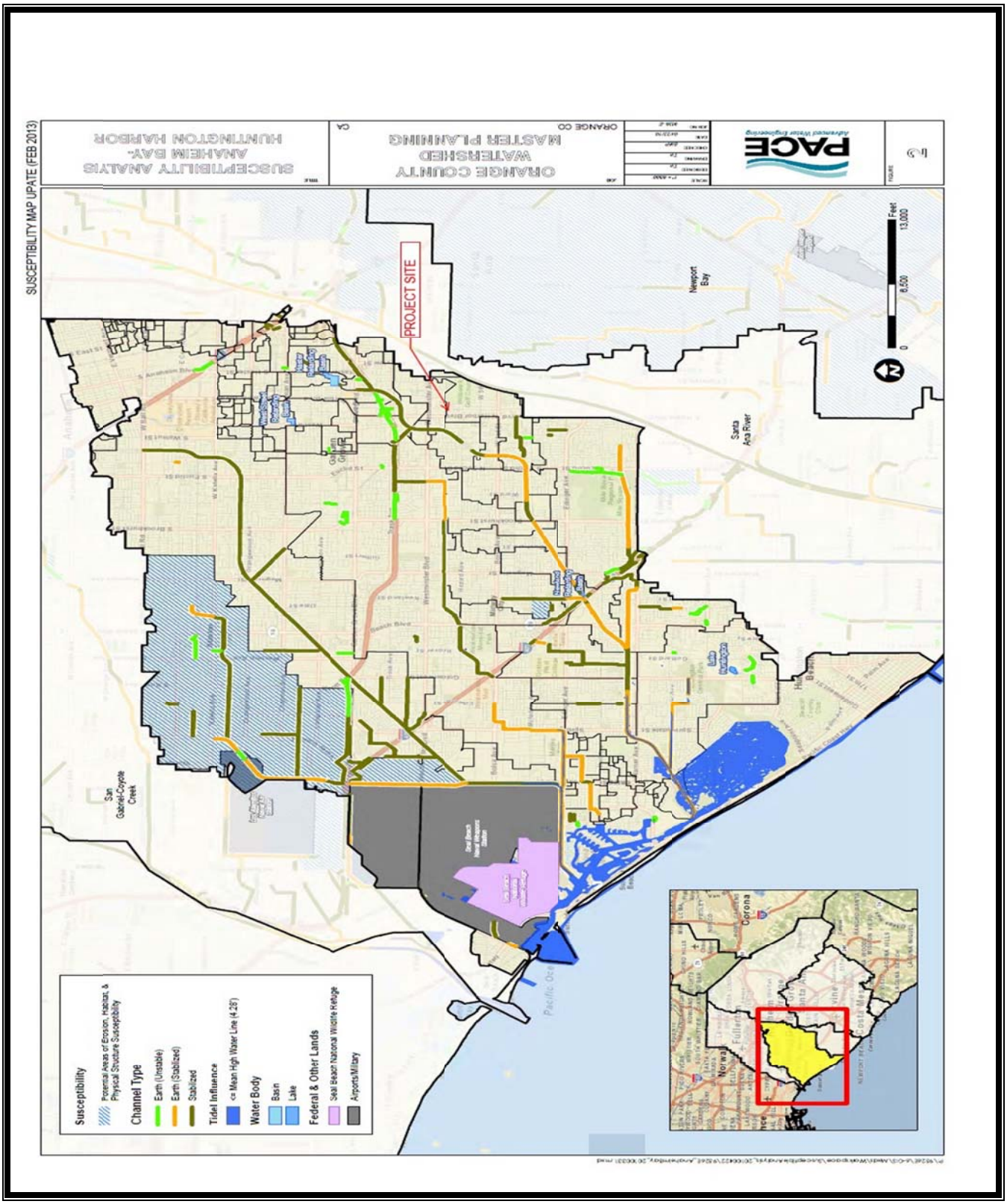
☒ Yes – Describe applicable hydrologic conditions of concern below. *Refer to Section 2.2.3 in the TGD.*

Refer to Susceptibility Analysis Anaheim Bay- Huntington Harbour Map as included in "Exhibit E"

HCOC Calculation:
Time of Concentration of Stormwater run-off: (See Attachment B WinTr-55 Tc results)
Pre-development Tc = 0.413 hr per WinTR-55 result
Post-development Tc = 0.10 hr per WinTr-55 result
($T_{C2\text{-}yr,POST}/T_{C2\text{-}yr,\ PRE}$) = 0.243 $\leq$ 1.05

Volume of Stormwater Runoff: (See Attachment B wintTr-20 for run-off Amount)
Run-off Amount per WinTR-55 result = 0.193
Pre-development Volume = 0.193 in*37,907 ft^2*1in/12ft = 610 ft^3
Post-development Volume = 0.990 in*37,907 ft^2*1in/12ft = 3,127 ft^3
($V_{C2\text{-}yr,POST}/V_{2\text{-}yr,PRE}$) =3,127 ft^3/610ft^3 = 5.13 $\geq$ 1.05
HCOCs Exist due to Post-development runoff volume for the 2-year, 24-hr storm event ($V_{C2\text{-}yr,POST}$) exceed that of the Pre-development condition ($V_{2\text{-}yr,PRE}$) by more than 5%.

The site per the Susceptibility Analysis Anaheim Bay-Huntington Harbour Map shown on Attachment E is located where there is no potential areas of erosion, habitat and physical structural susceptibility. The downstream channels consists of Stabilized Earth channel and stabilized or concrete lined channels which satisfies one of the hydromodification control measure Section 5.3.3 Site Specific Evaluation of In-stream Control Options. Since the site is miles away to the nearest channel hydromodification impact due to developing the site may be considered adding negligible amount of runoff to the tail of the receiving water's hydrograph. The project will not adversely impact downstream erosion, sedimentation, or stream habitat.


SUSCEPTIBILITY MAP UPATE (FEB 2013)
PROJECT SITE
Newport Bay
Santa Ana River
San Gabriel-Coyote Creek
Susceptibility
Potential Areas of Erosion, Habitat, & Physical Structure Susceptibility
Channel Type
Earth (Unstable)
Earth (Stabilized)
Stabilized
Tidal Influence
Water Body
Basin
Lake
Federal & Other Lands
Seal Beach National Wildlife Refuge
Airports/Military

II.4 Post Development Drainage Characteristics

Describe post development drainage characteristics. *Refer to Section 2.2.4 in the TGD.*

The proposed project drainage pattern will be from west to east of the property. Stormwater runoff from the west and north side of the property of will sheet flow from the backyards and side yards landscapes to the private road thru ribbon gutters. At the downstream end of the ribbon gutters, curb and gutter will be constructed at the south side of the property that slopes towards the driveway south east of the property. A catch basin is proposed at the downstream end of the curb and gutter that is connected to the proposed junction structure. Portions of lots along the east side not flowing to the said catch basin will have individual catch basin to intercept the stormwawter runoff. The catch basins will have storm drain pipe that will also be connected to the junction structure. The junction structure will have a REM-Triton crescent pipe screen that will serve as a pre-treatment prior to stormwater conveyance to the proposed infiltration trench. Excess runoff during the peak rainfall event that the infiltration trench can't retain will eventually bubble up to the overflow pipe. The junction structure as shown on the Grading and Drainage Plan will have parkway culvert drain that will serve as an overflow pipe to outflow to the street gutter. The street gutter flows southerly towards the 5th Street then to the street inlet at the corner of 5th Street and Figueroa. The street inlet is connected to the 72" dia. reinforced concrete pipe that runs south towards Figueroa Street to 2-66" dia, to Harbor Blvd to the local 6'x 8' reinforced concrete trapezoidal channel. The local channel is connected to Orange County Flood Control District Earth Trapezoidal Channel towards the East Garden Grove Wintersburg Channel with Reinforced Concrete trapezoidal channel and stabilized earth trapezoidal channel then to the Bolsa Bay then north to the Huntington Harbour to Anaheim Bay and ultimately to the Pacific Ocean.

II.5 Property Ownership/Management

Describe property ownership/management. *Refer to Section 2.2.5 in the TGD.*

Linda La

13212 Bowen Street

Garden Grove, CA 92843

(251)888-1889

Section III Site Description

III.1 Physical Setting

Fill out table with relevant information. *Refer to Section 2.3.1 in the TGD.*

Planning Area/ Community Name	Medium Density Residential (MR15)
Location/Address	1122 North Bewley Street Santa Ana, CA 92703
Project Area Description	4 Building with 10 attached 2 Story Condominium
Land Use	LR 7.0
Zoning	R2 - Two Family Residential
Acreage	0.87 Acres
Predominant Soil Type	B Soils

III.2 Site Characteristics

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. Refer to Section 2.3.2 in the TGD.

Precipitation Zone	*0.80"*
Topography	*Existing site is generally flat and slopes from east (front of property) to west (back of property). The proposed grade will be the opposite of the existing to to avoid stormwater runoff to cross lot to the adjacent west property and to allow it to slope towards the east along the Bewley Street. Significant area of the site will be raised due to the project is in a special flood hazard area designated on the insurance rate map (FIRM) as zone. The zone is requires that the lowest finish floor elevation of the structure shall one foot high above the adjacent grade for the A zone. The proposed slope grade will be less than 1%.*
Drainage Patterns/Connections	*Currently the site topography shows the ground surface slopes from west (front of the property) to east (back of the property). In this respect, stormwater runoff flows following ground surface topography. Pre-development condition show no stomrwater Best Management Practices (BMPs) being implemented.* *On the other hand, the proposed drainage pattern for the project is the opposite to the pre-development condition by directing the stormwater runoff from west (back of the property) to east (front of the property) to the catch basins. One of the units at the west side has its own catch basin with REM-Triton crescent pipe screen and is connected directly to the infiltration trench. The rest of the area with catch basins have storm drain pipe connected to the to the junction structure, with REM-Triton crescent pipe screen, as pretreatment, connected to the infiltration trench sytems. Stormwater runoff in excess not captured by the infiltration trench system will overflow thru parkway culvert connected to the street gutter*
Soil Type, Geology, and Infiltration Properties	*The soil is classified as B in the Hydrologic Soil Group (per figure XVI Figure XVI-2a of the TGD. See Attachment G # NRCS Hydrologic Soils Group) and Geological Conditions. In addition, Field Infiltration Test conducted by ZS Engineering Project No. 180505 geotechnical findings indicates that the subsurface soils encountered within the drilled holes, consists of light gray color silty fine sand within upper 5 feet. Soils below 5 feet and up to a depth about 12 feet are predominantly sand with few to little silts, light gray to light brown color, mottled. Sand Grains within depths 5 to 8 feet are fine to medium grained. Coarse grained sands are encountered within depths about 8 to 12 feet-gradually coarser with depth. Some gravel*

	(up to ¾") are encountered at depths from about 11 to 12 feet. Underlying sands, soil within depths form 12" to the explored depth to 16 feet are light gray color sandy silt, sandy clay and silty sand with fine sand and high fine contents. Subsurface geologic profiles are found to be fairly uniform across the project are. The geotechnical field infiltration tests report concluded that "Based on the evaluations the field test data, infiltration rates of subsurface soils within the target infiltration trench area vary from 1.04 to 1.54 inch/hour. For practical and conservative estimate, it is recommended a field infiltration rate of 1.04 in/hour.

Site Characteristics (continued)	
Hydrogeologic (Groundwater) Conditions	*Per field infiltration tests report prepared by ZS engineering dated May 30, 2018 stats that, "Groundwater was not encountered within the explored depth of 16 feet. Historical shallow groundwater within close vicinities of the site documented between 5 and 10 feet in the state's seismic hazard zones report (CGS, 2001). Fluctuations of the groundwater level may occur due to variations in rainfall and other factors that were not evident at the time of the field test." Meanwhile, communications with Geotechnical Engineer, state that based on the water table data from nearby monitoring wells, a conservative assumption can be made 15 feet as the shallowest level (with seasonal fluctuation). This will give a vertical separation which should be adequate for infiltration system.*
Geotechnical Conditions (relevant to infiltration)	The Orange County Soil Survey (NCRS, CA678, 1978) identifies the project site soil as Hydrologic Soil Group (HSG) B, determined to be typically silt loams or loams to have higher potential for infiltration based on likely infiltration rates and distance to limiting horizon. With regards to infiltration rate, ZS Engineering conducted Infiltration Test dated May 30, 2018. Findings indicated that infiltration rates of subsurface soils within the target infiltration trench area vary from 1.04 to 1.54 inch/hour. For practical and conservative estimate, it is recommended a field infiltration rate of 1.04 in/hour.
Off-Site Drainage	*The site has no tributary off-site drainage.*
Utility and Infrastructure Information	*There is no existing utility that will interfere with the proposed infiltration trench systems and its appurtenances.*

III.3 Watershed Description

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. *Refer to Section 2.3.3 in the TGD.*

Receiving Waters	East Garden Grove Wintersburg Channel, Huntington Harbour, Anaheim Bay
303(d) Listed Impairments	Huntington Harbour and Anaheim Bay
Applicable TMDLs	No TMDL data have been recorded to the above water bodies.
Pollutants of Concern for the Project	Suspended solid/sediments, Nutrients, Pathogens (Bacteria/Virus), Pesticides, Oil & Grease, and Trash & Debris are expected pollutants of concern from the proposed project.
Environmentally Sensitive and Special Biological Significant Areas	This project is not within an Environmentally Sensitive and Special Biologically Significant Area.

Section IV Best Management Practices (BMPs)

IV. 1 Project Performance Criteria

Describe project performance criteria. Several steps must be followed in order to determine what performance criteria will apply to a project. These steps include:

- If the project has an approved WIHMP or equivalent, then any watershed specific criteria must be used and the project can evaluate participation in the approved regional or sub-regional opportunities. The local Permittee planning or NPDES staff should be consulted regarding the existence of an approved WIHMP or equivalent.
- Determine applicable hydromodification control performance criteria. *Refer to Section 7.II-2.4.2.2 of the Model WQMP.*
- Determine applicable LID performance criteria. *Refer to Section 7.II-2.4.3 of the Model WQMP.*
- Determine applicable treatment control BMP performance criteria. *Refer to Section 7.II-*3.2.2 *of the Model WQMP.*
- Calculate the LID design storm capture volume for the project. *Refer to Section 7.II-2.4.3 of the Model WQMP.*

(NOC Permit Area only) Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implementing LID on regional or sub-regional basis?	YES ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.	N/A	

Project Performance Criteria (continued)	
If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	HCOC exist on site however, the downstream channels consists of Stabilized Earth channel and stabilized or concrete lined channels which satisfies one of the hydromodification control measure Section 5.3.3 Site Specific Evaluation of In-stream Control Options. Since the site is miles away to the nearest channel hydromodification impact due to developing the site may be considered adding negligible amount of runoff to the tail of the receiving water's hydrograph. The project will not adversely impact downstream erosion, sedimentation, or stream habitat.
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	Per MWQMP Section 7.II – 2.4.3 Determine LID Treatment Control BMP Performance Criteria: "The following performance criteria for LID implementation are stated: • Priority Projects must infiltrate, harvest and use, evapotranspire, or biotreat/biofilter, the 85th percentile, 24-hours storm event (Design Capture Volume) Infiltration system is proposed for the project since it is feasible for the project per Geotechnical findings.
List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)	N/A
Calculate LID design storm capture volume for Project.	85th percentile-24hr storm = 0.80 inches A = 0.87 Acres Imp = 0.78 C = (0.75 x 0.78) + 0.15 = 0.735 DCV = 0.735 x 0.80 in. x 0.87 Ac x 43,560 ft^2/Ac x 1 ft/12 in. = 1,857 cu-ft

IV.2. SITE DESIGN AND DRAINAGE PLAN

Describe site design and drainage plan including

- A narrative of site design practices utilized or rationale for not using practices;
- A narrative of how site is designed to allow BMPs to be incorporated to the MEP
- A table of DMA characteristics and list of LID BMPs proposed in each DMA.
- Reference to the WQMP plot plan.
- Calculation of Design Capture Volume (DCV) for each drainage area.
- A listing of GIS coordinates for LID and Treatment Control BMPs (unless not required by local jurisdiction).

Refer to Section 2.4.2 in the TGD.

Various site design practices were proposed in the preliminary planning phase of this project. Stated below is the explanation of each Site Design Principles and Technique from Section 3 of Technical Guidance Manual and how it is incorporated or are not used.

3.2.1 Minimize Impervious Area – this design practiced is used. The proposed development is designed to attain minimum road widths, building foot prints, and accessibility walkway width requirements.

3.2.1.1 Limit Over all Coverage of Paving and Roofs – this design practiced is used. The proposed development is designed to build taller structures with indoor parking, minimum width of private road, minimum width of parking lot and minimum walkway width. Landscape is intersperse at the backyards and sideyards of the building and in common areas.

3.2.1.2 Detain and Retain Throughout Site – this design is used. The proposed drainage is designed by collecting the stormwater runoff to the catch basins that has storm drain pipe connected ultimately connected by gravity to the infiltration trench.

3.2.1.3 Planning Phase Techniques – this design practice is used. Townhomes are design to 2 story to minimize building foot prints. Attached units are proposed to attain cluster development. Minimum road width is proposed necessary for emergency vehicles. Townhomes utilized shared driveways.

3.2.1.4 Design Phase Techniques – this design practice is used. Only one side of the private road is used for the sidewalk accessibility requirement. Smaller parking spaces intended for compact cars are proposed. Other than the private road, accessibility walkway requirement and building footprints, landscape is proposed

3.2.1.5 Construction Phase Techniques – this practice is used. Intersperse landscape area will not be compacted to maintain the infiltrative capacity of the unpaved or uncovered areas.

3.2.2 Maximize Natural Infiltration Capacity

3.2.2.1 Planning Phase Techniques – this design practice is proposed. Other than the building footprints, road, walkway and patio the rest of the areas will be landscape and planting areas to allow infiltration on the ground.

3.2.2.2 Design Technique

3.2.3 Preserve Existing Drainage Patterns and Time of Concentration –

3.2.3.1 Planning Phase Techniques – not used. The proposed drainage pattern is the opposite of the existing to allow the stormwater runoff to flow toward the east or front side of the property along Bewley Street rather

than to west side back of the property.

3.2.3.2 Design Phase Techniques – There are no natural streams or channels near or in the property.

3.2.3.3 Construction Phase Techniques – not used. The site will be completely disturbed and fill will be put to the entire lot due to change of drainage pattern and raising the building pads because the site is in the Flood Zone "A" with flood level 83.2 feet.

Minimize Construction Footprint – not used. The site must be completely be disturbed to raise the building foot print and divert the drainage to the proposed BMPs.

3.2.4 Disconnect Impervious Surface

3.2.4.1 Planning Phase Technique – partially used. Downspouts located at the backyards and sideyards will be directed to the landscape or planting areas. However, downspouts located at the front of the building will be directed to the adjacent pavements.

3.2.4.2 Design Phase Technique- partially used. Again, downspouts located at the backyards and sideyards will be directed to the landscape or planting areas.

3.3.1 Protect Existing Vegetation and Sensitive Areas – not used. There are no naturally vegetated areas near or on the site, nor any sensitive areas.

3.3.2 Revegetate Disturbed Area – not used. There are no naturally vegetated areas near or on the site, nor any sensitive areas.

3.3.3 Soils Stockpiling and Site Generated Organics – not used. No topsoil exists on the site since

3.3.4 Firescaping – not used

3.3.5 Xeriscape Landscaping – used. Water Efficient Landscaping and irrigation are required to be used as state requirement.

3.4 Slope and Channel Buffers – not used. There are no slopes or channels on or near the site.

3.5 Techniques to minimize land disturbance – not used. Site will be completely disturbed to improve the water quality and drainage solution.

Establish Vegetation and Soils Protection Areas – not used. There a no natural vegetated or vegetated areas to be protected on or near the site.

Use of Mulch and Load Disturbing Matting – not used. Soil must be compacted to ensure building safe and longevity of pavement.

Pre/post Construction Soil and Plant Treatments – not used. No existing vegetation will be maintained.

Inspection Guidelines and Procedures – not used. Entire site will be disturbed to improve drainage patterns

IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS

Each sub-section below documents that the proposed design features conform to the applicable project performance criteria via check boxes, tables, calculations, narratives, and/or references to worksheets. *Refer to Section 2.4.2.3 in the TGD for selecting LID BMPs and Section 2.4.3 in the TGD for conducting conformance analysis with project performance criteria.*

IV.3.1 Hydrologic Source Controls

If required HSCs are included, fill out applicable check box forms. If the retention criteria are otherwise met with other LID BMPs, include a statement indicating HSCs not required.

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☐
Street trees (canopy interception)	☐
Residential rain barrels (not actively managed)	☐
Green roofs/Brown roofs	☐
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐

IV.3.2 Infiltration BMPs

Identify infiltration BMPs to be used in project. If design volume cannot be met state why BMPs cannot be met

Name	Included?
Bioretention without underdrains	☐
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☒
Infiltration basins	☐
Drywells	☐
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐
Permeable concrete pavers	☐
Other:	☐
Other:	☐

Show calculations below to demonstrate if the LID Design Strom Capture Volume can be met with infiltration BMPs. If not document how much can be met with infiltration and document why it is not feasible to meet the full volume with infiltration BMPs.

Design Capture Depth = 0.80 inches

Design Capture Volume (DCV) =(37,907 ft^2)(0.80in)(1ft/12in)(0.78*0.75+0.15) = 1,857 ft^3

Design Infiltration BMP with $\leq$ 48 hours drawdown

Minimum Area Required = (DCV/0.35)/(assume depth of 4 feet can draw down in 48 hours)

= (1,857/0.35)/4 = 1,326 ft^2

Infiltration trench dimension = 20 ft x 67 ft x 4' depth

Infiltration Trench Capacity = 20 x 67 x 4 x 0.35 = 1,876 ft^3 > Design Capture Volume = 1,857 ft^3

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, describe any evapotranspiration, rainwater harvesting BMPs. <Delete or leave blank if not used>

Name	Included?
All HSCs; *See Section IV.3.1*	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐
Above-ground cisterns and basins	☐
Underground detention	☐
Other:	☐
Other:	☐
Other:	☐

Show calculations below to demonstrate if the LID Design Strom Capture Volume can be met with evapotranspiration, rainwater harvesting BMPs in combination with infiltration BMPs. If not document how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with either of these BMPs categories.

N/A

IV.3.4 Biotreatment BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, and/or evapotranspiration and rainwater harvesting BMPs, describe biotreatment BMPs. Include sections for selection, suitability, sizing, and infeasibility, as applicable. <Delete or leave blank if not used>

Name	Included?
Bioretention with underdrains	☐
Stormwater planter boxes with underdrains	☐
Rain gardens with underdrains	☐
Constructed wetlands	☐
Vegetated swales	☐
Vegetated filter strips	☐
Proprietary vegetated biotreatment systems	☐
Wet extended detention basin	☐
Dry extended detention basins	☐
Other:	☐
Other:	☐

Show calculations below to demonstrate if the LID Design Strom Capture Volume can be met with infiltration, evapotranspiration, rainwater harvesting and/or biotreatment BMPs. If not document how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with either of these BMPs categories.

N/A

IV.3.5 Hydromodification Control BMPs

Describe hydromodification control BMPs. See Section 5 TGD. Include sections for selection, suitability, sizing, and infeasibility, as applicable. Detail compliance with Prior Conditions of Approval.

Hydromodification Control BMPs	
BMP Name	**BMP Description**

IV.3.6 Regional/Sub-Regional LID BMPs

Describe regional/sub-regional LID BMPs in which the project will participate. *Refer to Section 7.II-2.4.3.2 of the Model WQMP*.

Regional/Sub-Regional LID BMPs
N/A

IV.3.7 Treatment Control BMPs

Treatment control BMPs can only be considered if the project conformance analysis indicates that it is not feasible to retain the full design capture volume with LID BMPs. Describe treatment control BMPs including sections for selection, sizing, and infeasibility, as applicable. <Delete or leave blank if not used>

Treatment Control BMPs	
BMP Name	**BMP Description**
REM-Triton Crescent Pipe Screen	At the south of driveway entrance
REM-Triton Crescent Pipe Screen	At the west side catch basin

IV.3.8 Non-structural Source Control BMPs

Fill out non-structural source control check box forms or provide a brief narrative explaining if non-structural source controls were not used.

Non-Structural Source Control BMPs

Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	
N2	Activity Restrictions	☒	☐	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	Infiltration Maintenance Guidelines
N5	Title 22 CCR Compliance (How development will comply)	☒	☐	
N6	Local Industrial Permit Compliance	☐	☒	No Industrial uses
N7	Spill Contingency Plan	☒	☐	
N8	Underground Storage Tank Compliance	☐	☒	No USTs on site
N9	Hazardous Materials Disclosure Compliance	☒	☐	
N10	Uniform Fire Code Implementation	☒	☐	
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☐	☒	
N13	Housekeeping of Loading Docks	☐	☒	SD-13, useful though there will be no loading docks on site
N14	Common Area Catch Basin Inspection	☒	☐	
N15	Street Sweeping Private Streets and Parking Lots	☒	☐	Monthly and as needed
N16	Retail Gasoline Outlets	☐	☒	N/A

IV.3.9 Structural Source Control BMPs

Fill out structural source control check box forms or provide a brief narrative explaining if Structural source controls were not used.

Structural Source Control BMPs				
Identifier	**Name**	**Check One**		**If not applicable, state brief reason**
		Included	**Not Applicable**	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	No Outdoor Storage
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☒	☐	
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☐	☒	N/A
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☒	N/A
S6	Dock areas	☐	☒	No loading docks
S7	Maintenance bays	☐	☒	No maintenance bays
S8	Vehicle wash areas	☐	☒	No Vehicle washing areas
S9	Outdoor processing areas	☐	☒	No outdoor processing areas
S10	Equipment wash areas	☐	☒	No equipment washing areas
S11	Fueling areas	☐	☒	No fueling areas
S12	Hillside landscaping	☐	☒	No hillside landscaping
S13	Wash water control for food preparation areas	☐	☒	Food preparation areas are inside the building
S14	Community car wash racks	☐	☒	No car washing on site

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

IV.4.1 Water Quality Credits

Determine if water quality credits are applicable for the project. *Refer to Section 3.1 of the Model WQMP for description of credits and Appendix VI of the TGD for calculation methods for applying water quality credits.*

<table>
<tr><th colspan="5">Description of Proposed Project</th></tr>
<tr><td colspan="5">Project Types that Qualify for Water Quality Credits (Select all that apply):</td></tr>
<tr><td colspan="2">☐Redevelopment projects that reduce the overall impervious footprint of the project site.</td><td colspan="2">☐Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.</td><td>☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).</td></tr>
<tr><td colspan="2">☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).</td><td colspan="2">☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned</td><td>☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).</td></tr>
<tr><td>☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.</td><td>☐ Developments in a city center area.</td><td>☐ Developments in historic districts or historic preservation areas.</td><td>☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.</td><td>☐In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.</td></tr>
<tr><td>Calculation of Water Quality Credits
(if applicable)</td><td colspan="4">N/A</td></tr>
</table>

IV.4.2 Alternative Compliance Plan Information

Describe an alternative compliance plan (if applicable). Include alternative compliance obligations (i.e., gallons, pounds) and describe proposed alternative compliance measures. *Refer to Section 7.II 3.0 in the WQMP.*

N/A

Section V Inspection/Maintenance Responsibility for BMPs

Fill out information in table below. Prepare and attach an Operation and Maintenance Plan. Identify the mechanism through which BMPs will be maintained. Inspection and maintenance records must be kept for a minimum of five years for inspection by the regulatory agencies. *Refer to Section 7.II 4.0 in the Model WQMP.*

BMP Inspection/Maintenance

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
Treatment Control BMP# 1 Infiltration Trench	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	Inspect infiltration trench frequently to ensure that the stormwater infiltrates into the subsurface completely within the detention time of 48 hours. If water is present in the observation well more than 48 hours after a major storm, the infiltration may be clogged. Maintenance activities triggered by a potential clogged facility may include: Check for debris/sediment accumulation, remove sediment (if any) and evaluate potential sources of sediment and vegetative or other debris at the pretreatment system (proprietary device). Inspect overflow devices for obstruction or debris.	Inspection should be conducted before the rainy season beginning October 1st and after rain event.
Treatment Control BMP #2 (Catch Basin Filter Insert) REM- Triton Crescent Pipe Screen	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	Conduct regular inspection and routine maintenance for catch basin filter insert "REM-Triton Crescent Pipe Screen per Manufacturer's recommendation as the pre-treatment device.	Inspection should be conducted before the rainy season beginning October 1st and before and after rain event or per manufacturer's recommendation.

BMP Inspection/Maintenance

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
N1. Education for Property Owners, Tenants and Occupants	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	The homeowner association will provide the residents and maintenance employees practical information materials on general housekeeping practices that contribute to the protection of stormwater quality. Periodically the employees shall be provided with environmental awareness educational materials, made available by the Municipalities. Among other things, these materials will describe the use of chemicals (including household type) that should be limited to the property, with no discharge of wastes via hosing or other direct discharge to gutters, catch basins and storm drains.	Start up to begin immediately after construction is completed. Maintenance Schedule: The owner will check with City and County at least once a year to obtain new or updated educational materials to homeowners. Maintenanance employees, homeowners shall be trained to clean up spills and participate in on-going maintenance. The project site will have annual homeowners and maintenance employees training within 1 month.
N2. Activity Restriction	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	Conditions, Covenants and Restrictions (CC&Rs) will identify restricting or prohibiting activities once the project is operational. These activities include but not limited to: • Prohibit discharges of fertilizer, pesticides, or animal wastes to streets or storm drains. • Prohibit blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into street or storm drains. • Requirement to keep trash receptacles covered or sheltered by a roof overhang or canopy. • Prohibit vehicle washing, maintenance, or repair on the premises.	Start up to begin immediately after construction. Activity restriction will be enforced daily.
N3. Common Area Landscape Management	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	Maintenance of the landscaping shall be done weekly. Irrigation must be consistent with City's Water Conservation Ordinance. Fertilizer and pesticides usage will be consistent with County Management Guidelines for Use of Fertilizers and Pesticides.	Start up upon completion of landscaping. Irrigation system shall be inspected monthly by landscape contractor to check for over-watering, leaks, or excessive runoff to paved areas and landscaping shall be maintained weekly and maintenance contractor shall properly dispose of all landscape wastes.

N4. BMP Maintenance	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	BMP maintenance, implementation schedules, and responsible parties are included with each specific BMP narrative.	Start up to begin immediately after construction and all BMPs are completed
N7. Spill Contingency Plan	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	A spill contingency plan will be prepared by the homeowner's association that describes how the residents and maintenance employees will prepare for and responds to spills of hazardous materials. The plans typically describe stockpiling of clean-up materials, notification of responsible agencies, disposal of clean-up materials, documentation, etc.	Inspection and maintenance will start when construction is complete. Daily inspection and maintenance throughout the project site.
N10. Uniform Fire Code Implementation	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	Site will be in compliance with article 80 of the Uniform Code Enforced by the fire protection agency.	Inspection and maintenance as necessary.
N11. Common Area Litter Control	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	Resdinets, maintenance employees, and the property manager will help keep the site free of trash and other debris. The trash enclosure is located south east side of the parking area. It will be the maintenance employees responsibility for having the site inspected weekly and cleaned as necessary.	Start up to begin immediately after construction is completed. The homeowner association will check with the City and County at least once a year to obtain new or updated educational materials and provide these materials to residents. Homeowners and maintenance employees shall be trained to clean up spills and participate in on-going maintenance.
N14. Common Area Catch Basin Inspection	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	The maintenance employees are required to have at least 80 percent of drainage facilities inspected, cleaned and maintained on an annual basis with 100 percent of the facilities included in a two-year period. Cleaning should take place in the late summer/early fall prior to the start of the rainy season. Record should be kept to document the annual maintenance.	Start up upon immediately after construction is completed. The catch basin and filter inserts will be inspected on regular basis. The frequency of inspection will be based on the pollutant loading, amount of debris, leaves, etc. and amount of runoff. At minimum there will be three inspection per year.

N15. Street sweeping Private Street and Parking Lots	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	The maintenance employees will have the private drive swept. Hosing or watering of the site will not be permitted as a method of cleaning.	Start up upon completing of the paving. Parking lots and drive isles will be swept or vacuumed at least quarterly. October 1, January 1, April 1 and July 1 and as necessary. If there are any trash or debris in between the routine sweeping will be swept and vacuumed immediately.

BMP Inspection/Maintenance			
BMP	**Reponsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
S1. Provide Storm Drain System Stenciling and Signage	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	Provide stencilling or labelling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language (such as: "No Dumping-Drains to Ocean") and or graphical icons to discourage illegal dumping.	Start up immediately after construction. The legibility of stencils and or signs at all catch basins within the project area must be maintained at all time.
S3. Design Trash Enclosures to Reduce Pollutant Introduction	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	Trash and waste storage areas will be incorporated on the site. The trash enclosure areas will be paved with an impervious surface to mitigate spills. The trash container areas will not be below grade. The trash enclosures shall have a solid roof to prevent rainfall from entering container (per architectural plans). In addition, storm water runoff from adjoining roofs and pavement must be diverted around the trash area and signs should be.	Weekly inspection, cleaning and sweeping of trash area by property owner. Trash to be removed weekly or more as needed.
S4. Use efficient Irrigation Systems & Landscape Design	Linda La 13212 Bowen Street, Garden Grove, CA 92843 (251)888-1889	Irrigation of the landscaping shall be implemented as indicated on the approved landscape drawings and be consistent with the City's Water Conservation Ordinance. The irrigation system shall have rain shutoff controls as well as a programmable timer. Short irrigation cycles should be used to meet with the plant/landscaping needs.	System shall be inspected (by the owner/ or maintenance contractor) once a month to check for over watering, broken sprinkler heads or lines, and excessive runoff onto paved areas.

Section VI Site Plan and Drainage Plan

VI.1 SITE PLAN AND DRAINAGE PLAN

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural BMP locations
- Drainage delineations and flow information
- Drainage connections
- BMP details

VI.2 ELECTRONIC DATA SUBMITTAL

The minimum requirement is to provide submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open.

If the local jurisdiction requires specialized electronic document formats (CAD, GIS) to be submitted, this section will be used to describe the contents (e.g., layering, nomenclature, georeferencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

Section VII Educational Materials

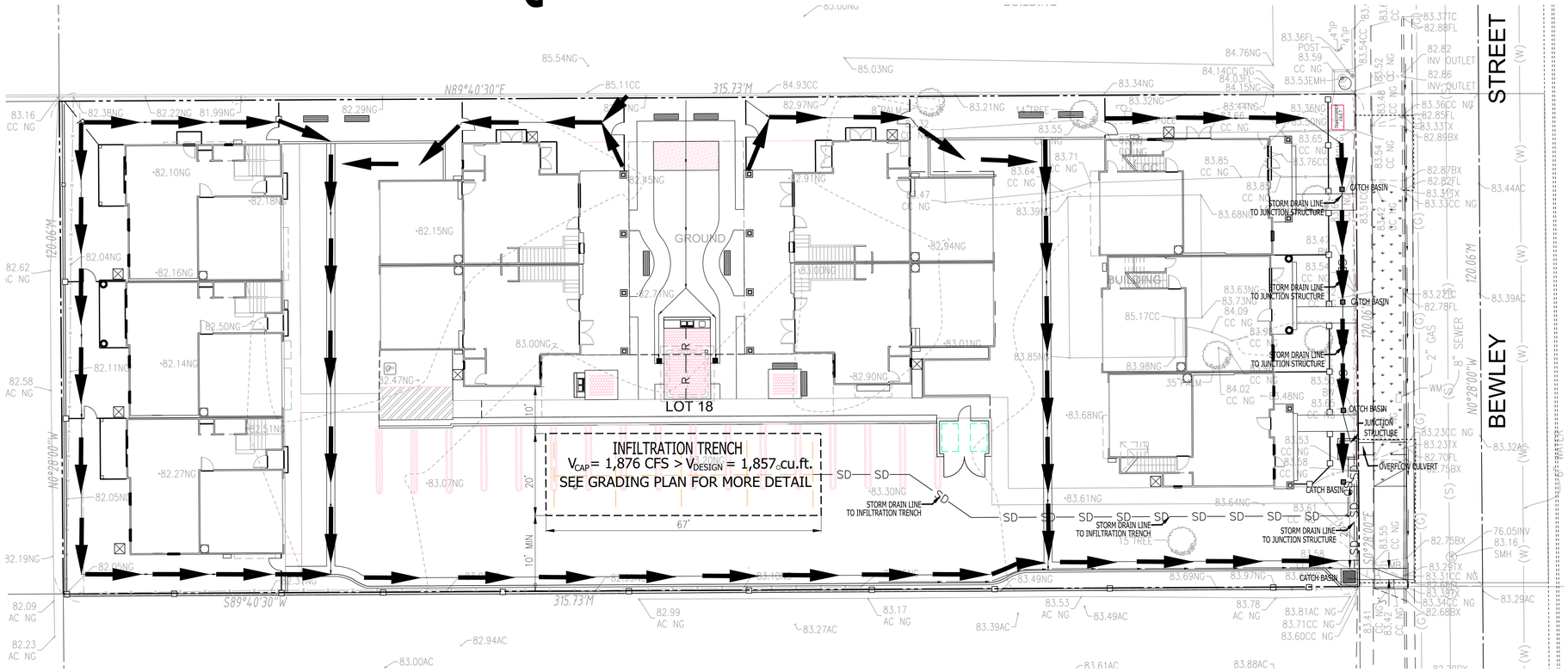
Refer to the Orange County Stormwater Program (ocwatersheds.com) for a library of materials available. For the copy submitted to the Permittee, only attach the educational materials specifically applicable to the project. Other materials specific to the project may be included as well and must be attached.

