<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>ROADS</th>
<th>Parkway &amp; S/W (Ac)</th>
<th>Lot (Ac)</th>
<th>Lot - Impervious (Ac)</th>
<th>Lot - Pervious (Ac)</th>
<th>Dev Slope (Ac)</th>
<th>Natural (Ac)</th>
<th>Total Surface Area (Ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASIN 1</td>
<td>15.79</td>
<td>9.87</td>
<td>77.16</td>
<td>34.72</td>
<td>42.44</td>
<td>22.66</td>
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<tr>
<td>BASIN 2</td>
<td>4.41</td>
<td>2.60</td>
<td>29.48</td>
<td>13.27</td>
<td>16.21</td>
<td>5.44</td>
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<td>29.86</td>
<td>15.66</td>
<td>140.04</td>
<td>63.02</td>
<td>77.02</td>
<td>39.07</td>
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<td>BASIN 4</td>
<td>15.57</td>
<td>8.89</td>
<td>84.04</td>
<td>37.82</td>
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<td>7.60</td>
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<td>BASIN 5</td>
<td>11.18</td>
<td>11.83</td>
<td>46.32</td>
<td>20.84</td>
<td>25.48</td>
<td>10.25</td>
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<td>0.00</td>
<td>5.56</td>
<td>0.00</td>
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<td>8.75</td>
<td>4.58</td>
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<td>21.60</td>
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<td>25.69</td>
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<td>0.00</td>
<td>0.00</td>
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<tr>
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<td>0.00</td>
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<td>0.00</td>
<td>0.00</td>
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<td>0.00</td>
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<td>0.00</td>
<td>0.00</td>
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<tr>
<td>CULVERT 6</td>
<td>15.79</td>
<td>9.87</td>
<td>77.16</td>
<td>34.72</td>
<td>42.44</td>
<td>22.66</td>
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<td>205.00</td>
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<td>5.42</td>
<td>9.7</td>
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<td>0.00</td>
<td>0.00</td>
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<tr>
<td>CULVERT 11</td>
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<td>CULVERT 16b</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>7.34</td>
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<td>0.00</td>
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<td>0.00</td>
<td>0.00</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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</tr>
<tr>
<td>CULVERT 18b</td>
<td>17.48</td>
<td>11.56</td>
<td>75.07</td>
<td>33.78</td>
<td>41.29</td>
<td>25.00</td>
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<td>996.20</td>
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<td>CULVERT 19</td>
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<td>0.00</td>
<td>0.00</td>
<td>2.85</td>
<td>0.70</td>
<td>4.47</td>
</tr>
<tr>
<td>CULVERT 20</td>
<td>1.15</td>
<td>0.88</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>4.57</td>
<td>13.96</td>
<td>20.56</td>
</tr>
</tbody>
</table>
# Table 1: Filterra® Quick Sizing Table
(Southern California - 0.2 in/hr Uniform Intensity Approach)

<table>
<thead>
<tr>
<th>Available Filterra® Box Sizes (feet)</th>
<th>Recommended Commercial Contributing Drainage Area (acres) where C = 0.85</th>
<th>Outlet Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x4</td>
<td>up to 0.22</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>4x6.5 or 6.5x4</td>
<td>0.23 to 0.35</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>4x8 or 8x4</td>
<td>0.36 to 0.44</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>Standard 6x6</td>
<td>0.45 to 0.49</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>6x8 or 8x6</td>
<td>0.50 to 0.65</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>6x10 or 10x6</td>
<td>0.66 to 0.82</td>
<td>6&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>6x12 or 12x6</td>
<td>0.83 to 0.98</td>
<td>6&quot; SDR-35 PVC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Available Filterra® Box Sizes (feet)</th>
<th>Recommended Residential Contributing Drainage Area (acres) where C = 0.50</th>
<th>Outlet Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x4</td>
<td>up to 0.37</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>4x6.5 or 6.5x4</td>
<td>0.38 to 0.60</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>4x8 or 8x4</td>
<td>0.61 to 0.74</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>Standard 6x6</td>
<td>0.75 to 0.83</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>6x8 or 8x6</td>
<td>0.84 to 1.11</td>
<td>4&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>6x10 or 10x6</td>
<td>1.12 to 1.39</td>
<td>6&quot; SDR-35 PVC</td>
</tr>
<tr>
<td>6x12 or 12x6</td>
<td>1.40 to 1.67</td>
<td>6&quot; SDR-35 PVC</td>
</tr>
</tbody>
</table>

Notes:

1. All boxes are a standard 3.5 feet depth (INV to TC)
2. A standard SDR-35 PVC pipe coupling is cast into the wall for easy connection to discharge drain
3. Dimensions shown are internal. Please add 1’ to each external (using 6” walls)
4. In line with TR55 data, for Commercial Developments a minimum (runoff coefficient) C factor of 0.85 is recommended. For Residential Developments, use of C factors less than 0.5 require individual site review by Filterra.
5. Please ask for Sizing Tables for other target treatment goals, e.g. 0.3 in/hr
6. This sizing table is valid only for Southern California.
Cross Section for BIORETENTION AREA TO CULV-1a (POC 3)

Project Description
Friction Method
Manning Formula
Solve For
Normal Depth

Input Data
Roughness Coefficient 0.450
Channel Slope 0.02000 ft/ft
Normal Depth 0.62 ft
Left Side Slope 3.00 H:V
Right Side Slope 3.00 H:V
Bottom Width 3.00 ft
Discharge 0.80 ft³/s

Cross Section Image
Cross Section for BIORETENTION AREA TO CULV-1b (POC 3)

Project Description
Friction Method Manning Formula
Solve For Normal Depth

Input Data
Roughness Coefficient 0.450
Channel Slope 0.02000 ft/ft
Normal Depth 0.37 ft
Left Side Slope 3.00 H:V
Right Side Slope 3.00 H:V
Bottom Width 3.00 ft
Discharge 0.30 ft³/s

Cross Section Image
**PROJECT NAME:** Otay Ranch Resort Village  
**PROJECT LOCATION:** Chula Vista

