Hydraulic Design
908-444 / 908-544

Puzzle Set 4
Due Tuesday, April 6, 2004

Puzzle Set Scenario:
A new residential development is planned along the Hot Summer Creek. The developer wants to know if excess runoff from the site will cause flooding in the development. You have already determined the geometry required to model the stream using HEC-RAS.

Assignment:

Field surveys have indicated that the Manning's n value for the main channel can be taken to be about 0.025, and for the overbanks (both left and right) to be about 0.090.

The head-discharge relationship for the downstream-most section is shown below, along with the design storms.

1. Determine the water surface profiles for the 1, 5, 10, 50, and 100-year floods. Plot the water surface profiles, along with energy grade lines.

2. Plot the cross sections, along with water surface elevations.

3. Plot a 3-d perspective view of the stream reach, for the 1-year and 100-year floods.

Design Storms and Tailwater Elevations

Storm Event	Maximum Flow (cfs)	Tailwater elev. (ft MSL)
1 year	200 cfs	52.0
5 year	740 cfs	
10 year	1100 cfs	
25 year	1450 cfs	54.8
50 year	1870 cfs	
100 year	2360 cfs	56.1