

**Project:** The Residences at Ashland  
**Location:** Ashland, MA  
**Prepared For:** SMMA



**Purpose:** To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

**Reference:** Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

**Procedure:** Determine unit peak discharge using Figure 3 or 4. Figure 4 is in tabular form so is preferred. Using the  $t_c$ , read the unit peak discharge ( $q_u$ ) from Figure 3 or Table in Figure 4.  $q_u$  is expressed in the following units: cfs/mi<sup>2</sup>/watershed inches (csm/in).

Compute Q Rate using the following equation:

$$Q = (q_u) (A) (WQV)$$

where:

Q = flow rate associated with first 1" of runoff

$q_u$  = the unit peak discharge, in csm/in.

A = impervious surface drainage area (in square miles)

WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles <sup>2</sup> )	$t_c$ (min)	$t_c$ (hr)	WQV (in)	$q_u$ (csm/in.)	Q (cfs)
WQU 1-1	0.12	0.0001828	6.0	0.100	1.00	774.00	0.14
WQU 1-2	1.08	0.0016906	6.0	0.100	1.00	774.00	1.31
WQU 2-1	2.06	0.0032234	6.0	0.100	1.00	774.00	2.49
WQU 2-2	0.27	0.0004234	6.0	0.100	1.00	774.00	0.33
WQU 3-1	1.51	0.0023578	6.0	0.100	1.00	774.00	1.82

The WQf sizing calculation selects the minimum size CDS/Cascade/StormCeptor model capable of operating at the computed WQf peak flowrate prior to bypassing. It assumes free discharge of the WQf through the unit and ignores the routing effect of any upstream storm drain piping. As with all hydrodynamic separators, there will be some impact to the Hydraulic Gradient of the corresponding drainage system, and evaluation of this impact should be considered in the design.