### 85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

### BASIN 1

<table>
<thead>
<tr>
<th>TOTAL DRAINAGE AREA:</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8,929,800</td>
<td>205.00</td>
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</tbody>
</table>

### SELF-TREATING VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS (PLANTER AREA)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE PRECIPITATION DEPTH (IN)</th>
<th>85TH PERCENTILE VOLUME (CU FT)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape</td>
<td>VEGETATED</td>
<td>6,299,428</td>
<td>144.61</td>
<td>0.1</td>
<td>0.65</td>
<td>34,122</td>
<td>2.89</td>
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</table>

### ROOFS, SIDEWALKS, AND STREETS DRAINING TO IMPS (PLANTER AREA)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE PRECIPITATION DEPTH (IN)</th>
<th>85TH PERCENTILE VOLUME (CU FT)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road/Sidewalk</td>
<td>IMPERVIOUS</td>
<td>2,630,372</td>
<td>60.39</td>
<td>1</td>
<td>0.65</td>
<td>142,478.50</td>
<td>12.08</td>
</tr>
</tbody>
</table>

| WQ Ponding Depth | h_BMP       | 6.50 ft.        |
| BMP Area Provided| A_BMP       | 22,050 ft.²     |

**Volume Storage Capacity:***  
\[
V_{85} = V_{TOP} + V_{UNDERGROUND}
\]

- Ponding Area at h_BMP = 30,448
- V_TOP = Volume at h_BMP = 170,617 ft.³  
  Volume Above Ground @ h_BMP, assuming 2:1 sideslopes

**Below Ground Volume:**  
\[
D_{SOIL\,MIX} = 1.5\, \text{ft.} \\
D_{gravel} = 1.0\, \text{ft.} \\
D_{soil\,mix} = 0.3\, \text{unitless porosity} \\
D_{gravel} = 0.4\, \text{unitless porosity}
\]

**Total underground volume provided:**  
\[
V_{total\,underground\,volume\,provided} = A_{BMP}(D_{SOIL\,MIX} + D_{gravel})
\]

\[
V_{total\,underground\,volume\,provided} = 18,743\, \text{ft.}^3
\]

**Total Volume Provided:**  
\[
189,360\, \text{cf} = 4.35\, \text{ac.-ft.}
\]

189,360 > 176,600  
**Therefore Capacity OK**
BASIN 1 DRAWDOWN CALCULATIONS
OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

\[ Q = C \cdot A \cdot (2gd)^{0.5} \]

- \( C = 0.67 \)
- \( d = 4 \) (in)
- \( A = 0.09 \) (sq ft)
- \( g = 32.2 \) (ft/s^2)

DRAWDOWN TIME (HR) = \( \sum (\Delta V/Q_{avg}/3600) \)

<table>
<thead>
<tr>
<th>d (ft)</th>
<th>Qout (CFS)</th>
<th>V in basin (CU FT)</th>
<th>DRAW DOWN TIME (HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5</td>
<td>1.2</td>
<td>170,617</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>1.1</td>
<td>154,835</td>
<td>3.74</td>
</tr>
<tr>
<td>5</td>
<td>1.0</td>
<td>125,766</td>
<td>11.08</td>
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<tr>
<td>4</td>
<td>0.9</td>
<td>98,045</td>
<td>18.83</td>
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<tr>
<td>3</td>
<td>0.8</td>
<td>71,640</td>
<td>27.21</td>
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<tr>
<td>2</td>
<td>0.7</td>
<td>46,519</td>
<td>36.66</td>
</tr>
<tr>
<td>1</td>
<td>0.5</td>
<td>22,649</td>
<td>48.37</td>
</tr>
<tr>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>75.19</td>
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50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)
**PROJECT NAME:** Otay Ranch Resort Village  
**PROJECT LOCATION:** Chula Vista  
**85TH PERCENTILE**  
**PRECIPITATION DEPTH (IN):** 0.65

<table>
<thead>
<tr>
<th><strong>TOTAL DRAINAGE AREA</strong></th>
<th><strong>AREA (SQ FT)</strong></th>
<th><strong>AREA (AC)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,880,600</td>
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</table>

<table>
<thead>
<tr>
<th><strong>BASIN 2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SELF-TREATING VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS (PLANTER AREA)</strong></td>
</tr>
<tr>
<td><strong>DMA NAME</strong></td>
</tr>
<tr>
<td>Landscape</td>
</tr>
</tbody>
</table>

| **ROADS, SIDEWALKS, AND STREETS DRAINING TO IMPS (PLANTER AREA)** |
| **DMA NAME** | **SURFACE TYPE** | **DMA AREA (SQ FT)** | **DMA AREA (AC)** | **DMA RUNOFF FACTOR** | **85TH PERCENTILE** | **VOLUME (CU FT)** | **FLOW (CFS)** |
| Road/Sidewalk | IMPERVIOUS      | 883,087           | 20.27            | 1                 | 0.65                  | 47,833.89         | 4.05            |

**WQ Ponding Depth =** $h_{BMP}$  
$4.50$ ft.

**BMP Area Provided =** $A_{BMP}$  
$12,475$ ft.$^2$

**Volume Storage Capacity:**

$V_{BS} = V_{TOP} + V_{UNDERGROUND}$

Ponding Area at $h_{BMP}$ = $16,820$

$V_{TOP} = Volume at h_{BMP} = 65,914$ ft.$^3$  
Volume Above Ground @ $h_{BMP}$ assuming 2:1 sideslopes

**Below Ground Volume:**

$D_{SOIL\ MIX} = 1.5$ ft.  
$n_{soil\ mix} = 0.3$ unitless porosity  
$D_{gravel} = 1.00$ ft.  
$n_{gravel} = 0.4$ unitless porosity

$V_{total\ underground\ volume\ provided} = A_{BMP}(D_{SOIL\ MIX} * n_{soil\ mix} + D_{gravel} * n_{gravel})$

$V_{total\ underground\ volume\ provided} = 10,604$ ft.$^3$

**Total Volume Provided =** $76,517$ cf = 1.76 ac.-ft.

$76,517 > 74,904$ Therefore Capacity OK
BASIN 2 DRAWDOWN CALCULATIONS
OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

\[ Q = C \times A \times (2gd)^{0.5} \]

