

## Exercise 2A – Instructions

### Given (Exercise 1A):

- ◆ Drainage Area = 6.7 acres
- ◆ Post Development Land Cover:
  - ◆ Managed Turf = 4.75 acres
  - ◆ Impervious Cover = 1.95 Acres.
- ◆ Assume “C” Soils throughout
- ◆ **1-yr Rainfall = 2.6 inches**

### Determine:

- Approximate **Curve Number** for a **1-year storm**
- Post-development 1-year **Runoff Volume** (in watershed-inches)

### Instructions:

1. Start with the “Site Data” for EX1A.
2. Copy the Site Data to DRAINAGE AREA A.
3. Go to the “Channel and Flood Protection” Tab.
4. Enter the Rainfall Amount.
5. Review the DA A summary information.
6. Save the spreadsheet for further use as “EX2A.xls” or similar.

**Helpful Hints:** *Make sure to copy the site data to Drainage Area Tab.*

## Exercise 2B – Instructions

### Given (Exercise 1A, No runoff reduction or ESD):

- ◆ Pre-development CN of 74:
  - ◆ Peak Q1 = 2.3 cfs
  - ◆ Runoff Volume = 0.62 inches
- ◆ Results from Exercise 2A for post-development where we found
  - ◆ Post-development curve number = 81
  - ◆ Runoff Volume = 1.01 inches

### Determine:

- Allowable discharge from site for a 1-year storm using the energy balance equation

### Instructions:

1. Start with the results from Exercise 2A.
2. Refer to the Energy Balance Equation on Pages 8-9 of Module 5 in the Participant Guide.
3. Use the equation to determine the max allowable post-development rate.
4. Save the spreadsheet as “EX2B.xls” or similar.

### Helpful Hints:

1. *Be sure to use the 0.8 Improvement Factor for a site with greater than 1 acre of land disturbance.*
2. *Refer to Module 5, p. 10 for additional information.*

## Exercise 2C – Instructions

### Given:

- ◆ Runoff Reduction/ESD approach (CAGC to ED-L2) (as in Exercise 1C)
- ◆ Post Development (Ex. 1C):
  - ◇ Impervious Cover = 1.95 acres
  - ◇ Open Space = 3.5 acres
  - ◇ Managed Turf = 1.25 acres
- ◆ 1-yr Rainfall = 2.6 inches
- ◆ Pre-development CN of 74:
  - ◇ Peak Q1 = 2.3 cfs
  - ◇ Runoff Volume = 0.62 inches

### Determine:

- Allowable discharge from site using the Energy Balance equation

### Instructions:

1. Start with the results from Exercise 1C.
2. Enter the 1-year precipitation (2.6 in.) into the “Channel and Flood Protection” tab.
3. Review the Adjusted CN and the Post-Development Runoff Volume (with Runoff Reduction).
4. Use the Energy Balance Equation to evaluate the allowable discharge again.
5. Save the spreadsheet as “EX2C.xls” or similar.

**Helpful Hints:** *Be sure to use the 0.8 Improvement Factor for a site with greater than 1 acre of land disturbance.*

## Exercise 2D – Facilitated Exercise

### Given:

- ◆ Results from Exercises 2B and 2C and following post-developed runoff rates for 1-year event:
  - ◆ 2B (no runoff reduction) = 6.7 cfs
  - ◆ 2C (ESD and runoff reduction) = 4.2 cfs

### Estimate:

- Detention storage needed to satisfy allowable release rate (use TR-55 - Fig 6-1, see p.38 in Module 3 and p. 23 in Module 5)

### Instructions:

1. Determine  $q_o/q_i$ 
  - i. No RR =  $1.1/6.7 = 0.16$
  - ii. RR/ESD =  $1.5/4.2 = 0.36$
2. Determine  $V_s/V_r$  (TR-55, Fig 6-1)
  - i. For No RR = 0.49
  - ii. For RR/ESD = 0.34
3. Multiply the Runoff Volume by the  $V_s/V_r$  ratio to identify approximate storage required for attenuation
  - i. For No RR =  $0.49 \times 0.56 \text{ ac-ft} = 0.27 \text{ ac-ft}$
  - ii. For RR/ESD =  $0.34 \times 0.44 \text{ ac-ft} = 0.15 \text{ ac-ft}$

**Helpful Hints:** Refer to Module 3 (pages 33-37) and Module 5 (pages 22-24) for additional information.