After Tournament Ends:

Discussion points for wrapping up activity-

1. What happens when you over-estimate CN for existing conditions (use higher CN for existing than warranted)? When could this happen? (Sites A1 and A2)
    a. Runoff depth or volume (Q) for existing increases (less absorption, infiltration per higher CN).
    (Ia indicates how much absorption, infiltration and decreases for existing with higher CN; Ia/P ratio decreases, and therefore qu increases).
    b. Peak flow rate (qp) for existing increases with the higher CN, and once again the difference between post and existing peak flow rates decreases
    c. Allowable release rate using Energy Balance increases (due to higher existing peak flow).
    d. This situation could arise if CN not correctly estimated or composite across different land types/uses not correctly calculated. Also, this could arise if CN for poor or fair conditions is assumed when these conditions are not actually verifiable. The allowable release rate could now result in erosion issues where there were none before if assumptions for existing conditions not valid. Existing conditions must be assumed to be in good conditions. If designer wants to reflect fair or poor conditions in calculations for existing conditions, then validation of field conditions must be provided.
2. What happens when you underestimate Tc for existing conditions? (Sites A1 and A3)
    a. Runoff depth (Q) for existing conditions stays the same (no change in CN).
    b. Peak flow rate (qp) for existing increases, therefore difference between post and existing peak flow rates decreases.
    (qu for existing conditions increases - flow moving faster as indicated by lower Tc.)
    c. Allowable release rate using Energy Balance increases (due to higher existing peak flow).
    d. The allowable release rate could now result in erosion issues where there were none before if Tc miscalculated and underestimated. Important to understand limitations and procedures for calculating Tc.
    e. This could happen if Tc path not correctly selected, if Tc does not represent most of the drainage area, or if Tc inappropriately developed across more than one sub-drainage areas.
3. What happens when you can lower post-development runoff through runoff reduction (use adjusted CN per VRRM)? (Sites B1 and B2 – **as shown on key, not blank worksheet**)
    a. Runoff depth or volume (Q) decreases (more absorption, infiltration per lower CN).
    (Ia indicates how much absorption, infiltration and increases with lower CN; Ia/P ratio increases, qu decreases)
    b. Peak flow rate for post-development (qp) decreases (due to lower runoff volume given more absorption, infiltration per lower CN)
    c. Allowable release rate using Energy Balance increases (due to lower runoff volume per lower CN).
    d. Decreased post-development runoff volume also means smaller detention facilities will be needed.
    e. Demonstrates benefits of reducing post-development runoff volume.

4. What happens when you underestimate CN for post-development conditions (use lower CN for post than warranted)? When could this happen? (Sites B1 and B3 **– the "mistake" being in B1post**)
    a. Runoff depth or volume (Q) for post-development decreases (more absorption, infiltration per lower CN).
    (Ia is a factor in the runoff equation: Ia indicates how much absorption, infiltration and increases for post-development with lower CN).
    b. Peak flow rate (qp) for post-development therefore decreases, and once again the difference between post and existing peak flow rates decreases.
    (qu and Q are both factors in the peak flow rate equation: lower CN results in lower qu and lower Q resulting in lower peak flow rate.)
    c. Allowable release rate using Energy Balance increases (due to decreased post-development runoff depth or volume, Q.)
    d. Note also that post-development peak flow is now also lower and so indicates that less flow will need to be managed and smaller facilities will be needed.
    e. This situation could arise if CN not correctly estimated or composite across different land types/uses not correctly calculated. The allowable release rate would be higher than warranted and may not be protective to prevent erosion in this case.
5. What happens when the drainage area to an outfall increases from pre to post? When would this happen? (Sites B1 and C1)
    a. Peak flow rate for post-development increases because the site is being designed to diverting more flow to outfall with the increase in drainage area.
    b. The allowable release rate will decrease because of the increase in total runoff volume (we must account for the change in drainage area by calculating the runoff volume in ac-ft or cf rather than using the runoff depth in inches in the Energy Balance equation).
    c. Grading changes, project design, etc. will result in changes of total drainage area pre to post. This reflects a self-created condition.
6. What happens when the drainage area to an outfall decreases from pre to post? When would this happen? (Sites B1 and C2)
    a. Peak flow rate for post-development decreases because the site is being designed to divert less flow to outfall with the decrease in drainage area.
    b. The allowable release rate will increase because of the decrease in total runoff volume (use runoff volume rather than runoff depth as stated above).
    c. Grading changes, project design, etc. could result in these types of drainage area changes pre to post. This reflects a self-created condition.

B2		
	Pre	Post
Tc (min)	20	5
Tc (hr)	0.333	0.0833

CN	78	79
S	2.821	2.658
Ia	0.564	0.532
P, in	2.6	
Ia/P	0.22	0.20
qu (csm/in)*	600	975

*Use Type II rainfall distribution

2.036

2.068

Q, in	0.853	0.905
Vr, ac-ft	0.384	0.407
Fp	1	1

DA (acres)	5.4	5.4
DA (sq mi)	0.0084	0.0084

q(peak), cfs	4.32	7.41

q(allowable), cfs	3.26

qu = Unit Peak Discharge