- \( C = 0.67 \)
- \( d \) (in) = 4
- \( A \) (sq ft) = 0.09
- \( g \) (ft/s^2) = 32.2

DRAWDOWN TIME (HR) = \( \frac{\Sigma (\Delta V/Q_{avg}/3600)}{d} \)

<table>
<thead>
<tr>
<th>d (ft)</th>
<th>Qout (CFS)</th>
<th>V in basin (CU FT)</th>
<th>DRAW DOWN TIME (HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5</td>
<td>1.0</td>
<td>65,914</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0.9</td>
<td>57,390</td>
<td>2.45</td>
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<tr>
<td>3</td>
<td>0.8</td>
<td>41,590</td>
<td>7.46</td>
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<tr>
<td>2</td>
<td>0.7</td>
<td>26,780</td>
<td>13.04</td>
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<tr>
<td>1</td>
<td>0.5</td>
<td>12,927</td>
<td>19.83</td>
</tr>
<tr>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>35.14</td>
</tr>
</tbody>
</table>

50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)
PROJECT NAME: Otay Ranch Resort Village  
PROJECT LOCATION: Chula Vista  
85TH PERCENTILE  
PRECIPITATION DEPTH (IN): 0.65

<table>
<thead>
<tr>
<th>TOTAL DRAINAGE AREA</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13,882,572</td>
<td>318.70</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE PRECIPITATION DEPTH (IN)</th>
<th>85TH PERCENTILE VOLUME (CU FT)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape</td>
<td>VEGETATED</td>
<td>9,154,742</td>
<td>210.16</td>
<td>0.1</td>
<td>0.65</td>
<td>49,588</td>
<td>4.20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE PRECIPITATION DEPTH (IN)</th>
<th>85TH PERCENTILE VOLUME (CU FT)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road/Sidewalk</td>
<td>IMPERVIOUS</td>
<td>4,727,830</td>
<td>108.54</td>
<td>1</td>
<td>0.65</td>
<td>256,090.81</td>
<td>21.71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Column Total</th>
<th>305,679</th>
<th>25.91</th>
</tr>
</thead>
</table>

WQ Ponding Depth = h\text{BMP} = 6.20 ft.  
BMP Area Provided = A\text{BMP} = 39,969 ft.²

Volume Storage Capacity:

\[ V_{B5} = V_{TOP} + V_{UNDERGROUND} \]

Ponding Area at \( h_{BMP} \) = 50,500

\[ V_{TOP} = \text{Volume at } h_{BMP} = 280,455 \text{ ft.}^3 \]

Volume Above Ground @ \( h_{BMP} \) assuming 2:1 sideslopes

Below Ground Volume:

\[ D_{\text{SOIL MIX}} = 1.5 \text{ ft.} \]
\[ n_{\text{soil mix}} = 0.3 \text{ unitless porosity} \]
\[ D_{\text{gravel}} = 1.00 \text{ ft.} \]
\[ n_{\text{gravel}} = 0.4 \text{ unitless porosity} \]

\[ V_{\text{total underground volume provided}} = A_{\text{BMP}}(D_{\text{SOIL MIX}} + n_{D_{\text{gravel}}}) \]

\[ V_{\text{total underground volume provided}} = 33,974 \text{ ft.}^3 \]

Total Volume Provided = 314,428 cf = 7.22 ac.-ft.

314,428 > 305,679 Therefore Capacity OK
BASIN 3 DRAWDOWN CALCULATIONS
OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

\[ Q = C \cdot A \cdot (2gd)^{0.5} \]

- \( C \): 0.67
- \( d \) (in): 6
- \( A \) (sq ft): 0.20
- \( g \) (ft/s²): 32.2

DRAWDOWN TIME (HR) = \( \left( \Sigma \frac{\Delta V}{Q_{\text{avg}}/3600} \right) \)

<table>
<thead>
<tr>
<th>d (ft)</th>
<th>Qout (CFS)</th>
<th>V in basin (CU FT)</th>
<th>DRAW DOWN TIME (HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2</td>
<td>2.6</td>
<td>280,455</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>2.6</td>
<td>269,755</td>
<td>1.14</td>
</tr>
<tr>
<td>5</td>
<td>2.4</td>
<td>220,504</td>
<td>6.67</td>
</tr>
<tr>
<td>4</td>
<td>2.1</td>
<td>159,103</td>
<td>14.30</td>
</tr>
<tr>
<td>3</td>
<td>1.8</td>
<td>127,248</td>
<td>18.79</td>
</tr>
<tr>
<td>2</td>
<td>1.5</td>
<td>83,179</td>
<td>26.16</td>
</tr>
<tr>
<td>1</td>
<td>1.1</td>
<td>40,774</td>
<td>35.40</td>
</tr>
<tr>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>56.86</td>
</tr>
</tbody>
</table>

50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)
**PROJECT NAME:** Otay Ranch Resort Village  
**PROJECT LOCATION:** Chula Vista  
**85TH PERCENTILE**  
**PRECIPITATION DEPTH (IN):** 0.65

### TOTAL DRAINAGE AREA:

<table>
<thead>
<tr>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,057,316</td>
<td>116.10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE PRECIPITATION DEPTH (IN)</th>
<th>85TH PERCENTILE VOLUME (CU FT)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape</td>
<td>VEGETATED</td>
<td>2,344,272</td>
<td>53.82</td>
<td>0.1</td>
<td>0.65</td>
<td>12,698</td>
<td>1.08</td>
</tr>
<tr>
<td>Road/Sidewalk</td>
<td>IMPERVIOUS</td>
<td>2,713,044</td>
<td>62.28</td>
<td>1</td>
<td>0.65</td>
<td>146,956.53</td>
<td>12.46</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Column Total</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>159,655</td>
<td>13.53</td>
<td></td>
</tr>
</tbody>
</table>