Education Materials			
Residential Material (http://www.ocwatersheds.com)	**Check If Applicable**	**Business Material (http://www.ocwatersheds.com)**	**Check If Applicable**
The Ocean Begins at Your Front Door	☒	Tips for the Automotive Industry	☐
Tips for Car Wash Fund-raisers	☐	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☐	Tips for the Food Service Industry	☐
Homeowners Guide for Sustainable Water Use	☒	Proper Maintenance Practices for Your Business	☐
Household Tips	☒	**Other Material**	**Check If Attached**
Proper Disposal of Household Hazardous Waste	☒		
Recycle at Your Local Used Oil Collection Center (North County)	☒		☐
Recycle at Your Local Used Oil Collection Center (Central County)	☐		☐
Recycle at Your Local Used Oil Collection Center (South County)	☐		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☒		☐
Sewer Spill	☐		☐
Tips for the Home Improvement Projects	☒		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☒		☐
Tips for Pet Care	☒		☐
Tips for Pool Maintenance	☐		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☒		☐
Tips for Projects Using Paint	☒		☐

ATTACHMENT A

WQMP EXHIBIT

"WATER QUALITY MANAGEMENT PLAN EXHIBIT"



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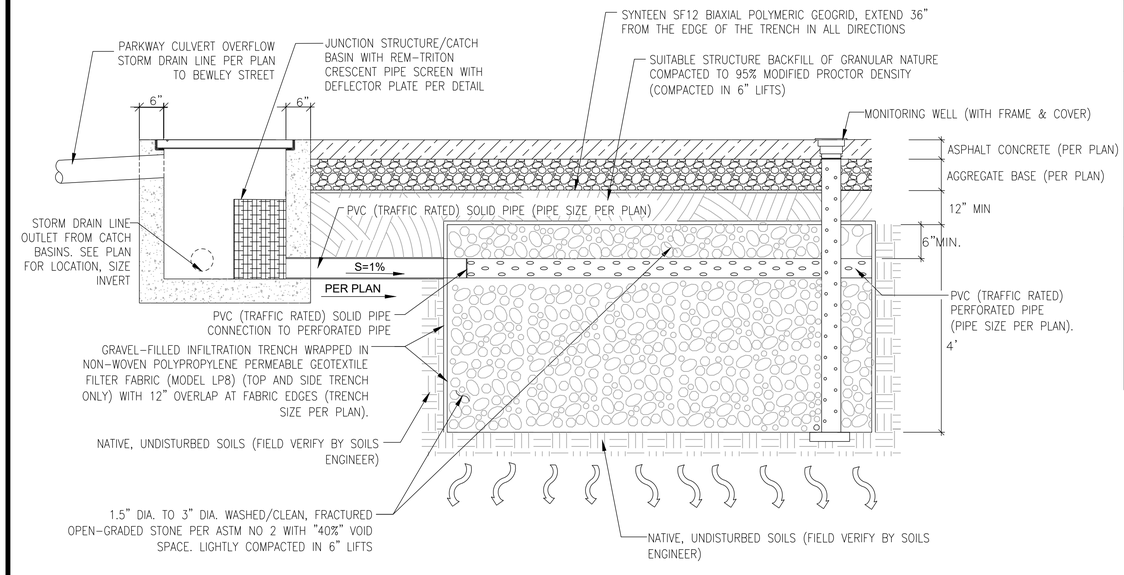
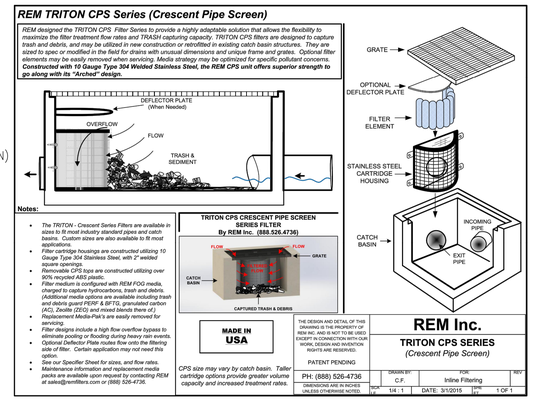


INFILTRATION TRENCH DETAIL



REM TRITON CRESCENT PIPE FILTER DETAIL

SPECIFIER CHART TRITON CRESCENT FILTERS	FILTERING OF LATERAL PIPES (1" THRU 20" Dia.)	MEDIA REM - BFTG* FILTERED Flow Rate	MEDIA REM - FOG** FILTERED Flow Rate	MEDIA REM - FOG & BFTG*** FILTERED Flow Rate	TOTAL FILTER BYPASS Flow Rate	DEBRIS HOLDING CAPACITY
MODEL:	*(inch)*	CFS	CFS	CFS	CFS	CUBIC FEET
10" CRESCENT	1" TO 7" Dia.					
TR10 -.5 (8) Crescent § (Standard)		0.82	0.19	0.19	2.57	5.94
TR10 -.5 (16) Crescent		1.54	0.4	0.4	2.57	11.88
TR10 -.5 (32) Crescent		2.6	0.81	0.81	2.57	23.76
14" CRESCENT	1" TO 10" Dia.					
TR14 -.5 (8) Crescent § (Standard)		1.31	0.35	0.35	6.58	5.82
TR14 -.5 (16) Crescent		2.46	0.72	0.72	6.58	11.6
TR14 -.5 (32) Crescent		4.91	1.45	1.45	6.58	23.2
24" CRESCENT	1" TO 20" Dia.					
TR24 -.5 (17) Crescent § (Standard)		5.15	1.21	1.21	25.65	11.4
TR24 -.5 (34) Crescent		10.3	2.42	2.42	25.65	22.32

Notes:

§ Standard cartridge configuration for the TRITON Crescent Series filter. Please specify if larger capacity cartridges are required. For shallow catch basins, choose the smaller cartridge heights. The cartridge heights are listed in the ( ) of the model number. Depending upon available space, height adjustments can be made for shallow catch basin configurations. There should be at least 4 to 6" of head space between the top of the filter and the grate. This allows for adequate flow through with the Overflow Port when needed.

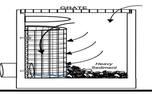
* REM - BFTG: Bioflex (BFTG) Media is designed to capture debris, trash and sediment while sustaining very high treatment rates. Mesh density of 3.5 ounces per square foot minimizes occlusion and blinding while capturing 100% of particles at 5mm or greater in size.

** REM - FOG: The FOG media is housed in a mono-filament weaved geotextile containment pack. FOG media effectively encapsulates liquefied petroleum hydrocarbons (Fats, Oils & Grease including animal fats). It's highly hydrophobic characteristic allows for increased polish of flow resulting in the reduction of Total Suspended Solids (TSS). TSS reduction includes (but is not limited to) debris, trash, silt, sediment and agglomerated heavy metals. REM- FOG is the standard media that is configured for Top Hats. Media options for other pollutants and particulate sizes are also available.

*** REM - FOG -BFTG: Media configuration utilizes both BFTG and FOG media strategies. The BFTG Media serves as a pre-screen to treat for larger debris, such as trash, leaves etc... The FOG media pack captures finer suspended solids and liquefied hydrocarbons.

**** Filter debris holding capacities can be modified to utilize the maximum dimensions of each specific catch basin. Volumes will either Increase or decrease depending upon the size of the catch basin and the cartridge size used. Volume capacities that are shown are based on the catch basin filters Standard inside wall dimensions for that filter. The volumes that are listed here are based on a 3' X 3' catch basin.

REM technical support is available to assist with TRITON Series filter configurations, media strategies and customization of models.



Revel Environmental Manufacturing Inc.
sales@remfilters.com (888) 526-4736 Lic. No. 857410
REM www.remfilters.com
Northern California
960-B Detroit Avenue
Concord, California 94518
P: (925) 676-4736
F: (925) 676-8676
Southern California
2110 South Grand Avenue
Santa Ana, California 92705
P: (714) 557-2676
F: (714) 557-2679

Filter Series	Drawing No.	Date	Sheet
TRITON CRESCENT FILTER	TCF -0001	3/3/2013	1 of 1

P.A. ARCA ENGINEERING, INC.
500 East Carson Plaza Drive, Suite 201, Carson, CA 90746
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Civil Engineers / Land Surveyors

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SANTA ANA, CA

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WATER QUALITY MANAGEMENT PLAN EXHIBIT

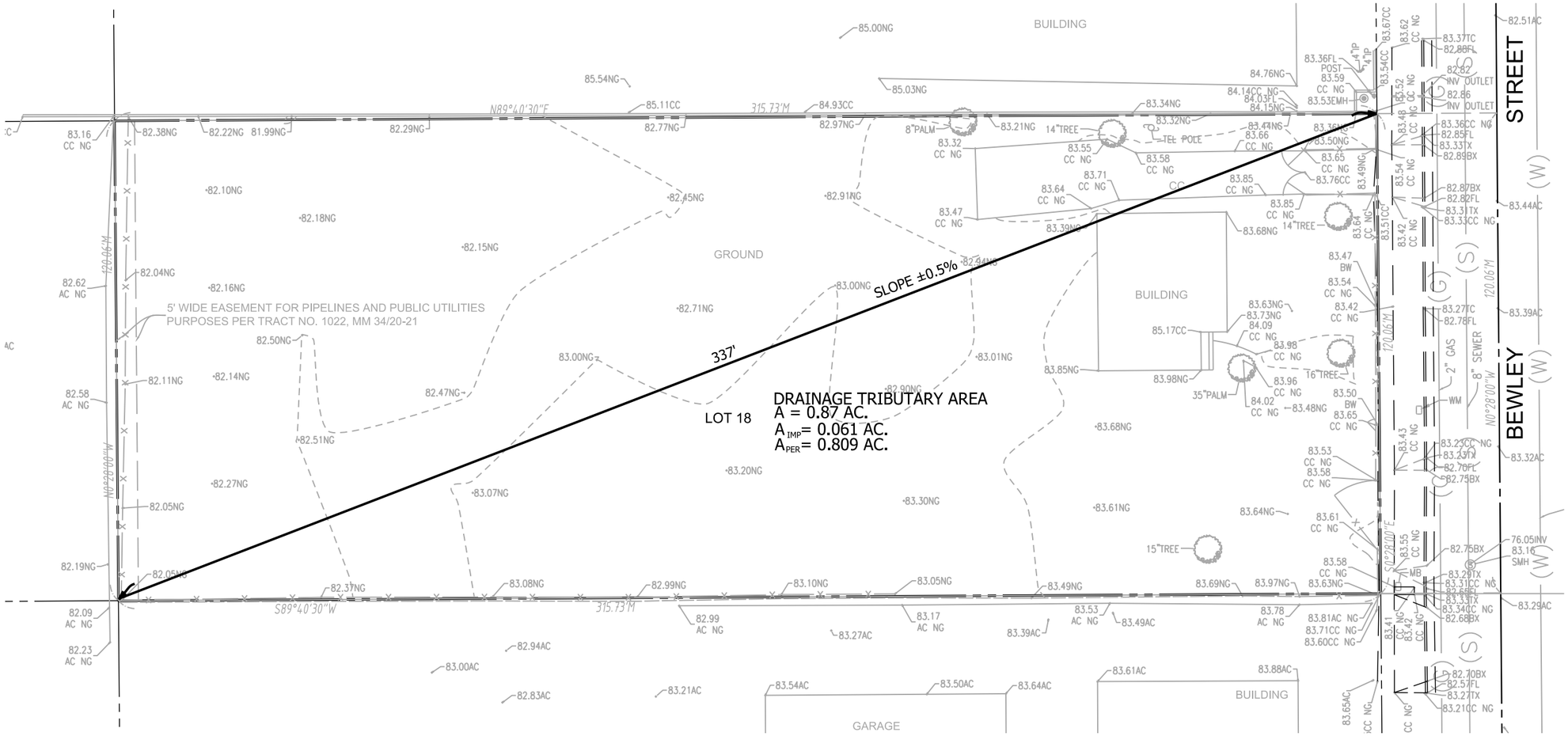
DATE	8/08/19
SCALE	SEE PLAN
DRAWN	N.A.
JOB#	AEI-19-0721
SHEET#	WQMP 1

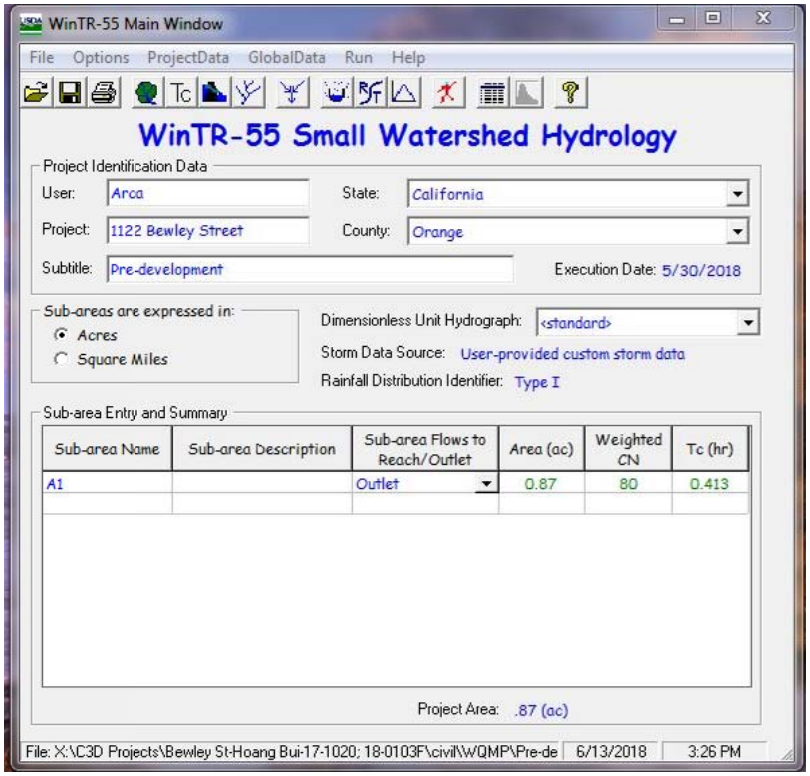
USER: NOEL PLOTTED: 8/8/2019 - 2:18 PM C:\Users\Noel\appdata\local\temp\AcPublish_14\DWEBEY-WQMP.dwg LAYOUT: WQMP

ATTACHMENT B

2-YEAR PRE AND POST CALCULATIONS FOR HCOC APPLICABILITY

HYDROLOGY MAP - PRE-DEVELOPMENT




WinTR-55 Main Window
File Options ProjectData GlobalData Run Help
WinTR-55 Small Watershed Hydrology
Project Identification Data
User: Arca
State: California
Project: 1122 Bewley Street
County: Orange
Subtitle: Pre-development
Execution Date: 5/30/2018
Sub-areas are expressed in:
Acres
Square Miles
Dimensionless Unit Hydrograph: <standard>
Storm Data Source: User-provided custom storm data
Rainfall Distribution Identifier: Type I
Sub-area Entry and Summary
Sub-area Name
Sub-area Description
Sub-area Flows to Reach/Outlet
Area (ac)
Weighted CN
Tc (hr)
A1
Outlet
0.87
80
0.413
Project Area: .87 (ac)
File: X:\C3D Projects\Bewley St-Hoang Bui-17-1020; 18-0103F\civil\WQMP\Pre-de
6/13/2018
3:26 PM

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
1122 Bewley Street
Pre-development

SUB-AREA:
A1 Outlet .00136 80. .413

STREAM REACH:

STORM ANALYSIS:
2-Yr 2.05 Type I 2

STRUCTURE RATING:

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20 Printed Page File End of Input Data List

1122 Bewley Street
Pre-development

Name of printed page file:
TR20.out

STORM 2-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
A1	0.001		0.193		10.17	0.20	150.23

Line Start Time (hr)	Flow Values @ time increment of 0.026 hr (cfs)						
9.886	0.06	0.07	0.09	0.10	0.12	0.14	0.16
10.068	0.18	0.19	0.20	0.20	0.20	0.20	0.19
10.251	0.19	0.18	0.17	0.16	0.15	0.14	0.13
10.434	0.13	0.12	0.11	0.11	0.10	0.10	0.10
10.616	0.09	0.09	0.09	0.08	0.08	0.08	0.08
10.799	0.07	0.07	0.07	0.07	0.07	0.07	0.06
10.981	0.06	0.06	0.06	0.06	0.06	0.06	0.06
11.164	0.06	0.06	0.06	0.05	0.05	0.05	0.05
11.346	0.05	0.05	0.05	0.05	0.05	0.05	0.05
11.529	0.05	0.05	0.05	0.05			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Pre-development

STORM 2-Yr

SUB-AREA:
A1 Outlet .00136 80. .413

STREAM REACH:

OUTLET 0.001 0.193 10.17 0.20 150.23

Line Start Time (hr)	Flow Values @ time increment of 0.026 hr (cfs)						
9.886	0.06	0.07	0.09	0.10	0.12	0.14	0.16
10.068	0.18	0.19	0.20	0.20	0.20	0.20	0.19
10.251	0.19	0.18	0.17	0.16	0.15	0.14	0.13
10.434	0.13	0.12	0.11	0.11	0.10	0.10	0.10
10.616	0.09	0.09	0.09	0.08	0.08	0.08	0.08
10.799	0.07	0.07	0.07	0.07	0.07	0.07	0.06
10.981	0.06	0.06	0.06	0.06	0.06	0.06	0.06
11.164	0.06	0.06	0.06	0.05	0.05	0.05	0.05
11.346	0.05	0.05	0.05	0.05	0.05	0.05	0.05
11.529	0.05	0.05	0.05	0.05			

1122 Bewley Street
Pre-development

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 2-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
A1	0.001		0.20				
OUTLET	0.001		0.20				

WinTR-20 Printed Page File TR20.inp Beginning of Input Data List

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Pre-development

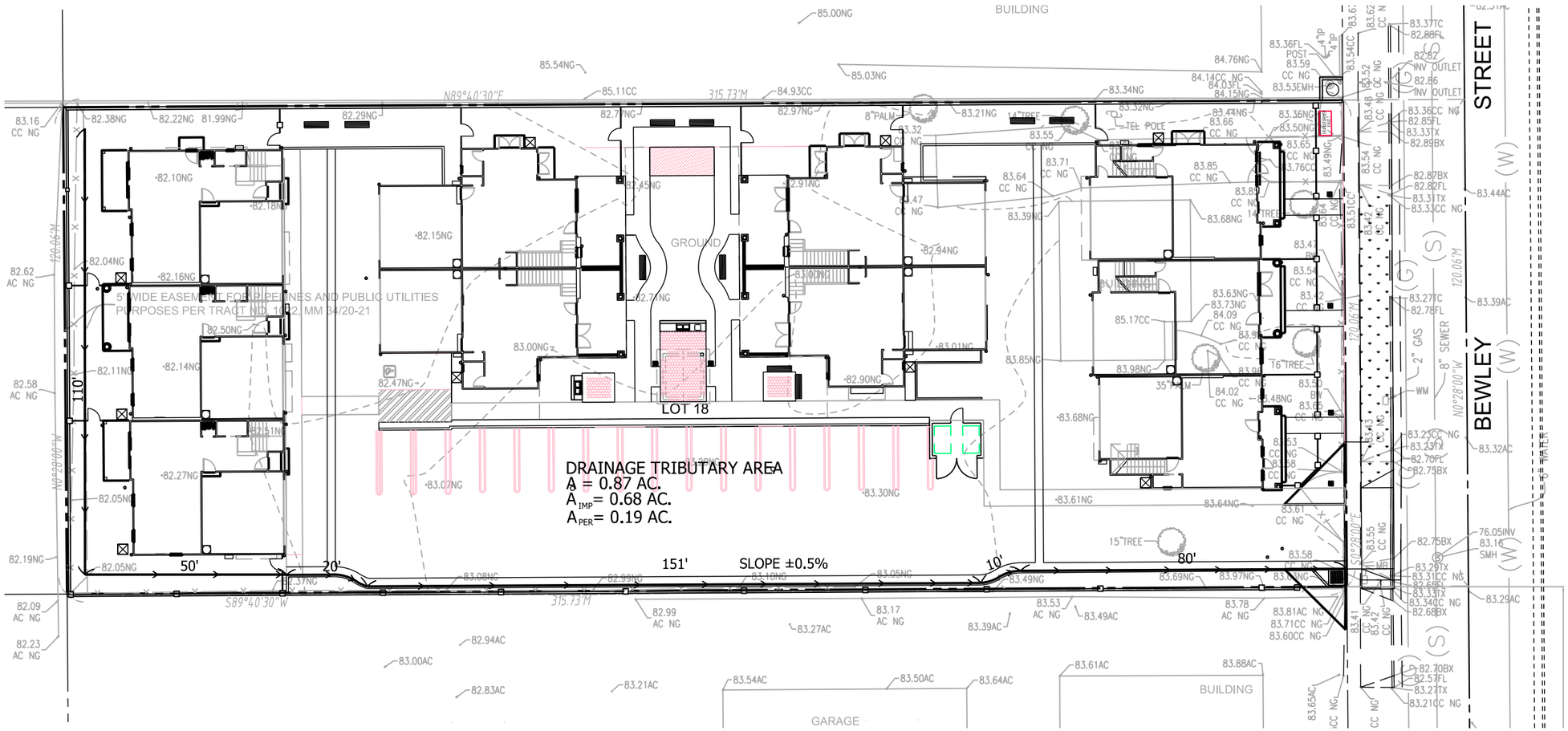
STORM 2-Yr

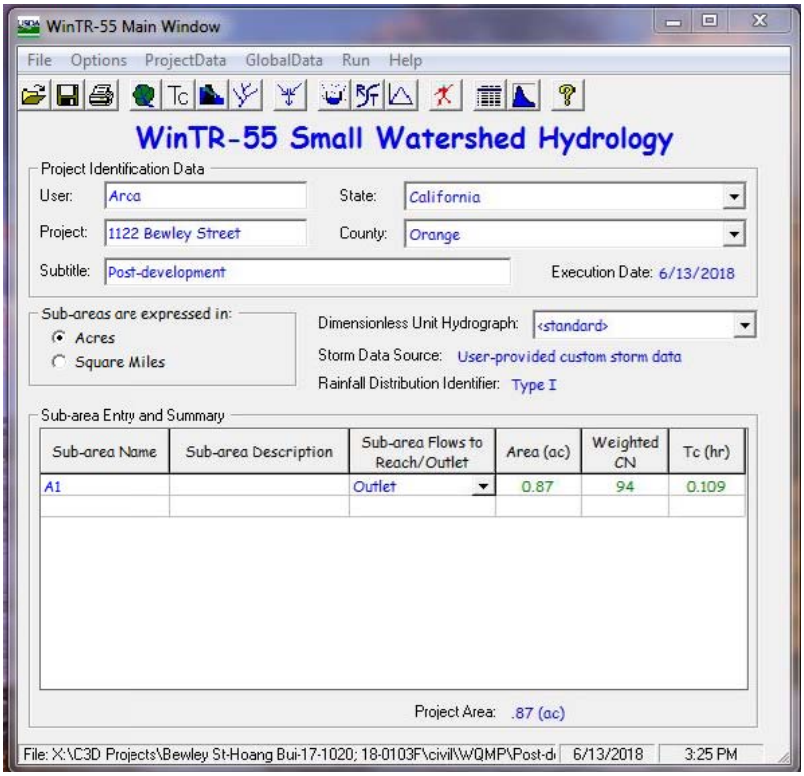
SUB-AREA:

	A1	Outlet	.00136	80.	.413

STREAM REACH:

HYDROLOGY MAP - POST DEVELOPMENT




WinTR-55 Main Window
File Options ProjectData GlobalData Run Help
WinTR-55 Small Watershed Hydrology
Project Identification Data
User: Arca
State: California
Project: 1122 Bewley Street
County: Orange
Subtitle: Post-development
Execution Date: 6/13/2018
Sub-areas are expressed in:
Acres
Square Miles
Dimensionless Unit Hydrograph: <standard>
Storm Data Source: User-provided custom storm data
Rainfall Distribution Identifier: Type I
Sub-area Entry and Summary
Sub-area Name
Sub-area Description
Sub-area Flows to Reach/Outlet
Area (ac)
Weighted CN
Tc (hr)
A1
Outlet
0.87
94
0.109
Project Area: .87 (ac)
File: X:\C3D Projects\Bewley St-Hoang Bui-17-1020; 18-0103F\civil\WQMP\Post-d
6/13/2018
3:25 PM

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WinTR-20 Printed Page File      Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10                  0         0         0.05
1122 Bewley Street
Post-development

SUB-AREA:
          A1        Outlet              .00136    94.       .1

STREAM REACH:

STORM ANALYSIS:
          2-Yr                          2.05      Type I    2

STRUCTURE RATING:


GLOBAL OUTPUT:
          2         0.05                YYYYN     YYYYNN


WinTR-20 Printed Page File      End of Input Data List

                                1122 Bewley Street
                                 Post-development

                           Name of printed page file:
                                TR20.out

                                        STORM 2-Yr

Area or    Drainage  Rain Gage     Runoff   ------------ Peak Flow ------------
 Reach       Area      ID or       Amount   Elevation   Time      Rate      Rate
Identifier  (sq mi)   Location     (in)      (ft)      (hr)     (cfs)     (csm)

A1            0.001                0.990                9.93      0.99   729.54

   Line
Start Time   ------------ Flow Values @ time increment of  0.006 hr ------------
      (hr)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)

