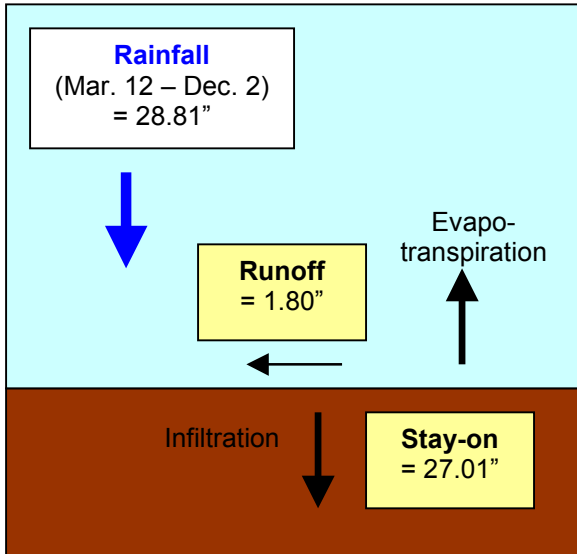
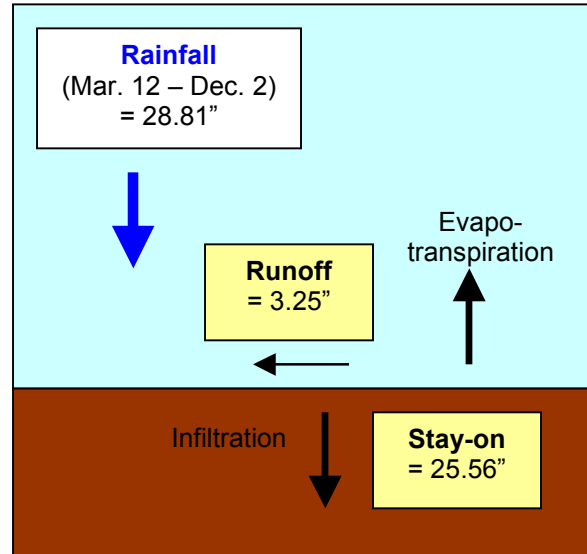


# DRAFT

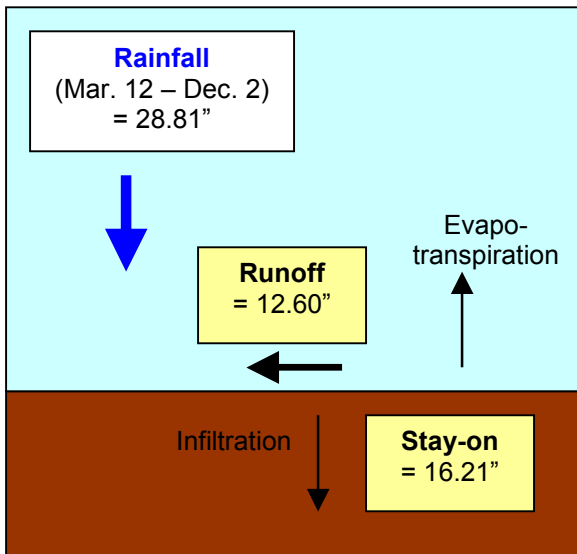
Water Balance Comparison of Pre-development and Post-development Conditions  
Modeled with RECARGA  
Rainfall = Runoff + Stay-on<sup>1</sup>



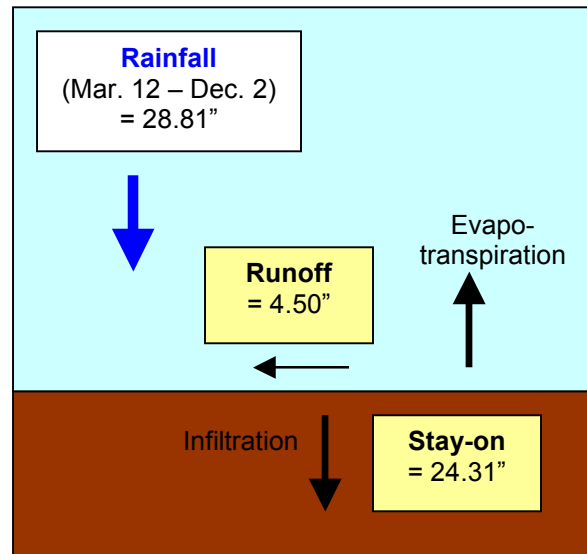
**"Ordinance" Pre-Development**  
(Max. allowed CN=68)<sup>2</sup>



**"Typical Real" Pre-Development**  
(Typical Ag. CN=75)<sup>3</sup>



**Post-Development w/  
60% Pre-Development (CN=68) Stay-on  
Standard**



**Post-Development w/  
90% Pre-Development (CN=68) Stay-on  
Standard**

<sup>1</sup> Stay-on = Evapo-transpiration + Infiltration

<sup>2</sup> For Hydrologic Soil Group B

<sup>3</sup> Agricultural curve numbers (CN) range from 61 to 85 depending on soil type, crop type, and farm practices

(2) EXEMPTIONS. This paragraph does not apply to:

(a) A post-construction site where the discharge is directly into a lake over 5,000 acres or a stream or river segment draining more than 500 square miles.