**WQ Ponding Depth =** $h_{BMP} = 4.70$ ft.

**BMP Area Provided =** $A_{BMP} = 26,580$ ft.$^2$

**Volume Storage Capacity:**

$$V_{BS} = V_{TOP} + V_{UNDERGROUND}$$

**Ponding Area at** $h_{BMP} =$ 33,064

**$V_{TOP} = Volume at$** $h_{BMP} = 140,162$ ft.$^3$

**Volume Above Ground @** $h_{BMP}$ assuming 2:1 sideslopes

**Below Ground Volume:**

- **$D_{SOIL\ MIX}$** 1.5 ft.
- **$D_{GRAVEL}$** 1.00 ft.
- **$n_{SOIL\ MIX}$** 0.3 unitless porosity
- **$n_{GRAVEL}$** 0.4 unitless porosity

**Total underground volume provided**

$$V_{total\ underground\ volume\ provided} = A_{BMP}(D_{SOIL\ MIX} \times n + D_{GRAVEL} \times n)$$

$$V_{total\ underground\ volume\ provided} = 22,593$$ ft.$^3$

<table>
<thead>
<tr>
<th><strong>Total Volume Provided</strong></th>
<th><strong>cf</strong></th>
<th><strong>ac-ft.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>162,755</td>
<td>3.74</td>
<td></td>
</tr>
</tbody>
</table>

162,755 > 159,655  
**Therefore Capacity OK**

---

RA:0982\Hyd\CALCS\EXCEL\Complete Table redos\BMP Basin Calcs.xlsx  
9/25/2014
BASIN 4 DRAWDOWN CALCULATIONS
OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

\[ Q = C \cdot A \cdot (2gd)^{0.5} \]

- \( C = 0.67 \)
- \( d \) (in) = 4
- \( A \) (sq ft) = 0.09
- \( g \) (ft/s^2) = 32.2

DRAWDOWN TIME (HR) = \( \sum (\Delta V/Q_{avg}/3600) \)

<table>
<thead>
<tr>
<th>d (ft)</th>
<th>Qout (CFS)</th>
<th>V in basin (CU FT)</th>
<th>DRAW DOWN TIME (HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7</td>
<td>1.0</td>
<td>140,162</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0.9</td>
<td>117,096</td>
<td>6.55</td>
</tr>
<tr>
<td>3</td>
<td>0.8</td>
<td>85,753</td>
<td>16.50</td>
</tr>
<tr>
<td>2</td>
<td>0.7</td>
<td>55,811</td>
<td>27.76</td>
</tr>
<tr>
<td>1</td>
<td>0.5</td>
<td>27,237</td>
<td>41.78</td>
</tr>
<tr>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>74.03</td>
</tr>
</tbody>
</table>

50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)
**PROJECT NAME:** Otay Ranch Resort Village  
**PROJECT LOCATION:** Chula Vista  
**85TH PERCENTILE**  
**PRECIPITATION DEPTH (IN):** 0.65

<table>
<thead>
<tr>
<th>TOTAL DRAINAGE AREA</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4,021,459</td>
<td>92.32</td>
</tr>
</tbody>
</table>

### SELF-TREating VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS (PLANter AREA)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE PRECIPITATION DEPTH (IN)</th>
<th>85TH PERCENTILE VOLUME (CU FT)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape</td>
<td>VEGETATED</td>
<td>2,111,312</td>
<td>48.47</td>
<td>0.1</td>
<td>0.65</td>
<td>11,436</td>
<td>0.97</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE PRECIPITATION DEPTH (IN)</th>
<th>85TH PERCENTILE VOLUME (CU FT)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road/Sidewalk</td>
<td>IMPERVIOUS</td>
<td>1,910,147</td>
<td>43.85</td>
<td>1</td>
<td>0.65</td>
<td>103,466.31</td>
<td>8.77</td>
</tr>
</tbody>
</table>

**Column Total** | 114,903 | 9.74 |

**WQ Ponding Depth = h**<sub>BMP</sub> 5.00 ft.  
**BMP Area Provided = A**<sub>BMP</sub> = 18,152 ft.<sup>2</sup>

**Volume Storage Capacity:**  

\[ V_{BS} = V_{TOP} + V_{UNDERGROUND} \]  

Ponding Area at **h**<sub>BMP</sub> = 23,941  
**V**<sub>TOP</sub> = Volume at **h**<sub>BMP</sub> = 105,233 ft.<sup>3</sup>  
Volume Above Ground @ **h**<sub>BMP</sub> assuming 2:1 sideslopes

**Below Ground Volume:**  
\[ D_{SOIL\,MIX} = 1.5 \text{ ft.} \]  
\[ n_{soil\,mix} = 0.3 \text{ unitless porosity} \]  
\[ D_{gravel} = 1.00 \text{ ft.} \]  
\[ n_{gravel} = 0.4 \text{ unitless porosity} \]  

\[ V_{total\,underground\,volume\,provided}^{\text{soil\,mix}} = A_{BMP} (D_{SOIL\,MIX} * n + D_{GRAVEL} * n) \]  
\[ V_{total\,underground\,volume\,provided}^{\text{gravel}} = 15,429 \text{ ft.}^3 \]

**Total Volume Provided** = 120,662 cf = 2.77 ac-ft.

Therefore Capacity OK
BASIN 5 DRAWDOWN CALCULATIONS
OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

\[ Q = C \cdot A \cdot (2gd)^{0.5} \]

- \( C = 0.67 \) (in)
- \( d = 4 \) (in)
- \( A = 0.09 \) (sq ft)
- \( g = 32.2 \) (ft/s^2)

DRAWDOWN TIME (HR) = \( \left( \Sigma \left( \Delta V / Q_{avg} / 3600 \right) \right) \)

<table>
<thead>
<tr>
<th>D (ft)</th>
<th>Qout (CFS)</th>
<th>V in basin (CU FT)</th>
<th>TIME (HR)</th>
<th>DRAWDOWN TIME (HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1.0</td>
<td>105,233</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0.9</td>
<td>81,572</td>
<td>6.61</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0.8</td>
<td>59,450</td>
<td>13.63</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0.7</td>
<td>38,502</td>
<td>21.52</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0.5</td>
<td>18,696</td>
<td>31.23</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>53.37</td>
<td>0</td>
</tr>
</tbody>
</table>