     8.374      0.05      0.05      0.05      0.05      0.05      0.05      0.05
     8.418      0.05      0.05      0.05      0.05      0.05      0.05      0.05
     8.462      0.05      0.05      0.06      0.06      0.06      0.06      0.06
     8.506      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     8.550      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     8.595      0.06      0.06      0.06      0.06      0.06      0.06      0.06
     8.639      0.06      0.06      0.06      0.06      0.07      0.07      0.07
     8.683      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     8.727      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     8.771      0.07      0.07      0.07      0.07      0.07      0.07      0.07
     8.816      0.07      0.07      0.07      0.07      0.07      0.07      0.08
     8.860      0.08      0.08      0.08      0.08      0.08      0.08      0.08
     8.904      0.08      0.08      0.08      0.08      0.08      0.08      0.08
     8.948      0.08      0.08      0.08      0.08      0.08      0.08      0.08
     8.992      0.08      0.08      0.08      0.08      0.08      0.09      0.09
     9.037      0.09      0.09      0.09      0.09      0.09      0.09      0.09
     9.081      0.09      0.09      0.09      0.09      0.09      0.09      0.09
     9.125      0.09      0.09      0.09      0.09      0.10      0.10      0.10
     9.169      0.10      0.10      0.10      0.10      0.10      0.10      0.10
     9.214      0.10      0.10      0.10      0.10      0.10      0.11      0.11
     9.258      0.11      0.11      0.11      0.11      0.11      0.11      0.11
     9.302      0.11      0.11      0.11      0.11      0.11      0.11      0.12
     9.346      0.12      0.12      0.12      0.12      0.12      0.12      0.12
     9.390      0.12      0.12      0.12      0.12      0.12      0.12      0.13
     9.435      0.13      0.13      0.13      0.13      0.13      0.13      0.13
     9.479      0.13      0.13      0.13      0.13      0.13      0.14      0.14
     9.523      0.14      0.14      0.14      0.14      0.15      0.16      0.16
     9.567      0.17      0.17      0.18      0.18      0.18      0.19      0.19
     9.611      0.19      0.20      0.20      0.21      0.21      0.22      0.23
     9.656      0.24      0.25      0.26      0.27      0.28      0.29      0.30
     9.700      0.30      0.31      0.31      0.32      0.33      0.34      0.35
     9.744      0.37      0.39      0.40      0.42      0.44      0.46      0.47
     9.788      0.49      0.50      0.51      0.52      0.53      0.55      0.56
     9.832      0.59      0.62      0.65      0.69      0.72      0.76      0.80
     9.877      0.83      0.87      0.90      0.92      0.95      0.97      0.98
```

9.921	0.99	0.99	0.99	0.98	0.97	0.95	0.94
9.965	0.92	0.90	0.88	0.86	0.85	0.84	0.82
10.009	0.81	0.80	0.79	0.77	0.74	0.71	0.67
10.054	0.63	0.59	0.55	0.52	0.48	0.45	0.42
10.098	0.39	0.37	0.35	0.34	0.33	0.32	0.31

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
10.142	0.30	0.29	0.28	0.27	0.27	0.26	0.26
10.186	0.26	0.25	0.25	0.25	0.24	0.24	0.24
10.230	0.24	0.24	0.23	0.23	0.23	0.23	0.22
10.275	0.22	0.22	0.22	0.22	0.21	0.21	0.21
10.319	0.21	0.21	0.21	0.21	0.21	0.20	0.20
10.363	0.20	0.20	0.19	0.19	0.19	0.19	0.19
10.407	0.19	0.19	0.18	0.18	0.18	0.18	0.18
10.451	0.18	0.17	0.17	0.17	0.17	0.17	0.16
10.496	0.16	0.16	0.16	0.16	0.16	0.16	0.16
10.540	0.15	0.15	0.15	0.15	0.15	0.15	0.15
10.584	0.14	0.14	0.14	0.14	0.14	0.14	0.14
10.628	0.14	0.14	0.14	0.14	0.14	0.14	0.14
10.672	0.13	0.13	0.13	0.13	0.13	0.13	0.13
10.717	0.13	0.13	0.13	0.13	0.13	0.13	0.13
10.761	0.13	0.13	0.13	0.13	0.13	0.13	0.13
10.805	0.13	0.13	0.13	0.13	0.13	0.12	0.12
10.849	0.12	0.12	0.12	0.12	0.12	0.12	0.12
10.894	0.12	0.12	0.12	0.12	0.12	0.12	0.12
10.938	0.12	0.12	0.12	0.12	0.12	0.12	0.11
10.982	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.026	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.070	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.115	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.159	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.203	0.11	0.11	0.11	0.11	0.11	0.10	0.10
11.247	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.291	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.336	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.380	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.424	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.468	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.512	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.557	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.601	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.645	0.10	0.10	0.09	0.09	0.09	0.09	0.09
11.689	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.734	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.778	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.822	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.866	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.910	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.955	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.999	0.09	0.09	0.09	0.09	0.09	0.09	0.09
12.043	0.09	0.09	0.09	0.09	0.09	0.08	0.08
12.087	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.131	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.176	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.220	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.264	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.308	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.352	0.08	0.08	0.08	0.08	0.08	0.08	0.08

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
12.397	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.441	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.485	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.529	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.574	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.618	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.662	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.706	0.08	0.08	0.08	0.08	0.08	0.07	0.07
12.750	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.795	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.839	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.883	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.927	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.971	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.016	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.060	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.104	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.148	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.192	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.237	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.281	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.325	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.369	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.414	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.458	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.502	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.546	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.590	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.635	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.679	0.06	0.06	0.06	0.06	0.06	0.06	0.06

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

13.723	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.767	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.811	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.856	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.900	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.944	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.988	0.06	0.06	0.06	0.05	0.05	0.05	0.05
14.032	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.077	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.121	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.165	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.209	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.254	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.298	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.342	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.386	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.430	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.475	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.519	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.563	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.607	0.05	0.05	0.05	0.05	0.05	0.05	0.05

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)						
14.651	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.696	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.740	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.784	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.828	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.872	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.917	0.05	0.05	0.05	0.05	0.05	0.05	0.05

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:

A1	Outlet	.00136	94.	.1

STREAM REACH:

14.961	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.005	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.049	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.094	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.138	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.182	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.226	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.270	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.315	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.359	0.05	0.05					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	0.001		0.990		9.93	0.99	729.54

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
8.374	0.05	0.05	0.05	0.05	0.05	0.05	0.05
8.418	0.05	0.05	0.05	0.05	0.05	0.05	0.05
8.462	0.05	0.05	0.06	0.06	0.06	0.06	0.06
8.506	0.06	0.06	0.06	0.06	0.06	0.06	0.06
8.550	0.06	0.06	0.06	0.06	0.06	0.06	0.06
8.595	0.06	0.06	0.06	0.06	0.06	0.06	0.06
8.639	0.06	0.06	0.06	0.06	0.07	0.07	0.07
8.683	0.07	0.07	0.07	0.07	0.07	0.07	0.07
8.727	0.07	0.07	0.07	0.07	0.07	0.07	0.07
8.771	0.07	0.07	0.07	0.07	0.07	0.07	0.07
8.816	0.07	0.07	0.07	0.07	0.07	0.07	0.08
8.860	0.08	0.08	0.08	0.08	0.08	0.08	0.08
8.904	0.08	0.08	0.08	0.08	0.08	0.08	0.08
8.948	0.08	0.08	0.08	0.08	0.08	0.08	0.08
8.992	0.08	0.08	0.08	0.08	0.08	0.09	0.09
9.037	0.09	0.09	0.09	0.09	0.09	0.09	0.09
9.081	0.09	0.09	0.09	0.09	0.09	0.09	0.09

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

9.125	0.09	0.09	0.09	0.09	0.10	0.10	0.10
9.169	0.10	0.10	0.10	0.10	0.10	0.10	0.10
9.214	0.10	0.10	0.10	0.10	0.10	0.11	0.11
9.258	0.11	0.11	0.11	0.11	0.11	0.11	0.11
9.302	0.11	0.11	0.11	0.11	0.11	0.11	0.12
9.346	0.12	0.12	0.12	0.12	0.12	0.12	0.12

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.390	0.12	0.12	0.12	0.12	0.12	0.12	0.13
9.435	0.13	0.13	0.13	0.13	0.13	0.13	0.13
9.479	0.13	0.13	0.13	0.13	0.13	0.14	0.14
9.523	0.14	0.14	0.14	0.15	0.15	0.16	0.16
9.567	0.17	0.17	0.18	0.18	0.18	0.19	0.19
9.611	0.19	0.20	0.20	0.21	0.21	0.22	0.23
9.656	0.24	0.25	0.26	0.27	0.28	0.29	0.30
9.700	0.30	0.31	0.31	0.32	0.33	0.34	0.35
9.744	0.37	0.39	0.40	0.42	0.44	0.46	0.47
9.788	0.49	0.50	0.51	0.52	0.53	0.55	0.56
9.832	0.59	0.62	0.65	0.69	0.72	0.76	0.80
9.877	0.83	0.87	0.90	0.92	0.95	0.97	0.98
9.921	0.99	0.99	0.99	0.98	0.97	0.95	0.94
9.965	0.92	0.90	0.88	0.86	0.85	0.84	0.82
10.009	0.81	0.80	0.79	0.77	0.74	0.71	0.67
10.054	0.63	0.59	0.55	0.52	0.48	0.45	0.42
10.098	0.39	0.37	0.35	0.34	0.33	0.32	0.31
10.142	0.30	0.29	0.28	0.27	0.27	0.26	0.26
10.186	0.26	0.25	0.25	0.25	0.24	0.24	0.24
10.230	0.24	0.24	0.23	0.23	0.23	0.23	0.22
10.275	0.22	0.22	0.22	0.22	0.21	0.21	0.21
10.319	0.21	0.21	0.21	0.21	0.21	0.20	0.20

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

10.363	0.20	0.20	0.19	0.19	0.19	0.19	0.19
10.407	0.19	0.19	0.18	0.18	0.18	0.18	0.18
10.451	0.18	0.17	0.17	0.17	0.17	0.17	0.16
10.496	0.16	0.16	0.16	0.16	0.16	0.16	0.16
10.540	0.15	0.15	0.15	0.15	0.15	0.15	0.15
10.584	0.14	0.14	0.14	0.14	0.14	0.14	0.14
10.628	0.14	0.14	0.14	0.14	0.14	0.14	0.14
10.672	0.13	0.13	0.13	0.13	0.13	0.13	0.13
10.717	0.13	0.13	0.13	0.13	0.13	0.13	0.13
10.761	0.13	0.13	0.13	0.13	0.13	0.13	0.13
10.805	0.13	0.13	0.13	0.13	0.13	0.12	0.12
10.849	0.12	0.12	0.12	0.12	0.12	0.12	0.12
10.894	0.12	0.12	0.12	0.12	0.12	0.12	0.12
10.938	0.12	0.12	0.12	0.12	0.12	0.12	0.11
10.982	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.026	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.070	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.115	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.159	0.11	0.11	0.11	0.11	0.11	0.11	0.11
11.203	0.11	0.11	0.11	0.11	0.11	0.10	0.10
11.247	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.291	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.336	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.380	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.424	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.468	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.512	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.557	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11.601	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Line
Start Time ---------- Flow Values @ time increment of 0.006 hr ----------

(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

11.645	0.10	0.10	0.09	0.09	0.09	0.09	0.09
11.689	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.734	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.778	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.822	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.866	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.910	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.955	0.09	0.09	0.09	0.09	0.09	0.09	0.09
11.999	0.09	0.09	0.09	0.09	0.09	0.09	0.09
12.043	0.09	0.09	0.09	0.09	0.09	0.08	0.08
12.087	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.131	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.176	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.220	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.264	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.308	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.352	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.397	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.441	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.485	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.529	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.574	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.618	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.662	0.08	0.08	0.08	0.08	0.08	0.08	0.08
12.706	0.08	0.08	0.08	0.08	0.08	0.07	0.07
12.750	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.795	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.839	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.883	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.927	0.07	0.07	0.07	0.07	0.07	0.07	0.07
12.971	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.016	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.060	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.104	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.148	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.192	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.237	0.07	0.07	0.07	0.07	0.07	0.07	0.07

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

13.281	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.325	0.07	0.07	0.07	0.07	0.07	0.07	0.07
13.369	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.414	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.458	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.502	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.546	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.590	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.635	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.679	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.723	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.767	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.811	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.856	0.06	0.06	0.06	0.06	0.06	0.06	0.06

1122 Bewley Street
Post-development

Line Start Time (hr)	Flow Values @ time increment of 0.006 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
13.900	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.944	0.06	0.06	0.06	0.06	0.06	0.06	0.06
13.988	0.06	0.06	0.06	0.05	0.05	0.05	0.05
14.032	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.077	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.121	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.165	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.209	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.254	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.298	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.342	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.386	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.430	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.475	0.05	0.05	0.05	0.05	0.05	0.05	0.05

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

14.519	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.563	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.607	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.651	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.696	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.740	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.784	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.828	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.872	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.917	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14.961	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.005	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.049	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.094	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.138	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.182	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.226	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.270	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.315	0.05	0.05	0.05	0.05	0.05	0.05	0.05
15.359	0.05	0.05					

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:
A1 Outlet .00136 94. .1

STREAM REACH:

1122 Bewley Street
Post-development

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 2-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
A1	0.001		0.99				
OUTLET	0.001		0.99				

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Bewley Street (continued)
Post-development

STORM 2-Yr

SUB-AREA:

	A1	Outlet	.00136	94.	.1

STREAM REACH:

ATTACHMENT C

INFILTRATION TRENCH CALCULATIONS AND WORKSHEET

Worksheet B: Simple Design Capture Volume Sizing Method

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, *d* (inches)	d=	0.80	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	0.80	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	0.87	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.78	
3	Calculate runoff coefficient, *C= (0.75 x imp) + 0.15*	C=	0.735	
4	Calculate runoff volume, V_{design}= *(C x* $d_{remainder}$ *x A x 43560 x (1/12))*	V_{design}=	1,857	cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{observed}$[1] (in/hr) (**Appendix VII**)	$K_{observed}$=	1.04	In/hr
2	Enter combined safety factor from Worksheet H, S_{total} (unitless)	S_{total}=	2	
3	Calculate design infiltration rate, $K_{design} = K_{observed} / S_{total}$	K_{design}=	0.52	In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, *T* (max 48 hours)	T=	48	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design}$ *x T x (1/12)* /.35	D_{max}=	5	feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$ = (1,857/0.35)/4 = 1,326 sq-ft	A_{min}=	1,326	sq-ft

Assume d = 4ft

[1] $K_{observed}$ is the vertical infiltration measured in the field, before applying a factor of safety. If field testing measures a rate that is different than the vertical infiltration rate (for example, three-dimensional borehole percolation rate), then this rate must be adjusted by an acceptable method (for example, Porchet method) to yield the field estimate of vertical infiltration rate, $K_{observed}$. See Appendix VII.

Infiltration trench dimensions = 20'x 67'x 4'depth

Infiltration trench capacity = 20'x 67' x 4' x 0.35 = 1,876 cu.ft.

ATTACHMENT D

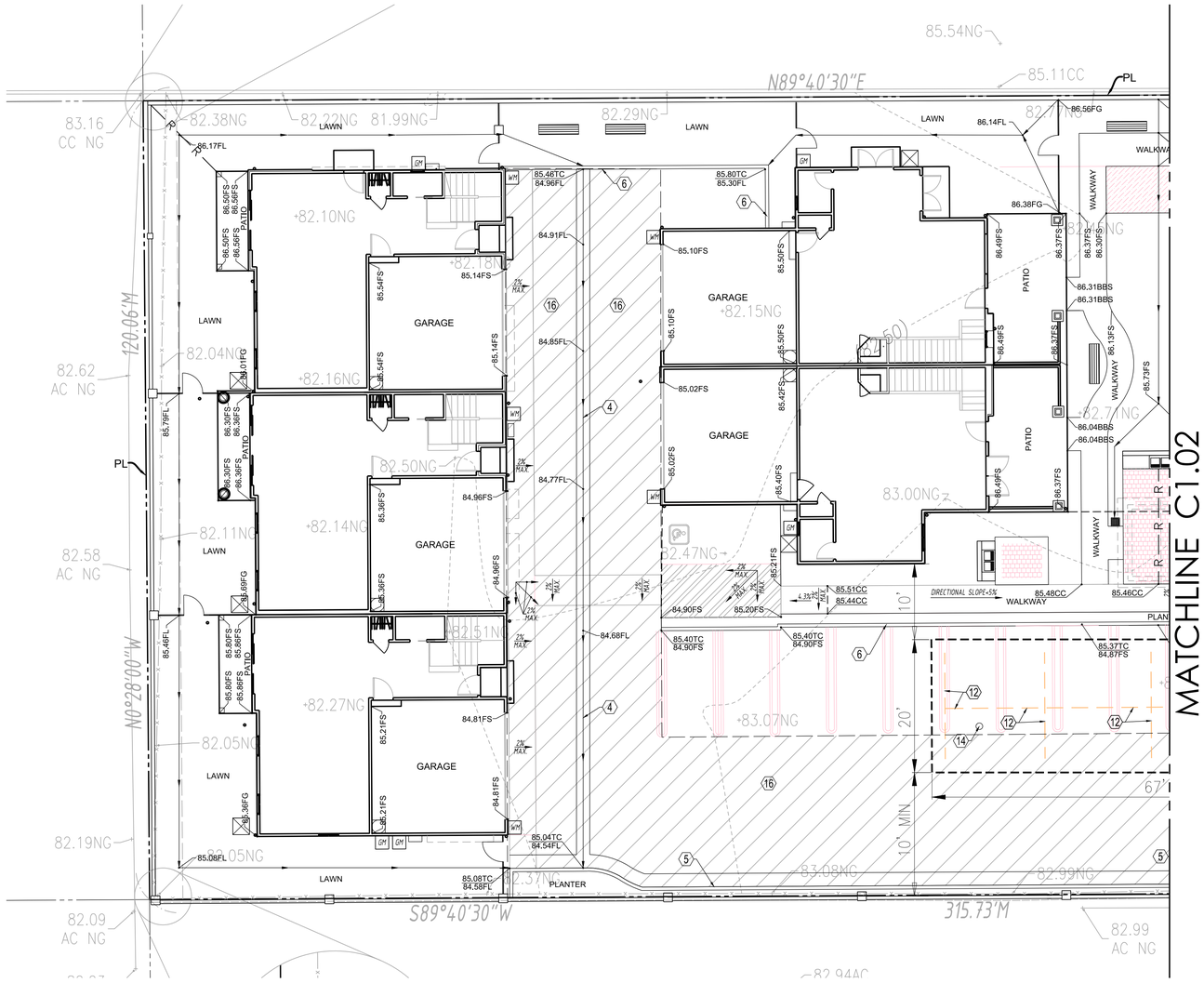
GRADING AND DRANAGE PLAN

GENERAL GRADING NOTES□

1□ ALL DEBRIS AND □OREIGN MATERIAL S□ALL BE REMO□ED □ROM T□E SITE PRIOR TO PLACING □ILL MATERIALS□RE□ER TO SOIL REPORT ON T□IS PRO□ECT□
□□ I□ SEEPAGE PIT OR CESSPOOL IS ENCOUNTERED□ DO NOT □ILL UNTIL APPRO□AL IS OBTAINED □ROM T□E CITY SANTA ANA□GRADING DEPT□AND APPRO□ED BY SOILS ENGINEERS□ □□ RE□UIRED BY CITY□
□□ ALL □ILL S□ALL BE COMPACTED TO A DENSITY O□ NOT LESS T□AN □□% O□ MA□IMUM DENSITY IN ACCORDANCE WIT□ AMERICAN SOCIETY □OR TESTING MATERIALS ASTM TEST MET□OD D 1□□□□8□
□□ T□E □ILL S□ALL BE PLACED AT A MOISTURE CONTENT O□ OPTIMUM MOISTURE OR ABO□E □ONLY IN E□PANSI□E SOILS□□
□□ T□E SELECTED □ILL MATERIALS S□ALL BE PLACED IN LE□EL□UNI□ORM LAYERS NOT E□CEEDING □" IN T□IC□NESS W□EN COMPACTED□EAC□ LAYER S□ALL BE T□OROUG□LY MI□ED DURING T□E SPREADING TO INSURE UNI□ORMITY O□ MATERIAL AND MOISTURE IN EAC□ LAYER□
□□ ALL WOR□ S□ALL COMPLY TO CITY GRADING REGULATIONS□
□□ T□E STAMPED SET O□ PLANS S□ALL BE ON T□E □OB SITE AT ALL TIMES□
8□ CUT SLOPES S□ALL BE □□1 MA□IMUM□ UNLESS APPRO□ED BY SOIL ENGINEER□
□□ □ILL SLOPES S□ALL BE □□1 MA□IMUM AND COMPACTED TO □□% O□ MA□IMUM DENSITY□
1□□PROTECTI□E MEASURE S□ALL BE TA□EN BY T□E CONTRACTOR AND T□E OWNER TO PROTECT AD□ACENT PROPERTY AND PUBLIC WAYS DURING GRADING OPERATIONS□
11□DUST S□ALL BE CONTROLLED BY WATERING□
1□□RETAINING WALL PERMITS I□ RE□UIRED TO BE OBTAINED BY OT□ERS□
1□□NO TRENC□ES OR E□CA□ATION □□□" OR MORE IN DEPT□ INTO W□IC□ A PERSON IS RE□UIRED TO DESCENT□ OR OBTAIN NECESSARY PERMIT □ROM T□E STATE O□ CALI□ORNIA DI□ISION O□ INDUSTRY SA□ETY PRIOR TO T□E ISSUANCE O□ A BUILDING OR GRADING PERMIT□MSC 1 □□□□□□ E□□ □□□□□□
1□□AN ENGINEER □SUR□EYOR MUST SET T□E CONSTRUCTION AND DRAINAGE STA□ING□
1□□CONTRACTOR S□ALL OBTAIN AND PAY ALL NECESSARY PERMITS□ □EE □OR ALL WOR□ DONE WIT□IN T□E PUBLIC RIG□T□O□WAY □ROM T□E CITY O□ SANTA ANA□ DEPT□O□ PUBLIC WOR□S□
1□□RE□ER TO ARC□ITECTURAL PLOT PLAN □OR ADDITIONAL DIMENSIONS□TIES AND OT□ER STA□ING DATA□
1□□□OR RE□ERENCE TO E□ISTING CONDITIONS□SEE S□EET C□□1□
18□ALL ASP□ALTIC CONCRETE PA□EMENT TO BE BORDERED BY □" □ □" REDWOOD □EADERS OR CONCRETE□ UNLESS OT□ERWISE SPECI□IED ON PLAN□
1□□GRADING □ CONSTRUCTION S□ALL BE IN ACCORDANCE WIT□ T□E STANDARD SPECI□ICATIONS □OR PUBLIC WOR□S CONSTRUCTION□ □□□□ EDITION AND IT□S LATEST SUPPLEMENTS□
□□□SITE GRADING RECOMMENDATIONS O□
□1□YARDAGE □UANTITIES□
□OL□O□ CUT = □
□OL□O□ □ILL = □
□OL□O□ IMPORT= □
□OL□O□ E□PORT= □
REMO□E □ RECOMPACT= □ CY
□□□ALL GRADED SLOPES S□ALL BE PLANTED AND SPRIN□LERED□
□□□STANDARD 1□" □IG□ BERM IS RE□UIRED AT TOP O□ ALL GRADED SLOPES□
□□□NO □ILL TO BE PLACED□UNTIL T□E CITY GRADING INSPECTOR □AS INSPECTED AND APPRO□ED T□E BOTTOM E□CA□ATION□
□□□STRAIG□T GRADE S□ALL BE RUN BETWEEN CONTOURS AND SPOT ELE□ATIONS UNLESS OT□ERWISE INDICATED□
□□□ANY DAMAGE DONE WIT□IN T□E PUBLIC RIG□T□O□WAY S□ALL BE REPAIRED AND RESTORED TO T□E SATIS□ACTION O□ T□E CITY O□ SANTA ANA□ DEPT□O□ PUBLIC WOR□S□
□□□I□ CON□LICT BETWEEN DRAWINGS AND SPECI□ICATIONS ARISE□T□E CONTRACTOR S□ALL AS□ □OR CLARI□ICATION □ROM T□E SUPER□ISING ARC□ITECT□ □OWE□ER GENERALLY T□E MOST RESTRICTI□E CONDITION S□ALL BE CONSIDERED T□E SCOPE O□ T□E WOR□□
□8□"GENERAL SPECI□ICATIONS □OR ALL GRADING PLANS"□DEPARTMENT O□ BUILDING AND SA□ETY □ORM B□1□□ IS A PART O□ T□ESE PLANS□ ALL GRADING SLOPES S□ALL BE PLANTED AND SPRIN□LERED□SEC□□1 □□□1 □□ □
□□□OWNER TO OBTAIN PERMISSION □ROM T□E AD□ACENT PROPERTY OWNER□S□□OR GRADING AND CONSTRUCTION O□ RETAINING WALL□
□□□MAN□MADE □ILL S□ALL BE COMPACTED TO A MINIMUM RELATI□E COMPACTION O□ □□% MA□□ DRY DENSITY WIT□IN □□ □EET BELOW □INIS□ GRADE□UNLESS A LOWER RELATI□E COMPACTION □NOT LESS T□AN □□% O□ MA□□DRY DENSITY□IS □USTI□IED BY T□E SOILS ENGINEER□
□1□ TEMPORARY EROSION CONTROL TO BE INSTALLED BETWEEN OCTOBER 1 AND APRIL 1□T□□ OBTAIN GRADING INSPECTOR□S AND DEPARTMENT O□ PUBLIC WOR□S APPRO□AL O□ PROPOSED PROCEDURES□□□□□□ CY□SEC□□1 □□□□□1
□□□ T□E □OLLOWING STATEMENT SIGNED BY BOT□ T□E SOILS ENGINEER AND GEOLOGIST□ S□ALL BE ON T□E □INAL PLANS□

"T□IS PLAN □AS BEEN RE□IEWED AND CON□ORMS TO RECOMMENDATIONS O□ SOILS ENGINEERING□GEOLOGIC REPORTS BY □S□E□□□□□r□□ □□DATED M□□□□□□□18□"

SIGNATURE AND DATE□ □□□□□□□□



CONSTRUCTION NOTES□

1. PRO□IDE AND INSTALL □DPE DRAIN PIPE PER SPECI□ICATIONS□ RE□ER TO PLAN □OR SI□E□
2. CONSTRUCT CATC□ BASIN □CB1□PER DETAIL 1/C3.01
3. CONSTRUCT CLEANOUT
4. CONSTRUCT RIBBON GUTTER PER DETAIL 3/C3.01
5. CONSTRUCT CURB AND GUTTER PER DETAIL 6/C3.01
6. CONSTRUCT CURB PER DETAIL 2/C3.01
7. CONSTRUCT CATC□ BASIN □CB□□PER DETAIL 1/C3.01
8. CONSTRUCT □UNCTION STRUCTURE PER DETAIL 5/C3.01
9. PRO□IDE AND INSTALL REM□TRITON CRESCENT PIPE SCREEN WIT□ DE□LECTOR PLATE PER DETAIL 11/C3.01
10. PRO□IDE STENCIL PER DETAIL 4/C3.01
11. CONSTRUCT IN□ILTRATION TRENC□ PER DETAIL 7/C3.01
12. CONSTRUCT 6"Ø PVC PERFORATED PIPE PER DETAIL 1/C3.01
13. CONSTRUCT O□ER□LOW PAR□WAY CUL□ERT PER DETAIL 1/C3.02, 5/C3.01
14. CONSTRUCT MONITORING WELL□ 3/C3.02
15. REMO□E E□ISTING DRI□EWAY APPROAC□□CURB AND GUTTER AND CONSTRUCT NEW CURB AND GUTTER AND PAR□WAY PER DETAIL 2/C3.02
16. CONSTRUCT ASP□ALT PA□EMENT PER DETAIL 8/C3.01
17. REMO□E E□ISTING DRI□EWAY□CURB AND GUTTER AND CONSTRUCT NEW DRI□EWAY TO MATC□ T□E E□ISTING□

NOTE□
T□IS SITE WILL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WIT□ CALI□ORNIA REGIONAL WATER □UALITY CONTROL BOARD SANTA ANA REGION ORDER NO□R8□□□□□□□□□ DISC□ARGE RE□UIREMENTS □MS□ PERMIT□□ CONTACT MINDY LY □1 □□□□□□□□□ □OR ADDITIONAL IN□ORMATION□

NOTE□
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E□CLUSI□E UNDERGROUND□NON□E□CLUSI□E SUR□ACE□PUBLIC UTILITY EASEMENT

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PRELIMINARY GRADING AND DRAINAGE PLAN

DATE	8/08/19
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DRAWN	N.A.
JOB#	AEI-19-0721
SHEET#	C1.01

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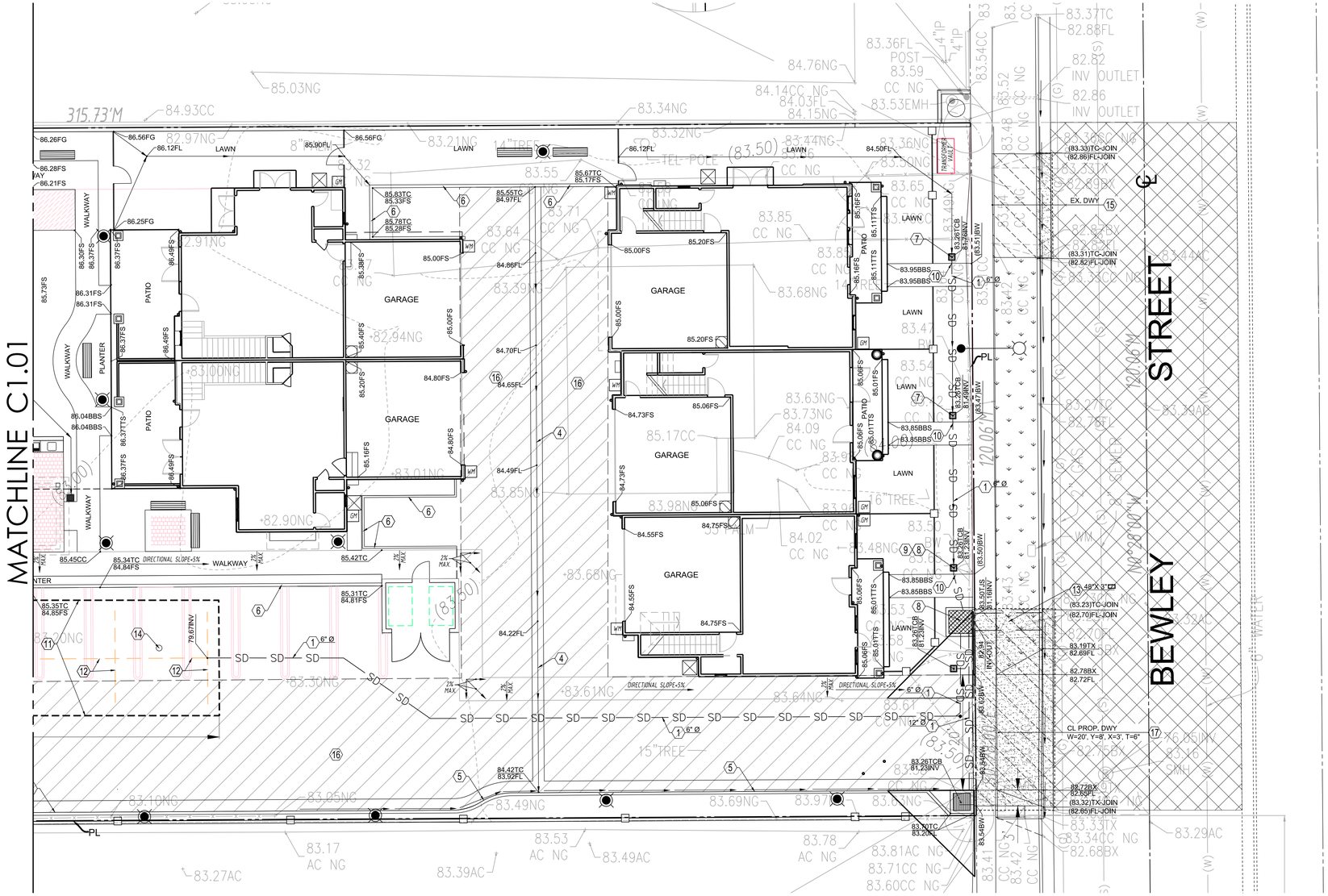

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LEGEND O□ PA□EMENT ALONG RIG□T O□ WAY □

- REMOVE EXISTING CONCRETE
- CONSTRUCT CEMENT CONCRETE DRIVEWAY APPROACH CURB AND GUTTER AND SIDEWALK WHERE OCCURS PER CITY STANDARD
- REMOVE EXISTING ASPHALT FULL DEPTH AND CONSTRUCT NEW ASPHALT TO MATCH THE EXISTING
- REMOVE EXISTING LANDSCAPE AND INSTALL NEW SOD NEW TREES PER CITY STANDARD
- GRIND 2" – 2.5" ASPHALT PAVEMENT AND OVERLAY FROM GUTTER LIP TO GUTTER LIP

CONSTRUCTION NOTES□

1. PRO□IDE AND INSTALL □DPE DRAIN PIPE PER SPECI□ICATIONS□ RE□ER TO PLAN □OR SI□E□
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15. REMO□E E□ISTING DRI□EWAY APPROAC□□CURB AND GUTTER AND CONSTRUCT NEW CURB AND GUTTER AND PAR□WAY PER DETAIL□ 1/C3.02
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SHEET#	C1.02

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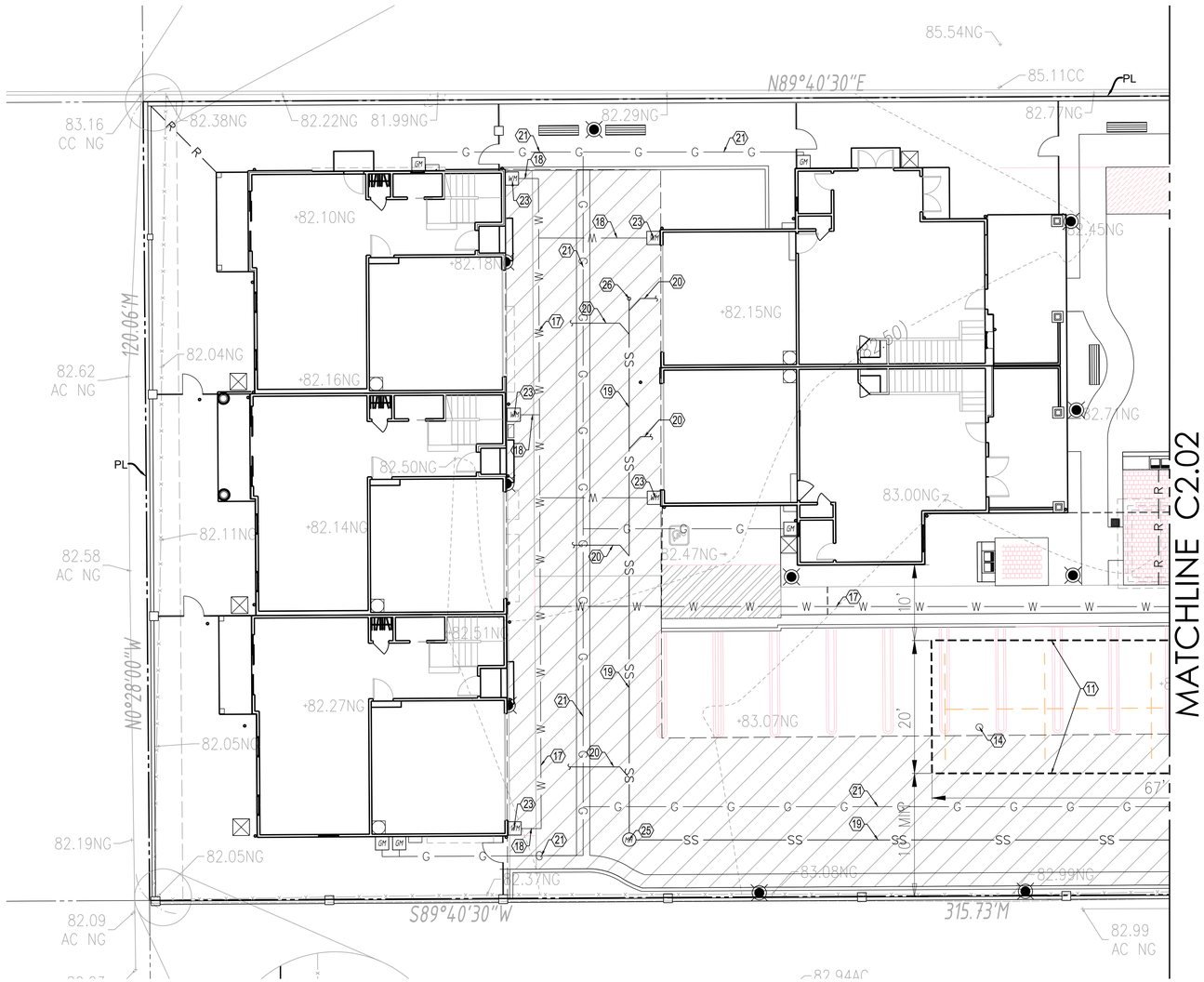

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11. CONSTRUCT IN□ILTRATION TRENC□ PER DETAIL□ 7/C3.01
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13. CONSTRUCT MONITORING WELL□
15. CONSTRUCT □" PRI□ATE WATERLINE TO BE CONNECTED DIRECTLY TO T□E CITY PUBLIC WATER MAINS□
18. CONSTRUCT WATER LINE
19. CONSTRUCT 8" PRI□ATE SEWER MAIN CONNECTED TO T□E CITY PUBLIC SEWER SYSTEM□
20. CONSTRUCT □" SEWER LINE□
21. CONSTRUCT GAS LINE□
22. CONSTRUCT BAC□□LOW PRE□ENTER □OR LANDSCAPE IRRIGATION WATER LINE□
23. CONSTRUCT DOMESTIC COMBINATION BAC□□LOW ASSEMBLY PER CITY O□ SANTA STANDARD PLAN NO□1 □□□□
24. CONSTRUCT TRANS□ORMER □AULT BY OT□ERS□
25. CONSTRUCT MAN□OLE PER DETAIL 4/C3.02
26. CONSTRUCT TERMINAL CLEANOUT STRUCTURE PER DETAIL 5/C3.02
27. CONSTRUCT □" REDUCED PRESSURE BAC□ □LOW PRE□ENTER
