

# Purpose and Approach

## Deerfield Township Stormwater System Evaluation and Management Planning Study

### Purpose of Stormwater Evaluation and Planning

A storm water system evaluation and management planning study (the Study) will define how to protect Deerfield Township (Township) from existing and future stream flooding, storm sewer flooding, stream bank erosion, and water quality degradation. It is supported by a credible storm water model of the Township that can assist in developing solutions that are accurate and acceptable to the public. The Study should consist of the following:

- 1) develop an effective data collection and management approach;
- 2) develop targeted information about rainfall, flooding, and erosion to support model calibration, verification and problem definition;
- 3) develop a stormwater system model that accurately represents critical flooding and erosion issues within the Township;
- 4) build consensus around a cost effective level of service;
- 5) prepare detention rules and other policies that minimize new flooding and erosion by runoff from development and re-development projects; and
- 6) develop effective and implementable solutions to stormwater problems that address both water quantity and quality.

### Study Approach

To achieve these goals and objectives and address the program elements, the storm water drainage system within the Township must be evaluated at a level of detail that is commensurate to the types of drainage problems that need to be solved. Credible solutions to existing and projected future stormwater problems are accomplished through a coordinated approach that addresses the following major elements:

- **Data Collection.** This will entail gathering existing land cover, stream, detention facility, and storm sewer data that are available to the Township or can be collected via field inspections/surveying. Effective data collection requires planning to determine the availability and accuracy of available data and identify the minimum data needed to meet study objectives.
- **A Credible Model.** A strategic development, calibration and verification of the storm water model supports effective characterization and solution of storm water problems. A storm water model that can reproduce observed high water marks

from historic storm events and/or flows and velocities from observed storm events is deemed to be more accurate. Coupled with a public information and education program, the results and recommended solutions generated from the model are more apt to be accepted by the public.

- **Accepted Level of Service Goals.** Once this model is developed and is deemed to be accurately predicting observed storm events, consensus should be built around level of service goals for storm water management, consisting of specific design storm, flood level/extent, streambank erosion control, detention and conveyance facility design criteria, and flood plain management recommendations that could potentially be adopted Township-wide.
- **Problem Characterization.** Upon reaching consensus upon level of service goals, the next step is to evaluate the problem areas using these criteria (i.e., acceptable depth and frequency of flooding of structures, roadways, property, open space, and/or agricultural land that will occur during a storm event of design proportions).
- **Detention Rules and Policies for Future Development.** The wide storm water model can be used to establish surface runoff release rates that represent runoff from current land use conditions and which are not to be exceeded after development or redevelopment of an area occurs. This process will allow the Township to dictate to the development community what the current runoff rates are in the Township versus the development community calculating these values and providing them to the Township. This procedure will provide added protection to downstream conveyance systems and receiving streams from future flooding and erosion.
- **Capital Project Planning.** The stormwater model can also be used to develop alternative detention, conveyance, and floodplain management measures that can achieve agreed upon level of service goals. These alternatives are evaluated based upon their relative cost, benefit, and potential impacts (positive and negative) to the community and to the environment. Alternatives that address water quality and/or minimize construction within streams are evaluated for consistency with water quality and environmental protection regulations.

The elements of an effective stormwater system evaluation and management planning study may be accomplished in a single project or phased by element and/or watershed to most cost-effectively address critical issues and budget limitations. Phased approaches have the advantage of using knowledge accumulated during previous phases to target actions in subsequent phases, but may sacrifice economies of scale possible under a Township-wide study.