50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)
PROJECT NAME: Otay Ranch Resort Village  
PROJECT LOCATION: Chula Vista  
85TH PERCENTILE  
PRECIPITATION DEPTH (IN): 0.65

<table>
<thead>
<tr>
<th>TOTAL DRAINAGE AREA:</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>365,468</td>
<td>8.39</td>
</tr>
</tbody>
</table>

### Self-Treating Vegetated/Landscaped Areas Daining to IMPS (Planter Area)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE PRECIPITATION DEPTH (IN)</th>
<th>85TH PERCENTILE VOLUME (CU FT)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape</td>
<td>VEGETATED</td>
<td>242,194</td>
<td>5.56</td>
<td>0.1</td>
<td>0.65</td>
<td>1,312</td>
<td>0.11</td>
</tr>
</tbody>
</table>

### Roofs, Sidewalks, and Streets Daining to IMPS (Planter Area)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE PRECIPITATION DEPTH (IN)</th>
<th>85TH PERCENTILE VOLUME (CU FT)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road/Sidewalk</td>
<td>IMPERVIOUS</td>
<td>123,275</td>
<td>2.83</td>
<td>1</td>
<td>0.65</td>
<td>6,677.39</td>
<td>0.57</td>
</tr>
</tbody>
</table>

**WQ Ponding Depth** = \( h_{BMP} \) = 5.00 ft.  
**BMP Area Provided** = \( A_{BMP} = 3,643 \text{ ft.}^2 \)

**Volume Storage Capacity:**

\[ V_{BS} = V_{TOP} + V_{UNDERGROUND} \]

Ponding Area at \( h_{BMP} = 6,457 \)

\[ V_{TOP} = \text{Volume at } h_{BMP} = 25,251 \text{ ft.}^3 \]

**Volume Above Ground @** \( h_{BMP} \) assuming 2:1 sideslopes

**Below Ground Volume:**

\[ D_{SOIL\, MIX} = 1.5 \text{ ft.} \]

\[ n_{soil\, mix} = 0.3 \text{ unitless porosity} \]

\[ D_{gravel} = 1.00 \text{ ft.} \]

\[ n_{gravel} = 0.4 \text{ unitless porosity} \]

\[ V_{\text{total underground volume provided}} = A_{BMP} (D_{SOIL\, MIX} + D_{gravel} + n) \]

\[ V_{\text{total underground volume provided}} = 3,097 \text{ ft.}^3 \]

**Total Volume Provided** = 28,347 cf = 0.65 ac.-ft.  

28,347 > 7,989  
**Therefore Capacity OK**
BASIN 6 DRAWDOWN CALCULATIONS
OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

\[ Q = C \cdot A \cdot (2gd)^{0.5} \]

- \( C = 0.67 \)
- \( d \) (in) = 2
- \( A \) (sq ft) = 0.02
- \( g \) (ft/s^2) = 32.2

DRAWDOWN TIME (HR) = \( \frac{\Sigma \left( \Delta V/Q_{avg}/3600 \right)}{d} \)

<table>
<thead>
<tr>
<th>d (ft)</th>
<th>Qout (CFS)</th>
<th>V in basin (CU FT)</th>
<th>DRAW DOWN TIME (HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.3</td>
<td>25,251</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0.2</td>
<td>18,776</td>
<td>7.24</td>
</tr>
<tr>
<td>3</td>
<td>0.2</td>
<td>13,246</td>
<td>14.26</td>
</tr>
<tr>
<td>2</td>
<td>0.2</td>
<td>8,294</td>
<td>21.71</td>
</tr>
<tr>
<td>1</td>
<td>0.1</td>
<td>3,890</td>
<td>30.35</td>
</tr>
<tr>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>48.77</td>
</tr>
</tbody>
</table>

50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)
### Project Information

**Project Name:** Otay Ranch Resort Village  
**Project Location:** Chula Vista  
**85th Percentile Precipitation Depth (in):** 0.65

### Drainage Area

<table>
<thead>
<tr>
<th>Total Drainage Area</th>
<th>Area (SQ FT)</th>
<th>Area (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,336,100</td>
<td>122.50</td>
<td></td>
</tr>
</tbody>
</table>

### Drainage Areas

<table>
<thead>
<tr>
<th>DMA Name</th>
<th>Surface Type</th>
<th>DMA Area (SQ FT)</th>
<th>DMA Area (AC)</th>
<th>DMA Runoff Factor</th>
<th>85th Percentile Precipitation Depth (IN)</th>
<th>85th Percentile Volume (CU FT)</th>
<th>85th Percentile Flow (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape</td>
<td>VEGETATED</td>
<td>3,814,425</td>
<td>87.57</td>
<td>0.1</td>
<td>0.65</td>
<td>20,661</td>
<td>1.75</td>
</tr>
<tr>
<td>Road/Sidewalk</td>
<td>IMPERVIOUS</td>
<td>1,521,675</td>
<td>34.93</td>
<td>1</td>
<td>0.65</td>
<td>82,424.04</td>
<td>6.99</td>
</tr>
</tbody>
</table>

#### BASIN 7

### Volume Storage Capacity:

- **WQ Ponding Depth** = \( h_{BMP} \) = 5.50 ft.
- **BMP Area Provided** = \( A_{BMP} \) = 14,971 ft.\(^2\)

**Volume Above Ground @ \( h_{BMP} \) assuming 2:1 sideslopes**

**Volume Storage Capacity:**

\[
V_{BS} = V_{TOP} + V_{UNDERGROUND}
\]

- **Ponding Area at \( h_{BMP} \)** = 20,839 ft.\(^3\)
- **Volume at \( h_{BMP} \)** = 98,477 ft.\(^3\)

**Below Ground Volume:**

- **\( D_{SOIL\,MIX} \)** = 1.5 ft.
- **\( n_{soil\,mix} \)** = 0.3 unitless
- **\( D_{GRAVEL} \)** = 1.00 ft.
- **\( n_{gravel} \)** = 0.4 unitless

\[
V_{total\,underground\,volume\,provided} = A_{BMP}(D_{SOIL\,MIX} * n_{SOIL\,MIX} + D_{GRAVEL} * n_{GRAVEL})
\]