28. INSTALL A STREET LIG□T IN PAR□WAY PER CITY STANDARDS AND CONNECT TO T□E POWER GRID□

NOTE□
ALL E□ISTING AND PROPOSED UTILITIES SER□ING T□IS PRO□ECT S□ALL BE UNDERGROUND□

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PRELIMINARY UTILITY PLAN

DATE	8/08/19
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SHEET#	C2.01

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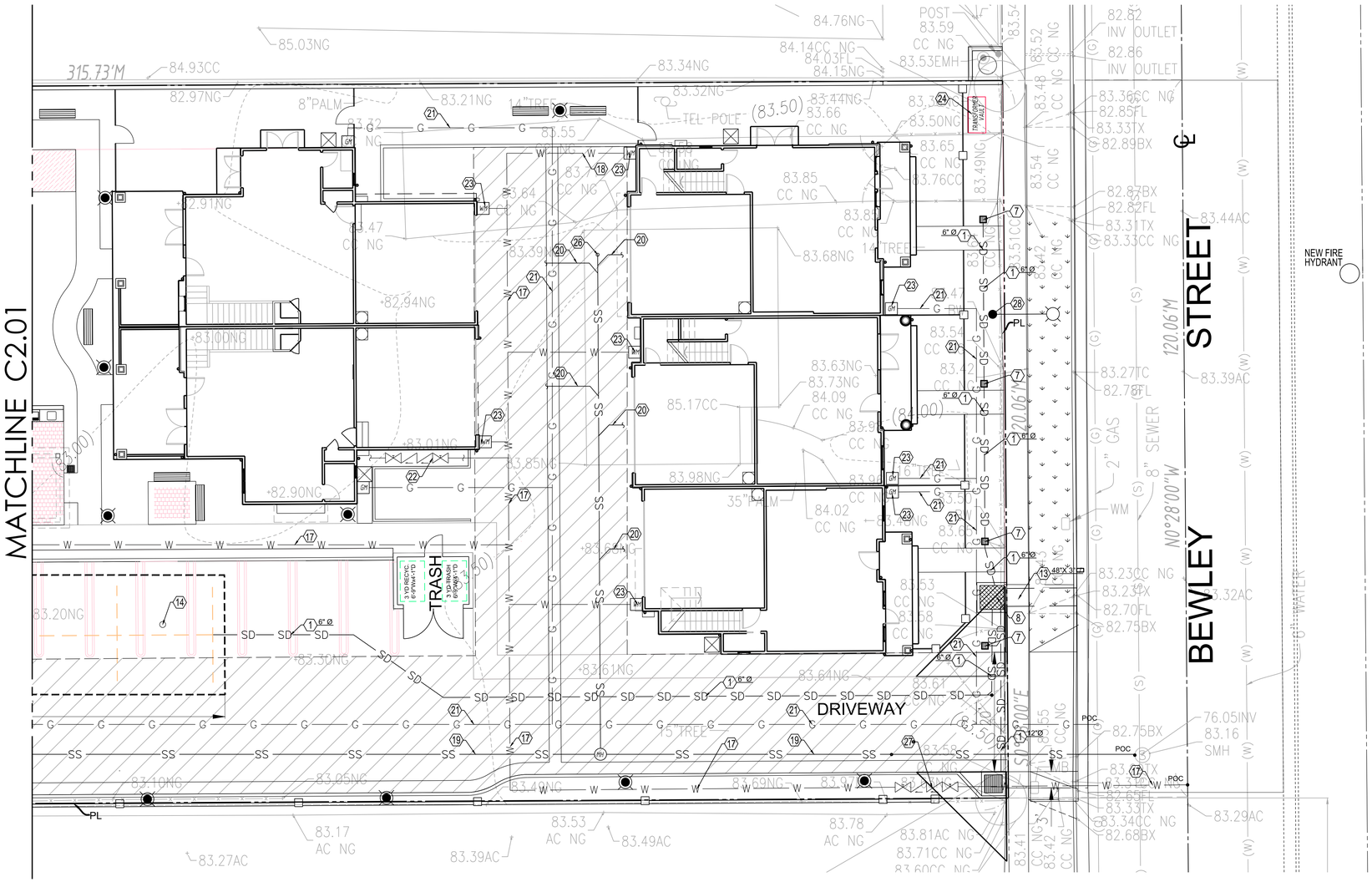

CONSTRUCTION NOTES

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2. CONSTRUCT CATC□ BASIN □CB1□PER DETAIL (1/C3.01)
3. CONSTRUCT CLEANOUT□
4. CONSTRUCT CATC□ BASIN □CB□□PER DETAIL (1/C3.01)
8. CONSTRUCT □UNCTION STRUCTURE PER DETAIL (5/C3.01)
11. CONSTRUCT IN□ILTRATION TRENC□ PER DETAIL□(7/C3.01)
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25. CONSTRUCT MAN□OLE PER DETAIL (4/C3.02)
26. CONSTRUCT TERMINAL CLEANOUT STRUCTURE PER DETAIL (5/C3.02)
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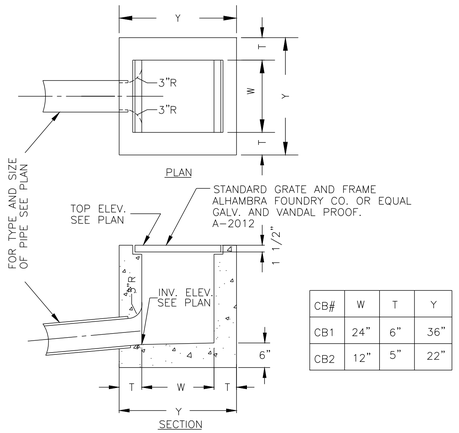
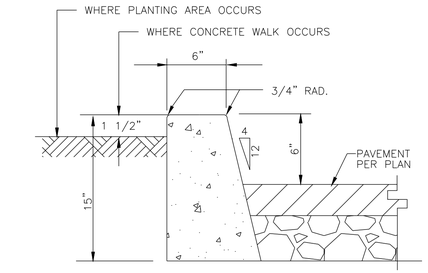


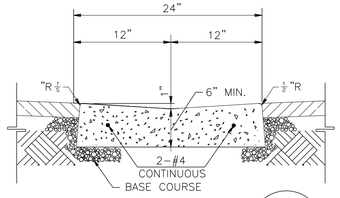
CB#	W	T	Y
CB1	24"	6"	36"
CB2	12"	5"	22"

CATCH BASIN
NOT TO SCALE — 1 C3.01



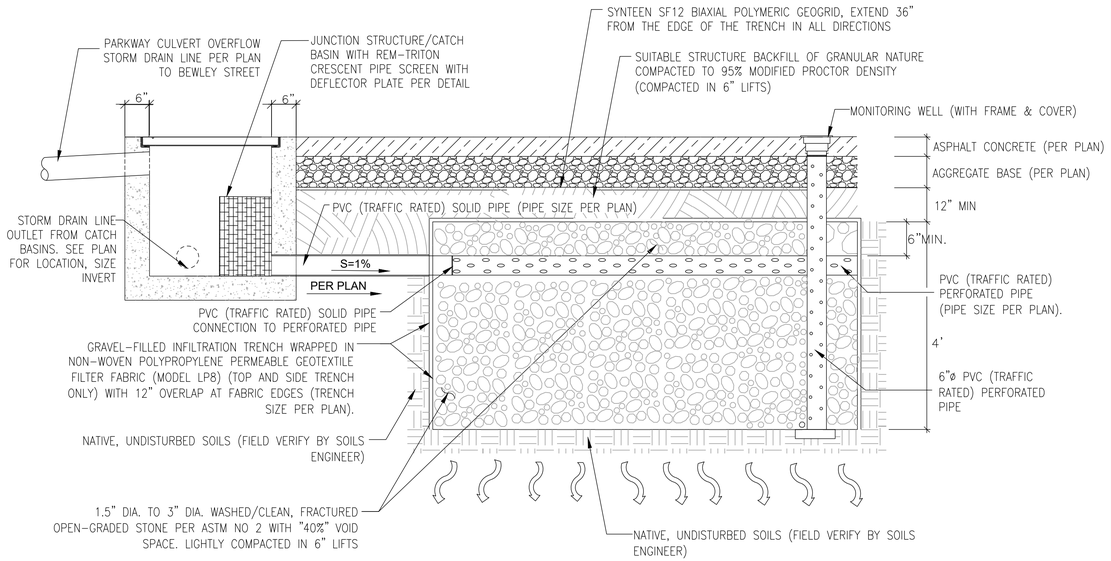
CONCRETE CURB & GUTTER DETAIL
NOT TO SCALE — 2 C3.01

NOTE:
1. PROVIDE EXPANSION @ 30'-0" O.C. MAX. PER DETAIL 9/C3.01
2. PROVIDE WEAK PLANE @ 10'-0" O.C. MAX. PER DETAIL 10/C3.01

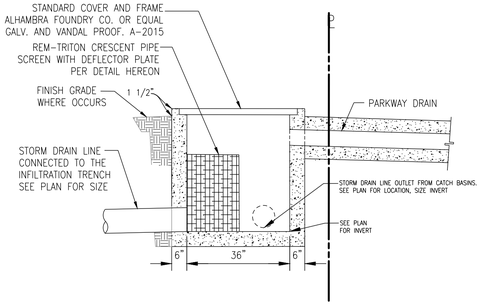


RIBBON GUTTER DETAIL
NOT TO SCALE — 3 C3.01

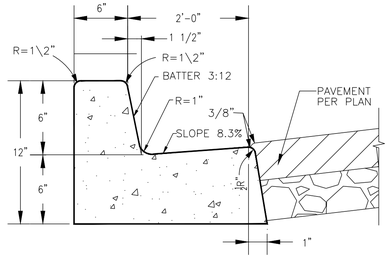
STENCIL DETAIL
NOT TO SCALE — 4 C3.01



INFILTRATION TRENCH DETAIL
NOT TO SCALE — 7 C3.01



JUNCTION STRUCTURE DETAIL
NOT TO SCALE — 5 C3.01

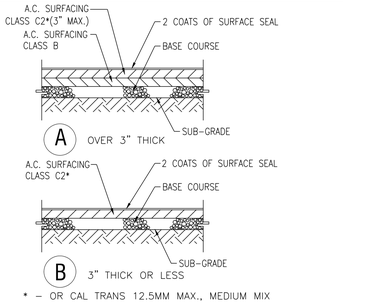


NOTES:

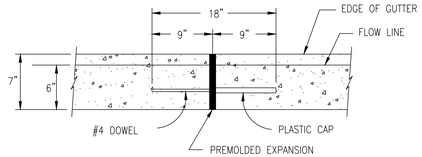
2. THE FLOW LINE SHALL HAVE A 3" WIDE SMOOTH STEEL TROWEL FINISH.

CONCRETE CURB & GUTTER DETAIL
NOT TO SCALE — 6 C3.01

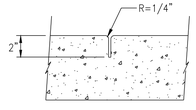
LOCATION	ASPHALT CONCRETE THICKNESS	ASPHALT CONCRETE CLASS	BASE COURSE THICKNESS: EXISTING PAVED SITE	BASE COURSE THICKNESS: NEW UNPAVED SITE	BASE COURSE TYPE	BASE COURSE GRADE
DRIVEWAY TO DWELLING AREAS, PARKING, FIRE LANE	3"	C2*	4"	4"	CAB	FINE
DRIVEWAY FOR TRASH & DELIVERY TRUCKS	4" / 2"	C2* / B	6"	6"	CAB	FINE



TYPICAL A.C. PAVEMENT
NOT TO SCALE — 8 C3.01



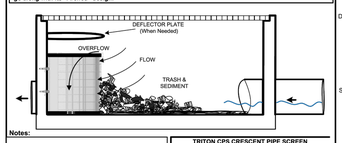
EXPANSION JOINT
NOT TO SCALE — 9 C3.01

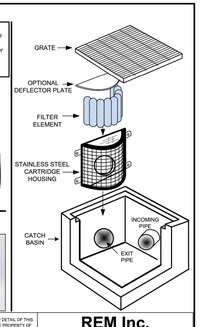


WEAK PLANE JOINT
NOT TO SCALE — 10 C3.01

REM TRITON CPS Series (Crescent Pipe Screen)

REM designed the TRITON CPS Filter Series to provide a highly adaptable solution that allows the flexibility to maximize the filter treatment flow rates and TRASH capturing capacity. TRITON CPS filters are designed to capture trash and debris, and may be utilized in new construction or retrofitted in existing catch basin structures. They are sized to spec or modified in the field for drains with unusual dimensions and unique frame and grates. Optional filter elements may be easily removed when servicing. Media strategy may be optimized for specific pollutant concerns. ***Constructed with 10 Gauge Type 304 Welded Stainless Steel, the REM CPS unit offers superior strength to go along with its "Arched" design.***





Notes:

- *The TRITON - Crescent Series Filters are available in sizes to fit most industry standard pipes and catch basins. Custom sizes are also available to fit most applications.*
- *Filter cartridge housings are constructed utilizing 10 Gauge Type 304 Stainless Steel, with 2" welded square openings.*
- *Removable CPS trays are constructed utilizing over 90% recycled ABS plastic.*
- *Filter medium is configured with REM FOG media, charged to capture hydrocarbons, trash and debris. Additional media options are BFTG, (also including trash and debris guard) and BFTG, (also including Activated Carbon (AC), Zeolite (ZEO) and mixed blends there of.)*
- *Replacement Media-Pak's are easily removed for servicing.*
- *Filter designs include a high flow overflow bypass to eliminate pooling or flooding during heavy rain events.*
- *Optional Deflector Plate routes flow onto the filtering side of filter. Certain application may not need this option.*
- *See our Specifier Sheet for sizes, and flow rates.*
- *Maintenance information and replacement media packs are available upon request by contacting REM at sales@remfilters.com or (888) 526-4736.*

TRITON CPS CRESCENT PIPE SCREEN SERIES FILTER
By REM Inc. (888.526.4736)

MADE IN USA

CPS size may vary by catch basin. Taller cartridge options provide greater volume capacity and increased treatment rates.

THE DESIGN AND DETAIL OF THIS DRAWING IS THE PROPERTY OF REM INC. AND MAY NOT BE USED, EXCEPT IN CONNECTION WITH OUR WORK, DESIGN AND INVENTION RIGHTS ARE RESERVED.

PATENT PENDING

PH: (888) 526-4736

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

DRAWN BY:	FOR:	REV
C.F.	Inline Filtering	
SCALE: NTS	DATE: 3/1/2015	SHT: 1 OF 1

REM Inc.
TRITON CPS SERIES
(Crescent Pipe Screen)

SPECIFIER CHART TRITON CRESCENT FILTERS	FILTERING OF LATERAL PIPES (1" THRU 20" Dia.)	MEDIA REM - BFTG* FILTERED Flow Rate	MEDIA REM - FOG** FILTERED Flow Rate	MEDIA REM - FOG & BFTG*** FILTERED Flow Rate	TOTAL FILTER BYPASS Flow Rate	DEBRIS HOLDING CAPACITY
MODEL:	*(inch)*	CFS	CFS	CFS	CFS	CUBIC FEET
10" CRESCENT	1" TO 7" Dia.					
TR10 -.5 (8) Crescent § (Standard)		0.82	0.19	0.19	2.57	5.94
TR10 -.5 (16) Crescent		1.54	0.4	0.4	2.57	11.88
TR10 -.5 (32) Crescent		2.6	0.81	0.81	2.57	23.76
14" CRESCENT	1" TO 10" Dia.					
TR14 -.5 (8) Crescent § (Standard)		1.31	0.35	0.35	6.58	5.82
TR14 -.5 (16) Crescent		2.46	0.72	0.72	6.58	11.6
TR14 -.5 (32) Crescent		4.91	1.45	1.45	6.58	23.2
24" CRESCENT	1" TO 20" Dia.					
TR24 -.5 (17) Crescent § (Standard)		5.15	1.21	1.21	25.65	11.4
TR24 -.5 (34) Crescent		10.3	2.42	2.42	25.65	22.32

Notes:

§ Standard cartridge configuration for the TRITON Crescent Series filter. Please specify if larger capacity cartridges are required. For shallow catch basins, choose the smaller cartridge heights. The cartridge heights are listed in the ( ) of the model number. Depending upon available space, height adjustments can be made for shallow catch basin configurations. There should be at least 4 to 6" of head space between the top of the filter and the grate. This allows for adequate flow through with the Overflow Port when needed.

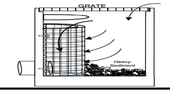
* REM - BFTG: Bioflex (BFTG) Media is designed to capture debris, trash and sediment while sustaining very high treatment rates. Mesh density of 3.5 ounces per square foot minimizes occlusion and blinding while capturing 100% of particles at 5mm or greater in size.

** REM - FOG: The FOG media is housed in a mono-filament weaved geotextile containment pack. FOG media effectively encapsulates liquefied petroleum hydrocarbons (Fats, Oils & Grease including animal fats). It's highly hydrophobic characteristic allows for increased polish of flow resulting in the reduction of Total Suspended Solids (TSS). TSS reduction includes (but is not limited to) debris, trash, silt, sediment and agglomerated heavy metals. REM- FOG is the standard media that is configured for Top Hats. Media options for other pollutants and particulate sizes are also available.

*** REM - FOG -BFTG: Media configuration utilizes both BFTG and FOG media strategies. The BFTG Media serves as a pre-screen to treat for larger debris, such as trash, leaves etc... The FOG media pack captures finer suspended solids and liquefied hydrocarbons.

**** Filter debris holding capacities can be modified to utilize the maximum dimensions of each specific catch basin. Volumes will either Increase or decrease depending upon the size of the catch basin and the cartridge size used. Volume capacities that are shown are based on the catch basin filters Standard inside wall dimensions for that filter. The volumes that are listed here are based on a 3' X 3' catch basin.

REM technical support is available to assist with TRITON Series filter configurations, media strategies and customization of models.



Revel Environmental Manufacturing Inc.
sales@remfilters.com (888) 526-4736 Lic. No. 857410
REM www.remfilters.com
Northern California 960-B Detroit Avenue Concord, California 94518 P: (925) 676-4736 F: (925) 676-8676
Southern California 2110 South Grand Avenue Santa Ana, California 92705 P: (714) 557-2676 F: (714) 557-2679

Filter Series	Drawing No.	Date	Sheet
TRITON CRESCENT FILTER	TCF -0001	3/3/2013	1 of 1

REM TRITON CRESCENT PIPE FILTER DETAIL
NOT TO SCALE — 11 C3.01

P.A. ARCA ENGINEERING, INC.
500 East Carson Plaza Drive, Suite 201, Carson, CA 90746
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www.paarcaengineering.com
Civil Engineers / Land Surveyors

PE/RCE ARCA RCE 8/18 — DATE 8/8/19

REVISIONS

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Santa Ana CA 92705
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PERFECTO A. ARCA, P.E.
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Exp. 3-31-21
CIVIL
STATE OF CALIFORNIA

BEWLEY STREET 10 UNIT CONDOMINIUM DEVELOPMENT
1122 N. BEWLEY ST.
SANTA ANA, CA

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DETAIL

DATE	8/08/19
SCALE	SEE PLAN
DRAWN	N.A.
JOB#	AEI-19-0721
SHEET#	C3.01

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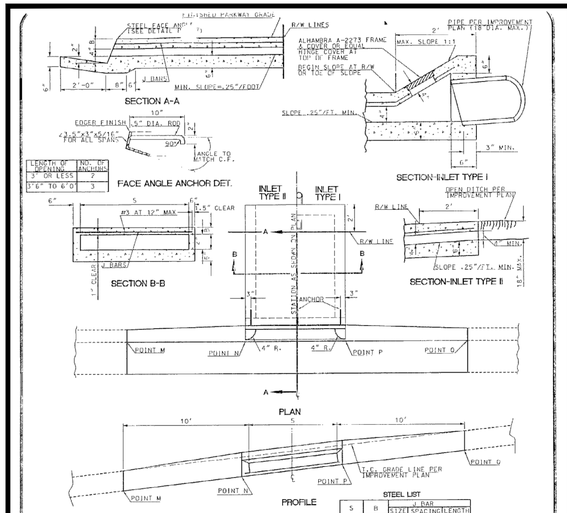


STEEL LIST

S	B	A BAR SIZE	A BAR SPACING	A BAR LENGTH
1'-0"	1'-0"	#3	12"	1'-9"
1'-6"	"	"	"	2'-3"
2'-0"	"	"	"	2'-9"
2'-6"	"	"	"	3'-3"
3'-0"	"	"	"	3'-9"
3'-6"	"	"	6"	4'-3"
4'-0"	"	"	5"	4'-9"
4'-6"	4"	"	6.5"	5'-3"
5'-0"	"	"	5"	5'-9"
5'-6"	"	"	4"	6'-3"
6'-0"	"	"	3.5"	6'-9"

NOTES:
1. NORMAL CURB FACE AT POINT M & Q. B = 5" AT POINTS N & P.
2. FLOOR OF CULVERT TO BE TROWELED SMOOTH.
3. ALL EXPOSED METAL SHALL BE GALVANIZED AFTER FABRICATION. ALL EXPOSED CAST IRON FIXTURES SHALL HAVE A BITUMINOUS COATING.
4. CONCRETE SHALL BE 560-C-3250.
5. TOP OF INLET STRUCTURES (TYPE I & II) SHALL BE FLUSH WITH ADJACENT SURFACE WHERE POSSIBLE.
6. SEE STANDARD #319 FOR DETAIL OF GRATED INLET.
7. FOR OPEN DITCH APPROACH (TYPE II), EXTENSION BEYOND R/W LINE IS NOT REQUIRED WHEN BACK OF WALK IS 2' OR MORE FROM R/W LINE.
8. INLET TYPE TO BE SPECIFIED ON IMPROVEMENT PLAN.

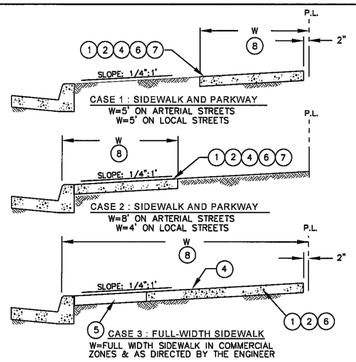
APPROVED: DATE: 1-3-00
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE	REVISION

PARKWAY CULVERT TYPE 'A' | STD. PLAN NO. 318

PARKWAY CULVERT DETAIL 1
NOT TO SCALE C3.02



1. CONCRETE SHALL BE CLASS 520-C-2500, CONFORMING TO SUBSECTION 201-1 OF THE STANDARD SPECIFICATIONS.
2. SIDEWALK THICKNESS = 4" (SEE ALLEY APRON AND DRIVEWAY APPROACH STANDARD PLANS FOR THICKNESS.)
3. PROVIDE 1/4" THICK EXPANSION JOINTS PER SECTION 303-5.4.2 OF THE STANDARD SPECIFICATIONS AT THE BC AND EC OF ALL WALK RETURNS, AROUND ALL UTILITY POLES. EXPANSION JOINT MATERIAL SHALL CONFORM TO SUBSECTION 201-3.2 OF THE STANDARD SPECIFICATIONS "PREMOLDED JOINT FILLER".
4. TRANSVERSE WEAKENED PLANE JOINTS SHALL BE PROVIDED PER SECTION 303-5.4.3 OF THE STANDARD SPECIFICATIONS.
5. CONSTRUCT 3'X3' TREE WELLS AT BACK OF CURB PER STD. PLAN NO. 1124 AND AS SHOWN ON PLANS. FOR LARGE TREES EXTEND THE TREE WELLS AS DIRECTED BY THE ENGINEER.
6. PRESERVE HISTORIC CONCRETE FEATURES. CONTRACTOR SHALL COORDINATE REMOVALS IN THE CIVIC CENTER/DOWNTOWN AREA WITH THE ENGINEER TO ENSURE PRESERVATION OF HISTORIC FEATURES.
7. LANDSCAPE PER PARKWAY IMPROVEMENT GUIDELINES FOR CASE 1 AND 2.
8. WHERE THERE ARE RIGHT-OF-WAY OR OTHER CONSTRAINTS, WIDTH "W" MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

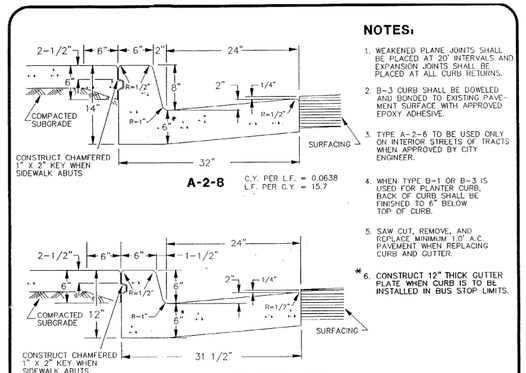
APPROVED: DATE: 3-22-16
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE	REVISION

SIDEWALK DETAILS | STD. PLAN NUMBER 1104

SIDEWALK DETAIL 2
NOT TO SCALE C3.02



NOTES:
1. WEAKENED PLANE JOINTS SHALL BE PLACED AT 20' INTERVALS AND EXPANSION JOINTS SHALL BE PLACED AT ALL CURB RETURNS.
2. B-3 CURB SHALL BE DOWELED AND BONDED TO EXISTING PAVEMENT SURFACE WITH APPROVED EPOXY ADHESIVE.
3. TYPE A-2-6 TO BE USED ONLY ON INTERIOR STREETS OF TRACTS WHEN APPROVED BY CITY ENGINEER.
4. WHEN TYPE B-1 OR B-3 IS USED FOR PLANTER CURB, BACK OF CURB SHALL BE FINISHED TO 6" BELOW TOP OF CURB.
5. SAW CUT, REMOVE, AND REPLACE MINIMUM 1.0' A.C. PAVEMENT WHEN REPLACING CURB AND GUTTER.
6. CONSTRUCT 12" THICK GUTTER PLATE WHEN CURB IS TO BE INSTALLED IN BUS STOP LIMITS.

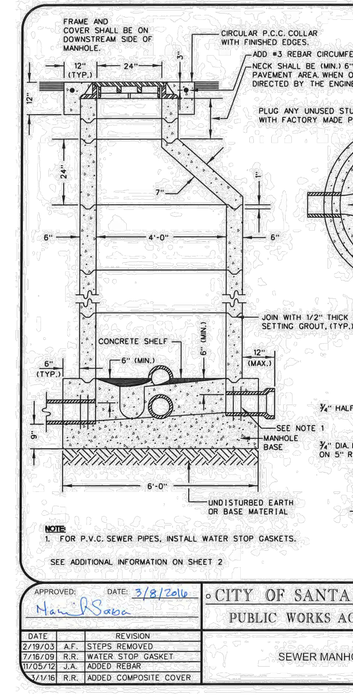
APPROVED: DATE: 12-22-88
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE	REVISION
6-29-91	ADD NOTE *6
10/21/96	CHANGE B-1 & 3 TO 10" C.F.

CONCRETE CURB AND GUTTER | STD. PLAN NUMBER 1101

CONCRETE CURB AND GUTTER DETAIL 3
NOT TO SCALE C3.02



SHEET 1 OF 2

NOTE:
1. FOR P.V.C. SEWER PIPES, INSTALL WATER STOP GASKETS.

SEE ADDITIONAL INFORMATION ON SHEET 2

APPROVED: DATE: 3/8/2016
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
2/19/03	A.F.	STEPS REMOVED
7/16/09	R.R.	WATER STOP GASKET
11/05/12	J.A.	ADDED REBAR
3/1/16	R.R.	ADDED COMPOSITE COVER

SEWER MANHOLE | STD. PLAN NUMBER 1201

SHEET 2 OF 2

NOTES:
1. MANHOLE FRAME AND COVER SHALL BE CAST IRON AND SHALL CONFORM TO A.S.T.M. A-48, CLASS 30. MANHOLE FRAME AND COVER SHALL BE ALHAMBRA FOUNDRY A-1270-C/R OR APPROVED EQUAL. MANHOLE COVER SHALL HAVE 2 PICK HOLES PER DETAIL ON SHEET 1.
2. THE IDENTIFYING WORD "SEWER" SHALL APPEAR ON ALL SANITARY SEWER MANHOLE COVERS.
3. ELEVATION OF THE COVER TO BE DETERMINED BY THE ENGINEER.
4. ALL CONCRETE SHALL BE 560-C-3250 PER STANDARD SPECIFICATIONS, (CURRENT EDITION OF GREENBOOK).
5. BACKFILL MATERIAL TO SUBGRADE SHALL BE SAND, PLACED A MINIMUM OF 2 FEET LATERALLY AROUND STRUCTURE.
6. WHERE MANHOLE HAS 1 OR 2 INLETS AND 1 OUTLET, PLACE THE COVER DOWNSTREAM AND AWAY FROM PIPES.
7. THE TOP SURFACE OF THE SHELVES SHALL BE SLOPED DOWNWARD TOWARD THE CENTER OF MANHOLE AT THE RATE OF 1 INCH PER FOOT. THE HIGHEST ELEVATION OF THE SHELVES SHALL BE 6" MINIMUM ABOVE THE TOP OF PIPE OF THE MAIN SEWER LINE. CHANNELS AND SHELVES SHALL HAVE A SMOOTH STEEL TROWEL FINISH.
8. MANHOLES SHALL BE PRECAST NON-REINFORCED CONCRETE EXCEPT THAT THE CONTRACTOR, AT HIS OPTION AND EXPENSE, MAY FURNISH REINFORCED PRECAST MANHOLES CONFORMING TO SECTION 70-1.02H OF THE STATE STANDARD SPECIFICATIONS, (CURRENT EDITION).
9. SOFFIT OF MAIN LINE BRANCHES AND LATERALS SHALL MATCH SOFFIT OF TRUNK SEWER.
10. RIGHT ANGLE TURN OF MANHOLE'S CHANNEL SHALL HAVE A MINIMUM DROP OF 0.20 FEET.
11. MAINTAIN THE SLOPE OF THE SEWER MAIN IN THE MANHOLES WITH A STRAIGHT THROUGH CHANNEL, IF NO INLET-OUTLET ELEVATIONS ARE SHOWN ON THE PLANS.
12. MANHOLE SHALL NOT HAVE STEPS. IF PRE-CAST MANHOLE IS MANUFACTURED W/ STEPS, CONTRACTOR SHALL AT HIS EXPENSE, REMOVE THE STEPS PRIOR TO INSTALLATION.
13. INSTALL #3 REBAR CIRCUMFERENTIAL TO THE P.C.C. COLLAR, 3" BELOW FINISHED GRADE
14. COMPOSITE MANHOLES AS MANUFACTURED BY EJ BEING H-20 TRAFFIC RATED MAY BE INSTALLED SUBJECT TO THE APPROVAL OF THE ENGINEER.

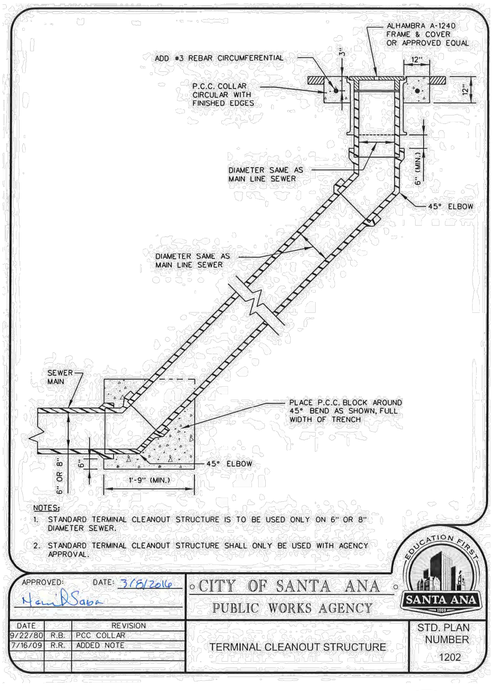
APPROVED: DATE: 3/8/2016
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
2/19/03	A.F.	STEPS REMOVED
7/16/09	R.R.	SPECIFY MH COVER
11/05/12	J.A.	ADD NOTE 12&13
3/1/16	R.R.	ADDED COMPOSITE COVER

NOTES FOR SEWER MANHOLE AND DROP MANHOLE | STD. PLAN NUMBER 1201

SEWER MANHOLE DETAIL 4
NOT TO SCALE C3.02



NOTES:
1. STANDARD TERMINAL CLEANOUT STRUCTURE IS TO BE USED ONLY ON 6" OR 8" DIAMETER SEWER.
2. STANDARD TERMINAL CLEANOUT STRUCTURE SHALL ONLY BE USED WITH AGENCY APPROVAL.

APPROVED: DATE: 3/8/2016
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
9/22/80	R.B.	PCC COLLAR
7/16/09	R.R.	ADDED NOTE

TERMINAL CLEANOUT STRUCTURE | STD. PLAN NUMBER 1202

TERMINAL CLEANOUT DETAIL 5
NOT TO SCALE C3.02

REVISIONS

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1122 N. BEWLEY ST.
SANTA ANA, CA

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DETAIL

DATE	8/08/19
SCALE	SEE PLAN
DRAWN	N.A.
JOB#	AEI-19-0721
SHEET#	C3.02

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www.paarcaengineering.com
Civil Engineers / Land Surveyors

PERFECTO A. ARCA RCE □□8□18 — 8□8□□1□ DATE

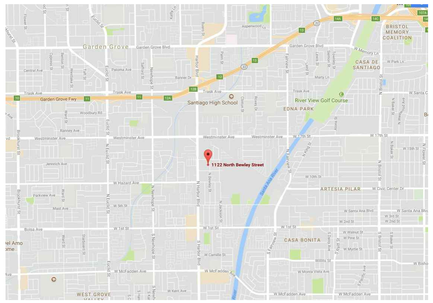
USER: NOEL PLOTTED: 11/14/2019 - 2:25 PM C:\Users\Noel\ypprdata\local\temp\AcPublish_12504\BEWLEY-GRADING.dwg LAYOUT: C3.02

STORMWATER POLLUTION PRE□ENTION PLAN □SWPPP□WET WEAT□ER EROSION CONTROL □WWECP□GENERAL NOTES□

1□ I□ □□□□ □□□□ □r □□□□□□□□□□ □□□□□□□□□□

□ICINITY MAP □

NOT TO SCALE



LEGEND □

PROPERTY LINE	P□ OR
CENTER LINE	C□ OR
C□AIN LIN□ □ENCE	CL□ OR
WOODEN □ENCE	WD□ OR
WROUG□T IRON □ENCE	WI□ OR
E□ISTING CONTOUR LINE	(100.00)
E□ISTING TREE □TRUN□ SI□E NOTED□	X"
E□ISTING GRADE ELE□ATION	+ 1□□□□
ASP□ALT CONCRETE	AC
AREA LIG□T	AL
BOTTOM O□ DRI□EWAY "□"	B□
BAC□ O□ WAL□	BW
CEMENT CONCRETE	CC
COMMUNICATIONS □AULT	C□
EDGE O□ GUTTER	EG
ELECTRICAL MAN□OLE	EM□
□IRE □YDRANT	□□
□LOWLINE	□L
GTE MAN□OLE	GTEM□
IRRIGATION CONTROL □AL□E	IC□
LIG□T STANDARD	LS
NATURAL GROUND	NG
PLANTING AREA	PA
STREET LIG□T □AULT	SL□□
SEWER MAN□OLE	SM□
TOP O□ CURB	TC
TELEP□ONE MAN□OLE	TM□
TRA□□IC SIGNAL PULLBO□	TSPB
TOP O□ DRI□EWAY "□"	T□
WATER METER	WM
WATER □AL□E	W□
YARD BO□□ELEC□GAS□SEWER□UTIL□WATER□	YB□E□G□S□U□W□
CLEAR	CLR□
ENCROAC□	ENCR□

LEGAL DESCRIPTION□

LOT 18 O□ TRACT NO□1□□□ MM □□□□□□1

BENC□MAR□□

□-" OCS ALUMINUM BENC□MAR□ DIS□ STAMPED "1□□1 □□□□□"
SET ON TOP O□ T□E SOUT□WEST CORNER O□ A □ □T BY 1□ □T
CONCRETE CATC□ BASIN□MONUMENT IS LOCATED IN T□E
NORT□EAST PORTION O□ T□E INTERSECTION O□ □ARBOR
BOULE□ARD AND 11T□ STREET□□□EAST O□ T□E CENTERLINE
O□ □ARBOR BOULE□ARD AND □□□NORT□ O□ T□E CENTERLINE
O□ 11T□ STREET□MONUMENT IS SET LE□EL WIT□ T□E
SIDEWAL□□

ELE□ATION = 8□□□1 □NA□D88□YEAR □□1□

1□ □ □ 1□ □□ □□

SCALE□1"=□□□

DISCLAIMER□

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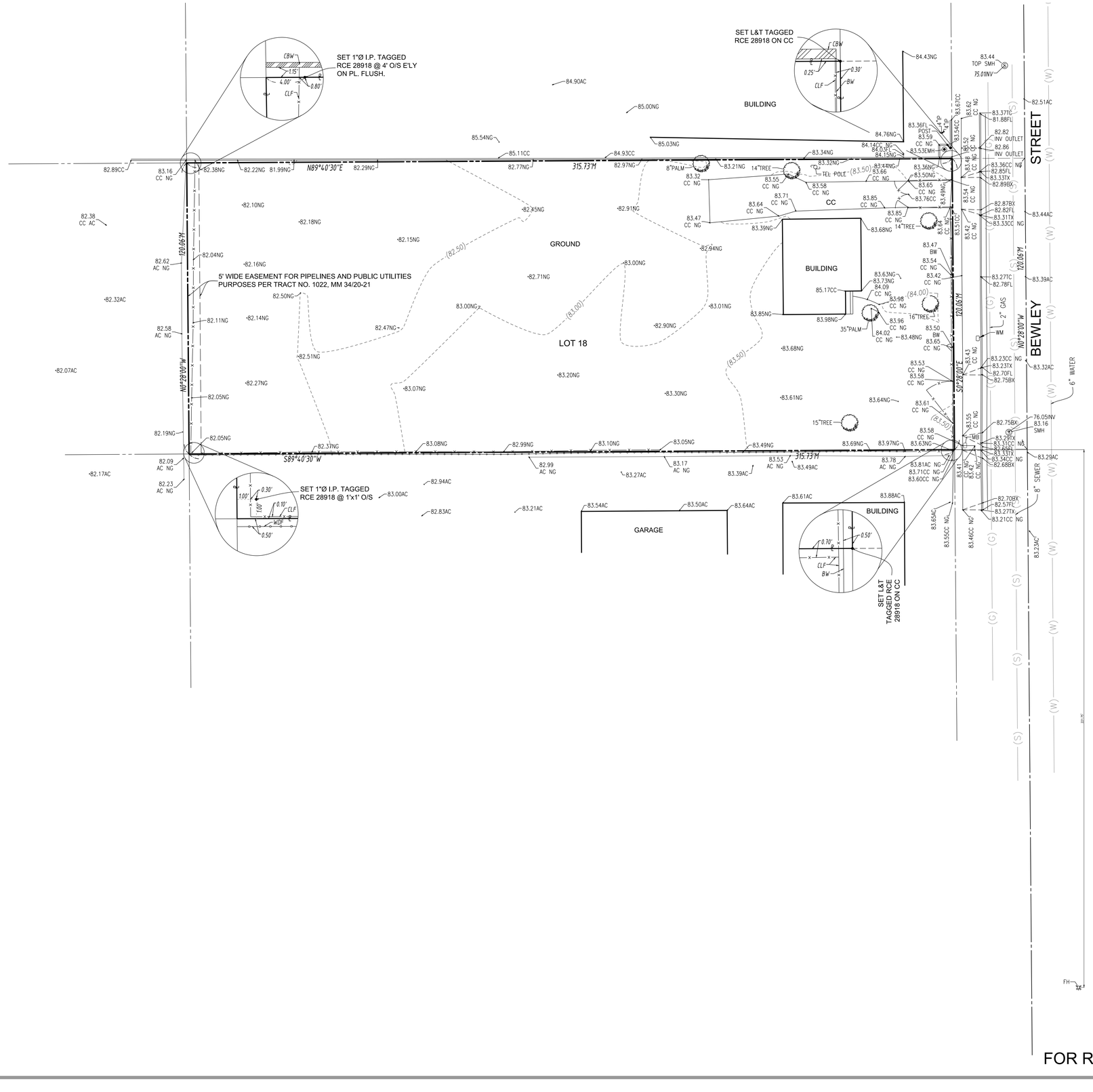

FOR REFERENCE ONLY

	BY
	DATE
	RE□ISIONS

□□□□ ID □18 P.A. ARCA ENGINEERING, INC.A □□□□□ □□□□18

OWNER□CLIENT□ HOANG BUI

PRO□ECT□ BOUNDARY AND TOPOGRAPHIC SURVEY
11□□ N□BEWLEY STREET
SANTA ANA□CA □□□□□

STAMP — PROFESSIONAL ENGINEER — EDWARD A. ARCA, PE — No. 28918 — CIVIL — STATE OF CALIFORNIA — Exp. 6-30-18

PREPARED BY:
P.A. ARCA ENGINEERING, INC.
Civil Engineers / Land Surveyors
550 East Carnon Rioja Drive, Suite 201, Corona, CA 92879
Office (951) 520-1000 ▪ Fax (951) 749-3977
www.paarcaengineering.com

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ATTACHMENT E

SUSCEPTIBILITY MAP ANAHEIM BAY – HUNTINGTON HARBOUR

Susceptibility

Potential Areas of Erosion, Habitat, & Physical Structure Susceptibility

Channel Type

- Earth (Unstable)
- Earth (Stabilized)
- Stabilized

Tidel Influence

- <= Mean High Water Line (4.28')

Water Body

- Basin
- Lake

Federal & Other Lands

- Seal Beach National Wildlife Refuge
- Airports/Military

San Gabriel-Coyote Creek

Los Alamitos Naval Air Station

Seal Beach Naval Weapons Station

Seal Beach National Wildlife Refuge

West Street Retarding Basin

Haster Retarding Basin

Newland Retarding Basin

Lake Huntington

PROJECT SITE

Santa Ana River

Newport Bay

John Wayne Airport

Pacific Ocean

Feet
0
6,500
13,000

TITLE
SUSCEPTIBILITY ANALYIS
ANAHEIM BAY-
HUNTINGTON HARBOR

JOB
ORANGE COUNTY
WATERSHED
MASTER PLANNING
ORANGE CO.

SCALE	1" = 6500'
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	04/22/10
JOB NO.	9526-E

PACE
Advanced Water Engineering
CA

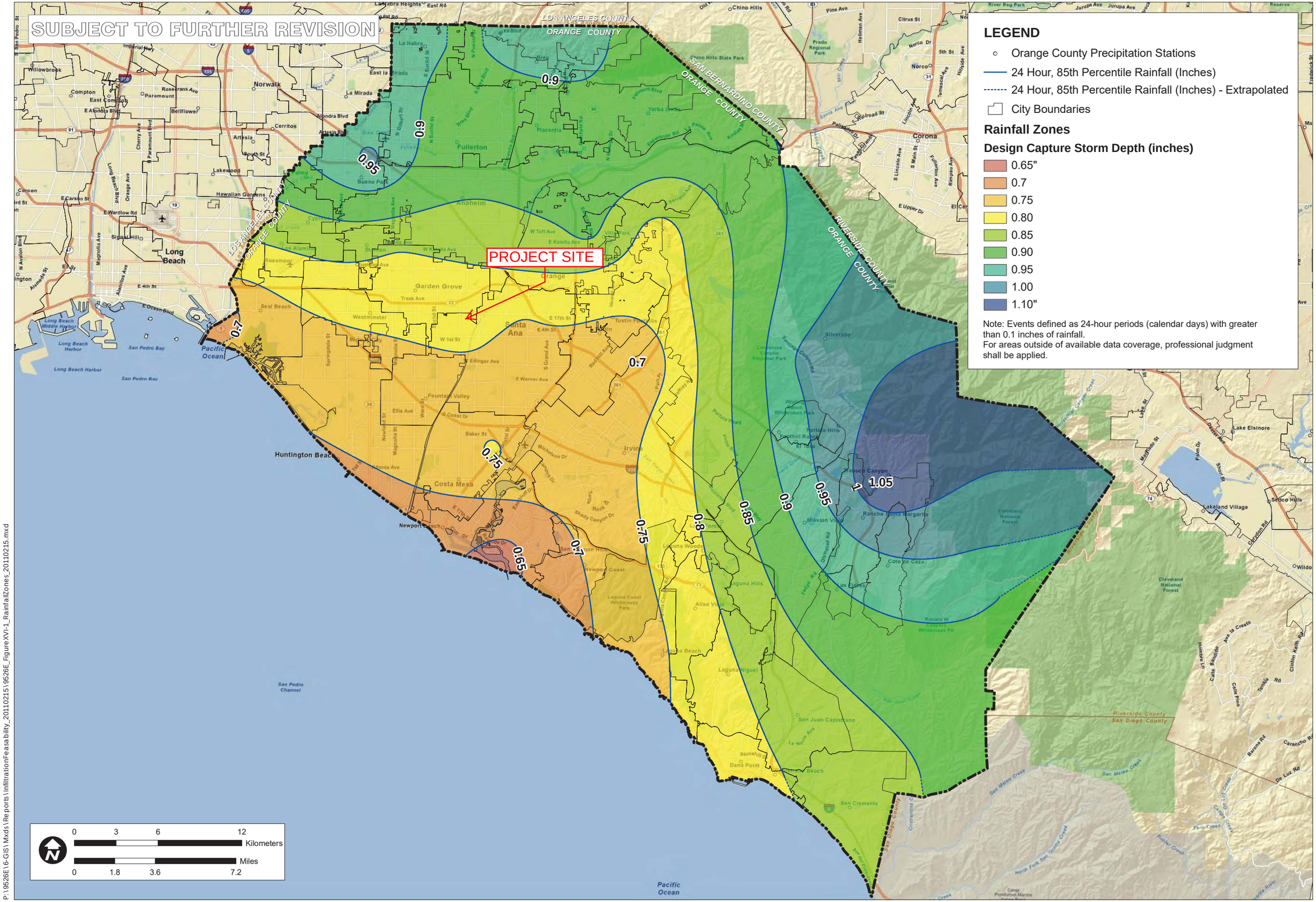
FIGURE
2

P:\9526E\6-GIS\Mxds\Workspace\SusceptibleAnalysis_20100422\9526E_AnaheimBay_20100331.mxd

ATTACHMENT F

RAINFALL ZONE MAP

SUBJECT TO FURTHER REVISION



LEGEND

- Orange County Precipitation Stations
- 24 Hour, 85th Percentile Rainfall (Inches)
- 24 Hour, 85th Percentile Rainfall (Inches) - Extrapolated
- City Boundaries

Rainfall Zones

Design Capture Storm Depth (inches)

- 0.65"
- 0.7
- 0.75
- 0.80
- 0.85
- 0.90
- 0.95
- 1.00
- 1.10"

Note: Events defined as 24-hour periods (calendar days) with greater than 0.1 inches of rainfall.
For areas outside of available data coverage, professional judgment shall be applied.

TITLE: RAINFALL ZONES

JOB: ORANGE COUNTY TECHNICAL GUIDANCE DOCUMENT — ORANGE CO., CA

SCALE	1" = 1.8 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	04/22/10
JOB NO.	9526-E

PACE Advanced Water Engineering

FIGURE XVI-1

P:\9526E\6-GIS\Mxds\Reports\InfiltrationFeasability_20110215\9526E_FigureXVI-1_RainfallZones_20110215.mxd

ATTACHMENT G

NCRS SOIL MAP

SUBJECT TO FURTHER REVISION

PROJECT SITE

LOS ANGELES COUNTY
ORANGE COUNTY
SAN BERNARDINO COUNTY
ORANGE COUNTY
RIVERSIDE COUNTY
ORANGE COUNTY
LOS ANGELES COUNTY
ORANGE COUNTY

LEGEND

City Boundaries

Hydrologic Soil Groups

- A Soils
- B Soils
- C Soils
- D Soils

Source:
Soils: Natural Resources Conservation Service (NRCS)
Soil Survey - soil_ca678, Orange County & Western Riverside
Date of publication: 2006-02-08
http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

0 2.5 5 10 Kilometers
0 1.8 3.6 7.2 Miles

P:\19526E\6-GIS\Mxds\Reports\InfiltrationFeasability_20110215\9526E_FigureXVI-2a_HydroSoils_20110215.mxd

TITLE
NRCS HYDROLOGIC SOILS GROUPS

JOB
ORANGE COUNTY INFILTRATION STUDY
CA
ORANGE CO.

SCALE	1" = 1.8 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	02/09/11
JOB NO.	9526-E

PACE
Advanced Water Engineering

FIGURE
XVI-2a

ATTACHMENT H

INFILTRATION TEST REPORT

ZS Engineering
113 Tomato Springs, Irvine, CA 92618
949-331-3232
info@zs-engineering.com

May 30, 2018
ZS Engineering #180505

Mai-Lan Thi Nguyen
946 S. Emerald Dtreet
Anaheim, CA 92804

Subject : **Field Infiltration Tests Report**
Proposed Multi--Family Residential Complex
1122 N. Bewley Street, Santa Ana, CA 92703
(APN 198-101-07)

Dear Ms. Nguyen:

Pursuant to our proposal, dated May 18, 2018, which was authorized by you, ZS Engineering conducted field infiltration tests within the proposed infiltration trench area near the north-central property boundary of the subject residential lot, located at 1122 N. Bewley Street in the City of Santa Ana, California.

Purpose of this study was to determine the design field infiltration rate of the subsurface soils at the target infiltration trench area. Our scope of services for this study included the following:

- Review of published reports and maps pertinent to local and regional geology within and adjacent to the site that could impact the proposed developments.
- Conduct field exploration consisting of three (3) hand augered bore holes, each 8-inch diameter, drilled to depths varying from 4 to 16 feet. Of these, two (2) holes, 4 and 8 feet deep, were drilled at the target infiltration trench bottom elevations. These holes were converted into infiltration test holes. Remaining 16 feet deep was drilled within the project area for verification of geologic profile below the infiltration trench bottom.
- Pre-soak the infiltration test holes and conduct field infiltration tests. Test holes preparation, pre-soaking and field tests were performed in accordance with the Orange County WQMP Guidelines (see References).

- Prepare this report summarizing the findings from the field tests and recommendations on design infiltration rate for the proposed infiltration trench.

Site Description and Proposed Developments

The subject property is within a developed area on the south side of Westminster Avenue and on the east side of Harbor Blvd. in the City of Santa Ana, California. Santa Ana River trail and Santa Anita Park/golf course are located to the near east, southeast of this site. Developments surrounding the site is mostly residential and some commercial. Site location and its vicinities are shown in Figure 1, *Site Location Map*. Topography within the site and its surroundings is fairly flat.

This property is a rectangular shaped parcel of 37,800 sq. feet (~0.87 acre) gross lot area with dimensions about 315 feet along the east-west and about 120 feet along the north-south direction. Previously, this lot was occupied with a single-family home, a detached garage, and a detached guest house within the eastern portion of the lot. Western portion of the lot was a yard, vacant of any structures. At the time of this field exploration, demolition was ongoing at the site. Majority of the structures, except the main building at the front, had already been demolished and cleared off the site. This property was originally developed in 1945.

Based on the project site plan, prepared by YNG Architects (see References), we understand that all the previous structures at the site will be demolished. There will be a new multi-family residential complex. It will have four (4) 2-story buildings with multi-family units and attached garages. Site improvements will include driveways, parking lots, open space patios, a trash enclosure, green areas, landscaping, perimeter walls, etc.

As a part of the developments, there will be a shallow infiltration trench near the north-central boundary of the site (see the Exhibit). Depth of this trench will vary from 4 to 8 feet. Purpose of this study is to determine the field infiltration rate of subsurface soils within the target infiltration trench area.

Field Exploration

On May 28, 2018, we conducted field exploration consisting of three (3) 8-inch diameter (outside) bore holes, B-1, P-1 and P-2, within the project infiltration trench area. Of these, bore holes P-1 and P-2, depths 4 and 8 feet, respectively, were drilled to the target bottom elevations of the proposed infiltration trench. Remaining bore hole B-1 was drilled to a depth 16 feet for verification of subsurface geologic profile below the infiltration trench bottom. Drilling for these

holes was conducted utilizing a hand auger and hand tools. Approximate bore hole locations are shown on Figure 2, *Site Plan and Exploration Map*.

During drilling, subsurface geologic profiles as encountered within each hole were visually observed and described in general conformance with the Unified Soil Classification System (USCS) as defined in the ASTM D2487. Soil descriptions were entered on the field exploration logs (Appendix A).

After drilling of the test holes P-1 and P-2 to target depths, a 2-inch thick layer of 1/2-inch size open graded gravel was placed at the bottom of each hole. The test holes were prepared in accordance with the Orange County Guidelines for WQMP (see References). After completion of the field infiltration tests, all drilled holes were backfilled with the excavated soil spoils.

Geotechnical Findings

Subsurface soils, as encountered within the drilled holes, consist of light gray color silty fine sand within upper about 5 feet. Soils below 5 feet and up to a depth about 12 feet are predominantly sand with few to little silts, light gray to light brown color, mottled. Sand grains within depths 5 to 8 feet are fine to medium grained. Coarse grained sands are encountered within depths about 8 to 12 feet - gradually more coarser with depth. Some gravel (up to 3/4") are encountered at depths from about 11 to 12 feet. Underlying sands, soil within depths from 12 to the explored depth of 16 feet are light gray to light olive gray color sandy silt, sandy clay and silty sand with fine sand and high fine contents. Subsurface geologic profiles are found to be fairly uniform across the project area. Detail descriptions of the soils are presented in the field exploration logs (see Appendix A).

Natives soils within the general are surrounding the site comprise of young alluvial fan deposits (Qyf) of Holocene to late Pleistocene age, which are generally unconsolidated to moderately consolidated silt, sand and pebbly, cobbly sand.

Groundwater was not encountered within the explored depth of 16 feet. Historical shallow groundwater within close vicinities of the site is documented between 5 and 10 feet in the state's seismic hazard zones report (CGS, 2001). Fluctuations of the groundwater level may occur due to variations in rainfall and other factors that were not evident at the time of the field tests.

Pre-Soaking and Percolation Test

After preparation of the test holes P-1 and P-2, each of the holes was filled with water up to the top of the hole and were allowed to be soaked. Two consecutive test measurements of water level inside the each hole showed more than 6 inches of drop for each 25-minute time interval for each hole. After the first 25-minute interval, each hole was filled to the top for the second interval. These percolation rates during pre-soaking stage met the sandy soils criteria according to the County Guidelines.

