Geodatabase Standards, Flowchart Development

Geodatabase Standards
We will establish a standard set of layers, layer names, attribute types and names for each layer, and extents for the campus projects, both each of your sub-areas, and for the entire area. We will do this at the start so that it will be easier for you all to create a seamless data set for the entire campus analysis each of you will have to do later in the semester.

Specifically, you need to provide a list of layers, and define:
- The coordinate system used by all layers
- The name, type (raster, vector poly, vector point, etc.) for each layer
- The name, type, precision, scale, and domain of all table attributes for all vector layers. By domain, we mean the range of values that each attribute can take, e.g., all positive integers for a count variable, or the values loam, sand, silt for main soil type, or all values between 0 and 1 for a variable named permeability in the landsurface polygon data layer.
- The data type for any raster layers (e.g., float, integer, nominal)
- Any topological constraints

Because you'll be independently developing data for your sub-areas, you must agree on a standard polygon layer that defines the boundaries of each of your individual project areas. I roughly sketched the location of the boundaries on the sign-up document, but this is only a rough guide, and there may be issues with it not staying within roads or other "natural" dividing boundaries. Also note that you'll each have to develop area for a specific project area, but that you should extend your development for a small buffer area around your project area so that you may reduce editing when you need to stitch the various project areas together.

Use the goals and details provided in the main project description in developing your standard, and ask questions as appropriate. Remember that our primary goals are to estimate the amount of rainwater delivered to the stormsewer system and leaving campus as overland flow, to estimate how much additional canopy will reduce storm water exports, and what are the best ways to reduce flow to acceptable levels with a given storm amount. From the description, it is clear that you'll need image, landcover, soils, vegetation canopy, elevation, hillshade, storm sewer drains, and sewer line layers. You'll also need to create some key water flow layers. All of you will have created these hydrologic layers in the terrain analysis lab in FNRM 3131/5131 or equivalent, if not, you should see one of the instructors for a review.

What other data layers might you need, or be key in the analysis?

What variable do you need for each layer?

Each of you will generate this list in an MSWord, Apple Pages, or similar format, create a pdf, and turn it in on Moodle.

You should also create an empty geodatabase that implements your proposed geodatabase, and submit that via Moodle.

We will discuss these proposed geodatabases, and create a standard, "empty" geodatabase template for everyone to use. We will likely have to modify this during processing, as new needs appear during analysis; this often happens, because it is often difficult to foresee all needs the first time you do a type of problem

Each of you will populate this geodatabase with all required data for you assigned project area. You will then do a "trial" analysis to estimate rainfall runoff from a given storm, e.g., 1", and work out your analysis methods.

Once you have determined you can estimate runoff, we will then stitch together everyone's data into one large, seamless data set, and each of you will run an analysis for the entire campus (undergraduates only work on their own study areas).
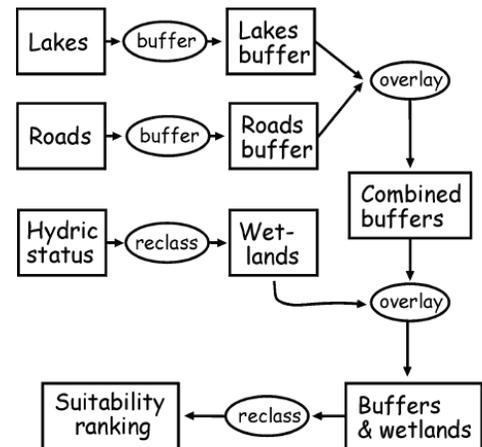
Flowchart
Each of you will also have to develop a flowchart of your intended analysis. You should give this considerable thought now. What are your starting layers for each branch of your analysis?

Below is an example flowchart from a simple problem in the "GIS Fundamentals" textbook. This flowchart selects areas that are near lakes, near roads, and not in wetlands.

The flowchart shows the data sets as rectangles and operations as ovals, and succinctly depicts the steps and their order, with intermediate layers. Some of these intermediate layers are temporary, and would be discarded at the end of the analysis, but some might be important enough to save into the final geodatabase.

On the next page is a rather more complicated flowchart, also from the GIS Fundamentals textbook. It shows a sequence of steps for solving a rather simple problem.

The problem specification for the flowchart shown on the next page is in the table below. This example problem requires areas be identified that meet a set of general criteria specified initially (left column, below), which have been turned into a set of refined criteria (right column, below). You'll need to generate a perhaps somewhat more complicated flowchart for this semester's analysis.

You may use any graphics software you wish, if you have no preference, we suggest Paraben's free flowcharting software, you can download it for home, and there is a version in the lab. Create an initial flowchart, export/print it to a PDF, and turn it in via Moodle.

General Criteria	Refined Criteria
Slopes not too steep	Slopes < 30 degrees
Southern aspect preferred	90 < Aspect < 270
Soils suitable for septic system	Specified list of septic-suitable soil units
Far enough from road to provide privacy, but not isolated	300 meter < distance to road < 2000 meters