- **\( V_{total\,underground\,volume\,provided} \)** = 12,725 ft.\(^3\)

**Total Volume Provided** = 111,202 cf = 2.55 ac-ft.

**Therefore Capacity OK**

---

R:\0982\Hyd\CALCS\EXCEL\Complete Table redos\BMP Basin Calcs.xlsx  
9/25/2014
**BASIN 7 DRAWDOWN CALCULATIONS**

OUTLET LOCATED AT BOTTOM OF BASIN

**ORIFICE EQUATION**

\[ Q = C \times A \times (2gd)^{0.5} \]

- \( C = 0.67 \)
- \( d \) (in) = 4
- \( A \) (sq ft) = 0.09
- \( g \) (ft/s\(^2\)) = 32.2

**DRAWDOWN TIME (HR) = \( \sum (\Delta V/Q_{avg}/3600) \)**

<table>
<thead>
<tr>
<th>d (ft)</th>
<th>( Q_{out} ) (CFS)</th>
<th>( V ) in basin (CU FT)</th>
<th>DRAW DOWN TIME (HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5</td>
<td>1.1</td>
<td>98,477</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>1.0</td>
<td>87,757</td>
<td>2.77</td>
</tr>
<tr>
<td>4</td>
<td>0.9</td>
<td>68,056</td>
<td>8.28</td>
</tr>
<tr>
<td>3</td>
<td>0.8</td>
<td>49,462</td>
<td>14.18</td>
</tr>
<tr>
<td>2</td>
<td>0.7</td>
<td>31,942</td>
<td>20.77</td>
</tr>
<tr>
<td>1</td>
<td>0.5</td>
<td>15,466</td>
<td>28.85</td>
</tr>
<tr>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>47.16</td>
</tr>
</tbody>
</table>

50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)
**OTAY RANCH VILLAGE 13**

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

<table>
<thead>
<tr>
<th>AREA DRAINING TO CULVERT 1a</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</td>
</tr>
<tr>
<td>1,287,634</td>
</tr>
</tbody>
</table>

### I. SELF-TREATING AREAS

**SELF-TREATING VEGETATED/LANDSCAPED AREAS**

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>1,119,056</td>
<td>25.7</td>
<td>0.1</td>
<td>0.2</td>
<td>0.51</td>
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</table>

### II. AREAS DRAINING TO IMPs

**ROADS DRAINING TO ALTERNATIVE IMPs (ROADSIDE SWALES)**

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>SWALE LENGTH (FT)</th>
<th>V (ft/s) (1)</th>
<th>MINIMUM RETENTION TIME (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>168,577</td>
<td>3.9</td>
<td>1</td>
<td>0.2</td>
<td>0.8</td>
<td>500</td>
<td>0.27</td>
<td>31</td>
</tr>
</tbody>
</table>

(1) From Flowmaster Calculations
**OTAY RANCH VILLAGE 13**

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

<table>
<thead>
<tr>
<th>AREA DRAINING TO CULVERT 1b</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
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<tbody>
<tr>
<td>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</td>
<td>267,894</td>
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### I. SELF-TREATING AREAS

<table>
<thead>
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<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>206,039</td>
<td>4.7</td>
<td>0.1</td>
<td>0.2</td>
<td>0.09</td>
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### II. AREAS DRAINING TO IMPs

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>SWALE LENGTH (FT)</th>
<th>V (ft/s) (1)</th>
<th>MINIMUM RETENTION TIME (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>61,855</td>
<td>1.4</td>
<td>1</td>
<td>0.2</td>
<td>0.3</td>
<td>150</td>
<td>0.20</td>
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</tbody>
</table>

(1) From Flowmaster Calculations
OTAY RANCH VILLAGE 13

**85TH PERCENTILE PRECIPITATION DEPTH (IN):** 0.65

### AREA DRAINING TO CULVERT 2

<table>
<thead>
<tr>
<th>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,385,208</td>
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### I. SELF-TREATING AREAS

**SELF-TREATING VEGETATED/LANDSCAPED AREAS**

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>1,292,861</td>
<td>29.7</td>
<td>0.1</td>
<td>0.2</td>
<td>0.59</td>
</tr>
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</table>

### II. AREAS DRAINING TO IMPs

**ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)**

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>FILTERRA DRAINAGE AREA (AC)</th>
<th># INLET UNITS REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>92,347</td>
<td>2.1</td>
<td>1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.22</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.98</td>
<td>2</td>
</tr>
</tbody>
</table>
### Area Draining to Culvert 4

<table>
<thead>
<tr>
<th>Total Project Area That Pertains to This Amendment:</th>
<th>Area (SQ FT)</th>
<th>Area (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>690,862</td>
<td>15.9</td>
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</tbody>
</table>

### I. Self-Treating Areas

<table>
<thead>
<tr>
<th>DMA Name</th>
<th>Surface Type</th>
<th>DMA Area (SQ FT)</th>
<th>DMA Area (AC)</th>
<th>DMA Runoff Factor</th>
<th>85th Percentile Intensity (in/hr)</th>
<th>85th Percentile Flow (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>398,138</td>
<td>9.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.18</td>
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</tbody>
</table>

### II. Areas Draining to IMPs

<table>
<thead>
<tr>
<th>DMA Name</th>
<th>Surface Type</th>
<th>DMA Area (SQ FT)</th>
<th>DMA Area (AC)</th>
<th>DMA Runoff Factor</th>
<th>85th Percentile Intensity (in/hr)</th>
<th>85th Percentile Flow (CFS)</th>
<th>Filterra Drainage Area (AC)</th>
<th># Inlet Units Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>292,723</td>
<td>6.7</td>
<td>1</td>
<td>0.2</td>
<td>1.3</td>
<td>0.22</td>
<td>31</td>
</tr>
</tbody>
</table>

9/25/2014
### OTAY RANCH VILLAGE 13

#### 85TH PERCENTILE PRECIPITATION DEPTH (IN):

0.65

#### AREA DRAINING TO CULVERT 7 NOT TRIBUTARY TO BASINS 2 & 3

<table>
<thead>
<tr>
<th>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28,444,680</td>
<td>653.0</td>
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#### I. SELF-TREATING AREAS