After completion of pre-soaking in each hole with all the water dissipated, field percolation tests began with filling the hole with water to the top. Six (6) consecutive readings of water level inside the test hole were taken over a period of 60 minutes, each of the readings at a 10-minute interval. The drop that occurred during the final 10 minutes is used to calculate the percolation rate. These field tests were done in compliance with the County Guidelines. Field measurements of the water head during pre-soaking and percolation tests were taken with a precision of 0.1 inch. Field test data and calculations are presented in Appendix B, *Infiltration Test Data Sheets*.

Field Infiltration Rate

Percolation rate from the field test data is related to, but not equal to, the infiltration rate. While an infiltration rate is a measure of the speed at which water progresses downward into the soil, the percolation rate measures not only the downward progression but the lateral progression through the soil as well. This reflects the fact that the surface area for infiltration testing would include only the horizontal surface while the percolation test includes both the bottom surface area and the sidewalls of the test hole. In order to convert the percolation rate into infiltration rate, the following equation, known as Porchet Method, is recommended in the County Guidelines.

$$I_t = \frac{\Delta H \; 60 \; r}{\Delta t \; (r + 2H_{avg})}$$

Where, I_t = Infiltration Rate (inch/hr)
ΔH = Water level drop over the final time interval (inch)
Δt = Time interval (minute)
r = Effective radius of the test hole (inch)
H_{avg} = Average water head over the final time interval (inch)

Summary of the field test data and infiltration rates, evaluated utilizing the above equation, at different test holes are presented in the following table:

Table 1 - Summary of the Field Tests Data

Test Hole No.	Test Hole Depth (ft)	Final ΔH (inch)	Δt (min)	Final H_{avg} (inch)	Infiltration Rate, I_t (inch/hr)
P-1	4.0	2.0	10	21.0	1.04
P-2	8.0	4.5	10	33.0	1.54

Conclusions

Based on our evaluations the field test data, infiltration rates of the subsurface soils within the target infiltration trench area vary from 1.04 to 1.54 inch/hour. Higher infiltration rate in the test hole P-2, compared to the test hole P-1, may be attributed to high amount of sand contents within depths 5 to 8 feet in P-2. For a practical and conservative estimate, we recommend a field infiltration rate of 1.04 inch/hr. Project Civil Engineer may need to implement appropriate factor of safety to this field infiltration rate for design of the proposed infiltration trench.

Limitations

This report is not authorized for use by, and is not to be relied upon by any party except the following: the owner(s) of this property; his(their) successors and assignees as the future owners of the property; design professionals and contractors for this project. Use of or reliance on this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify ZS Engineering from and against any liability which may arise as a result of such use or reliance

The findings and conclusions presented in this report were prepared in adequate compliance with the Orange County guidelines for field tests for the storm water infiltration system design and also, with the generally accepted principles and practices in the field of geotechnical engineering in southern California at the time of this report. No other warranty is expressed or implied herein.

We appreciate this opportunity of service. If there are any questions and comments about this report, please contact the undersigned.

Respectfully submitted,
ZS ENGINEERING

_____

Zafar Ahmed, PE, GE
Geotechnical Engineer

Attachments: References
Figure 1 - Site Location Map
Figure 2 - Site Plan and Exploration Map
Appendix A - Field Exploration Logs
Appendix B - Infiltration Test Data Sheets

References

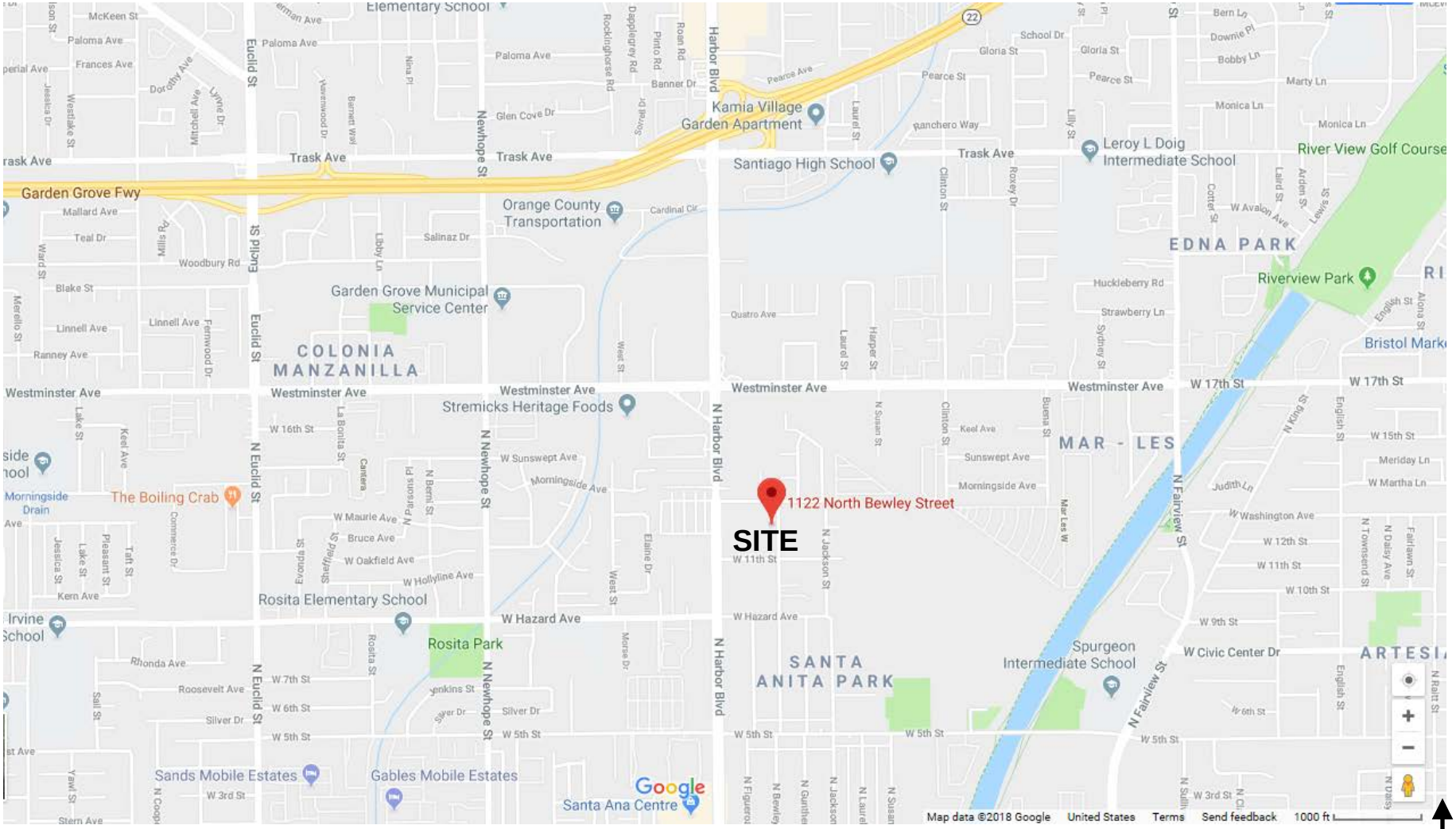
California Geological Survey (CGS), 1998, Earthquake Zones of Requires Investigation, Anaheim Quadrangle, released on April 15, 1998.

California Geological Survey (CGS), 1997, Seismic Hazard Zone Report 03 for Anaheim and Newport Beach 7.5-Minute Quadrangles, Orange County, California, published in 1997, revised in 2001.

Morton, D.M., and Miller, F.K., 2006, Geologic Map of the San Bernardino and Santa Ana 30'X60' Quadrangles, California: U.S. Geological Survey, Open-File Report OF-2006-1217, Scale 1:100,000.

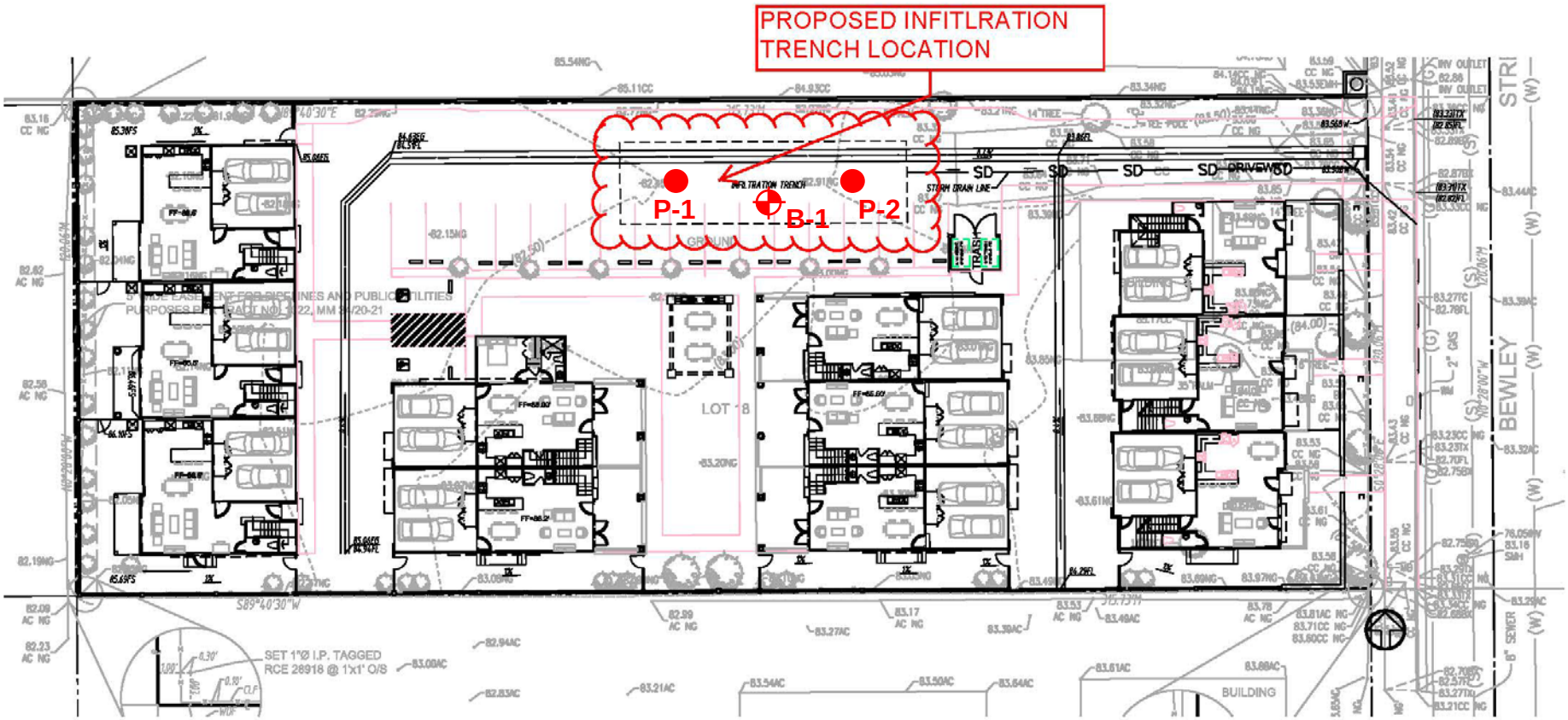
Orange County Technical Guidance Document for the Preparation of Conceptual/Preliminary and/or Project Water Quality Management Plans (WQMPs), dated May 19, 2011.

YNG Architects, Enlarged Site Plan/First Floor Plan, Multi-Family Residential, 1122 N. Bewley Street, Santa Ana, Sheet No. A1.1, dated May 10, 2018.



Source: Image from Google Map

	Figure 1 – Site Location Map **Residential Lot at 1122 N. Bewley Street, Santa Ana, CA 92703**	**ZS Engineering #180505**



Legends:

- P-2 — **Infiltration Test Holes**
- B-1 — **Exploratory Bore Hole**

N

Figure 2 – Site Plan and Exploration Map

Residential Lot at 1122 N. Bewley Street, Santa Ana, CA 92703

ZS Engineering #180505

APPENDIX A

Field Exploration Logs

ZS Engineering

113 Tomato Springs, Irvine, CA 92618

(949) 331-3232 | info@zs-engineering.com

EXPLORATION DATE: 5/28/18 EXPLORATION METHOD: Hand Auger (6-inch dia.), Hand Tools

LOGGED BY: ZA ELEVATION: ~ 85 ft LOCATION: See Fig. 2, Site Plan & Exploration Map

DEPTH (FEET)	SAMPLE NUMBER	RING SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PROPOSED MULTI-FAMILY RESIDENTIAL COMPLEX 1122 N. BEWLEY STREET, SANTA ANA, CA 92703 BORE HOLE NO. **P-1** SOIL DESCRIPTION	SOIL TEST
4						0 - 4': Surface covered w/ dirt. Light gray silty fine Sand (SM), moist.	
						- Depth of excavation 4 feet below the existing grade. - Groundwater was not encountered. - Drilled hole was converted into infiltration test hole. - After field tests, drilled hole was backfilled w/ excavated soil cuttings on 5/28/18.	

ZS ENG. #180505 **LOG OF BORE HOLE P-1**

ZS Engineering

113 Tomato Springs, Irvine, CA 92618

(949) 331-3232 | info@zs-engineering.com

EXPLORATION DATE: 5/28/18 EXPLORATION METHOD: Hand Auger (6-inch dia.), Hand Tools

LOGGED BY: ZA ELEVATION: ~ 85 ft LOCATION: See Fig. 2, Site Plan & Exploration Map

DEPTH (FEET)	SAMPLE NUMBER	RING SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PROPOSED MULTI-FAMILY RESIDENTIAL COMPLEX 1122 N. BEWLEY STREET, SANTA ANA, CA 92703 BORE HOLE NO. **P-2** SOIL DESCRIPTION	SOIL TEST
2						0 - 5': Surface covered w/ dirt. Light gray silty fine Sand (SM), moist.	
5						5' - 6': Lt. brown silty fine Sand (SM), less silts than above. 6' - 7': Lt. brown, mottled, fine sands w/ few silts (SP-SM), moist.	
8						7' - 8': Same as above, fine to medium sand.	
						- Depth of excavation 8 feet below the existing grade. - Groundwater was not encountered. - Drilled hole was converted into infiltration test hole. - After field tests, drilled hole was backfilled w/ excavated soil cuttings on 5/28/18.	

ZS ENG. #180505 **LOG OF BORE HOLE P-2**

APPENDIX B

Infiltration Test Data Sheets

Percolation Test Data Sheet for P-1

Project Name: Multi-Family Residential Complex, 1122 N. Bewley Street, Santa Ana, CA Job No.: 180505

Test Hole No.: P-1 (see Figure 2, Site Plan & Exploration Map)

Depth of Test Hole (ft): 4 Soil Description: 0 - 4': Silty fine sand (SM)

Sandy Soil Criteria Test By: ZA Date: 5/28/18 Presoak: Yes

Percolation Test By: ZA Date: 5/28/18

Sandy Soil Criteria Test Data (Test Date 5/28/18)

Trial No.	Time	Time Interval (min)	Water Level			Passed Sandy Soil Criteria
			Initial	Final	Δ (inch)	
1	9:21 AM 9:46 AM	25	0 ft 0.0 in	2 ft 8.00 in	32.00	Yes
2	9:46 AM 10:11 AM	25	0 ft 0.0 in	2 ft 4.00 in	28.00	Yes

Percolation Test Data (Test Date 5/28/18)

Time	Time Interval, Δt (min)	Total Elapsed Time (min)	Water Level		
			Initial	Final	ΔH (inch)
12:30 PM 12:40 PM	10	10	0 ft. 0.00 in	0 ft. 8.50 in	8.50
12:40 PM 12:50 PM	10	20	0 ft. 8.50 in	1 ft. 3.50 in	7.00
12:50 PM 1:00 PM	10	30	1 ft. 3.50 in	1 ft. 9.00 in	5.50
1:00 PM 1:10 PM	10	40	1 ft. 9.00 in	2 ft. 1.50 in	4.50
1:10 PM 1:20 PM	10	50	2 ft. 1.50 in	2 ft. 4.00 in	2.50
1:20 PM 1:30 PM	10	60	2 ft. 4.00 in	2 ft. 6.00 in	2.00

Percolation Test Data Sheet for P-2

Project Name: Multi-Family Residential Complex, 1122 N. Bewley Street, Santa Ana, CA Job No.: 180505

Test Hole No.: P-2 (see Figure 2, Site Plan & Exploration Map)

Depth of Test Hole (ft): 8 Soil Description: 0 - 5': Silty fine sand (SM); 5' - 8': Sand w/ few to less silts (SM to SP-SM)

Sandy Soil Criteria Test By: ZA Date: 5/28/18 Presoak: Yes

Percolation Test By: ZA Date: 5/28/18

Sandy Soil Criteria Test Data (Test Date 5/28/18)

Trial No.	Time	Time Interval (min)	Water Level			Passed Sandy Soil Criteria
			Initial	Final	Δ (inch)	
1	8:20 AM 8:45 AM	25	0 ft 0.0 in	5 ft 4.00 in	64.00	Yes
2	8:45 AM 10:10 AM	25	0 ft 0.0 in	4 ft 8.00 in	56.00	Yes

Percolation Test Data (Test Date 5/28/18)

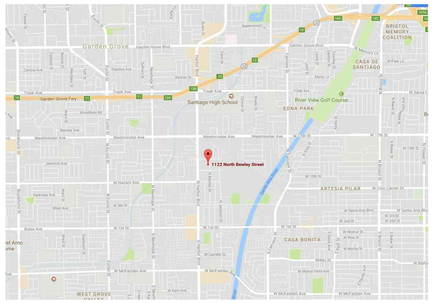
Time	Time Interval, Δt (min)	Total Elapsed Time (min)	Water Level		
			Initial	Final	ΔH (inch)
12:21 PM 12:31 PM	10	10	0 ft. 0.00 in	1 ft. 6.00 in	18.00
12:31 PM 12:41 PM	10	20	1 ft. 6.00 in	2 ft. 8.50 in	14.50
12:41 PM 12:51 PM	10	30	2 ft. 8.50 in	3 ft. 8.75 in	12.25
12:51 PM 1:01 PM	10	40	3 ft. 8.75 in	4 ft. 6.25 in	9.50
1:01 PM 1:11 PM	10	50	4 ft. 6.25 in	5 ft. 0.75 in	6.50
1:11 PM 1:21 PM	10	60	5 ft. 0.75 in	5 ft. 5.25 in	4.50

ATTACHMENT I

TOPOGRAPHIC SURVEY

□ICINITY MAP □

NOT TO SCALE



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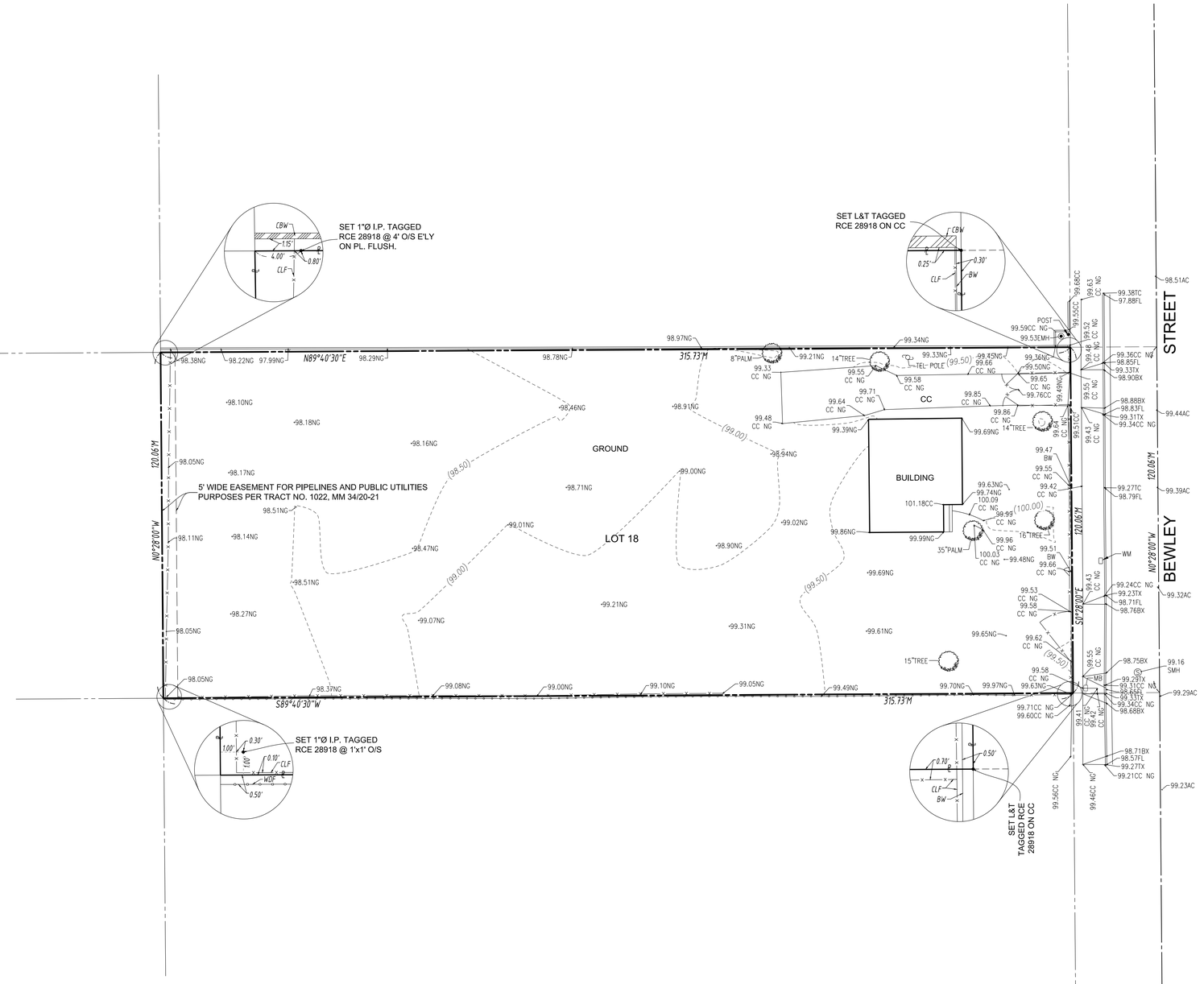

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PREPARED BY:

P.A. ARCA ENGINEERING, INC.

590 East Carson Plaza Drive, Suite 291, Carson, CA 90746
Office (310) 952-9434 Fax (310) 769-5977
www.paarcaengineering.com
Civil Engineers / Land Surveyors

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ATTACHMENT J

INFILTRATION TRENCH FACT SHEET

INF-2: Infiltration Trench Fact Sheet

An infiltration trench is a long, narrow, rock-filled trench with no outlet other than an overflow outlet. Runoff is stored in the void space between stones and infiltrates through the bottom and sides of the trench. Infiltration trenches provide the majority of their pollutant removal benefits through volume reduction. Pretreatment is important for limiting amounts of coarse sediment entering the trench which can clog and render the trench ineffective. *Note: if an infiltration trench is "deeper than its widest surface dimension," or includes an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute runoff below the surface of the ground, it would probably be considered a "Class V Injection Well" under the federal Underground Injection Control (UIC) Program, which is regulated in California by U.S. EPA Region 9. A UIC permit may be required for such a facility (for details see* **http://www.epa.gov/region9/water/groundwater/uic-classv.html**).

Also known as:

- *French Drains*
- *Rock Trenches*
- *Exfiltration Trenches*
- *Soak-aways*
- *Soakage Trenches*

Infiltration Trench

Source: www.dot.ca.gov

Feasibility Screening Considerations

- Infiltration trenches shall pass infeasibility screening criteria to be considered for use
- Infiltration trenches, particularly deeper designs, may not provide significant attenuation of stormwater pollutants if underlying soils have high permeability; potential risk of groundwater contamination.
- The potential for groundwater mounding should be evaluated if depth to seasonally high groundwater (unmounded) is less than 15 feet.

Opportunity Criteria

- Soils are adequate for infiltration or can be amended to provide an adequate infiltration rate.
- Drainage area area is ≤ 5 acres and has low to moderate sediment production.
- 2-3 percent of drainage area available for infiltration (generally requires less surface area than infiltration basins and bioretention areas without underdrain).
- Space available for pretreatment (biotreatment or treatment control BMP as described below).
- Potential for groundwater contamination can be mitigated through isolation of pollutant sources, pretreatment of inflow, and/or demonstration of adequate treatment capacity of underlying soils.
- Infiltration is into native soil, or depth of engineered fill is ≤ 5 feet from the bottom of the facility to native material and infiltration into shallow fill is approved by a geotechnical professional.
- Tributary area land uses include open areas adjacent to parking lots, driveways, and buildings, and roadway medians and shoulders.

OC-Specific Design Criteria and Considerations

☐ Must comply with local, state, and federal UIC regulations if applicable; a permit may be required.

- ☐ Placement of BMPs should observe geotechnical recommendations with respect to geological hazards (e.g. landslides, liquefaction zones, erosion, etc.) and set-backs (e.g., foundations, utilities, roadways, etc.)
- ☐ For facilities with tributary area less than 1 acre and less than 3 foot depth, minimum separation to mounded seasonally high groundwater of 5 feet shall be observed.
- ☐ For facilities with tributary area greater than 1 acre or deeper than 3 feet, minimum separation to mounded seasonally high groundwater of 10 feet shall be observed.
- ☐ Minimum pretreatment should be provided upstream of the infiltration trench, and water bypassing pretreatment should not be directed to the infiltration trench.
- ☐ Infiltration trenches should not be used for drainage areas with high sediment production potential unless preceded by full treatment control with a BMP effective for sediment removal.
- ☐ Ponded water should not persist within 1 foot of the surface of the facility for longer than 72 hours following the end of a storm event (observation well is needed to allow observation of drain time).
- ☐ Energy dissipators should be provided at inlet and outlet to prevent erosion.
- ☐ An overflow device must be provided if basin is on-line.
- ☐ A minimum freeboard of one foot should be provided above the overflow device (for an on-line basin) or the outlet (for an off-line basin).
- ☐ Longitudinal trench slope should not exceed 3%.
- ☐ Side slopes above trench fill should not be steeper than 3:1.

Simple Sizing Method for Infiltration Trenches

If the Simple Design Capture Volume Sizing Method is used to size an infiltration trench, the user calculates the DCV and then designs the geometry required to draw down the DCV in 48 hours. The sizing steps are as follows:

Step 1: Determine Infiltration Basin DCV

Calculate the DCV using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1**.

Step 2: Determine the 48-hour Effective Depth

The depth of water that can be drawn down in 48 hours can be calculated using the following equation:

$$d_{48} = K_{DESIGN} \times SACF \times 48 \text{ hours}$$

Where:

d_{48} = trench effective 48-hour depth, ft

K_{DESIGN} = basin design infiltration rate, in/hr (See **Appendix VII**)

SACF = Surface Area Correction Factor = ranges from 1.0 (sides insignificant or not accounted) to 2.0 (sides plus bottom are 2 times the surface area of the bottom at mid depth) to account for the ratio of infiltration through the sides of the trench to the bottom footprint of the trench; should be based on anticipated trench geometry and wetted surface area at mid-depth.

This is the maximum effective depth of the trench below the overflow device to achieve drawdown in 48 hours.

ATTACHMENT K

EDUCATIONAL MATERIAL

The Ocean Begins at Your Front Door

Even if you live miles from the Pacific Ocean, you may be unknowingly polluting it.

Did You Know?

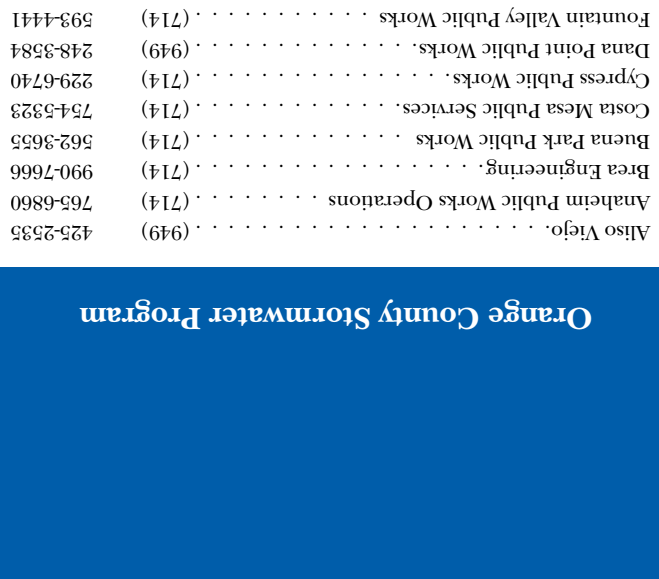
- Most people believe that the largest source of water pollution in urban areas comes from specific sources such as factories and sewage treatment plants. In fact, the largest source of water pollution comes from city streets, neighborhoods, construction sites and parking lots. This type of pollution is sometimes called “non-point source” pollution.
- There are two types of non-point source pollution: stormwater and urban runoff pollution.
- Stormwater runoff results from rainfall. When rainstorms cause large volumes of water to rinse the urban landscape, picking up pollutants along the way.
- Urban runoff can happen any time of the year when excessive water use from irrigation, vehicle washing and other sources carries trash, lawn clippings and other urban pollutants into storm drains.

Where Does It Go?

- Anything we use outside homes, vehicles and businesses – like motor oil, paint, pesticides, fertilizers and cleaners – can be blown or washed into storm drains.
- A little water from a garden hose or rain can also send materials into storm drains.
- Storm drains are separate from our sanitary sewer systems; unlike water in sanitary sewers (from sinks or toilets), water in storm drains is not treated before entering our waterways.

Sources of Non-Point Source Pollution

- Automotive leaks and spills.
- Improper disposal of used oil and other engine fluids.
- Metals found in vehicle exhaust, weathered paint, rust, metal plating and tires.
- Pesticides and fertilizers from lawns, gardens and farms.
- Improper disposal of cleaners, paint and paint removers.
- Soil erosion and dust debris from landscape and construction activities.
- Litter, lawn clippings, animal waste, and other organic matter.
- Oil stains on parking lots and paved surfaces.

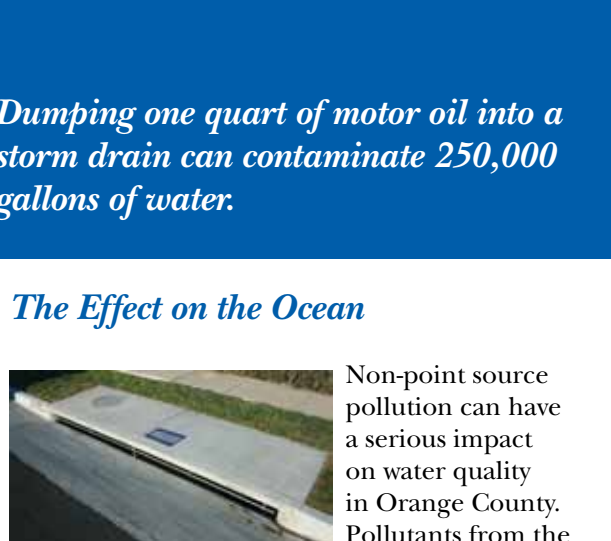


The Effect on the Ocean

Non-point source pollution can have a serious impact on water quality in Orange County. Pollutants from the storm drain system can harm marine life as well as coastal and wetland habitats. They can also degrade recreation areas such as beaches, harbors and bays.

Stormwater quality management programs have been developed throughout Orange County to educate and encourage the public to protect water quality, monitor runoff in the storm drain system, investigate illegal dumping and maintain storm drains.

Support from Orange County residents and businesses is needed to improve water quality and reduce urban runoff pollution. Proper use and disposal of materials will help stop pollution before it reaches the storm drain and the ocean.



For More Information

Dumping one quart of motor oil into a storm drain can contaminate 250,000 gallons of water.

Orange County Stormwater Program

California Environmental Protection Agency
www.calepa.ca.gov

- **Air Resources Board**
  www.arb.ca.gov
- **Department of Pesticide Regulation**
  www.cdpr.ca.gov
- **Department of Toxic Substances Control**
  www.dtsc.ca.gov
- **Integrated Waste Management Board**
  www.ciwmb.ca.gov
- **Office of Environmental Health Hazard Assessment**
  www.oehha.ca.gov
- **State Water Resources Control Board**
  www.waterboards.ca.gov

Earth 911 - Community-Specific Environmental Information 1-800-cleanup or visit www.1800cleanup.org

Health Care Agency’s Ocean and Bay Water Closure and Posting Hotline
(714) 433-6400 or visit www.ocbeachinfo.com

Integrated Waste Management Dept. of Orange County (714) 834-6752 or visit www.oclandfills.com for information on household hazardous waste collection centers, recycling centers and solid waste collection

O.C. Agriculture Commissioner
(714) 447-7100 or visit www.ocagcomm.com

Stormwater Best Management Practice Handbook
Visit www.cabmphandbooks.com

UC Master Gardener Hotline
(714) 708-1646 or visit www.uccemg.com

The Orange County Stormwater Program has created and moderates an electronic mailing list to facilitate communications, take questions and exchange ideas among its users about issues and topics related to stormwater and urban runoff and the implementation of program elements. To join the list, please send an email to ocstormwaterinfo-join@list.ocwatersheds.com

Aliso Viejo	(949)	425-2535
Anaheim Public Works Operations	(714)	765-6860
Brea Engineering	(714)	990-7666
Buena Park Public Works	(714)	562-3655
Costa Mesa Public Services	(714)	754-5323
Cypress Public Works	(714)	229-6740
Dana Point Public Works	(949)	248-3584
Fountain Valley Public Works	(714)	593-4441
Fullerton Engineering Dept.	(714)	738-6853
Garden Grove Public Works	(714)	741-5956
Huntington Beach Public Works	(714)	536-5431
Irvine Public Works	(949)	724-6315
La Habra Public Services	(562)	905-9792
La Palma Public Works	(714)	690-3310
Laguna Beach Water Quality	(949)	497-0378
Laguna Hills Public Services	(949)	707-2650
Laguna Niguel Public Works	(949)	362-4337
Laguna Woods Public Works	(949)	639-0500
Lake Forest Public Works	(949)	461-3480
Los Alamitos Community Dev.	(562)	431-3538
Mission Viejo Public Works	(949)	470-3056
Newport Beach, Code & Water Quality Enforcement	(949)	644-3215
Orange Public Works	(714)	532-6480
Placentia Public Works	(714)	993-8245
Rancho Santa Margarita	(949)	635-1800
San Clemente Environmental Programs	(949)	361-6143
San Juan Capistrano Engineering	(949)	234-4413
Santa Ana Public Works	(714)	647-3380
Seal Beach Engineering	(562)	431-2527 x317
Stanton Public Works	(714)	379-9222 x204
Tustin Public Works/Engineering	(714)	573-3150
Villa Park Engineering	(714)	998-1500
Westminster Public Works/Engineering	(714)	898-3311 x446
Yorba Linda Engineering	(714)	961-7138
Orange County Stormwater Program	(877)	897-7455

Orange County 24-Hour
Water Pollution Problem Reporting Hotline
1-877-89-SPILL (1-877-897-7455)

On-line Water Pollution Problem Reporting Form
www.ocwatersheds.com

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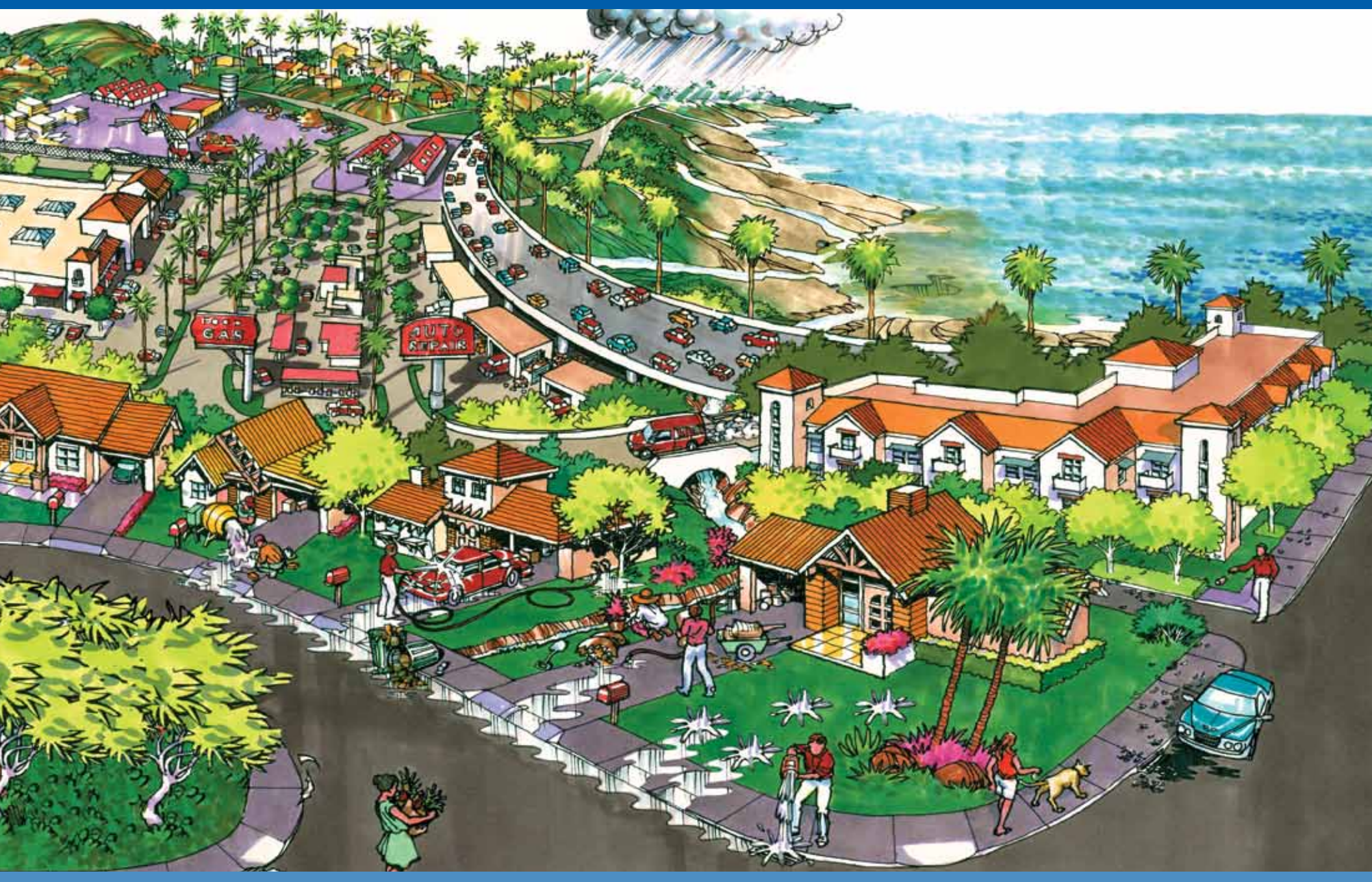
The Ocean Begins at Your Front Door



Never allow pollutants to enter the street, gutter or storm drain!

Follow these simple steps to help reduce water pollution:

Household Activities

- Do not rinse spills with water. Use dry cleanup methods such as applying cat litter or another absorbent material, sweep and dispose of in the trash. Take items such as used or excess batteries, oven cleaners, automotive fluids, painting products and cathode ray tubes, like TVs and computer monitors, to a Household Hazardous Waste Collection Center (HHWCC).
- For a HHWCC near you call (714) 834-6752 or visit www.oclandfills.com.
- Do not hose down your driveway, sidewalk or patio to the street, gutter or storm drain. Sweep up debris and dispose of it in the trash.

Automotive

- Take your vehicle to a commercial car wash whenever possible. If you wash your vehicle at home, choose soaps, cleaners, or detergents labeled non-toxic, phosphate- free or biodegradable. Vegetable and citrus-based products are typically safest for the environment.
- Do not allow washwater from vehicle washing to drain into the street, gutter or storm drain. Excess washwater should be disposed of in the sanitary sewer (through a sink or toilet) or onto an absorbent surface like your lawn.
- Monitor your vehicles for leaks and place a pan under leaks. Keep your vehicles well maintained to stop and prevent leaks.
- Never pour oil or antifreeze in the street, gutter or storm drain. Recycle these substances at a service station, a waste oil collection center or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.1800cleanup.org.

Pool Maintenance

- Pool and spa water must be dechlorinated and free of excess acid, alkali or color to be allowed in the street, gutter or storm drain.
- When it is not raining, drain dechlorinated pool and spa water directly into the sanitary sewer.
- Some cities may have ordinances that do not allow pool water to be disposed of in the storm drain. Check with your city.

Landscape and Gardening

- Do not over-water. Water your lawn and garden by hand to control the amount of water you use or set irrigation systems to reflect seasonal water needs. If water flows off your yard onto your driveway or sidewalk, your system is over-watering. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of waste by composting, hauling it to a permitted landfill, or as green waste through your city's recycling program.
- Follow directions on pesticides and fertilizer, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Take unwanted pesticides to a HHWCC to be recycled. For locations and hours of HHWCC, call (714) 834-6752 or visit www.oclandfills.com.

Trash

- Place trash and litter that cannot be recycled in securely covered trash cans.
- Whenever possible, buy recycled products.
- Remember: Reduce, Reuse, Recycle.

Pet Care

- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash. Pet waste, if left outdoors, can wash into the street, gutter or storm drain.
- If possible, bathe your pets indoors. If you must bathe your pet outside, wash it on your lawn or another absorbent/permeable surface to keep the washwater from entering the street, gutter or storm drain.
- Follow directions for use of pet care products and dispose of any unused products at a HHWCC.

Common Pollutants

Home Maintenance

- Detergents, cleaners and solvents
- Oil and latex paint
- Swimming pool chemicals
- Outdoor trash and litter

Lawn and Garden

- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

Automobile

- Oil and grease
- Radiator fluids and antifreeze
- Cleaning chemicals
- Brake pad dust

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, if we are not careful, our daily activities can lead directly to water pollution problems. Water that drains through your watershed can pick up pollutants which are then transported to our waterways and beautiful ocean.

You can prevent water pollution by taking personal action and by working with members of your watershed community to prevent urban runoff from entering your waterway.

For more information, please call the **Orange County Stormwater Program** at **1.877.89.SPILL** or visit **www.ocwatersheds.com**

To report a spill, call the **Orange County 24-Hour Water Pollution Problem Reporting Hotline** at **1.877.89.SPILL.**

For emergencies, dial 911.

The tips contained in this brochure provide useful information to help protect your watershed. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

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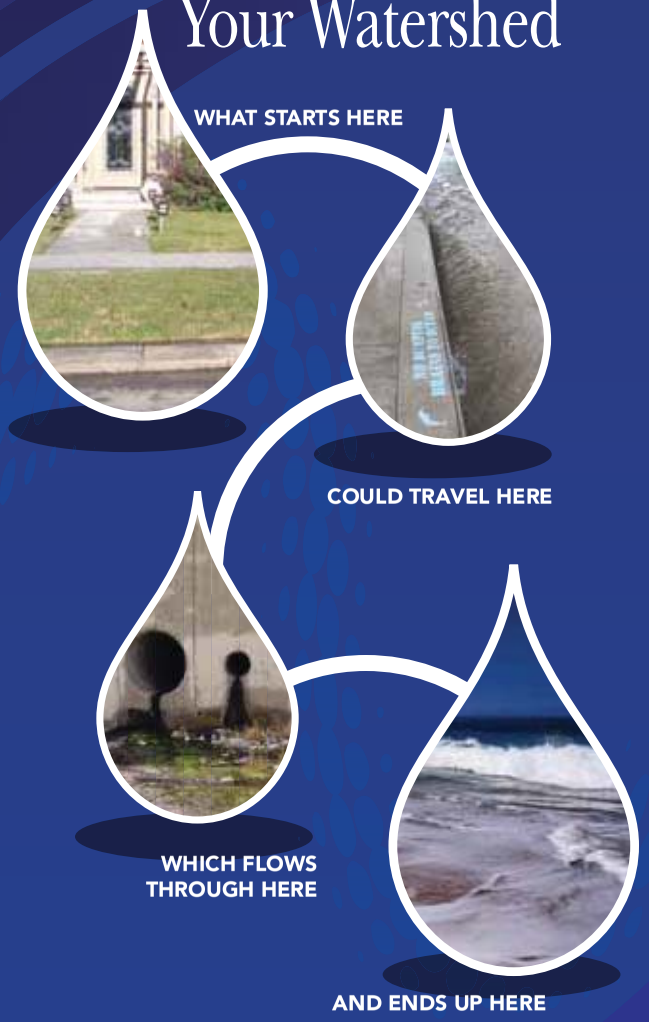
Help Prevent Ocean Pollution:

Tips For Protecting Your Watershed



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Tips for Protecting Your Watershed

My Watershed. Our Ocean.

Water + shed, *noun: A region of land within which water flows down into a specified water body, such as a river, lake, sea, or ocean; a drainage basin or catchment basin.*

Orange County is comprised of 11 major watersheds into which most of our water flows, connecting all of Orange County to the Pacific Ocean.

As water from rain (stormwater) or sprinklers and hoses (urban runoff) runs down your driveway and into your neighborhood streets, sidewalks and gutters, it flows into storm drains that lead to waterways within your watershed. The waterways from other cities merge as they make their way through our watersheds until all the runoff water in Orange County meets at the Pacific Ocean. The water that reaches our ocean is not pure. As it flows through the watershed, it picks up pollutants such as litter, cigarette butts, fertilizer, pesticides, pet waste, motor oil and lawn clippings. Unlike water that enters the sewer (from sinks and toilets), water that enters the storm drain is not treated before it flows, ultimately, to the ocean.

Water quality can be improved by "Adopting Your Watershed." Through this effort, we are challenging citizens and organizations to join the Orange County Stormwater Program and others who are working to protect and restore our creeks, rivers, bays and ocean.

There are many opportunities to get involved:

- Appreciate your watershed - explore the creeks, trails and ocean and make observations about its conditions. If you see anything abnormal (such as dead fish, oil spills, leaking barrels, and other pollution) contact the Orange County 24-hour water pollution problem reporting hotline at 1.877.89.SPILL to report the problem.