(b) A redevelopment post-construction site, including a transportation facility that is part of a redevelopment project.

(c) An in-fill development area of less than 5 acres.

(d) A highway reconstruction or minor reconstruction of a highway site.

**Note:** The intent of s. NR 151.123 is to minimize streambank erosion under bank-full conditions.

**NR 151.124 Infiltration performance standard. (1) REQUIREMENT.** BMPs shall be designed, installed and maintained to infiltrate runoff in accordance with the following or to the maximum extent practicable:

(a) *Low imperviousness.* For development with less than 40 percent connected imperviousness, such as parks, cemeteries and low density residential development, infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 90 percent of the pre-development infiltration volume, based on an average annual rainfall. However, when designing appropriate infiltration systems to meet this requirement, no more than 1 percent of the post-construction site is required as an effective infiltration area.

(b) *Moderate imperviousness.* For development with more than 40 percent and up to 80 percent connected imperviousness, such as medium and high density residential, multi-family development, industrial and institutional development, and office parks, infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 75 percent of the pre-development infiltration volume, based on an average annual rainfall. However, when designing appropriate infiltration systems to meet this requirement, no more than 2 percent of the post-construction site is required as an effective infiltration area.

(c) *High imperviousness.* For development with more than 80 percent connected imperviousness, such as commercial strip malls, shopping centers and commercial downtowns, infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 60 percent of the pre-development infiltration volume, based on an average annual rainfall. However, when designing appropriate infiltration systems to meet this requirement, no more than 2 percent of the post-construction site is required as an effective infiltration area.

# Draft 2 for Discussion

## Environmental Resources Technical Advisory Committee Recommendations to the Capital Area Regional Planning Commission

### Background

On October 8, 2009, the Capital Area Regional Planning Commission (CARPC) requested that its Environmental Resources Technical Advisory Committee (TAC) convene to provide technical recommendations on a more stringent stormwater runoff volume control standard than the one currently required under NR 151 and Dane County Chapter 14.

The TAC met on November 12, 2009 to review and discuss some of the relevant literature on stormwater volume control as well as some of the volume control standards currently in use around the country. On December 16, 2009 the TAC met to review and discuss modeling results of the runoff volumes resulting from different volume control standards. On January 25, 2010 the TAC met to review and discuss the analysis approach used by Montgomery Associates for the standards recommended in the Badger Mill Creek – Sugar River Study and prepare draft recommendations. On February 22, 2010 the TAC met to finalize their volume control standard recommendations.

### Discussion

The TAC agrees that without controls, increased volumes of stormwater runoff from impervious surfaces have an adverse effect on receiving waters. The TAC further agrees that the current infiltration (stay-on) standards in NR 151 and Dane County Chapter 14 do not adequately mitigate the impacts of increased volumes of stormwater runoff in all cases. The TAC recognizes the potential benefits of a runoff volume control standard to 100% of pre-development volumes, however it has several concerns related to the achievability and the cost versus benefit of adopting a standard of no increase in pre-development runoff volumes. Therefore, the TAC proposes that the CARPC adopt the following more stringent volume control standard and that the standard be reevaluated in 5 years.

### Recommendations

The TAC proposes that the CARPC adopt a runoff volume control standard for all new Urban Service Area Amendments based on the infiltration standard in Chapter 14 of the Dane County Ordinances [14.51(2)(e)] with the following revisions:

1. For residential and nonresidential developments, design practices to control sufficient runoff volume so that post-development stay-on volume shall be at least 90% of the pre-development stay-on volume, based upon average annual rainfall.
2. If when designing appropriate volume control systems, more than two percent (2%) of the site is required to be used as effective infiltration area, the applicant may alternately design infiltration systems and pervious surfaces to meet or exceed the pre-development recharge rate from the 2009 Wisconsin Geological and Natural History Survey report on groundwater recharge rates in Dane County or site specific data. If this alternative design approach is taken, at least two percent (2%) of the site must be used for infiltration.

February 22, 2010

# Draft 2 for Discussion

3. The standard should be applied on a watershed basis and allow credit for best management practices (BMPs) located within the watershed of concern, including retrofit practices in existing developed areas. The standard can be met with a combination of infiltration, evapotranspiration, and/or reuse BMPs.

The TAC also recommends that the following additional research efforts, data collection, and modeling be conducted to provide the information needed to further evaluate this issue:

- Completion of the SWAT (Soil and Water Assessment Tool) model / continuous hydraulic/hydrologic/water quality model of the Yahara Lakes watershed. This should be a high priority.
- Improvements to the SLAMM model to better account for the split between recharge and evapotranspiration that occurs in infiltration / biofiltration practices
- Improvements to the RECARGA model to better account for early season and late season infiltration.
- The failure rate of infiltration practices currently in place and an assessment of contributing factors.
- Case studies demonstrating that volume control to 100% of predevelopment volumes can be met by constructed best management practices
- Biological monitoring.....
- *Others?*

The TAC also recommends that the Dane County Board also adopt this more stringent volume control standard, so that it is applied to all new development within Dane County and not only to new urban service areas.