**SELF-TREATING VEGETATED/LANDSCAPED AREAS**

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>167,706</td>
<td>3.9</td>
<td>0.1</td>
<td>0.2</td>
<td>0.08</td>
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#### II. AREAS DRAINING TO IMPs

**ROADS DRAINING TO ALTERNATIVE IMPs (FILTERRA UNIT)**

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>FILTERRA DRAINAGE AREA (AC)</th>
<th># INLET UNITS REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>207,346</td>
<td>4.8</td>
<td>1</td>
<td>0.2</td>
<td>1.0</td>
<td>0.22</td>
<td>22</td>
</tr>
</tbody>
</table>
OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

<table>
<thead>
<tr>
<th>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,797,836</td>
<td>133.1</td>
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</tbody>
</table>

### I. SELF-TREATING AREAS

#### SELF-TREATING VEGETATED/LANDSCAPED AREAS

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>657,756</td>
<td>15.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.30</td>
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</table>

### II. AREAS DRAINING TO IMPs

#### ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>FILTERRA DRAINAGE AREA (AC)</th>
<th># INLET UNITS REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>82,764</td>
<td>1.9</td>
<td>1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.22</td>
<td>9</td>
</tr>
</tbody>
</table>

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8/14/2014
## OTAY RANCH VILLAGE 13

### 85TH PERCENTILE PRECIPITATION DEPTH (IN):

<table>
<thead>
<tr>
<th>Area Draining to Culvert 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Project Area that Pertains to This Amendment:</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

### I. SELF-TREATING AREAS

#### SELF-TREATING VEGETATED/LANDSCAPED AREAS

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>278,784</td>
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<td>0.13</td>
</tr>
</tbody>
</table>

### II. AREAS DRAINING TO IMPs

#### ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>FILTERRA DRAINAGE AREA (AC)</th>
<th># INLET UNITS REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>89,734</td>
<td>2.1</td>
<td>1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.22</td>
<td>9</td>
</tr>
</tbody>
</table>
OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

<table>
<thead>
<tr>
<th>AREA DRAINING TO CULVERT 14</th>
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</thead>
<tbody>
<tr>
<td>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</td>
</tr>
<tr>
<td>466,528</td>
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</table>

### I. SELF-TREATING AREAS

#### SELF-TREATING VEGETATED/LANDSCAPED AREAS

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>359,806</td>
<td>8.3</td>
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<td>0.17</td>
</tr>
</tbody>
</table>

### II. AREAS DRAINING TO IMPs

#### ROADS DRAINING TO ALTERNATIVE IMPs (FILTERRA UNIT)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>FILTERRA DRAINAGE AREA (AC)</th>
<th># INLET UNITS REQUIRED</th>
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</thead>
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<td>106,722</td>
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<td>0.22</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.98</td>
<td>3</td>
</tr>
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8/14/2014
### OTAY RANCH VILLAGE 13

**85TH PERCENTILE PRECIPITATION DEPTH (IN):** 0.65

<table>
<thead>
<tr>
<th>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10,522,354</td>
<td>241.6</td>
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#### I. SELF-TREATING AREAS

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>10,310,916</td>
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#### II. AREAS DRAINING TO IMPs (FILTERRA UNIT)

<table>
<thead>
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<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>FILTERRA DRAINAGE AREA (AC)</th>
<th># INLET UNITS REQUIRED</th>
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</thead>
<tbody>
<tr>
<td>2</td>
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<td>1.0</td>
<td>0.22</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.98</td>
<td>5</td>
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</tbody>
</table>

8/14/2014

R:\0982\Hyd\CALCS\EXCEL\Complete Table redos\BMP Basin Calcs.xlsx
OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

<table>
<thead>
<tr>
<th>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,645,376</td>
<td>129.6</td>
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### I. SELF-TREATING AREAS

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (IN/HR)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>1,679,674</td>
<td>38.6</td>
<td>0.1</td>
<td>0.2</td>
<td>0.77</td>
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### II. AREAS DRAINING TO IMPS

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (IN/HR)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>FILTERRA DRAINAGE AREA (AC)</th>
<th># INLET UNITS REQUIRED</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>162,948</td>
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<td>0.7</td>
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<td>17</td>
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</tbody>
</table>

R:\0982\Hyd\CALCS\EXCEL\Complete Table redos\BMP Basin Calcs.xlsx
8/14/2014
# OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

<table>
<thead>
<tr>
<th>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</th>
<th>AREA (SQ FT)</th>
<th>AREA (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>43,394,472</td>
<td>996.2</td>
</tr>
</tbody>
</table>

## I. SELF-TREATING AREAS

### SELF-TREATING VEGETATED/LANDSCAPED AREAS

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>40,657,967</td>
<td>933.4</td>
<td>0.1</td>
<td>0.2</td>
<td>18.67</td>
</tr>
</tbody>
</table>

## II. AREAS DRAINING TO IMPS

### ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (in/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>FILTERRA DRAINAGE AREA (AC)</th>
<th># INLET UNITS REQUIRED</th>
</tr>
</thead>
</table>
| 2        | PAVED        | 1,264,982        | 29.0          | 1                 | 0.2                               | 5.8                       | 0.22                       | 132                     
|          |              |                  |               |                   |                                   |                           | 0.98                       | 30                      |
### 85TH PERCENTILE PRECIPITATION DEPTH (IN):

0.65

<table>
<thead>
<tr>
<th>AREA DRAINING TO CULVERT 19</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:</td>
</tr>
<tr>
<td>194,713</td>
</tr>
</tbody>
</table>

### I. SELF-TREATING AREAS

#### SELF-TREATING VEGETATED/LANDSCAPED AREAS

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (IN/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VEGETATED</td>
<td>154,512</td>
<td>3.5</td>
<td>0.1</td>
<td>0.2</td>
<td>0.07</td>
</tr>
</tbody>
</table>

