



Case Study Two: Redevelopment of Ex. Single Family House to Townhouse

- Demonstrate how to provide storage for the water quality volume (WQV) and to provide detention to limit 10-yr, 2-hr peak discharge rate to pre-development condition.
- Assume that providing storage for 3" of runoff from the post-development impervious area will provide required detention storage for the 10-yr, 2-hr storm.
- WQV = 0.5" of runoff over the impervious area.
- Drainage area is assumed to equal site area, 1.33 acres.

Existing Conditions

- Woods = 35,000 S.F. (site is approx. 2/3 forested)
- Roof + pavement = 2,800 S.F.
- Lawn = 20,000 S.F.

Post-Development Conditions

- Total forested area = 18,000 S.F.
 - 3,000 S.F. cleared and disturbed by construction is reforested
 - 4,500 S.F. is afforested and soil amendments are added, increasing the area's infiltration capacity.
 - Remaining ex. trees = 10,500 S.F.
- Roofs + pavement = 22,000 S.F.
- Lawn = 17,800 S.F.
- Roof leaders in front of townhouses drain to driveways.

Result

- Water quality volume = 920 C.F.
 - WQV = 0.5" / (12" per foot) * 22,000 S.F.
- Detention volume = 5,500 C.F.
 - Detention volume = 3" / (12" per foot) * 22,000 S.F.
- WQV is contained within the detention volume; therefore, BMPs will be sized to contain the detention volume.

BMPs

- Use a combination of bioretention basins, bioswales, and permeable pavement.
- Bioretention basins and bioswales are designed so that surface ponding drains within 24 hours.
- BMPs are sized to capture 3" of runoff from the post-development impervious area.
- Two (2) 600 S.F. bioswales with yard inlets
 - Capture runoff from back of roofs (4,600 S.F.)
 - Assume 6" surface storage and 6" subsurface storage is provided.
 - Each bioswale is 133' long and 4.5' wide.
 - Bioswales can also provide conveyance for larger storms.
- Twelve (12) sections of permeable pavement totaling 3,300 S.F.
 - All driveway surfaces are constructed with permeable pavement.
 - Capture rainfall that falls on driveways (3,300 S.F.)
 - And capture runoff from front of roofs (4,600 S.F.)
 - Assume 7.5" storage in gravel bed below permeable pavement.
- Two (2) 230 S.F. bioretention basins
 - Capture runoff from east end of street (2,800 S.F.)
 - Assume 6" surface storage and 1' subsurface storage is provided.
- Two (2) 125 S.F. bioretention basins
 - Capture runoff from west end of street (1,500 S.F.)
 - Assume 6" surface storage and 1' subsurface storage is provided.
- Two (2) 400 S.F. sections of permeable pavement
 - Capture runoff middle portion of street (4,800 S.F.)
 - Assume 1.5' storage in gravel bed below permeable pavement.

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 REDEVELOPMENT OF EX. SINGLE FAMILY
 TO TOWNHOUSE

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 PUBLIC FACILITIES MANUAL
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