Background

**Project:** Create a comprehensive map of campus to be used for future stormwater modeling. Rainfall-runoff models show how water flows across different surfaces on campus. Modeling results will help determine optimum locations for rain gardens in order to reduce runoff.

**Why Stormwater Management?**
- **Reduces flooding** by decreasing water that flows through storm sewers and into rivers and lakes.
- **Limits soil erosion** by reducing the amount of runoff that can wash soil away.
- **Maintains high water quality** by reducing the amount of contaminants, such as fertilizers, pesticides, oils, and heat, that reach rivers.
- **Increases groundwater recharge** by limiting runoff and promoting infiltration.

**What Affects Stormwater Flow?**

- Rainwater
  - Land cover
  - Topography
  - Rainfall Intensity
  - Storm Sewers
  - Downspouts

**Runoff**

**Infiltration**

**Equipment**

1. Sokkia® Automatic level to survey elevation (± 0.5 cm).
2. Trimble® GeoXH (GPS) for sewer and downspout positions and elevations (± 10 cm).
3. Brunton compass for surveying and measuring downspout aspect.
4. Tape measure (numerous uses).
5. Stadia rod for surveying.
6. Nikon® Laser Rangefinder to measure distances and heights.

**Mapping Process**

- **Downspout** and **sewer grate** locations were recorded using the GeoXH and refined using an aerial photo taken in late 2010 and obtained from the City of Beloit.
- **Land cover** was determined using the aerial photo.
- **Elevation** was determined using the GeoXH except near buildings and beneath trees where GPS signals were poor. Surveying equipment was used in these areas.

**Result**

- **Files of spatial data compiled for campus:**
  - Storm sewers including position, shape, and size.
  - Downspouts including position, aspect, distance from building, and height above ground.
  - Buildings including name, primary use, area, and roof height.
  - Land cover including seven different surface types.
  - Elevation across campus.

**Recommendations**

- Split lawn cover type into grass, shrubs, and plantings.
- Map locations and canopy density of trees on campus.
- Improve elevation data west of Neese Theatre, north east of Campbell Hall, surrounding Morse Library, and down the hill toward Pleasant Drive and Nikki’s Cafe.

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