- Research your watershed. Learn about what watershed you live in by visiting www.ocwatersheds.com.
- Find a watershed organization in your community and volunteer to help. If there are no active groups, consider starting your own.
- Visit EPA's Adopt Your Watershed's Catalog of Watershed Groups at www.epa.gov/adopt to locate groups in your community.
- Organize or join in a creek, river, bay or ocean cleanup event such as Coastal & Inner Coastal Cleanup Day that takes place the 3rd Saturday of every September. For more information visit www.coast4u.org.

Follow these simple tips to protect the water quality of your watershed:

- **Sweep up debris and dispose of it in the trash. Do not hose down driveways or sidewalks into the street or gutter.**
- **Use dry cleanup methods such as cat litter to absorb spills and sweep up residue.**
- **Set your irrigation systems to reflect seasonal water needs or use weather-based controllers. Inspect for runoff regularly.**
- **Cover trashcans securely.**
- **Take hazardous waste to a household hazardous waste collection center. (For example, paint, batteries and petroleum products)**
- **Pick up after your pet.**
- **Follow application and disposal directions for pesticides and fertilizers.**
- **If you wash your car at home, wash it on your lawn or divert the runoff onto a landscaped area. Consider taking your car to a commercial car wash, where the water is reclaimed or recycled.**
- **Keep your car well maintained.**
- **Never pour oil or antifreeze in the street, gutter or storm drain.**

The Pollution Solution

Several residential activities can result in water pollution. Among these activities are car washing and hosing off driveways and sidewalks. Both activities can waste water and result in excess runoff. Water conservation methods described in this pamphlet can prevent considerable amounts of runoff and conserve water. By taking your car to a commercial car wash and by sweeping driveways and sidewalks, you can further prevent the transport of pollutants to Orange County waterways. Here are some of the common pollutants for which you can be part of the solution:

1 Pesticides and Fertilizer

- **Pollution:** The same pesticides that are designed to be toxic to pests can have an equally lethal impact on our marine life. The same fertilizer that promotes plant growth in lawns and gardens can also create nuisance algae blooms, which remove oxygen from the water and clog waterways when it decomposes.

- **Solution:** Never use pesticides or fertilizer within 48 hours of an anticipated rainstorm. Use only as much as is directed on the label and keep it off driveways and sidewalks.

2 Dirt and Sediment

- **Pollution:** Dirt or sediment can impede the flow of the stormwater and negatively impact stream habitat as it travels through waterways and deposits downstream. Pollutants can attach to sediment, which can then be transported through our waterways.

- **Solution:** Protect dirt stockpiles by covering them with tarps or secure plastic sheets to prevent wind or rain from allowing dirt or sediment to enter the storm drain system.

3 Metals

- **Pollution:** Metals and other toxins present in car wash water can harm important plankton, which forms the base of the aquatic food chain.

- **Solution:** Take your car to a commercial car wash where the wash water is captured and treated at a local wastewater treatment plant.

DID YOU KNOW?

Did you know that most of the pollution found in our waterways is not from a single source, but from a "non-point" source meaning the accumulation of pollution from residents and businesses throughout the community

4 Pet Waste

- **Pollution:** Pet waste carries bacteria through our watersheds and eventually will be washed out to the ocean. This can pose a health risk to swimmers and surfers.

- **Solution:** Pick up after your pets!

5 Trash and Debris

- **Pollution:** Trash and debris can enter waterways by wind, littering and careless maintenance of trash receptacles. Street sweeping collects some of this trash; however, much of what isn't captured ends up in our storm drain system where it flows untreated out to the ocean.

- **Solution:** Don't litter and make sure trash containers are properly covered. It is far more expensive to clean up the litter and trash that ends up in our waterways than it is to prevent it in the first place. Come out to one of Orange County's many locations for Coastal and Inner-Coastal Cleanup Day, which is held in September.

6 Motor Oil / Vehicle Fluids

- **Pollution:** Oil and petroleum products from our vehicles are toxic to people, wildlife and plants.

- **Solution:** Fix any leaks from your vehicle and keep the maintenance up on your car. Use absorbent material such as cat litter on oil spills, then sweep it up and dispose of it in the trash. Recycle used motor oil at a local Household Hazardous Waste Collection Center.

A TEAM EFFORT

The Orange County Stormwater Program has teamed with the Municipal Water District of Orange County (MWDOC) and the University of California Cooperative Extension Program (UCCE) to develop this pamphlet.

Low Impact Development (LID) and sustainable water use prevents water pollution and conserves water for drinking and reuse. Reducing your water use and the amount of water flowing from your home protects the environment and saves you money.

Thank you for making water protection a priority!

For more information, please visit www.ocwatersheds.com/publiced/

www.mwdoc.com

www.uccemg.com

To report a spill, call the Orange County 24-Hour Water Pollution Prevention Reporting Hotline at 1-877-89-SPILL \(1-877-897-7455)

Special Thanks to
The City of Los Angeles Stormwater Program for the use of its artwork

The Metropolitan Water District of Southern California for the use of the California-Friendly Plant and Native Habitat photos

Homeowners Guide for Sustainable Water Use

Low Impact Development, Water Conservation & Pollution Prevention

The Ocean Begins at Your Front Door

RUNOFF, RAINWATER AND REUSE

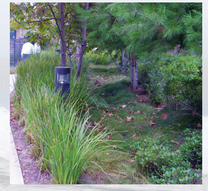
Where Does Water Runoff Go?

Stormwater, or water from rainfall events, and runoff from outdoor water use such as sprinklers and hoses flows from homes directly into catch basins and the storm drain system. After entering the storm drain, the water flows untreated into streams, rivers, bays and ultimately the Pacific Ocean. Runoff can come from lawns, gardens, driveways, sidewalks and roofs. As it flows over hard, impervious surfaces, it picks up pollutants. Some pollutants carried by the water runoff include trash, pet waste, pesticides, fertilizer, motor oil and more.

Water Conservation

Pollution not only impairs the water quality for habitat and recreation, it can also reduce the water available for reuse. Runoff allowed to soak into the ground is cleaned as it percolates through the soil, replenishing depleted groundwater supplies. Groundwater provides at least 50% of the total water for drinking and other indoor household activities in north and central Orange County. When land is covered with roads, parking lots, homes, etc., there is less land to take in the water and more hard surfaces over which the water can flow.

In Orange County, 60-70% of water used by residents and businesses goes to irrigation and other outdoor uses. Reusing rainwater to irrigate our lawn not only reduces the impact of water pollution from runoff, but it also is a great way to conserve our precious water resources and replenish our groundwater basin.



What is Low Impact Development (LID)?

Low Impact Development (LID) is a method of development that seeks to maintain the natural hydrologic character of an area. LID provides a more sustainable and pollution-preventative approach to water management.

New water quality regulations require implementation of LID in larger new developments and encourage implementation of LID and other sustainable practices in existing residential areas. Implementing modifications to your lawn or garden can reduce pollution in our environment, conserve water and reduce your water bill.

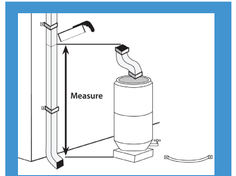
Permeable pavement allows water runoff to infiltrate through the soil and prevents most pollutants from reaching the storm drain system.

OPTIONS FOR RAINWATER HARVESTING AND REUSE

Rainwater harvesting is a great way to save money, prevent pollution and reduce potable water use. To harvest your rainwater, simply redirect the runoff from roofs and downspouts to rain barrels. Rain gardens are another option; these reduce runoff as well as encourage infiltration.

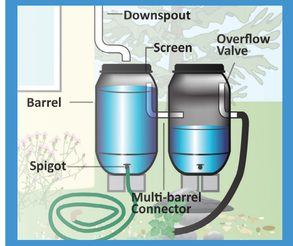
Downspout Disconnection/Redirection

Disconnecting downspouts from pipes running to the gutter prevents runoff from transporting pollutants to the storm drain. Once disconnected, downspouts can be redirected to rain gardens or other vegetated areas, or be connected to a rain barrel.



Rain Barrels

Rain barrels capture rainwater flow from roofs for reuse in landscape irrigation. Capacity of rain barrels needed for your home will depend on the amount of roof area and rainfall received. When purchasing your rain barrel, make sure it includes a screen, a spigot to siphon water for use, an overflow tube to allow for excess water to run out and a connector if you wish to connect multiple barrels to add capacity of water storage.

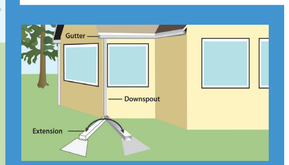


Mosquito growth prevention is very important when installing a rain barrel. The best way to prevent mosquito breeding is to eliminate entry points by ensuring all openings are sealed tightly. If these methods are unsuccessful, products are available to kill mosquito larvae, but that are harmless to animals and humans. Regular application of these products is essential. Please visit the Orange County Vector Control website for more information at www.ocvcd.org/mosquitoes3.php.

Rain Gardens

Rain gardens allow runoff to be directed from your roof downspout into a landscaped area. Vegetation and rocks in the garden will slow the flow of water to allow for infiltration into the soil. Plants and soil particles will absorb pollutants from the roof runoff. By utilizing a native plant palate, rain gardens can be maintained all year with minimal additional irrigation. These plants are adapted to the semi-arid climate of Southern California, require less water and can reduce your water bill.

Before modifying your yard to install a rain garden, please consult your local building and/or planning departments to ensure your garden plan follows pertinent building codes and ordinances. Besides codes and ordinances, some home owner associations also have guidelines for yard modifications. If your property is in hill areas or includes engineered slopes, please seek professional advice before proceeding with changes.



For information on how to disconnect a downspout or to install and maintain a rain barrel or rain garden at your home, please see the Los Angeles Rainwater Harvesting Program, A Homeowner's "How-To" Guide, November 2009 at www.larainwaterharvesting.org/

OTHER WATER CONSERVATION AND POLLUTION PREVENTION TECHNIQUES

Native Vegetation and Maintenance

"California Friendly" plants or native vegetation can significantly reduce water use. These plants often require far less fertilizers and pesticides, which are two significant pollutants found in Orange County waterways. Replacing water "thirsty" plants and grass types with water efficient natives is a great way to save water and reduce the need for potentially harmful pesticides and fertilizer.

Please see the California Friendly Garden Guide produced by the Metropolitan Water District of Southern California and associated Southern California Water Agencies for a catalog of California friendly plants and other garden resources at www.bewaterwise.com/Gardensoft.

Weed Free Yards

Weeds are water thieves. They often reproduce quickly and rob your yard of both water and nutrients. Weed your yard by hand if possible. If you use herbicides to control the weeds, use only the amount recommended on the label and never use it if rain is forecast within the next 48 hours.

Soil Amendments

Soil amendments such as green waste (e.g. grass clippings, compost, etc.) can be a significant source of nutrients and can help keep the soil near the roots of plants moist. However, they can cause algal booms if they get into our waterways, which reduces the amount of oxygen in the water and impacts most aquatic organisms. It is important to apply soil amendments more than 48 hours prior to predicted rainfall.

IRRIGATE EFFICIENTLY

Water runoff from sprinklers left on too long will carry pollutants into our waterways.

Smart Irrigation Controllers

Smart Irrigation Controllers have internal clocks as well as sensors that will turn off the sprinklers in response to environmental changes. If it is raining, too windy or too cold, the smart irrigation control sprinklers will automatically shut off.

Check with your local water agency for available rebates on irrigation controllers and smart timers.

- Aim your sprinklers at your lawn, not the sidewalk – By simply adjusting the direction of your sprinklers you can save water, prevent water pollution from runoff, keep your lawn healthy and save money.
- **Set a timer for your sprinklers** – lawns absorb the water they need to stay healthy within a few minutes of turning on the sprinklers. Time your sprinklers; when water begins running off your lawn, you can turn them off. Your timer can be set to water your lawn for this duration every time.
- **Water at Sunrise** – Watering early in the morning will reduce water loss due to evaporation. Additionally, winds tend to die down in the early morning so the water will get to the lawn as intended.
- **Water by hand** – Instead of using sprinklers, consider watering your yard by hand. Hand-watering ensures that all plants get the proper amount of water and you will prevent any water runoff, which wastes water and carries pollutants into our waterways.
- **Fix leaks** - Nationwide, households waste one trillion gallons of water a year to leaks – that is enough water to serve the entire state of Texas for a year. If your garden hose is leaking, replace the nylon or rubber hose washer and ensure a tight connection. Fix broken sprinklers immediately.

Do your part to prevent water pollution in our creeks, rivers, bays and ocean.

Clean beaches and healthy creeks, rivers, bays, and ocean are important to Orange County. However, many common household activities can lead to water pollution if you're not careful.

Remember the Water in Your Storm Drain is Not Treated BEFORE It Enters Our Waterways

Litter, oil, chemicals and other substances that are left on your yard or driveway can be blown or washed into storm drains that flow to the ocean. Over-watering your lawn and washing your car can also flush materials into the storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated.

You would never pour soap, fertilizers or oil into the ocean, so don't let them enter streets, gutters or storm drains. Follow the easy tips in this brochure to help prevent water pollution.

For more information, please call the **Orange County Stormwater Program** at **1-877-89-SPILL** (1-877-897-7455) or visit **www.ocwatersheds.com**

To report a spill, call the **Orange County 24-Hour Water Pollution Problem Reporting Hotline 1-877-89-SPILL** (1-877-897-7455).

For emergencies, dial 911.

The tips contained in this brochure provide useful information to help prevent water pollution while performing everyday household activities. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

GENUINE RECYCLED PAPER
50% PRE-CONSUMER AND 15% POST-CONSUMER

RECYCLE USED OIL

Help Prevent Ocean Pollution:

Household Tips

The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Pollution Prevention

Household Activities

- **Do not rinse spills with water!** Sweep outdoor spills and dispose of in the trash. For wet spills like oil, apply cat litter or another absorbent material, then sweep and bring to a household hazardous waste collection center (HHWCC).
- Securely cover trash cans.
- Take household hazardous waste to a household hazardous waste collection center.
- Store household hazardous waste in closed, labeled containers inside or under a cover.
- Do not hose down your driveway, sidewalk or patio. Sweep up debris and dispose of in trash.
- Always pick up after your pet. Flush waste down the toilet or dispose of in the trash.
- Bathe pets indoors or have them professionally groomed.

Household Hazardous Wastes include:

- ▲ **Batteries**
- ▲ **Paint thinners, paint strippers and removers**
- ▲ **Adhesives**
- ▲ **Drain openers**
- ▲ **Oven cleaners**
- ▲ **Wood and metal cleaners and polishes**
- ▲ **Herbicides and pesticides**
- ▲ **Fungicides/wood preservatives**
- ▲ **Automotive fluids and products**
- ▲ **Grease and rust solvents**
- ▲ **Thermometers and other products containing mercury**
- ▲ **Fluorescent lamps**
- ▲ **Cathode ray tubes, e.g. TVs, computer monitors**
- ▲ **Pool and spa chemicals**

Gardening Activities

- Follow directions on pesticides and fertilizers, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Water your lawn and garden by hand to control the amount of water you use. Set irrigation systems to reflect seasonal water needs. If water flows off your yard and onto your driveway or sidewalk, your system is over-watering.
- Mulch clippings or leave them on the lawn. If necessary, dispose in a green waste container.
- Cultivate your garden often to control weeds.

Washing and Maintaining Your Car

- Take your car to a commercial car wash whenever possible.
- Choose soaps, cleaners, or detergents labeled "non-toxic," "phosphate free" or "biodegradable." Vegetable and citrus-based products are typically safest for the environment, **but even these should not be allowed into the storm drain.**
- Shake floor mats into a trash can or vacuum to clean.
- Do not use acid-based wheel cleaners and "hose off" engine degreasers at home. They can be used at a commercial facility, which can properly process the washwater.
- **Do not dump washwater onto your driveway, sidewalk, street, gutter or storm drain.** Excess washwater should be disposed of in the sanitary sewers (through a sink, or toilet) or onto an absorbent surface like your lawn.
- Use a nozzle to turn off water when not actively washing down automobile.
- Monitor vehicles for leaks and place pans under leaks. Keep your car well maintained to stop and prevent leaks.
- Use cat litter or other absorbents and sweep to remove any materials deposited by vehicles. Contain sweepings and dispose of at a HHWCC.
- Perform automobile repair and maintenance under a covered area and use drip pans or plastic sheeting to keep spills and waste material from reaching storm drains.
- **Never pour oil or antifreeze in the street, gutter or storm drains.** Recycle these substances at a service station, HHWCC, or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.ciwmb.ca.gov/UsedOil.

For locations and hours of Household Hazardous Waste Collection Centers in Anaheim, Huntington Beach, Irvine and San Juan Capistrano, call (714)834-6752 or visit www.oclandfills.com.

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Home improvement projects and work sites must be maintained to ensure that building materials do not enter the street, gutter or storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never dump building materials into the ocean, so don't let them enter the storm drains. Follow these tips to help prevent water pollution.

For more information,
please call the
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at **1-877-89-SPILL** (1-877-897-7455)
or visit
www.ocwatersheds.com

To report a spill,
call the
Orange County 24-Hour
Water Pollution Problem
Reporting Hotline
at **1-877-89-SPILL** (1-877-897-7455).

For emergencies, dial 911.

The tips contained in this brochure provide useful information to help prevent water pollution while performing home improvement projects. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

Printed on Recycled Paper

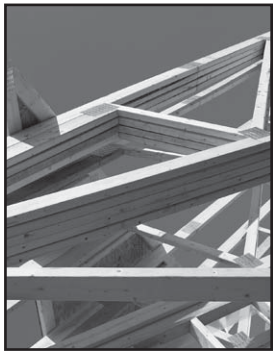
Help Prevent Ocean Pollution:

Tips for Home Improvement Projects

Tips for Home Improvement Projects

Home improvement projects can cause significant damage to the environment. Whether you hire a contractor or work on the house yourself, it is important to follow these simple tips while renovating, remodeling or improving your home:

General Construction



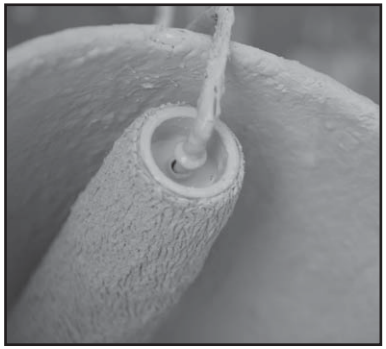
- Schedule projects for dry weather.
- Keep all construction debris away from the street, gutter and storm drain.
- Store materials under cover with temporary roofs or plastic sheets to eliminate or reduce the possibility that rainfall, runoff or wind will carry materials from the project site to the street, storm drain or adjacent properties.

Building Materials

- Never hose materials into a street, gutter or storm drain.
- Exposed piles of construction material should not be stored on the street or sidewalk.
- Minimize waste by ordering only the amount of materials needed to complete the job.
- Do not mix more fresh concrete than is needed for each project.
- Wash concrete mixers and equipment in a designated washout area where the water can flow into a containment area or onto dirt.
- Dispose of small amounts of dry excess materials in the trash. Powdery waste, such as dry concrete, must be properly contained within a box or bag prior to disposal. Call your local trash hauler for weight and size limits.

Paint

- Measure the room or object to be painted, then buy only the amount needed.
- Place the lid on firmly and store the paint can upside-down in a dry location away from the elements.
- Tools such as brushes, buckets and rags should never be washed where excess water can drain into the street, gutter or storm drain. All tools should be rinsed in a sink connected to the sanitary sewer.
- When disposing of paint, never put wet paint in the trash.
- Dispose of water-based paint by removing the lid and letting it dry in the can. Large amounts must be taken to a Household Hazardous Waste Collection Center (HHWCC).



- Oil-based paint is a household hazardous waste. All leftover paint should be taken to a HHWCC.
- For HHWCC locations and hours, call **(714) 834-6752** or visit **www.oclandfills.com**.

Erosion Control

- Schedule grading and excavation projects for dry weather.
- When temporarily removing soil, pile it in a contained, covered area where it cannot spill into the street, or obtain the required temporary encroachment or street closure permit and follow the conditions instructed by the permit.
- When permanently removing large quantities of soil, a disposal location must be found prior to excavation. Numerous businesses are available to handle disposal needs. For disposal options, visit **www.ciwmb.ca.gov/SWIS**.
- Prevent erosion by planting fast-growing annual and perennial grasses. They will shield and bind the soil.

Recycle

- Use a construction and demolition recycling company to recycle lumber, paper, cardboard, metals, masonry (bricks, concrete, etc.), carpet, plastic, pipes (plastic, metal and clay), drywall, rocks, dirt and green waste.

- For a listing of construction and demolition recycling locations in your area, visit **www.ciwmb.ca.gov/recycle.**

Spills

- Clean up spills immediately by using an absorbent material such as cat litter, then sweep it up and dispose of it in the trash.
- Immediately report spills that have entered the street, gutter or storm drain to the County's 24-Hour Water Pollution Problem Reporting Hotline at **(714) 567-6363** or visit **www.ocwatersheds.com** to fill out an incident reporting form.

PROJECT Pollution PREVENTION

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities such as painting can lead to water pollution if you're not careful. Paint must be used, stored and disposed of properly to ensure that it does not enter the street, gutter or storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never dump paint into the ocean, so don't let it enter the storm drains. Follow these easy tips to help prevent water pollution.

For more information,
please call the
Orange County Stormwater Program
at **1-877-89-SPILL** (1-877-897-7455)
or visit
www.ocwatersheds.com

To report a spill,
call the
Orange County 24-Hour Water Pollution Problem Reporting Hotline
at **1-877-89-SPILL** (1-877-897-7455).

For emergencies, dial 911.

The tips contained in this brochure provide useful information to help prevent water pollution while using, storing and disposing of paint. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Tips for Projects Using Paint

Tips for Projects Using Paint

Paint can cause significant damage to our environment. Whether you hire a contractor or do it yourself, it is important to follow these simple tips when purchasing, using, cleaning, storing and disposing of paint.

Purchasing Paint

- Measure the room or object to be painted, then buy only the amount needed.
- Whenever possible, use water-based paint since it usually does not require hazardous solvents such as paint thinner for cleanup.

Painting

- Use only one brush or roller per color of paint to reduce the amount of water needed for cleaning.
- Place open paint containers or trays on a stable surface and in a position that is unlikely to spill.
- Always use a tarp under the area or object being painted to collect paint drips and contain spills.

Cleaning

- Never clean brushes or rinse paint containers in the street, gutter or storm drain.
- For oil-based products, use as much of the paint on the brushes as possible. Clean brushes with thinner. To reuse thinner, pour it through a fine filter (e.g. nylon, metal gauze or filter paper) to remove solids such as leftover traces of paint.
- For water-based products, use as much of the paint on the brushes as possible, then rinse in the sink.
- Collect all paint chips and dust. Chips and dust from marine paints or paints containing lead, mercury or tributyl tin are hazardous waste. Sweep up and dispose of at a Household Hazardous Waste Collection Center (HHWCC).

Storing Paint

- Store paint in a dry location away from the elements.
- Store leftover water-based paint, oil-based paint and solvents separately in original or clearly marked containers.
- Avoid storing paint cans directly on cement floors. The bottom of the can will rust much faster on cement.
- Place the lid on firmly and store the paint can upside-down to prevent air from entering. This will keep the paint usable longer. Oil-based paint is usable for up to 15 years. Water-based paint remains usable for up to 10 years.

Alternatives to Disposal

- Use excess paint to apply another coat, for touch-ups, or to paint a closet, garage, basement or attic.
- Give extra paint to friends or family. Extra paint can also be donated to a local theatre group, low-income housing program or school.
- Take extra paint to an exchange program such as the **"Stop & Swap"** that allows you to drop off or pick up partially used home care products free of charge. **"Stop & Swap"** programs are available at most HHWCCs.
- For HHWCC locations and hours, call **(714) 834-6752** or visit **www.oclandfills.com**.

Disposing of Paint

- Never put wet paint in the trash.

For water-based paint:

- If possible, brush the leftover paint on cardboard or newspaper. Otherwise, allow the paint to dry in the can with the lid off in a well-ventilated area protected from the elements, children and pets. Stirring the paint every few days will speed up the drying.
- Large quantities of extra paint should be taken to a HHWCC.
- Once dried, paint and painted surfaces may be disposed of in the trash. When setting a dried paint can out for trash collection, leave the lid off so the collector will see that the paint has dried.

For oil-based paint:

- Oil-based paint is a household hazardous waste. All leftover paint should be taken to a HHWCC.

