

APPENDIX 5.15B

# Storm Water Drainage Calculations

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## Storm Water Drainage Calculations

Computation Sheet for Determining Runoff Coefficients and Site Discharge  
Pre-Development vs. Post Development <sup>1</sup>

### Existing Site Conditions- Prior to Construction

Total Site Area/Drainage Area		<u>23 Acres</u>		(A)
Impervious Site Area <sup>2</sup>	=	<u>9 Acres</u>		(B)
Impervious Site Area Runoff Coefficient <sup>3</sup>	=	<u>0.87</u>		(C)
Pervious Site Area <sup>4</sup>	=	<u>14 Acres</u>		(D)
Pervious Site Area Runoff Coefficient <sup>5</sup>	=	<u>0.25</u>		(E)
Existing Site Area Runoff Coefficient	=	$\frac{(B \times C) + (D \times E)}{(A)}$	= $\frac{(9 \times 0.87) + (14 \times 0.25)}{23} = 0.49$	(F)

### Existing Site Conditions Runoff

Area Runoff Coefficient		<u>0.49</u>		(F)
Area Rainfall Intensity <sup>6</sup>	=	<u>0.68 in/hr</u>		(G)
Drainage Area	=	<u>23 Acres</u>		(A)
Site Area Pre-Development Discharge	(A) x (F) x (G)	=	(23) x (0.49) x (0.68) = <b>7.66 ft<sup>3</sup>/sec</b>	

**Post Development (after construction)**

$$\begin{aligned}
 \text{Total Post Development Site Drainage Area} &= \underline{\hspace{2cm} 23 \text{ Acres} \hspace{2cm}} && \text{(A)} \\
 \text{Impervious Site Area}^2 &= \underline{\hspace{2cm} 10 \text{ Acres} \hspace{2cm}} && \text{(B)} \\
 \text{Impervious Site Area Runoff Coefficient}^3 &= \underline{\hspace{2cm} 0.87 \hspace{2cm}} && \text{(C)} \\
 \text{Pervious Site Area}^4 &= \underline{\hspace{2cm} 13 \text{ Acres} \hspace{2cm}} && \text{(D)} \\
 \text{Pervious Site Area Runoff Coefficient}^5 &= \underline{\hspace{2cm} 0.25 \hspace{2cm}} && \text{(E)} \\
 \text{Proposed Site Area Runoff Coefficient} &= \frac{(B \times C) + (D \times E)}{A} = \frac{(10 \times 0.87) + (13 \times 0.25)}{23} = \underline{\hspace{2cm} 0.51 \hspace{2cm}} && \text{(F)}
 \end{aligned}$$

***Post Development Site Conditions***

$$\begin{aligned}
 \text{Area Runoff Coefficient} &= \underline{\hspace{2cm} 0.51 \hspace{2cm}} && \text{(F)} \\
 \text{Area Rainfall Intensity}^6 &= \underline{\hspace{2cm} 0.68 \text{ in/hr} \hspace{2cm}} && \text{(G)} \\
 \text{Drainage Area} &= \underline{\hspace{2cm} 23 \text{ Acres} \hspace{2cm}} && \text{(A)} \\
 \text{Site Area Post Development Discharge} &= (A) \times (F) \times (G) = \underline{\hspace{2cm} (23) \times (0.51) \times (0.68) = 7.97 \text{ ft}^3/\text{sec} \hspace{2cm}}
 \end{aligned}$$

1. Calculations based on Carlsbad Energy Center Construction Storm Water Pollution Prevention Plan, Attachment C
2. Includes paved areas, areas covered by buildings, and other impervious surfaces.
3. Based on San Diego County Hydrology Manual, Runoff Coefficients for Urban Areas, General Industrial- Type B Soils, June 2003.
4. Includes areas of vegetation, most unpaved or uncovered soil surfaces, and other pervious areas.
5. Based on San Diego County Hydrology Manual, Runoff Coefficients for Urban Areas, 0% Impervious, B-Type Soils, June 2003.
6. Based on San Diego County Hydrology Manual, Rainfall Intensity-Duration Design Chart, 25 year-2 hour Storm Duration