

**Case Study Four: Big Box Development**

- Determine feasibility for water quality control and for providing storage volume to limit the 10-yr, 24-hr peak discharge rate to the pre-development condition.
- Use NRCS TR-55 graphical peak discharge method to determine storage volume.
- Drainage area is assumed to equal site area, 22.5 ac.

**Existing Conditions**

- Site is sloping from SE to NW at 2 to 5 percent
- Moderate slope on western portion of site
- 0.7 acres Woods and 21.8 acres Meadow
- HSG C. Weighted CN is 65
- Tc is 0.27 hours
- Peak Discharge (cfs): 41
- Runoff Volume (in.): 1.79

**Post-Development Conditions**

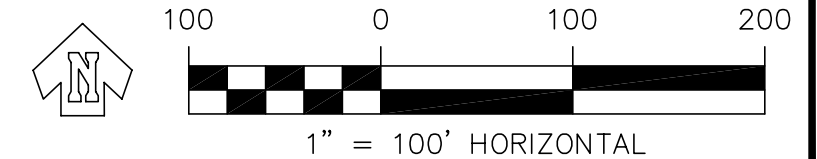
- Afforestation and soil amendments on western portion of site. Increase infiltration capacity to HSG B and change in land cover
- Conservation of woods
- Credit bioretention areas as HSG B and Meadow
- Weighted CN is 86
- Tc is 0.26 hours
- Peak Discharge (cfs): 92
- Runoff Volume (in.): 3.65

**Results**

- Detention volume: 2.1 acre feet or 1.1 inches using TR-55 graphical peak method

**BMPs**

- Tree box filters provide majority of water quality control
- Green roof captures first 1" of roof runoff (Water quality volume = first 0.5" of roof runoff.)
- Bioretention basins: 1.7 ac/ft storage is available.
  - Assume 6" surface storage and 1' subsurface storage is provided.
- Some bioretention basins include additional gravel underground storage.
  - 0.35 ac/ft is available in gravel storage.
- Some runoff is treated by soil amendment / bioslope areas
- Pipes or other underground facilities provide 0.5 ac/ft storage
- Additional storage can be provided in bioswales, amended soils, or cisterns.



CASE STUDY FOUR  
BIG BOX RETAIL SITE

FAIRFAX COUNTY  
PUBLIC FACILITIES MANUAL  
LOW IMPACT DEVELOPMENT CASE STUDIES  
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