Aerosol paint:

- Dispose of aerosol paint cans at a HHWCC.

Spills

- Never hose down pavement or other impermeable surfaces where paint has spilled.
- Clean up spills immediately by using an absorbent material such as cat litter. Cat litter used to clean water-based paint spills can be disposed of in the trash. When cleaning oil-based paint spills with cat litter, it must be taken to a HHWCC.
- Immediately report spills that have entered the street, gutter or storm drain to the County's 24-Hour Water Pollution Problem Reporting Hotline at **(714) 567-6363** or visit **www.ocwatersheds.com** to fill out an incident reporting form.

PROJECT Pollution PREVENTION

Did you know that just one quart of oil can pollute 250,000 gallons of water?

A clean ocean and healthy creeks, rivers, bays and beaches are important to Orange County. However, not properly disposing of used oil can lead to water pollution. If you pour or drain oil onto driveways, sidewalks or streets, it can be washed into the storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering the ocean. Help prevent water pollution by taking your used oil to a used oil collection center.

Included in this brochure is a list of locations that will accept up to five gallons of used motor oil at no cost. Many also accept used oil filters. Please contact the facility before delivering your used oil. This listing of companies is for your reference and does not constitute a recommendation or endorsement of the company.

Please note that used oil filters may not be disposed of with regular household trash. They must be taken to a household hazardous waste collection or recycling center in Anaheim, Huntington Beach, Irvine or San Juan Capistrano. For information about these centers, visit www.oclandfills.com.

Please do not mix your oil with other substances!

For more information, please call the Orange County Stormwater Program at 1-877-89-SPILL (1-877-897-7455) or visit www.watersheds.com.

For information about the proper disposal of household hazardous waste, call the Household Waste Hotline at (714) 834-6752 or visit www.oclandfills.com.

RECYCLE USED OIL

For additional information about the nearest oil recycling center, call the Used Oil Program at 1-800-CLEANUP or visit www.cleanup.org.

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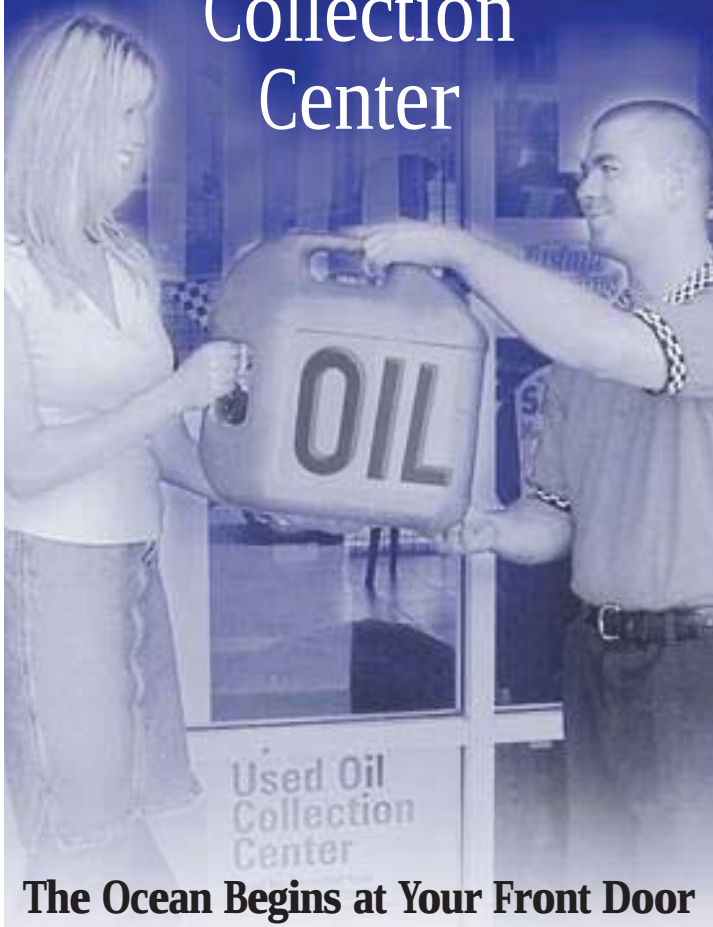
Help Prevent Ocean Pollution:

Recycle at Your Local Used Oil Collection Center



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

NORTH COUNTY

Used Oil Collection Centers

Anaheim

All Seasons Tire and Auto Center, Inc.
817 S Brookhurst St., Anaheim, CA 92804
(714)772-6090( )
CIWMB#: 30-C-03177

AutoZone #3317
423 N Anaheim Blvd., Anaheim, CA 92805
(714)776-0787( )
CIWMB#: 30-C-05263

AutoZone #5226
2145 W Lincoln Ave., Anaheim, CA 92801
(714)533-6599( )
CIWMB#: 30-C-04604

Bedard Automotive
3601 E Miraloma Ave., Anaheim, CA 92806
(714)528-1380( )
CIWMB#: 30-C-02205

Classic Chevrolet
1001 Weir Canyon Rd., Anaheim, CA 92807
(714)283-5400( )
CIWMB#: 30-C-05223

Econo Lube N' Tune #4
3201 W Lincoln Ave., Anaheim, CA 92801
(714)821-0128( )
CIWMB#: 30-C-01485

EZ Lube Inc - Savi Ranch #43
985 N Weir Canyon Rd., Anaheim, CA 92807
(714)556-1312( )
CIWMB#: 30-C-06011

Firestone Store #71C7
1200 S Magnolia Ave., Anaheim, CA 92804
(949)598-5520( )
CIWMB#: 30-C-05743

Great Western Lube Express
125 N Brookhurst St., Anaheim, CA 92801
(714)254-1300( )
CIWMB#: 30-C-05542

HR Pro Auto Service Center
3180 W Lincoln Ave., Anaheim, CA 92801
(714)761-4343( )
CIWMB#: 30-C-05927

Ira Newman Automotive Services
1507 N State College Blvd., Anaheim, CA 92806
(714)635-2392( )
CIWMB#: 30-C-01482

Jiffy Lube #1028
2400 W Ball Rd., Anaheim, CA 92804
(714)761-5211( )
CIWMB#: 30-C-00870

Jiffy Lube #1903
2505 E Lincoln Ave., Anaheim, CA 92806
(714)772-4000( )
CIWMB#: 30-C-05511

Jiffy Lube #2340
2181 W Lincoln Ave., Anaheim, CA 92801
(714)533-1000( )
CIWMB#: 30-C-04647

Kragen Auto Parts #1303
1088 N State College Blvd., Anaheim, CA 92806
(714)956-7351( )
CIWMB#: 30-C-03438

Kragen Auto Parts #1399
2245 W Ball Rd., Anaheim, CA 92804
(714)490-1274( )
CIWMB#: 30-C-04094

Kragen Auto Parts #1565
2072 Lincoln Ave., Anaheim, CA 92806
(714)502-6992( )
CIWMB#: 30-C-04078

Kragen Auto Parts #1582
3420 W Lincoln Ave., Anaheim, CA 92801
(714)828-7977( )
CIWMB#: 30-C-04103

Pep Boys #613
10912 Katella Ave., Anaheim, CA 92804
(714)638-0863( )
CIWMB#: 30-C-01756

Pep Boys #663
3030 W Lincoln Anaheim, CA 92801
(714)826-4810( )
CIWMB#: 30-C-03417

Pep Boys #809
8205 E Santa Ana Cyn Rd., Anaheim, CA 92808
(714)974-0105( )
CIWMB#: 30-C-03443

Pick Your Part
1235 S Beach Blvd., Anaheim, CA 92804
(714)527-1645( )
CIWMB#: 30-C-03744

PK Auto Performance
3106 W. Lincoln Ave., Anaheim, CA 92801
(714)826-2141( )
CIWMB#: 30-C-05628

Quick Change Lube and Oil
2731 W Lincoln Ave., Anaheim, CA 92801
(714)821-4464( )
CIWMB#: 30-C-04363

Saturn of Anaheim
1380 S Auto Center Dr., Anaheim, CA 92806
(714)648-2444( )
CIWMB#: 30-C-06332

Sun Tech Auto Service
105 S State College Blvd., Anaheim, CA 92806
(714)956-1389( )
CIWMB#: 30-C-06455

Vonic Truck Services
515 S Rose St., Anaheim, CA 92805
(714)533-3333( )
CIWMB#: 30-C-01142

Anaheim Hills

Anaheim Hills Car Wash & Lube
5810 E La Palma Ave., Anaheim Hills, CA 92807
(714)777-6605( )
CIWMB#: 30-C-01387

Brea

Firestone Store #27A9
891 E Imperial Hwy., Brea, CA 92821
(714)529-8404( )
CIWMB#: 30-C-01221

Oil Can Henry's
230 N Brea Blvd., Brea, CA 92821
(714)990-1900( )
CIWMB#: 30-C-04273

Buena Park

Firestone Store #71F7
6011 Orangethorpe Buena Park, CA 90620
(714)670-7912( )
CIWMB#: 30-C-01218

Firestone Store #71T8
8600 Beach Blvd., Buena Park, CA 90620
(714)827-5300( )
CIWMB#: 30-C-02121

Kragen Auto Parts #1204
5303 Beach Blvd., Buena Park, CA 90621
(714)994-1320( )
CIWMB#: 30-C-02623

Cypress

AutoZone #5521
5471 Lincoln Ave., Cypress, CA 90630
(714)995-4644( )
CIWMB#: 30-C-00836

Big O Tires
6052 Cerritos Ave., Cypress, CA 90630
(714)826-6334( )
CIWMB#: 30-C-04245

Econo Lube N' Tune #213
5497 Cerritos Ave., Cypress, CA 90630
(714)761-0456( )
CIWMB#: 30-C-06240

Jiffy Lube #851
4942 Lincoln Ave., Cypress, CA 90630
(626)965-9689( )
CIWMB#: 30-C-06182

M & N Coastline Auto & Tire Service
4005 Ball Rd., Cypress, CA 90630
(714)826-1001( )
CIWMB#: 30-C-04387

Masterlube #103
5904 Lincoln Cypress, CA 90630
(714)826-2323( )
CIWMB#: 30-C-01071

Masterlube #104
5971 Ball Rd., Cypress, CA 90630
(714)220-1555( )
CIWMB#: 30-C-04682

Metric Motors of Cypress
6042 Cerritos Ave., Cypress, CA 90630
(714)821-4702( )
CIWMB#: 30-C-05157

Fullerton

AutoZone #2898
146 N. Raymond Ave., Fullerton, CA 92831
(714)870-9772( )
CIWMB#: 30-C-04488

AutoZone #5522
1801 Orangethorpe W. Fullerton, CA 92833
(714)870-8286( )
CIWMB#: 30-C-06062

AutoZone #5523
102 N Euclid Fullerton, CA 92832
(714)870-8286( )
CIWMB#: 30-C-04755

EZ Lube #17
4002 N Harbor Blvd., Fullerton, CA 92835
(714)871-9980( )
CIWMB#: 30-C-03741

Firestone Store #27EH
1933 N Placentia Ave., Fullerton, CA 92831
(714)993-7100( )
CIWMB#: 30-C-02122

Fox Service Center
1018 W Orangethorpe Fullerton, CA 92833
(714)879-1430( )
CIWMB#: 30-C-02318

Fullerton College Automotive Technology
321 E Chapman Ave., Fullerton, CA 92832
(714)992-7275( )
CIWMB#: 30-C-03165

Kragen Auto Parts #0731
2978 Yorba Linda Fullerton, CA 92831
(714)996-4780( )
CIWMB#: 30-C-02628

Kragen Auto Parts #4133
904 W Orangethorpe Ave., Fullerton, CA 92832
(714)526-3570( )
CIWMB#: 30-C-06256

Pep Boys #642
1530 S Harbor Blvd., Fullerton, CA 92832
(714)870-0700( )
CIWMB#: 30-C-01755

Sunnyside 76 Car Care Center
2701 N Brea Blvd., Fullerton, CA 92835
(714)256-0773( )
CIWMB#: 30-C-01381

Garden Grove

76 Pro Lube Plus
9001 Trask Ave., Garden Grove, CA 92844
(714)393-0590( )
CIWMB#: 30-C-05276

AutoZone #5527
13190 Harbor Blvd., Garden Grove, CA 92843
(714)636-5665( )
CIWMB#: 30-C-04760

David Murray Shell
12571 Vly View St., Garden Grove, CA 92845
(714)898-0170( )
CIWMB#: 30-C-00547

Express Lube & Wash
8100 Lampson Ave., Garden Grove, CA 92841
(909)316-8261( )
CIWMB#: 30-C-06544

Firestone Store #7180
10081 Chapman Ave., Garden Grove, CA 92840
(714)530-4630( )
CIWMB#: 30-C-01224

Firestone Store #71W3
13961 Brookhurst St., Garden Grove, CA 92843
(714)590-2741( )
CIWMB#: 30-C-03690

Jiffy Lube #1991
13970 Harbor Blvd., Garden Grove, CA 92843
(714)554-0610( )
CIWMB#: 30-C-05400

Kragen Auto Parts #1251
13933 N Harbor Blvd., Garden Grove, CA 92843
(714)554-3780( )
CIWMB#: 30-C-02663

Kragen Auto Parts #1555
9851 Chapman Ave., Garden Grove, CA 92841
(714)741-8030( )
CIWMB#: 30-C-04079

Nissan of Grarden Grove
9670 Trask Ave., Garden Grove, CA 92884
(714)537-0900( )
CIWMB#: 30-C-06553

Toyota of Garden Grove
9444 Trask Ave., Garden Grove, CA 92844
(714)895-5595( )
CIWMB#: 30-C-06555

La Habra

AutoZone #5532
1200 W Imperial Hwy., La Habra, CA 90631
(562)694-5337( )
CIWMB#: 30-C-04784

Burch Ford
201 N Harbor Blvd., La Habra, CA 90631
(562)691-3225( )
CIWMB#: 30-C-05179

Firestone Store #2736
1071 S Beach Blvd., La Habra, CA 90631
(562)691-1731( )
CIWMB#: 30-C-01169

Kragen Auto Parts #1569
1621 W Whittier Blvd., La Habra, CA 90631
(562)905-2538( )
CIWMB#: 30-C-04076

Pep Boys #997
125 W Imperial Hwy., La Habra, CA 90631
(714)447-0601( )
CIWMB#: 30-C-04026

SpeeDee Oil Change & Tune-Up
1580 W Imperial Hwy., La Habra, CA 90631
(562)697-3513( )

Los Alamitos

Jiffy Lube #1740
3311 Katella Ave., Los Alamitos, CA 90720
(562)596-1827( )
CIWMB#: 30-C-03529

Midway City

Bolsa Transmission
8331 Bolsa Ave., Midway City, CA 92655
(714)799-6158( )
CIWMB#: 30-C-05768

Placentia

Advanced Auto & Diesel
144 S Bradford Placentia, CA 92870
(714)996-8222( )
CIWMB#: 30-C-06242

Castner's Auto Service
214 S. Bradford Ave., Placentia, CA 92870
(714)528-1311( )
CIWMB#: 30-C-06452

Econo Lube N' Tune
100 W Chapman Ave., Placentia, CA 92870
(714)524-0424( )
CIWMB#: 30-C-06454

Fairway Ford
1350 E Yorba Linda Blvd., Placentia, CA 92870
(714)524-1200( )
CIWMB#: 30-C-01863

Seal Beach

M & N Coastline Auto & Tire Service
12239 Seal Beach Blvd., Seal Beach, CA 90740
(714)826-1001( )
CIWMB#: 30-C-04433

Seal Beach Chevron
12541 Seal Beach Blvd., Seal Beach, CA 90740
(949)495-0774(14)
CIWMB#: 30-C-06425

Stanton

AutoZone #2806
11320 Beach Blvd., Stanton, CA 90680
(714)895-7665( )
CIWMB#: 30-C-04563

Joe's Auto Clinic
11763 Beach Blvd., Stanton, CA 90680
(714)891-7715( )
CIWMB#: 30-C-03253

Kragen Auto Parts #1742
11951 Beach Blvd., Stanton, CA 90680
(714)799-7574( )
CIWMB#: 30-C-05231

Scher Tire #20
7000 Katella Ave., Stanton, CA 90680
(714)892-9924( )
CIWMB#: 30-C-05907

USA 10 Minute Oil Change
8100 Lampson Ave., Stanton, CA 92841
(714)373-4432( )
CIWMB#: 30-C-05909

Westminster

AutoZone #5543
6611 Westminster Blvd., Westminster, CA 92683
(714)898-2898( )
CIWMB#: 30-C-04964

AutoZone #5544
8481 Westminster Blvd., Westminster, CA 92683
(714)891-3511( )
CIWMB#: 30-C-04966

City of Westminster Corporate Yard
14381 Olive St., Westminster, CA 92683
(714)895-2876(292)
CIWMB#: 30-C-02008

Honda World
13600 Beach Blvd., Westminster, CA 92683
(714)890-8900( )
CIWMB#: 30-C-03639

Jiffy Lube #1579
6011 Westminster Blvd., Westminster, CA 92683
(714)899-2727( )
CIWMB#: 30-C-02745

John's Brake & Auto Repair
13050 Hoover St., Westminster, CA 92683
(714)379-2088( )
CIWMB#: 30-C-05617

Kragen Auto Parts #0762
6562 Westminster Blvd., Westminster, CA 92683
(714)898-0810( )
CIWMB#: 30-C-02590

Midway City Sanitary District
14451 Cedarwood St., Westminster, CA 92683
(714)893-3553( )
CIWMB#: 30-C-01626

Pep Boys #653
15221 Beach Blvd., Westminster, CA 92683
(714)893-8544( )
CIWMB#: 30-C-03415

Yorba Linda

AutoZone #5545
18528 Yorba Linda Blvd., Yorba Linda, CA 92886
(714)970-8933( )
CIWMB#: 30-C-04971

Econo Lube N' Tune
22270 La Palma Ave., Yorba Linda, CA 92887
(714)692-8394( )
CIWMB#: 30-C-06513

EZ Lube Inc. #41
17511 Yorba Linda Blvd., Yorba Linda, CA 92886
(714)556-1312( )
CIWMB#: 30-C-05739

Firestone Store #27T3
18500 Yorba Linda Blvd., Yorba Linda, CA 92886
(714)779-1966( )
CIWMB#: 30-C-01222

Jiffy Lube #1532
16751 Yorba Linda Blvd., Yorba Linda, CA 92886
(714)528-2800( )
CIWMB#: 30-C-03777

Mike Schultz Import Service
4832 Eureka Ave., Yorba Linda, CA 92886
(714)528-4411( )
CIWMB#: 30-C-04313

This information was provided by the County of Orange Integrated Waste Management Department and the California Integrated Waste Management Board (CIWMB).

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities such as pest control can lead to water pollution if you're not careful. Pesticide treatments must be planned and applied properly to ensure that pesticides do not enter the street, gutter or storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never dump pesticides into the ocean, so don't let it enter the storm drains. Pesticides can cause significant damage to our environment if used improperly. If you are thinking of using a pesticide to control a pest, there are some important things to consider.

For more information,
please call
University of California Cooperative
Extension Master Gardeners at
(714) 708-1646
or visit these Web sites:
www.uccemg.org
www.ipm.ucdavis.edu

For instructions on collecting a specimen sample visit the Orange County Agriculture Commissioner's website at:
http://www.ocagcomm.com/ser_lab.asp

To report a spill, call the
Orange County 24-Hour
Water Pollution Problem
Reporting Hotline
at 1-877-89-SPILL (1-877-897-7455).

For emergencies, dial 911.

Information From:
Cheryl Wilen, Area IPM Advisor; Darren Haver, Watershed Management Advisor; Mary Louise Flint, IPM Education and Publication Director; Pamela M. Geisel, Environmental Horticulture Advisor; Carolyn L. Unruh, University of California Cooperative Extension staff writer. Photos courtesy of the UC Statewide IPM Program and Darren Haver.

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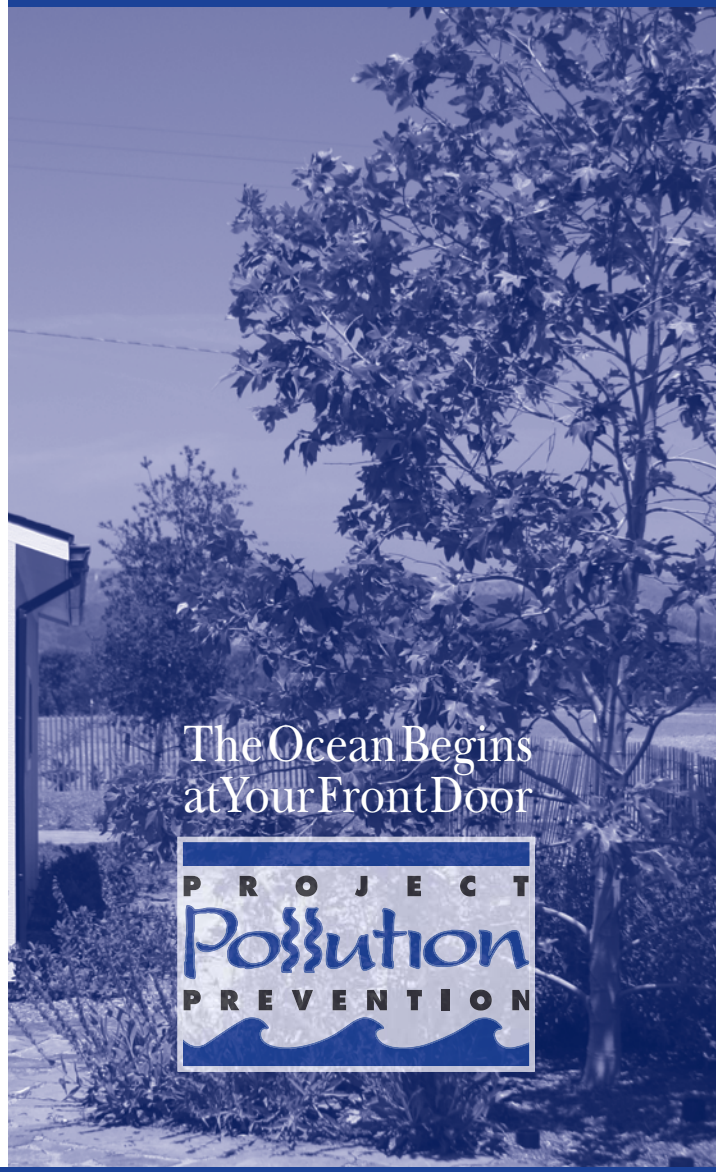
Help Prevent Ocean Pollution:

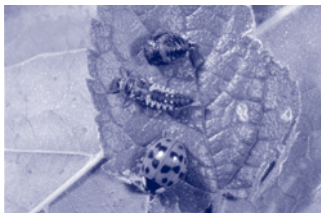
Responsible Pest Control



Tips for Pest Control

Key Steps to Follow:

Step 1: **Correctly identify the pest (insect, weed, rodent, or disease) and verify that it is actually causing the problem.**



Three life stages of the common lady beetle, a beneficial insect.

This is important because beneficial insects are often mistaken for pests and sprayed with pesticides needlessly.

Consult with a Certified Nursery Professional at a local nursery or garden center or send a sample of the pest to the Orange County Agricultural Commissioner's Office.

Determine if the pest is still present – even though you see damage, the pest may have left.

Step 2: **Determine how many pests are present and causing damage.**

Small pest populations may be controlled more safely using non-pesticide techniques. These include removing food sources, washing off leaves with a strong stream of water, blocking entry into the home using caulking and replacing problem plants with ones less susceptible to pests.

Integrated Pest Management (IPM) usually combines several least toxic pest control methods for long-term prevention and management of pest problems without harming you, your family, or the environment.

UC CE University of California Cooperative Extension

Step 3: **If a pesticide must be used, choose the least toxic chemical.**

Obtain information on the least toxic pesticides that are effective at controlling the target pest from the UC Statewide Integrated Pest Management (IPM) Program's Web site at www.ipm.ucdavis.edu.

Seek out the assistance of a Certified Nursery Professional at a local nursery or garden center when selecting a pesticide. Purchase the smallest amount of pesticide available.

Apply the pesticide to the pest during its most vulnerable life stage. This information can be found on the pesticide label.

Step 4: **Wear appropriate protective clothing.**

Follow pesticide labels regarding specific types of protective equipment you should wear. Protective clothing should always be washed separately from other clothing.

Step 5: **Continuously monitor external conditions when applying pesticides such as weather, irrigation, and the presence of children and animals.**

Never apply pesticides when rain is predicted within the next 48 hours. Also, do not water after applying pesticides unless the directions say it is necessary.

Apply pesticides when the air is still; breezy conditions may cause the spray or dust to drift away from your targeted area.

In case of an emergency call 911 and/or the regional poison control number at (714) 634-5988 or (800) 544-4404 (CA only).

For general questions you may also visit www.calpoison.org.

Step 6: **In the event of accidental spills, sweep up or use an absorbent agent to remove any excess pesticides. Avoid the use of water.**

Be prepared. Have a broom, dust pan, or dry absorbent material, such as cat litter, newspapers or paper towels, ready to assist in cleaning up spills.

Contain and clean up the spill right away. Place contaminated materials in a doubled plastic bag. All materials used to clean up the spill should be properly disposed of according to your local Household Hazardous Waste Disposal site.

Step 7: **Properly store and dispose of unused pesticides.**

Purchase Ready-To-Use (RTU) products to avoid storing large concentrated quantities of pesticides.

Store unused chemicals in a locked cabinet.

Unused pesticide chemicals may be disposed of at a Household Hazardous Waste Collection Center.

Empty pesticide containers should be triple rinsed prior to disposing of them in the trash.

Household Hazardous Waste Collection Center
(714) 834-6752
www.oclandfills.com

PROJECT Pollution PREVENTION

Do your part to prevent water pollution in our creeks, rivers, bays and ocean.

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, not properly disposing of household hazardous waste can lead to water pollution. Batteries, electronics, paint, oil, gardening chemicals, cleaners and other hazardous materials cannot be thrown in the trash. They also must never be poured or thrown into yards, sidewalks, driveways, gutters or streets. Rain or other water could wash the materials into the storm drain and eventually into our waterways and the ocean. In addition, hazardous waste must not be poured in the sanitary sewers (sinks and toilets).

NEVER DISPOSE OF HOUSEHOLD HAZARDOUS WASTE IN THE TRASH, STREET, GUTTER, STORM DRAIN OR SEWER.

For more information, please call the **Orange County Stormwater Program** at **1-877-89-SPILL** (1-877-897-7455) or visit **www.ocwatersheds.com**

To Report Illegal Dumping of Household Hazardous Waste call 1-800-69-TOXIC

To report a spill, call the **Orange County 24-Hour Water Pollution Problem Reporting Hotline 1-877-89-SPILL** (1-877-897-7455)**.**

For emergencies, dial 911.

RECYCLE USED OIL

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Help Prevent Ocean Pollution:

Proper Disposal of Household Hazardous Waste

The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

ORANGE COUNTY

Pollution Prevention

Leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be "household hazardous waste" or "HHW." HHW can be found throughout your home, including the bathroom, kitchen, laundry room and garage.

WHEN POSSIBLE, USE NON-HAZARDOUS OR LESS-HAZARDOUS PRODUCTS.

Disposal of HHW down the drain, on the ground, into storm drains, or in the trash is illegal and unsafe.

Proper disposal of HHW is actually easy. Simply drop them off at a Household Hazardous Waste Collection Center (HHWCC) for free disposal and recycling. Many materials including anti-freeze, latex-based paint, motor oil and batteries can be recycled. Some centers have a "Stop & Swap" program that lets you take partially used home, garden, and automobile products free of charge. There are four HHWCCs in Orange County:

Anaheim:.....1071 N. Blue Gum St
Huntington Beach:.....17121 Nichols St
Irvine:..... 6411 Oak Canyon
San Juan Capistrano:... 32250 La Pata Ave

Centers are open Tuesday-Saturday, 9 a.m.-3 p.m. Centers are closed on rainy days and major holidays. For more information, call **(714) 834-6752** or visit **www.oclandfills.com.**

Common household hazardous wastes

- Batteries
- Paint and paint products
- Adhesives
- Drain openers
- Household cleaning products
- Wood and metal cleaners and polishes
- Pesticides
- Fungicides/wood preservatives
- Automotive products (antifreeze, motor oil, fluids)
- Grease and rust solvents
- Fluorescent lamps
- Mercury (thermometers & thermostats)
- All forms of electronic waste including computers and microwaves
- Pool & spa chemicals
- Cleaners
- Medications
- Propane (camping & BBQ)
- Mercury-containing lamps
- Television & monitors (CRTs, flatscreens)

Tips for household hazardous waste

- Never dispose of HHW in the trash, street, gutter, storm drain or sewer.
- Keep these materials in closed, labeled containers and store materials indoors or under a cover.
- When possible, use non-hazardous products.
- Reuse products whenever possible or share with family and friends.
- Purchase only as much of a product as you'll need. Empty containers may be disposed of in the trash.
- HHW can be harmful to humans, pets and the environment. Report emergencies to 911.

Sewage Spill Regulatory Requirements

Allowing sewage to discharge to a gutter or storm drain may subject you to penalties and/or out-of-pocket costs to reimburse cities or public agencies for clean-up efforts.

Here are the pertinent codes, fines, and agency contact information that apply.

Orange County Stormwater Program
24 Hour Water Pollution Reporting Hotline
1-877-89-SPILL (1-877-897-7455)

- County and city water quality ordinances prohibit discharges containing pollutants.

Orange County Health Care Agency Environmental Health
(714) 433-6419

California Health and Safety Code, Sections 5410-5416

- No person shall discharge raw or treated sewage or other waste in a manner that results in contamination, pollution or a nuisance.
- Any person who causes or permits a sewage discharge to any state waters:
  - must immediately notify the local health agency of the discharge.
  - shall reimburse the local health agency for services that protect the public's health and safety (water-contact receiving waters).
  - who fails to provide the required notice to the local health agency is guilty of a misdemeanor and shall be punished by a fine (between $500–$1,000) and/or imprisonment for less than one year.

Regional Water Quality Control Board
Santa Ana Region (951) 782-4130
San Diego Region (858) 467-2952

- Requires the prevention, mitigation, response to and reporting of sewage spills.

California Office of Emergency Services
(800) 852-7550

California Water Code, Article 4, Chapter 4, Sections 13268-13271
California Code of Regulations, Title 23, Division 3, Chapter 9.2, Article 2, Sections 2250-2260

- Any person who causes or permits sewage in excess of 1,000 gallons to be discharged to state waters **shall immediately notify the Office of Emergency Services.**
- Any person who fails to provide the notice required by this section is **guilty of a misdemeanor** and shall be punished by a fine (less than $20,000) and/or imprisonment for not more than one year.

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Sewage Spill
Reference Guide

Your Responsibilities as a Private Property Owner

Residences
Businesses
Homeowner/Condominium Associations
Federal and State Complexes
Military Facilities

Orange County Sanitation District

Health Care Agency
Environmental Health

PROJECT Pollution PREVENTION

www.ocwatersheds.com

This brochure was designed courtesy of the Orange County Sanitation District (OCSD).
For additional information, call (714) 962-2411, or visit their website at www.ocsd.com

What is a Sewage Spill?

Sewage spills occur when the wastewater being transported via underground pipes overflows through a manhole, cleanout or broken pipe. Sewage spills can cause health hazards, damage to homes and businesses, and threaten the environment, local waterways and beaches.

Common Causes of Sewage Spills

Grease builds up inside and eventually blocks sewer pipes. Grease gets into the sewer from food establishments, household drains, as well as from poorly maintained commercial grease traps and interceptors.

Structure problems caused by tree roots in the lines, broken/cracked pipes, missing or broken cleanout caps or undersized sewers can cause blockages.

Infiltration and inflow (I/I) impacts pipe capacity and is caused when groundwater or rainwater enters the sewer system through pipe defects and illegal connections.

You Are Responsible for a Sewage Spill Caused by a Blockage or Break in Your Sewer Lines!

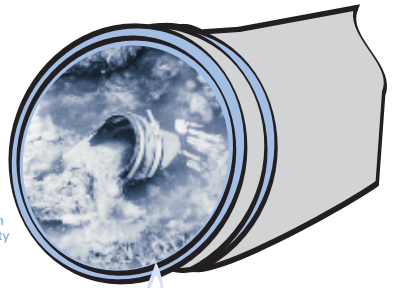
Time is of the essence in dealing with sewage spills. You are required to **immediately**:

Control and minimize the spill. Keep spills contained on private property and out of gutters, storm drains and public waterways by shutting off or not using the water.

Use sandbags, dirt and/or plastic sheeting to prevent sewage from entering the storm drain system.

Clear the sewer blockage. Always wear gloves and wash your hands. It is recommended that a plumbing professional be called for clearing blockages and making necessary repairs.

Always notify your city sewer/public works department or public sewer district of sewage spills. If the spill enters the storm drains also notify the Health Care Agency. In addition, if it exceeds 1,000 gallons notify the Office of Emergency Services. Refer to the numbers listed in this brochure.



Overflowing cleanout pipe located on private property

You Could Be Liable

Allowing sewage from your home, business or property to discharge to a gutter or storm drain may subject you to penalties and/or out-of-pocket costs to reimburse cities or public agencies for clean-up and enforcement efforts. See Regulatory Codes & Fines section for pertinent codes and fines that apply.

What to Look For

Sewage spills can be a very noticeable gushing of water from a manhole or a slow water leak that may take time to be noticed. Don't dismiss unaccounted-for wet areas.

Look for:

- Drain backups inside the building.
- Wet ground and water leaking around manhole lids onto your street.
- Leaking water from cleanouts or outside drains.
- Unusual odorous wet areas: sidewalks, external walls or ground/landscape around a building.

Caution

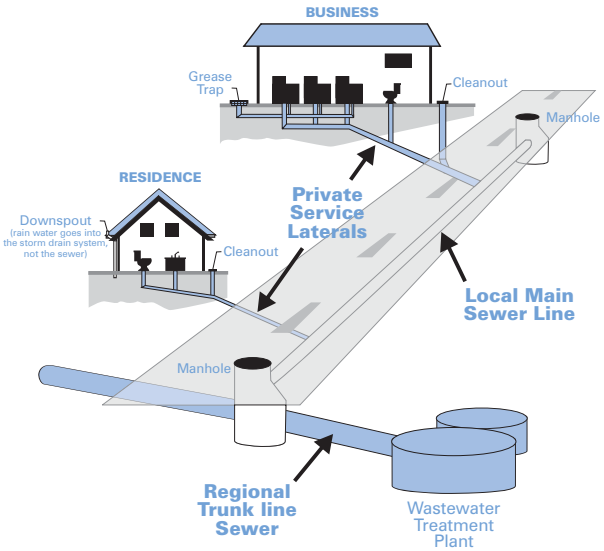
Keep people and pets away from the affected area. Untreated sewage has high levels of disease-causing viruses and bacteria. Call your local health care agency listed on the back for more information.

If You See a Sewage Spill Occurring, Notify Your City Sewer/Public Works Department or Public Sewer District IMMEDIATELY!

How a Sewer System Works

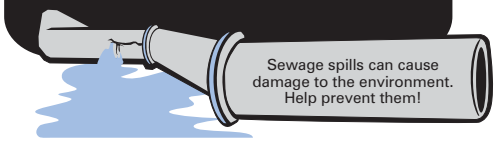
A property owner's sewer pipes are called service laterals and are connected to larger local main and regional trunk lines. Service laterals run from the connection at the home to the connection with the public sewer (including the area under the street). These laterals are the responsibility of the property owner and must be maintained by the property owner. Many city agencies have adopted ordinances requiring maintenance of service laterals. Check with your city sewer/local public works department for more information.

Operation and maintenance of **local and regional sewer lines** are the responsibility of the city sewer/public works departments and public sewer districts.



How You Can Prevent Sewage Spills

1. **Never put grease down garbage disposals, drains or toilets.**
2. **Perform periodic cleaning to eliminate grease, debris and roots in your service laterals.**
3. **Repair any structural problems in your sewer system and eliminate any rainwater infiltration/inflow leaks into your service laterals.**



Preventing Grease Blockages

The drain is not a dump! Recycle or dispose of grease properly and never pour grease down the drain.

Homeowners should mix fats, oils and grease with absorbent waste materials such as paper, coffee grounds, or kitty litter and place it in the trash. Wipe food scraps from plates and pans and dump them in the trash.

