

# DRAINAGE ANALYSIS

Prepared for

Alpha Phi

Tax map 2  
Lot 10  
8 Strafford Ave  
Durham, NH

Submitted  
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Prepared by



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Town of Durham

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Planning, Assessing  
and Zoning

## PROJECT DESCRIPTION

The proposed project is located at the Alpha Phi Sorority at 8 Strafford Ave. The parcel is 0.65 acres. The occupancy of the house is between 54 and 83 residents. There are currently 18 parking spaces and 2 handicap parking spaces. The proposed plan would create 8 additional parking spaces. In order to offset the increase in impervious surface, we are proposing a rain garden on the southern strip of this property.

## CALCULATION METHODS

The drainage study was completed using HydroCAD. The program generates runoff hydrographs for specified storm distributions, and performs reservoir routing using the storage indication method. The criteria used for this drainage analysis is the 2, 10, AND 25 year 24-hour Type III frequency storm events. Flow depths are based on Cornell precipitation data.

The accuracy of stormwater management modeling is limited. The peak flow rates and flood elevations provided herein should not be considered absolute due to the number of variables involved in their determination. Surface roughness coefficient ( $n$ ), entrance loss coefficients ( $k_e$ ), velocity factors ( $k_v$ ), time of concentration ( $T_c$ ) and tail water conditions are subjective to field observation and engineering judgment. Curve Numbers (CN) describes the average conditions useful for design purposes. Modeling to simulate an actual storm event requires additional knowledge of antecedent runoff conditions (ARC). Curve numbers will vary from storm to storm dependent on the ARC.

## SUMMARY

### Site Soils

The soils on site are HcB – Hollis Charlton fine sandy loam. The hydrologic soil group for Hollis is D and for Charlton is A. We have used a Hydrologic soil group of B for the site.

The lowest K-sat rates are 6in/ hr., We have applied a safety factor of 2 and utilized 12 in/hr for the infiltration rate for the rain garden.

### Pre- and Post-Development

The area that we are proposing to pave is being used for parking. Parking this area will stabilize the soils and prevent erosion. The parking area is on the crest of the driveway and is not conducive for pervious pavement. A site visit was performed on June 20<sup>th</sup> Mr. Mike Lynch was present and agreed with this assessment. In order to offset the increase in pavement we are proposing to construct a rain garden.

Stormwater is currently concentrated at this location. We are proposing to maximize the size of the rain garden in the space. The rain garden will treat the stormwater and recharge the ground water.

Study Point 1: Study point 1 is towards Strafford Ave

Study Point 2. Study point 2 is the southerly dog leg of the property.

**Drainage Analysis**

A complete summary of the flow conditions is included in Appendix A. The following compares pre- and post-development peak flow rates of runoff leaving the site.

**2-year Storm Event (3.13 inches)**

Point of Analysis	Pre-Development	Pre-volume	Post Development	Post volume	Difference (cfs)
	Peak Flow(cfs)	Acre-feet (af)	Peak Flow(cfs)	Acre-feet (af)	
SP-1	0.3	0.019	0.36	.022	+0.06
SP-2	0.64	0.042	0.01	0.001	-0.041

**10-year Storm Event (4.74 inches)**

Point of Analysis	Pre-Development	Pre-volume	Post Development	Post volume	Difference (cfs)
	Peak Flow(cfs)	Acre-feet (af)	Peak Flow(cfs)	Acre-feet (af)	
SP-1	0.66	0.04	0.73	0.044	+0.07
SP-2	1.32	0.086	0.05	0.003	-1.27

**25-year Storm Event (6.0 inches)**

Point of Analysis	Pre-Development	Pre-volume	Post Development	Post volume	Difference (cfs)
	Peak Flow(cfs)	Acre-feet (af)	Peak Flow(cfs)	Acre-feet (af)	
SP-1	0.96	0.058	1.04	0.064	+0.08
SP-2	1.88	0.123	0.09	0.006	-1.79

**Conclusion**

There is a minor increase in the peak flow to Strafford Ave. There is a considerable drop in flow from the southeastern property line.