



STORMWATER ASSESSMENT PROCEDURE TECHNICAL MEMORANDUM

Garrett County, Maryland
North Glade Run Watershed
Stormwater Assessment

AMT Project
15-0097.001
December 18, 2015

To: Deborah Carpenter
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GIS DESKTOP EVALUATION PARAMETER CALCULATIONS:

Several GIS provided and derived data were considered in determining subwatersheds for further analysis. In addition, data derived from field observations and citizen's feedback were also considered. Below is a brief description of each of the watershed characteristics evaluated and the GIS tools used to develop each watershed characteristic. Spatial Analyst (SA), 3D Analyst (3D), and Arc Hydro Tools (AHT) (free toolbar downloaded from <http://downloads.esri.com/archydro/archydro/>) extensions were used.

Subwatershed boundaries were developed using the watershed boundary and the contour layers. The contour layer was first masked to the watershed boundary using the "Clip" tool. The resulting contour layer underwent a series of spatial analysis in the following order: "Create TIN" (3D), "From TIN to Raster" (3D), "Fill Sinks" (AHT), "Flow Direction" (AHT), "Flow Accumulation" (AHT), "Stream Definition" (AHT), "Stream Segmentation" (AHT), "Catchment Grid Delineation" (AHT), and "Catchment Polygon Processing" (AHT).

- Hydro ID: Identification number for subwatershed. The NGR watershed was subdivided into a total of 78 subwatersheds and given a random identification number.
- Acres: Drainage area of subwatershed in Acres.

Relief as a percent was developed using the resulting DEM from the "From TIN to Raster" step above and the "Slope" (SA) tool. The statistics were extracted using "Summary Statistics" tool.

- Relief Min: Minimum ground relief of the subwatershed as a percentage.
- Relief Max: Maximum ground relief of the subwatershed as a percentage.
- Relief Range: Range of ground relief, difference between maximum and minimum in percentage.
- Relief Mean: Average ground relief of the subwatershed as a percentage.
- Relief Std: Ground relief standard deviation of the subwatershed.

The following watershed characteristics were calculated using the "Intersect" tool between the subwatershed layer and each of the parameters to be extracted. For the impervious percentage, all impervious layers (e.g. buildings, roads, driveways) were first combined using the "Union" tool. The Soil layer was downloaded from the Web Soil Survey in the NRCS website.



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- ImperPct: Percentage of the subwatershed with impervious surfaces as defined by the GIS paved and unpaved road surface, building, driveway, and parking lot layers.
- AgriPct: Percentage of the subwatershed with agricultural land use as defined by the GIS Zoning layer.
- WoodPct: Percentage of the subwatershed with wooded land use as defined by the GIS Forest Wooded layer.
- HSG A: Percentage of the subwatershed with hydrologic soil group A as defined by the NRCS GIS Soil layer.
- HSG B: Percentage of the subwatershed with hydrologic soil group B as defined by the NRCS GIS Soil layer.
- HSG C: Percentage of the subwatershed with hydrologic soil group C as defined by the NRCS GIS Soil layer.
- HSG D: Percentage of the subwatershed with hydrologic soil group D as defined by the NRCS GIS Soil layer.
- HSG W: Percentage of the subwatershed with hydrologic soil group W, water, as defined by the NRCS GIS Soil layer.
- Soil HSG: An overall numerical value that identifies the prevalent hydrologic soil group of the subwatershed. The value corresponds to the weighted average based on area of the hydrologic soils by assigning a 1 to soil type A, 2 to soil type B, 3 to soil type C, and 4 to soil type D, without considering water areas.
- Soil K: Soil erosion factor identifies the susceptibility of the soil to sheet and rill erosion by water. The K factor ranges from 0.02 to 0.69, the higher the value the more susceptible the soil is to sheet and rill erosion by water.
- SWM No: Indicates the number of stormwater management structures in the subwatershed. The number of structures is evaluated in combination with the type of structures.
- Ditch ft: Total length in feet representing the sum of the lengths of ditches in the subwatershed.
- Ditch FA: Total ditch length in feet divided by the drainage area in acres. This parameter provides information about the subwatershed ditch density.
- Ditch FRA: Total ditch length in feet multiplied by the mean relief in percent and divided by the drainage area in acres. The parameter provides information about the subwatershed ditch density with regards to the potential for flashy, high velocity, concentrated flows.
- Complaints: Number of citizen complaints/comments related to rainfall runoff problems as expressed in the returned Citizen Input Form.

Multiple rasters and layers were created in the process, it is very important to name each new raster and layer with a significant file name for ease of identification. After all the significant data was added to the subwatershed boundary layer, the attribute table was cleaned up and organized to maintain only relevant information for the analysis.