

## **Term Project Assignment for Urban Water – Water Use Patterns and On-Site Water Reuse/Conservation Opportunities and Effects on Infrastructure**

There are three study areas that student groups will examine this term:

- Rural small community (for those students taking Dr. Johnson's on-site wastewater treatment class; select the community being examined in Dr. Johnson's class)
- Downtown Tuscaloosa redevelopment area (for the other Tuscaloosa students not taking Dr. Johnson's class). There are six subareas, enough for each student; students who studied this area last term in the stormwater class will take the lead in organizing the information and making sure all have copies of available information and data. The class web site also has information posted for this area.
- North Huntsville Industrial Park (for the Huntsville students). There are four subareas, more than enough for one per student – make sure that only one area is being examined by each student. The class web site also has information about this area.

As noted, information describing the Huntsville and Tuscaloosa sites are posted on the class web site. However, you will have to obtain the other needed information for this project. As you will need to contact city personnel and others, please organize the contacts so only one person per team contacts each person (with specific questions).

This final project report needs to include the following items. These will be submitted during the term (due dates noted for each item), but the final report and presentation will consolidate all this material:

- 1) A general description of the study area you are investigating, including aerial photos from the internet, along with topographic maps. Show the area outline on the maps. Site photos will also be useful, if access to the sites is possible.
- 2) Demographic information for the area, specifically information that you are using to calculate the water use for the area. You do not have to be absolutely accurate, but you can obtain building areas, general building occupancy and in-building activities, and water use rates for the type of area from class information and other references.
- 3) Determine the water use for the area (including fire fighting water needs, outside irrigation, and in-building uses), being as specific as possible, including monthly variations, and even hourly variations, if possible. Breakdown the water use by activity, and describe the quality of water needed for that use.

**The above three items are due on March 12, 2008. You will also make a short powerpoint presentation and we will discuss on this evening. This can be a group presentation for the area being studied, as I expect each group to coordinate their data and information.**

4) How can the waters that do not need to be of pristine drinking water quality be replaced by waters of impaired quality? How can the amount of water needed be reduced through conservation? We will focus on site stormwater as a water source. Discuss human health risks associated with reuse of the various waters. Which area stormwater has the necessary quality, and how can that be made available? You will use WinSLAMM and the options for water cisterns and wet detention ponds, and the water reuse and pumped water options, to conduct continuous simulations. How much of the water can be replaced by the site stormwater? How much of the stormwater will be reduced by this on-site reuse? How much water can be reduced through conservation efforts (consider composting toilets and xeroscaping, let alone water conserving appliances, at least)? Size the water storage facilities needed to maximize reuse. Develop design curves showing how much stormwater can be reduced and how much of the on-site water needs are being met through different sizes of on-site storage and for various levels of water conservation. Consider both individual buildings and groups of buildings.

**Item 4 above is due on March 26 (however, it is recommended that you start this earlier as part of item 3). Again, presentations and discussions will be made on this evening also.**

5) Quantify the reduced deliveries of domestic water made possible through the conservation and reuse efforts described above. Can you envision a system where the cleanest domestic water is not supplied through pipes? Does trucking of water to the buildings make sense? Can on-site pond storage of water be suitable for fire fighting needs? Basically, describe the water delivery system alternatives that can be used in conjunction with the water conservation and reuse options for your area. Quantify the domestic water pipe system for the different options; size the system using EPANET; determine the amount of trucking used, etc.

6) Quantify the reduced quantities of domestic sewage made possible through the conservation and reuse efforts described above. Again, consider composting toilets, on-site treatment, and conventional (but reduced size) sanitary sewage collection systems. Size the systems using SWMM5 for the piped systems, and describe/size the alternative systems.

7) Write an overall summary of this project, considering the benefits and problems of the alternatives, and recommend a final plan for your site. You must consider human health risks as part of your analysis.

**Items 5, 6 and 7 above are due on the last night of classes, April 30**

**The “final exam” will be powerpoint presentations for your project. A group presentation is also suitable, coordinating the information. You will have 15 minutes per person. The final exam is scheduled for May 7 from 7 to 9:30 pm.**