**Demos**

1. Demo 1
   1. Open the calculator and create a new file
   2. Site information tab: yes CSW permit, zip=55155, 3 acres impervious, 2 acres turf B soil
   3. Schematic tab
      1. Bioretention no underdrain, 1 acre impervious , 3000 ft2 areas, 1.35 feet depth, B soil, 48 hour drawdown
      2. Bioretention with underdrain, 2 acre turf B soil, 1 acre impervious, underdrain not raised, not lined, 3000 ft2 for each area, overflow depth=1.5 feet, 2 foot media depth, 0.11 FC-WPt, 0.25 MP-FC, no tree, Mix A, no P test, no amendment, B soil (0.45 in/hr), 48 hr drawdown
   4. Infiltration basin, 1 acre impervious, 4000 ft2 areas, 1.8 foot overflow depth, B soils, 48 hour drawdown
   5. Results tab: Is the performance goal met? If not, how can it be met?
2. Demo 2 – C and D soils
   1. 50 acre site – 20 percent impervious; 40 acres residential; 5 acres commercial; 5 acres green space on D soil; meet the CSW permit (1 inch retention requirement)
   2. 30 acres turf on D soil; 10 acres turf on C soil (0.2 in/hr)
   3. Individual bioretention max size = 10000 ft2
   4. Can the goal be met with a **realistic** BMP scenario? If not, how can we maximize volume and P retention?
3. Demo 3 – Ultra-urban setting
   1. 50 acre site – 90 percent impervious; all commercial/business
   2. A soils (0.8 in/hr)
   3. Can the retention goal be met with a **realistic** BMP scenario? If not, how can we maximize volume and phosphorus retention?
   4. What BMPs work well for this scenario?

**Features, warnings, restrictions, BMPs**

1. Site information tab
   1. Zip code – rainfall data
   2. Question about CSW permit – affects BMPs available
   3. Default values for retention requirement, P and TSS concentrations
   4. Must have impervious acres
2. Summary information toolbar on left
3. Warnings involve a change of a default condition (e.g. changing the P concentration)
4. Restrictions prevent you from entering data (examples - drawdown requirement, green roof and permeable pavement areas, bioretention depth
5. Help button or links within each BMP – go to Stormwater Manual
6. Bioretention with underdrain
   1. Elevating the underdrain
   2. Can be lined
   3. Can include a tree
   4. Maximum 1.5 foot water depth
   5. Media mixes C and D retain P; A and B leach P unless P content is <30 ppm
   6. Adding an amendment to attenuate phosphorus
7. Permeable pavement
   1. The area of permeable pavement must be included in the impervious acreage for the BMP
   2. The impervious:permeable pavement area ratio cannot exceed 5:1 (e.g. for 1 acre of impervious, must have at least = 8712 of permeable pavement)
   3. Volume credit for water stored beneath drain and infiltration during drawdown time
   4. An effective BMP for retaining runoff
8. Harvest and reuse/cistern
   1. Storage volume – ponds can store very large volumes, while cisterns typically are limiting to what volume can be retained
   2. User-defined max irrigation rate can be 2 in/week on A soils. On other soils default is lesser of defined rate or PET
   3. Offline systems – drained during winter
   4. Can retain water for non-irrigation uses
9. Tree trench
   1. Field capacity minus wilting point is available to plants
   2. More ET for larger trees
   3. Will get a warning and lose credit if soil volume per tree is below the recommended value
   4. Phosphorus crediting is same as for bioretention
   5. Note the ET credit
10. Green roof
    1. Can have a conventional roof drain to a green roof, but the conventional roof area must be equal to or less than the green roof area
    2. Maximum media depth is 4 inches
    3. No phosphorus credit
11. Disconnection BMP
    1. Can’t be used if you are trying to meet the Construction SW permit
    2. On Watershed tab, must enter permeable acres that will be used as effective pervious area
    3. Difficult to meet retention requirement with this BMP
12. Swales
    1. Side slope is routed to a swale main channel or with underdrain – treat as a single BMP (e.g. match lengths)
    2. Have all impervious acres go to side slope(s) and none to main channel
    3. Ways to increase infiltration
       1. Put in check dams
       2. Put in bioretention base
       3. Make swale longer
13. Underground infiltration
    1. Along with infiltration basin/trench, the most effective retention BMP for highly permeable soils (A soils)
    2. Must either know two values or go outside calculator to a spreadsheet to calculate these 2 values (equations were too difficult to incorporate into the calculator)
    3. Vp = underground pipe/storage volume
    4. Am = area of engineered media

Demo 2 (low permeability)

* Harvest and reuse; 5 acres on D; 3000 ft3 storage
* 4 bioretention basins with raised underdrain on C soil; Mix C; include tree
* Route 10 acres C, 25 acres D, and 8 acres impervious; include check dams; route to bioretention with underdrain
* Green roof – 2 acres
* Can’t get the performance goal (about 87% there); 74% P removal and 92% TSS removal

Demo 3

* Green roofs – 2 acres
* Permeable pavement - 6 acres impervious, 2 of which are ppavement (87120 ft2)
* Bioretention – 3 acres A soil turf; 2 acres impervious; 5000 ft2
* Tree trench – 2 acres turf; 30 acres impervious; 10 acres media area (435600 ft2); 2 foot media depth; medium tree; 875 trees
* Underground infiltration – 5 acres impervious; Vp = just enough to meet required retention volume