### II. AREAS DRAINING TO IMPs

#### ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)

<table>
<thead>
<tr>
<th>DMA NAME</th>
<th>SURFACE TYPE</th>
<th>DMA AREA (SQ FT)</th>
<th>DMA AREA (AC)</th>
<th>DMA RUNOFF FACTOR</th>
<th>85TH PERCENTILE INTENSITY (IN/hr)</th>
<th>85TH PERCENTILE FLOW (CFS)</th>
<th>FILTERRA DRAINAGE AREA (AC)</th>
<th># INLET UNITS REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>40,201</td>
<td>0.9</td>
<td>1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.22</td>
<td>4</td>
</tr>
</tbody>
</table>

R:\0982\Hyd\CALCS\EXCEL\Complete Table redos\BMP Basin Calcs.xlsx
8/14/2014
### 85th Percentile Precipitation Depth (in):

0.65

### Total Project Area That Pertains to This Amendment:

<table>
<thead>
<tr>
<th>DMA Name</th>
<th>Surface</th>
<th>Area (SQ FT)</th>
<th>Area (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>895,594</td>
<td>20.6</td>
</tr>
</tbody>
</table>

### DMA

<table>
<thead>
<tr>
<th>DMA Name</th>
<th>Surface</th>
<th>Area (SQ FT)</th>
<th>Area (AC)</th>
<th>Runoff Factor</th>
<th>85th Percentile Intensity (in/hr)</th>
<th>85th Percentile Flow (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>806,953</td>
<td>18.5</td>
<td>0.1</td>
<td>0.2</td>
<td>0.37</td>
</tr>
</tbody>
</table>

### 85th Percentile Intensity (in/hr)

0.98

### 85th Percentile Flow (CFS)

2

### Self-Treating Areas

#### I. Self-Treating Vegetated/Landscaped Areas

<table>
<thead>
<tr>
<th>DMA Name</th>
<th>Surface</th>
<th>Area (SQ FT)</th>
<th>Area (AC)</th>
<th>Runoff Factor</th>
<th>85th Percentile Intensity (in/hr)</th>
<th>85th Percentile Flow (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>88,641</td>
<td>2.0</td>
<td>1</td>
<td>0.2</td>
<td>0.4</td>
</tr>
</tbody>
</table>

### Areas Draining to IMPs

#### II. Areas Draining to Alternative IMPs (Filtterra Unit)

<table>
<thead>
<tr>
<th>DMA Name</th>
<th>Surface</th>
<th>Area (SQ FT)</th>
<th>Area (AC)</th>
<th>Runoff Factor</th>
<th>85th Percentile Intensity (in/hr)</th>
<th>85th Percentile Flow (CFS)</th>
<th>Filtterra Drainage Area (AC)</th>
<th># Inlet Units Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PAVED</td>
<td>88,641</td>
<td>2.0</td>
<td>1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.22</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.98</td>
<td>2</td>
</tr>
</tbody>
</table>
ATTACHMENT E

Geotechnical Certification Sheet
(If applicable)

The design of stormwater treatment and other control measures proposed in this plan requiring specific soil infiltration characteristics and / or geological conditions has been reviewed and approved by a registered Civil Engineer, Geotechnical Engineer, or Geologist in the State of California.

_________________________________________  ______________________
Name and registration #                     Date
ATTACHMENT F

Maintenance Plan
(Use Chapter 5 of the SUSMP as guidance in developing your Maintenance Plan)

The following is a general outline to create your project specific Maintenance Plan. A Maintenance Plan is a living document and field conditions may require modifications to the Maintenance Plan.

I. Inspection, Maintenance Log and Self-Verification Forms (Examples are provided in Appendix F of the San Diego County SUSMP)

II. Updates, Revisions and Errata

III. Introduction
   A. Narrative overview describing the site; drainage areas, routing, and discharge points; and treatment facilities.

IV. Responsibility for Maintenance
   A. General
      (1) Name and contact information for responsible individual(s).
      (2) Organization chart or charts showing organization of the maintenance function and location within the overall organization.
      (3) Insert a copy of the recorded maintenance agreement.
      (4) Maintenance Funding
         (1) Sources of funds for maintenance
         (2) Budget category or line item
         (3) Description of procedure and process for ensuring adequate funding for maintenance
   
   B. Staff Training Program
   
   C. Records
   
   D. Safety

V. Summary of Drainage Areas and Stormwater Facilities
   A. Drainage Areas
(1) Drawings showing pervious and impervious areas (copied or adapted from initial SWMP).

(2) Designation and description of each drainage area and how flow is routed to the corresponding facility.

B. Treatment and Flow-Control Facilities

(1) Drawings showing location and type of each facility

(2) General description of each facility (Consider a table if more than two facilities)

(1) Area drained and routing of discharge.

(2) Facility type and size

VI. Facility Documentation

A. “As-built’ drawings of each facility (design drawings in the draft Plan)

B. Manufacturer’s data, manuals, and maintenance requirements for pumps, mechanical or electrical equipment, and proprietary facilities (include a “placeholder” in the draft plan for information not yet available).

C. Specific operation and maintenance concerns and troubleshooting

VII. Maintenance Schedule or Matrix

A. Maintenance Schedule for each facility with specific requirements for:

(1) Routine inspection and maintenance

(2) Annual inspection and maintenance

(3) Inspection and maintenance after major storms

B. Service Agreement Information

Assemble and make copies of your maintenance plan. One copy must be submitted to the County, and at least one copy kept on-site. Here are some suggestions for formatting the maintenance plan:

- Format plans to 8½ x 11” to facilitate duplication, filing, and handling.

- Include the revision date in the footer on each page.

- Scan graphics and incorporate with text into a single electronic file. Keep the electronic file backed-up so that copies of the maintenance plan can be made if the hard copy is lost or damaged.
Filterra® Maintenance Steps

1. Inspection of Filterra and surrounding area
2. Removal of tree grate and erosion control stones
3. Removal of debris, trash and mulch
4. Mulch replacement
5. Clean area around Filterra
6. Complete paperwork and record plant height and width

For additional information please contact your local Filterra sales representative.
Eastern Zone: 866-349-3458, Western Zone: 877-345-1450.