Restaurants and commercial food service establishments should always use "Kitchen Best Management Practices." These include:

- Collecting all cooking grease and liquid oil from pots, pans and fryers in covered grease containers for recycling.
- Scraping or dry-wiping excess food and grease from dishes, pots, pans and fryers into the trash.
- Installing drain screens on all kitchen drains.
- Having spill kits readily available for cleaning up spills.
- Properly maintaining grease traps or interceptors by having them serviced regularly. Check your local city codes.

Orange County Agency Responsibilites

- **City Sewer/Public Works Departments—** Responsible for protecting city property and streets, the local storm drain system, sewage collection system and other public areas.
- **Public Sewer/Sanitation District—** Responsible for collecting, treating and disposing of wastewater.
- **County of Orange Health Care Agency—** Responsible for protecting public health by closing ocean/bay waters and may close food-service businesses if a spill poses a threat to public health.
- **Regional Water Quality Control Boards—** Responsible for protecting State waters.
- **Orange County Stormwater Program—** Responsible for preventing harmful pollutants from being discharged or washed by stormwater runoff into the municipal storm drain system, creeks, bays and the ocean.

You Could Be Liable for Not Protecting the Environment

Local and state agencies have legal jurisdiction and enforcement authority to ensure that sewage spills are remedied.

They may respond and assist with containment, relieving pipe blockages, and/or clean-up of the sewage spill, especially if the spill is flowing into storm drains or onto public property.

A property owner may be charged for costs incurred by these agencies responding to spills from private properties.

Report Sewage Spills!

City Sewer/Public Works Departments

Aliso Viejo	(949) 425-2500
Anaheim	(714) 765-6860
Brea	(714) 990-7691
Buena Park	(714) 562-3655
Costa Mesa	(949) 645-8400
Cypress	(714) 229-6760
Dana Point	(949) 248-3562
Fountain Valley	(714) 593-4600
Fullerton	(714) 738-6897
Garden Grove	(714) 741-5375
Huntington Beach	(714) 536-5921
Irvine	(949) 453-5300
Laguna Beach	(949) 497-0765
Laguna Hills	(949) 707-2650
Laguna Niguel	(949) 362-4337
Laguna Woods	(949) 639-0500
La Habra	(562) 905-9792
Lake Forest	(949) 461-3480
La Palma	(714) 690-3310
Los Alamitos	(562) 431-3538
Mission Viejo	(949) 831-2500
Newport Beach	(949) 644-3011
Orange	(714) 532-6480
Orange County	(714) 567-6363
Placentia	(714) 993-8245
Rancho Santa Margarita	(949) 635-1800
San Clemente	(949) 366-1553
San Juan Capistrano	(949) 443-6363
Santa Ana	(714) 647-3380
Seal Beach	(562) 431-2527
Stanton	(714) 379-9222
Tustin	(714) 962-2411
Villa Park	(714) 998-1500
Westminster	(714) 893-3553
Yorba Linda	(714) 961-7170

Public Sewer/Water Districts

Costa Mesa Sanitary District	(714) 393-4433/ (949) 645-8400
El Toro Water District	(949) 837-0660
Emerald Bay Service District	(949) 494-8571
Garden Grove Sanitary District	(714) 741-5375
Irvine Ranch Water District	(949) 453-5300
Los Alamitos/Rossmoor Sewer District	(562) 431-2223
Midway City Sanitary District (Westminster)	(714) 893-3553
Moulton Niguel Water District	(949) 831-2500
Orange County Sanitation District	(714) 962-2411
Santa Margarita Water District	(949) 459-6420
South Coast Water District	(949) 499-4555
South Orange County Wastewater Authority	(949) 234-5400
Sunset Beach Sanitary District	(562) 493-9932
Trabuco Canyon Sanitary District	(949) 858-0277
Yorba Linda Water District	(714) 777-3018

Other Agencies

Orange County Health Care Agency	(714) 433-6419
Office of Emergency Services	(800) 852-7550

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Pet waste and pet care products can be washed into the storm drains that flow to the ocean. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never put pet waste or pet care products into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution.

For more information,
please call the
Orange County Stormwater Program
at **1-877-89-SPILL** (1-877-897-7455)
or visit
www.ocwatersheds.com

To report a spill,
call the
Orange County 24-Hour Water Pollution Problem Reporting Hotline
1-877-89-SPILL (1-877-897-7455).

For emergencies, dial 911.

The tips contained in this brochure provide useful information to help prevent water pollution while caring for your pet. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

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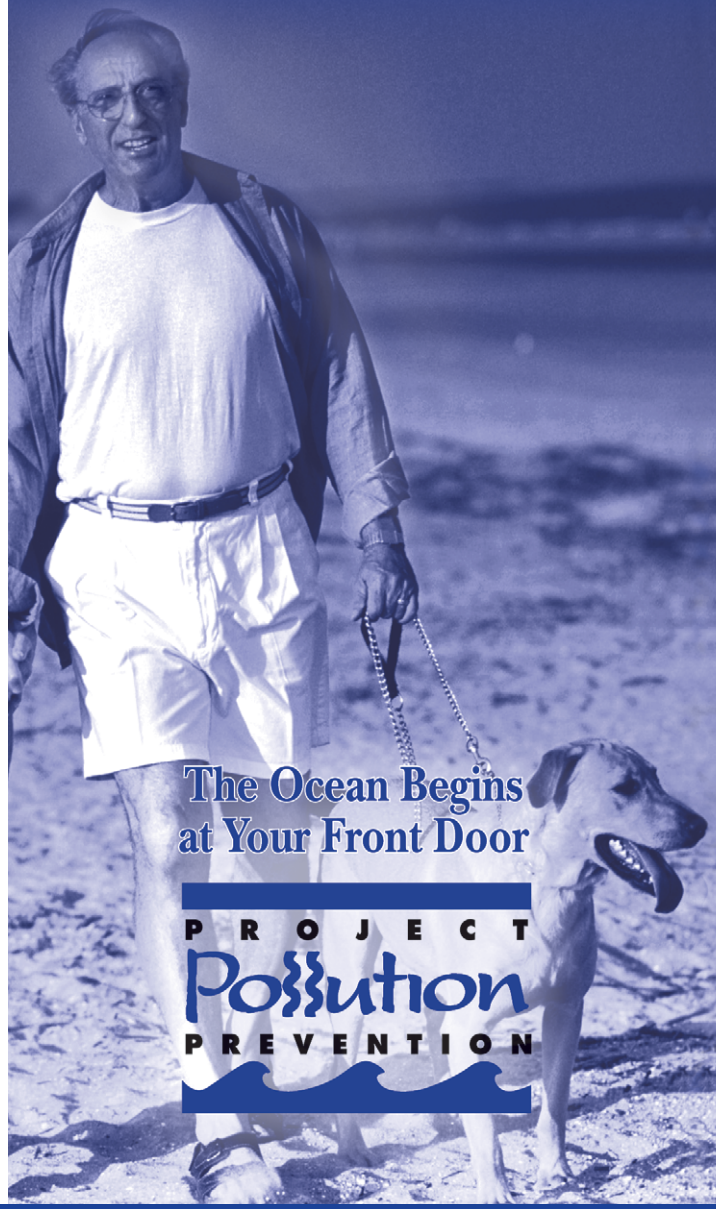
Help Prevent Ocean Pollution:

Tips for Pet Care



Tips for Pet Care

Never let any pet care products or washwater run off your yard and into the street, gutter or storm drain.

Washing Your Pets

Even biodegradable soaps and shampoos can be harmful to marine life and the environment.

- If possible, bathe your pets indoors using less-toxic shampoos or have your pet professionally groomed. Follow instructions on the products and clean up spills.

- If you bathe your pet outside, wash it on your lawn or another absorbent/ permeable surface to keep the washwater from running into the street, gutter or storm drain.

Flea Control

- Consider using oral or topical flea control products.

- If you use flea control products such as shampoos, sprays or collars, make sure to dispose of any unused products at a Household Hazardous Waste Collection Center. For location information, call **(714) 834-6752**.

Why You Should Pick Up After Your Pet

It's the law! Every city has an ordinance requiring you to pick up after your pet. Besides being a nuisance, pet waste can lead to water pollution, even if you live inland. During rainfall, pet waste left outdoors can wash into storm drains. This waste flows directly into our waterways and the ocean where it can harm human health, marine life and the environment.

As it decomposes, pet waste demands a high level of oxygen from water. This decomposition can contribute to killing marine life by reducing the amount of dissolved oxygen available to them.

Have fun with your pets, but please be a responsible pet owner by taking care of them and the environment.

- Take a bag with you on walks to pick up after your pet.

- Dispose of the waste in the trash or in a toilet.

PROJECT Pollution PREVENTION

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Fertilizers, pesticides and other chemicals that are left on yards or driveways can be blown or washed into storm drains that flow to the ocean. Overwatering lawns can also send materials into storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never pour gardening products into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution.

For more information,
please call the
Orange County Stormwater Program
at **1-877-89-SPILL** (1-877-897-7455)
or visit
www.ocwatersheds.com

UCCE Master Gardener Hotline:
(714) 708-1646

To report a spill,
call the
Orange County 24-Hour
Water Pollution Problem
Reporting Hotline
1-877-89-SPILL (1-877-897-7455).

For emergencies, dial 911.

The tips contained in this brochure provide useful information to help prevent water pollution while landscaping or gardening. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Tips for Landscape & Gardening

The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Tips for Landscape & Gardening

Never allow gardening products or polluted water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.
- Plant native vegetation to reduce the amount of water, fertilizers, and pesticide applied to the landscape.

- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

- Use slow-release fertilizers to minimize leaching, and use organic fertilizers.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.

- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting. For more information, visit **www.ipm.ucdavis.edu**.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. Locations are provided below.

Household Hazardous Waste Collection Centers

Anaheim:	1071 N. Blue Gum St.
Huntington Beach:	17121 Nichols St.
Irvine:	6411 Oak Canyon
San Juan Capistrano:	32250 La Pata Ave.

For more information, call (714) 834-6752 or visit www.oclandfills.com

ENVIRONMENTAL CHALLENGE

YOUR SCORE

0 POINTS:
SPOTLESS
Congratulations, your family, friends and neighbors are doing a great job keeping your environment pollutant-free.

5-50 POINTS:
SPRINKLING OF POLLUTANTS
Your neighbors/schoolmates are working hard to keep your environment pollutant-free. Keep up the good work.

55-100 POINTS:
SEVERAL POLLUTANTS
Your environment has too many pollutants. Help keep your environment pollutant free by doing your part.

105-150 POINTS:
SCORES OF POLLUTANTS
With so many pollutants in your environment, consider teaming up with a friend or family member to educate your community about the simple ways they can keep your environment pollutant free.

155+ POINTS:
SUBMERGED IN POLLUTANTS
Your environment has a significant amount of pollutants that may enter the storm drain and flow directly to the ocean. Consider working with adults in your area to organize a school/ neighborhood clean-up event.

ENVIRONMENTAL CHALLENGE

Are you able to spot real pollutants? Search your yard, neighborhood or schoolyard for the following pollutants. Each item has a point value. Once your search is completed, add up your points and find out how polluted your environment is.

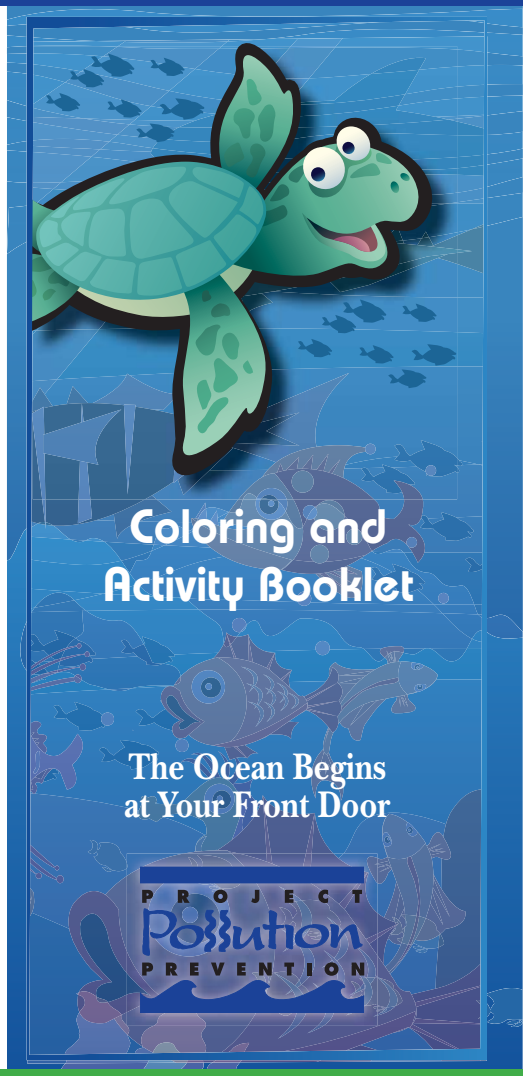
Animal waste	10 points
Bag	10 points
Candy wrapper	10 points
Cardboard	15 points
Cigarette	5 points
Cut grass	10 points
Dirt on the street	15 points
Fallen leaves	5 points
Fast food wrapper	10 points
Glass	20 points
Metal	15 points
Newspaper	10 points
Oil	15 points
Paper	5 points
Plastic bottle	10 points
Soapsuds	20 points
Soda can	5 points
Water in the gutter	10 points

YOU CAN HELP KEEP YOUR ENVIRONMENT POLLUTANT FREE BY:

- Not Littering
- Participate in a clean-up event.
- Recycling
- Picking up after your pet
- Do not overwater your lawn.
- Sweeping up trash, leaves and cut grass from your driveway, sidewalk or patio and putting it in the trash.
- Soaking up outdoor spills with towels or cat litter rather than rinsing them with water.
- Reminding your parents to check their cars for leaks.
- Never putting anything into the storm drain. Storm drains are only for rainwater.
- Teaching others how to protect the environment.

To learn more about protecting your environment from pollution visit www.ocwatersheds.com.
Pollution Prevention Hotline
1-877-89-SPILL / 1-877-897-7455

Help Prevent Ocean Pollution



Environmental Encyclopedia

STORMWATER:
Water from nature such as rain or snow melt.

URBAN RUN-OFF:
Water from a hose or sprinkler that flows into the street.

POLLUTANT:
Materials such as litter, pet waste, motor oil and yard clippings that harm the environment.

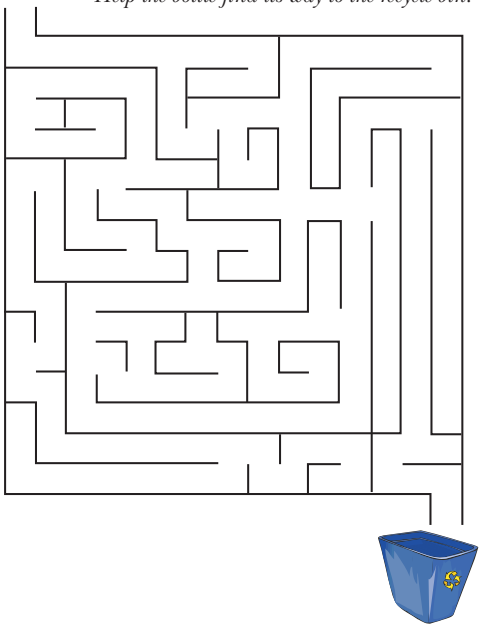
STORM DRAIN:
An opening in the street where water from rain or urban run-off flows. This water picks up pollutants on the way to the storm drain. Once in the storm drain, the water and pollutants flow untreated to the ocean.

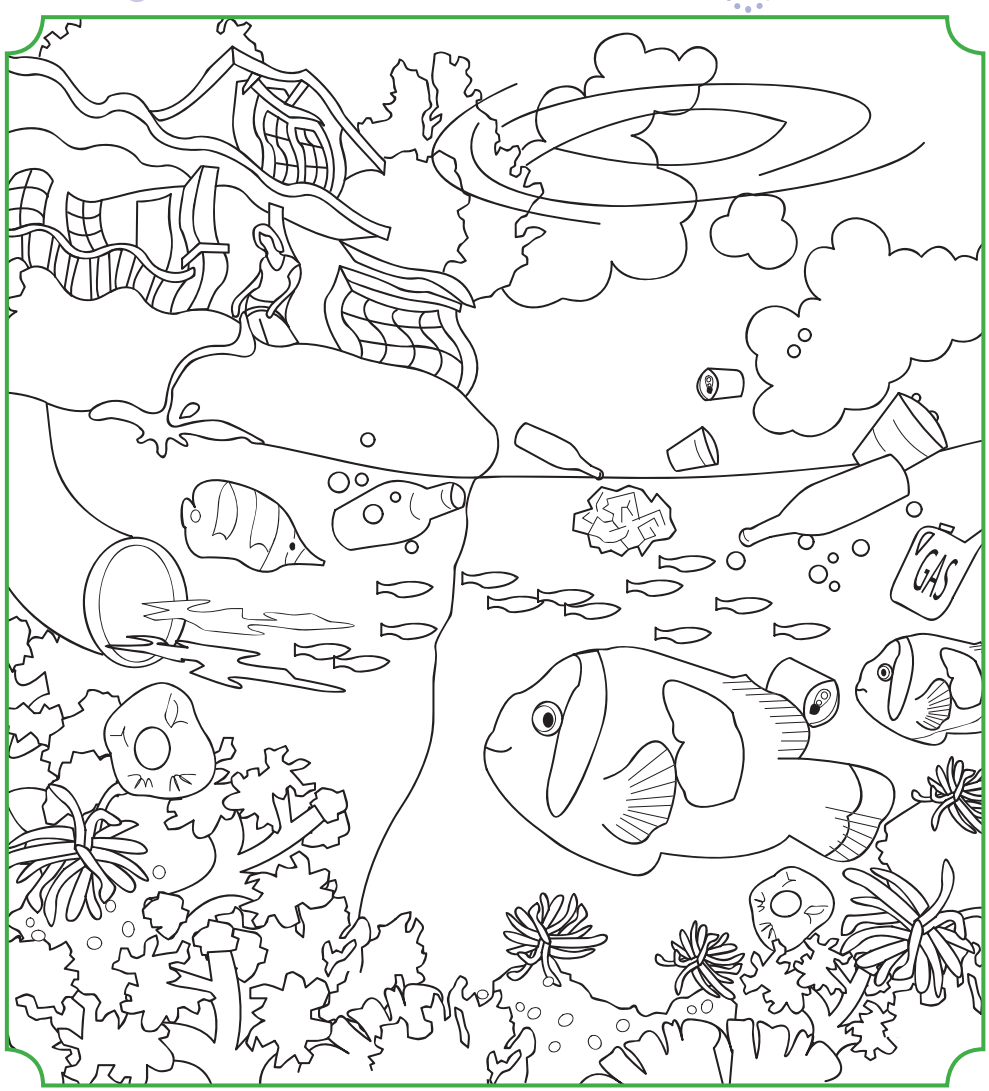
WHAT DOES NOT BELONG IN THE OCEAN?

When we throw trash on the ground, it can end up in the ocean. Put an 'X' on the things that DO NOT belong in the ocean and color the things that DO belong in the ocean.

MAZE:

Help the bottle find its way to the recycle bin!





A Fish EyeView of Pollution.

ZS Engineering
113 Tomato Springs, Irvine, CA 92618
949-331-3232
info@zs-engineering.com

May 30, 2018
ZS Engineering #180505

Mai-Lan Thi Nguyen
946 S. Emerald Dtreet
Anaheim, CA 92804

Subject : **Field Infiltration Tests Report**
Proposed Multi--Family Residential Complex
1122 N. Bewley Street, Santa Ana, CA 92703
(APN 198-101-07)

Dear Ms. Nguyen:

Pursuant to our proposal, dated May 18, 2018, which was authorized by you, ZS Engineering conducted field infiltration tests within the proposed infiltration trench area near the north-central property boundary of the subject residential lot, located at 1122 N. Bewley Street in the City of Santa Ana, California.

Purpose of this study was to determine the design field infiltration rate of the subsurface soils at the target infiltration trench area. Our scope of services for this study included the following:

- Review of published reports and maps pertinent to local and regional geology within and adjacent to the site that could impact the proposed developments.
- Conduct field exploration consisting of three (3) hand augered bore holes, each 8-inch diameter, drilled to depths varying from 4 to 16 feet. Of these, two (2) holes, 4 and 8 feet deep, were drilled at the target infiltration trench bottom elevations. These holes were converted into infiltration test holes. Remaining 16 feet deep was drilled within the project area for verification of geologic profile below the infiltration trench bottom.
- Pre-soak the infiltration test holes and conduct field infiltration tests. Test holes preparation, pre-soaking and field tests were performed in accordance with the Orange County WQMP Guidelines (see References).

- Prepare this report summarizing the findings from the field tests and recommendations on design infiltration rate for the proposed infiltration trench.

Site Description and Proposed Developments

The subject property is within a developed area on the south side of Westminster Avenue and on the east side of Harbor Blvd. in the City of Santa Ana, California. Santa Ana River trail and Santa Anita Park/golf course are located to the near east, southeast of this site. Developments surrounding the site is mostly residential and some commercial. Site location and its vicinities are shown in Figure 1, *Site Location Map*. Topography within the site and its surroundings is fairly flat.

This property is a rectangular shaped parcel of 37,800 sq. feet (~0.87 acre) gross lot area with dimensions about 315 feet along the east-west and about 120 feet along the north-south direction. Previously, this lot was occupied with a single-family home, a detached garage, and a detached guest house within the eastern portion of the lot. Western portion of the lot was a yard, vacant of any structures. At the time of this field exploration, demolition was ongoing at the site. Majority of the structures, except the main building at the front, had already been demolished and cleared off the site. This property was originally developed in 1945.

Based on the project site plan, prepared by YNG Architects (see References), we understand that all the previous structures at the site will be demolished. There will be a new multi-family residential complex. It will have four (4) 2-story buildings with multi-family units and attached garages. Site improvements will include driveways, parking lots, open space patios, a trash enclosure, green areas, landscaping, perimeter walls, etc.

As a part of the developments, there will be a shallow infiltration trench near the north-central boundary of the site (see the Exhibit). Depth of this trench will vary from 4 to 8 feet. Purpose of this study is to determine the field infiltration rate of subsurface soils within the target infiltration trench area.

Field Exploration

On May 28, 2018, we conducted field exploration consisting of three (3) 8-inch diameter (outside) bore holes, B-1, P-1 and P-2, within the project infiltration trench area. Of these, bore holes P-1 and P-2, depths 4 and 8 feet, respectively, were drilled to the target bottom elevations of the proposed infiltration trench. Remaining bore hole B-1 was drilled to a depth 16 feet for verification of subsurface geologic profile below the infiltration trench bottom. Drilling for these

holes was conducted utilizing a hand auger and hand tools. Approximate bore hole locations are shown on Figure 2, *Site Plan and Exploration Map*.

During drilling, subsurface geologic profiles as encountered within each hole were visually observed and described in general conformance with the Unified Soil Classification System (USCS) as defined in the ASTM D2487. Soil descriptions were entered on the field exploration logs (Appendix A).

After drilling of the test holes P-1 and P-2 to target depths, a 2-inch thick layer of 1/2-inch size open graded gravel was placed at the bottom of each hole. The test holes were prepared in accordance with the Orange County Guidelines for WQMP (see References). After completion of the field infiltration tests, all drilled holes were backfilled with the excavated soil spoils.

Geotechnical Findings

Subsurface soils, as encountered within the drilled holes, consist of light gray color silty fine sand within upper about 5 feet. Soils below 5 feet and up to a depth about 12 feet are predominantly sand with few to little silts, light gray to light brown color, mottled. Sand grains within depths 5 to 8 feet are fine to medium grained. Coarse grained sands are encountered within depths about 8 to 12 feet - gradually more coarser with depth. Some gravel (up to 3/4") are encountered at depths from about 11 to 12 feet. Underlying sands, soil within depths from 12 to the explored depth of 16 feet are light gray to light olive gray color sandy silt, sandy clay and silty sand with fine sand and high fine contents. Subsurface geologic profiles are found to be fairly uniform across the project area. Detail descriptions of the soils are presented in the field exploration logs (see Appendix A).

Natives soils within the general are surrounding the site comprise of young alluvial fan deposits (Qyf) of Holocene to late Pleistocene age, which are generally unconsolidated to moderately consolidated silt, sand and pebbly, cobbly sand.

Groundwater was not encountered within the explored depth of 16 feet. Historical shallow groundwater within close vicinities of the site is documented between 5 and 10 feet in the state's seismic hazard zones report (CGS, 2001). Fluctuations of the groundwater level may occur due to variations in rainfall and other factors that were not evident at the time of the field tests.

Pre-Soaking and Percolation Test

After preparation of the test holes P-1 and P-2, each of the holes was filled with water up to the top of the hole and were allowed to be soaked. Two consecutive test measurements of water level inside the each hole showed more than 6 inches of drop for each 25-minute time interval for each hole. After the first 25-minute interval, each hole was filled to the top for the second interval. These percolation rates during pre-soaking stage met the sandy soils criteria according to the County Guidelines.

After completion of pre-soaking in each hole with all the water dissipated, field percolation tests began with filling the hole with water to the top. Six (6) consecutive readings of water level inside the test hole were taken over a period of 60 minutes, each of the readings at a 10-minute interval. The drop that occurred during the final 10 minutes is used to calculate the percolation rate. These field tests were done in compliance with the County Guidelines. Field measurements of the water head during pre-soaking and percolation tests were taken with a precision of 0.1 inch. Field test data and calculations are presented in Appendix B, *Infiltration Test Data Sheets*.

Field Infiltration Rate

Percolation rate from the field test data is related to, but not equal to, the infiltration rate. While an infiltration rate is a measure of the speed at which water progresses downward into the soil, the percolation rate measures not only the downward progression but the lateral progression through the soil as well. This reflects the fact that the surface area for infiltration testing would include only the horizontal surface while the percolation test includes both the bottom surface area and the sidewalls of the test hole. In order to convert the percolation rate into infiltration rate, the following equation, known as Porchet Method, is recommended in the County Guidelines.

$$I_t = \frac{\Delta H \; 60 \; r}{\Delta t \; (r + 2H_{avg})}$$

Where, I_t = Infiltration Rate (inch/hr)
ΔH = Water level drop over the final time interval (inch)
Δt = Time interval (minute)
r = Effective radius of the test hole (inch)
H_{avg} = Average water head over the final time interval (inch)

Summary of the field test data and infiltration rates, evaluated utilizing the above equation, at different test holes are presented in the following table:

Table 1 - Summary of the Field Tests Data

Test Hole No.	Test Hole Depth (ft)	Final ΔH (inch)	Δt (min)	Final H_{avg} (inch)	Infiltration Rate, I_t (inch/hr)
P-1	4.0	2.0	10	21.0	1.04
P-2	8.0	4.5	10	33.0	1.54

Conclusions

Based on our evaluations the field test data, infiltration rates of the subsurface soils within the target infiltration trench area vary from 1.04 to 1.54 inch/hour. Higher infiltration rate in the test hole P-2, compared to the test hole P-1, may be attributed to high amount of sand contents within depths 5 to 8 feet in P-2. For a practical and conservative estimate, we recommend a field infiltration rate of 1.04 inch/hr. Project Civil Engineer may need to implement appropriate factor of safety to this field infiltration rate for design of the proposed infiltration trench.

Limitations

This report is not authorized for use by, and is not to be relied upon by any party except the following: the owner(s) of this property; his(their) successors and assignees as the future owners of the property; design professionals and contractors for this project. Use of or reliance on this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify ZS Engineering from and against any liability which may arise as a result of such use or reliance

The findings and conclusions presented in this report were prepared in adequate compliance with the Orange County guidelines for field tests for the storm water infiltration system design and also, with the generally accepted principles and practices in the field of geotechnical engineering in southern California at the time of this report. No other warranty is expressed or implied herein.

We appreciate this opportunity of service. If there are any questions and comments about this report, please contact the undersigned.

Respectfully submitted,
ZS ENGINEERING

_____

Zafar Ahmed, PE, GE
Geotechnical Engineer

Attachments: References
Figure 1 - Site Location Map
Figure 2 - Site Plan and Exploration Map
Appendix A - Field Exploration Logs
Appendix B - Infiltration Test Data Sheets

References

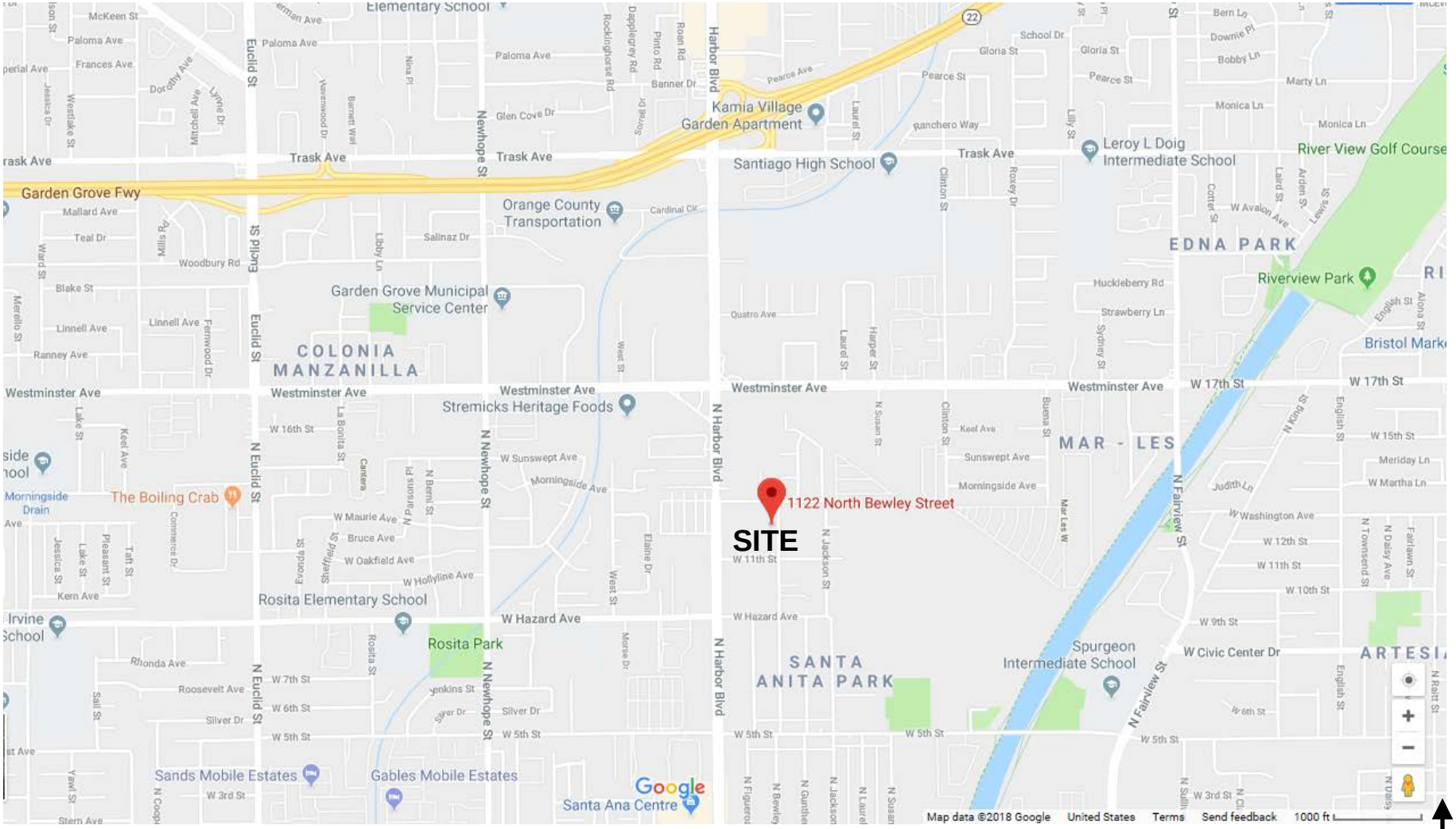
California Geological Survey (CGS), 1998, Earthquake Zones of Requires Investigation, Anaheim Quadrangle, released on April 15, 1998.

California Geological Survey (CGS), 1997, Seismic Hazard Zone Report 03 for Anaheim and Newport Beach 7.5-Minute Quadrangles, Orange County, California, published in 1997, revised in 2001.

Morton, D.M., and Miller, F.K., 2006, Geologic Map of the San Bernardino and Santa Ana 30'X60' Quadrangles, California: U.S. Geological Survey, Open-File Report OF-2006-1217, Scale 1:100,000.

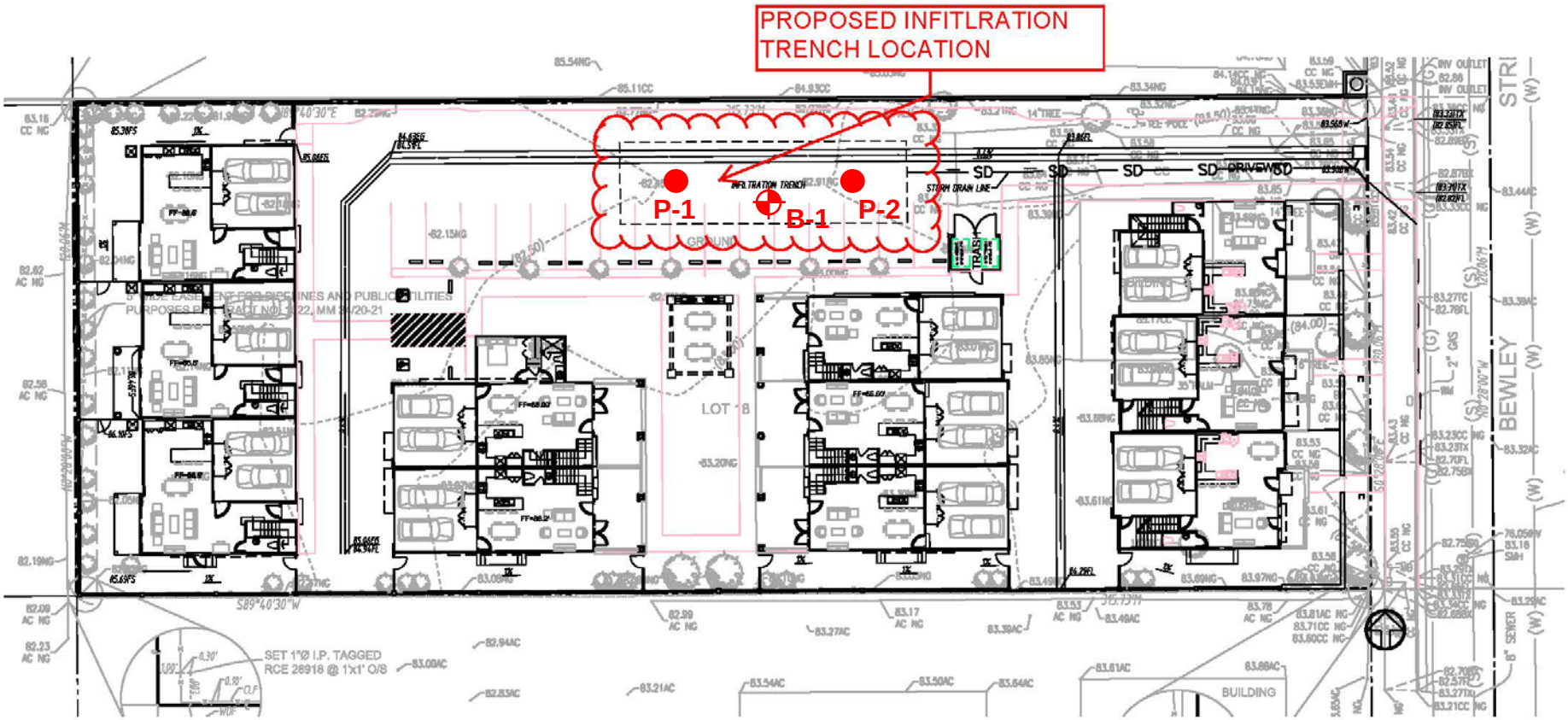
Orange County Technical Guidance Document for the Preparation of Conceptual/Preliminary and/or Project Water Quality Management Plans (WQMPs), dated May 19, 2011.

YNG Architects, Enlarged Site Plan/First Floor Plan, Multi-Family Residential, 1122 N. Bewley Street, Santa Ana, Sheet No. A1.1, dated May 10, 2018.



Source: Image from Google Map

	Figure 1 – Site Location Map **Residential Lot at 1122 N. Bewley Street, Santa Ana, CA 92703**	**ZS Engineering #180505**



Legends:

- P-2 — **Infiltration Test Holes**
- B-1 — **Exploratory Bore Hole**

N

Figure 2 – Site Plan and Exploration Map

Residential Lot at 1122 N. Bewley Street, Santa Ana, CA 92703

ZS Engineering #180505

APPENDIX A

Field Exploration Logs

ZS Engineering

113 Tomato Springs, Irvine, CA 92618

(949) 331-3232 | info@zs-engineering.com

EXPLORATION DATE: 5/28/18 EXPLORATION METHOD: Hand Auger (6-inch dia.), Hand Tools

LOGGED BY: ZA ELEVATION: ~ 85 ft LOCATION: See Fig. 2, Site Plan & Exploration Map

DEPTH (FEET)	SAMPLE NUMBER	RING SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PROPOSED MULTI-FAMILY RESIDENTIAL COMPLEX 1122 N. BEWLEY STREET, SANTA ANA, CA 92703 BORE HOLE NO. **P-1** SOIL DESCRIPTION	SOIL TEST
4						0 - 4': Surface covered w/ dirt. Light gray silty fine Sand (SM), moist.	
						- Depth of excavation 4 feet below the existing grade. - Groundwater was not encountered. - Drilled hole was converted into infiltration test hole. - After field tests, drilled hole was backfilled w/ excavated soil cuttings on 5/28/18.	

ZS ENG. #180505 **LOG OF BORE HOLE P-1**

ZS Engineering

113 Tomato Springs, Irvine, CA 92618

(949) 331-3232 | info@zs-engineering.com

EXPLORATION DATE: 5/28/18 EXPLORATION METHOD: Hand Auger (6-inch dia.), Hand Tools

LOGGED BY: ZA ELEVATION: ~ 85 ft LOCATION: See Fig. 2, Site Plan & Exploration Map

DEPTH (FEET)	SAMPLE NUMBER	RING SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PROPOSED MULTI-FAMILY RESIDENTIAL COMPLEX 1122 N. BEWLEY STREET, SANTA ANA, CA 92703 BORE HOLE NO. **P-2** SOIL DESCRIPTION	SOIL TEST
2						0 - 5': Surface covered w/ dirt. Light gray silty fine Sand (SM), moist.	
5						5' - 6': Lt. brown silty fine Sand (SM), less silts than above. 6' - 7': Lt. brown, mottled, fine sands w/ few silts (SP-SM), moist.	
8						7' - 8': Same as above, fine to medium sand.	
						- Depth of excavation 8 feet below the existing grade. - Groundwater was not encountered. - Drilled hole was converted into infiltration test hole. - After field tests, drilled hole was backfilled w/ excavated soil cuttings on 5/28/18.	

ZS ENG. #180505 **LOG OF BORE HOLE P-2**

APPENDIX B

Infiltration Test Data Sheets

Percolation Test Data Sheet for P-1

Project Name: Multi-Family Residential Complex, 1122 N. Bewley Street, Santa Ana, CA Job No.: 180505

Test Hole No.: P-1 (see Figure 2, Site Plan & Exploration Map)

Depth of Test Hole (ft): 4 Soil Description: 0 - 4': Silty fine sand (SM)

Sandy Soil Criteria Test By: ZA Date: 5/28/18 Presoak: Yes

Percolation Test By: ZA Date: 5/28/18

Sandy Soil Criteria Test Data (Test Date 5/28/18)

Trial No.	Time	Time Interval (min)	Water Level			Passed Sandy Soil Criteria
			Initial	Final	Δ (inch)	
1	9:21 AM 9:46 AM	25	0 ft 0.0 in	2 ft 8.00 in	32.00	Yes
2	9:46 AM 10:11 AM	25	0 ft 0.0 in	2 ft 4.00 in	28.00	Yes

Percolation Test Data (Test Date 5/28/18)

Time	Time Interval, Δt (min)	Total Elapsed Time (min)	Water Level		
			Initial	Final	ΔH (inch)
12:30 PM 12:40 PM	10	10	0 ft. 0.00 in	0 ft. 8.50 in	8.50
12:40 PM 12:50 PM	10	20	0 ft. 8.50 in	1 ft. 3.50 in	7.00
12:50 PM 1:00 PM	10	30	1 ft. 3.50 in	1 ft. 9.00 in	5.50
1:00 PM 1:10 PM	10	40	1 ft. 9.00 in	2 ft. 1.50 in	4.50
1:10 PM 1:20 PM	10	50	2 ft. 1.50 in	2 ft. 4.00 in	2.50
1:20 PM 1:30 PM	10	60	2 ft. 4.00 in	2 ft. 6.00 in	2.00

Percolation Test Data Sheet for P-2

Project Name: Multi-Family Residential Complex, 1122 N. Bewley Street, Santa Ana, CA Job No.: 180505

Test Hole No.: P-2 (see Figure 2, Site Plan & Exploration Map)

Depth of Test Hole (ft): 8 Soil Description: 0 - 5': Silty fine sand (SM); 5' - 8': Sand w/ few to less silts (SM to SP-SM)

Sandy Soil Criteria Test By: ZA Date: 5/28/18 Presoak: Yes

Percolation Test By: ZA Date: 5/28/18

Sandy Soil Criteria Test Data (Test Date 5/28/18)

Trial No.	Time	Time Interval (min)	Water Level			Passed Sandy Soil Criteria
			Initial	Final	Δ (inch)	
1	8:20 AM 8:45 AM	25	0 ft 0.0 in	5 ft 4.00 in	64.00	Yes
2	8:45 AM 10:10 AM	25	0 ft 0.0 in	4 ft 8.00 in	56.00	Yes

Percolation Test Data (Test Date 5/28/18)

Time	Time Interval, Δt (min)	Total Elapsed Time (min)	Water Level		
			Initial	Final	ΔH (inch)
12:21 PM 12:31 PM	10	10	0 ft. 0.00 in	1 ft. 6.00 in	18.00
12:31 PM 12:41 PM	10	20	1 ft. 6.00 in	2 ft. 8.50 in	14.50
12:41 PM 12:51 PM	10	30	2 ft. 8.50 in	3 ft. 8.75 in	12.25
12:51 PM 1:01 PM	10	40	3 ft. 8.75 in	4 ft. 6.25 in	9.50
1:01 PM 1:11 PM	10	50	4 ft. 6.25 in	5 ft. 0.75 in	6.50
1:11 PM 1:21 PM	10	60	5 ft. 0.75 in	5 ft. 5.25 in	4.50