

## **Hydrologic/Drainage Modeling Justification**

### **Hydrology**

In order to determine the flow rates and runoff volumes, we utilized the HEC-HMS 3.5 modeling software. The hydrologic analysis was performed using the Natural Resource Conservation Service (NRCS) Unit Hydrograph and Curve Number Method. The overall footprint of our proposed site (approximately 15.4 acres) was used as the total drainage area for pre-existing, existing, and proposed conditions. For each condition, a time of concentration was calculated and a weighted Curve Number (CN) Value was determined based on the hydrologic soil group (HSG) classification and land use. A 24-hour rainfall distribution obtained from the City of Tulsa drainage criteria manual was used for the meteorological data. A table which shows the Summary of Hydrologic Coefficients can be found in Appendix A.

### **LID Assumptions**

Infiltration rates are a driving force in determining many LID techniques efficiency in water quality and storage capabilities. The proposed site consists of Group D soils which on average have an infiltration rate less than 0.2 inch/hour. (Fuss & O'Neill) When comparing infiltration rates of Group A (minimum of 0.5 inch/hour) and Group D soils, one could argue that Group A Soils infiltrate at a minimum of 2.5 times that of Group D. (Fuss & O'Neill) The assumption was made that the proposed Storage Trench areas will more than triple the infiltration rates and act similar to Pasture: Fair Condition with Group A soil based on the CN table provided in the City of Tulsa drainage criteria; therefore the CN Value of 49 was used for the areas that would drain to the Storage Trenches until the available volume is maximized. The Curve Number Value utilized for Permeable Pavers was 74 and for Planters was 76. This data can also be found on the Summary of Hydrologic Coefficients in Appendix A.

### **References**

Fuss & O'Neill - <http://www.greenwichct.org/upload/medialibrary/0cb/Appendix%20B%20-%20Recharge%20Requirements.pdf>

# **APPENDIX A**

**Summary of Hydrologic Coefficients**

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
DA-01-Post	Overland	34		1.59	0.88	0.63	11.5		Commercial	50	89	92	94	95	0.0	0.0	0.0	49.9	80.6	15.4	0.02404
		1109		0.60	1.14	16.22			Impervious	11	98	98	98	98	0.0	0.0	0.0	11.0			
		288		1.04	2.03	2.36			Permeable Pavers	1	22	52	67	74	0.0	0.0	0.0	1.1			
					0.00	0.00			Planters	11	25	55	70	76	0.0	0.0	0.0	11.0			
					0.00	0.00			Storage Trench	27	49	49	49	49	0.0	0.0	0.0	27.1			
DA-01-Pre	Overland	34		1.59	0.88	0.63	12.8		Pasture: Fair Condition	100	49	69	79	84	0.0	0.0	0.0	100.0	84.0	15.4	0.02404
		1381		0.57	1.11	20.77															
					0.00	0.00															
					0.00	0.00															
DA-01-Ex	Overland	34		1.59	0.88	0.63	8.5		Commercial	100	89	92	94	95	0.0	0.0	0.0	100.0	95.0	15.4	0.02404
		1381		0.72	1.69	13.61															
					0.00	0.00															
					0.00	0.00															