# TSM 352 Land and Water Mgt Systems

**Drainage Lab (Due Thursday, March 5th, 2015)**

**Sizing Drainage Pipes**

1. Open MapWindow and add the following map layers from the lab07 folder.
* Drain\_Outlet • Laterals
* Main • Outline
* Soilmu\_a\_aoi • Elevation
1. Generate a contour file with 0.5 ft. contour intervals.
2. Reproject all the vector layers to UTM Zone 15(NAD 83, meters)
3. Convert (<http://www.earthpoint.us/Convert.aspx>) the lat/long coordinates below to UTM Zone 15 (NAD 83, meters) coordinates, and geo-reference the satellite map provided using the three marked locations

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| Long/Lat Coordinates |
| Top Left | -90.97297 | 39.67168 |
| Bottom Left | -90.97281 | 39.66879 |
| Middle Right | -90.96689 | 39.66975 |
|  |  |  |
| UTM Coordinates |
| Top Left |  |  |
| Bottom Left |  |  |
| Middle Right |  |  |

1. Close the project, and open a new one and load the reprojected layers. Recolor the line layers, remove the fill from the polygon layers and label the contour layer.
2. Use the Measurement Tool to determine the distance from the outlet to where each contour line intersects the main. Use this information to graph the soil profile over the main. And parallel lines 3ft. and 4 ft. below the soil surface
3. Based on your knowledge of drain layout principles, bury the main. The main should not have a slope less than 0.1%, it should **never** be shallower than 3 ft., and should be kept between 3ft. and 4 ft. deep where it is possible to do so.
4. Repeat Step 6 for each lateral, noting that the buried depth where each lateral joins the main is fixed by the depth of the main at that point.
5. Label each lateral, showing its slope and length.
6. Determine the size of each segment of pipe using the Drain Size and Capacity Sheet on the Illinois Drainage Guide. Use a 0.5” drainage coefficient. <http://www.wq.illinois.edu/dg/Equations/Drainage%20layout.xls>
7. Calculate the cost of the drainage system based on the prices below.

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| Sample Drainage Pipe Costs |
| **Item** | **Unit** | **Cost** |
| 8” plastic installed | foot | $2.93 |
| 6” plastic installed | foot | $1.81 |
| 4” plastic installed | foot | $1.28 |
| 10” PVC for 8” outlet at ditch | foot | $10.30 |
| 8” plastic Tee | each | $15.75 |
| 6” plastic Tee | each | $9.45 |
| 4” tap Tee | each | $4.73 |
| 4” lateral connection to main | each | $45.00 |

1. Write a report for the land owner, Mr. Seymour Yields, indicating what you did in nontechnical terms, including any maps and tables that you deem necessary.