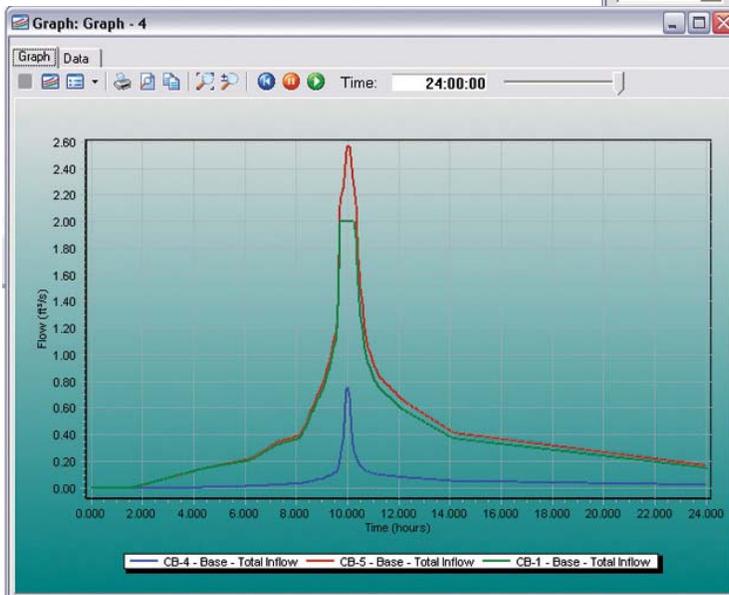


# CHAPTER 8

# STORMWATER

# MODELING



Properties Calculation Options Base Calculation Options

GU-1 100.00%

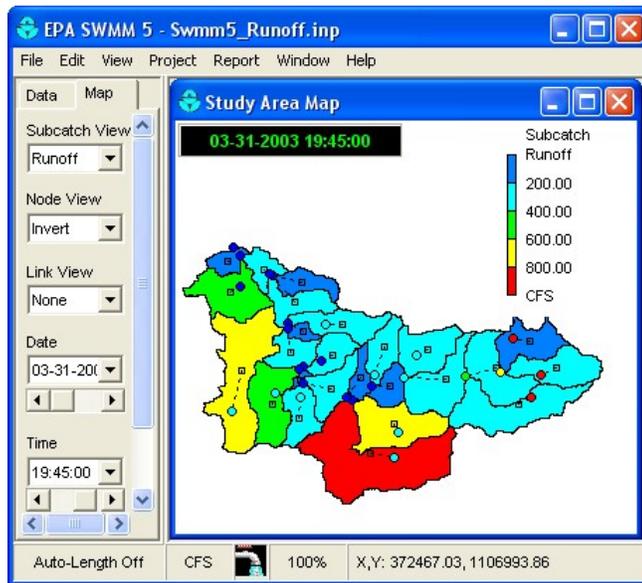
Base Calculation Options	
Calculation Options	
Time (hr)	0.03
Velocity (ft/s)	1.000
Friction Coefficient	0.700
Manning Coefficient	0.600
Time to Peak (hr)	50.00
Warm Up Time (hrs)	0.250
Method	Implicit
Time Step (hours)	Implicit
Time Step (hours)	Explicit (SWM5)
Time Step (hours)	0.025
Time Step (hours)	0.025
Multiplier	84: Pattern
Method	1.000
	Manning



## 8.01 Stormwater Modeling

Stormwater modeling is dynamic rainfall-runoff simulation used for single event or long-term (continuous) simulation of runoff quantity and quality from a given area. The proprietary system that these programs run off of is called SWMM (Storm Water Management Model). It continues to be widely used throughout the world for planning, analysis and design related to stormwater runoff, combined sewers, sanitary sewers, and other drainage systems in urban areas, with many applications in non-urban areas as well. The use of these programs will allow Collierville to improve our ability to introduce low impact development and other best management practices.

The modeling programs available take into account various hydrological processes that produce runoff from urban areas including overland flow, evaporation of standing water, and infiltration of rainfall into unsaturated soil layers. SWMM also includes flexible hydraulic modeling options to route runoff and external inflows through the drainage system network of pipes, channels, storage/treatment units and diversion structures. The programs can also estimate the production of pollutant loads associated with runoff. All of these capabilities provide a way to predict the effects of storm events, development, detention areas and any other stormwater issues the Town of Collierville might face.



Since the inception of stormwater modeling, the process has been used in many types of sewer and stormwater studies throughout the world. Typical uses include:

- design and sizing of drainage system components for flood control
- sizing of detention facilities and their appurtenances for flood control and water quality protection
- flood plain mapping of natural channel systems
- designing control strategies for minimizing combined sewer overflows
- evaluating the impact of inflow and infiltration on sanitary sewer overflows
- generating non-point source pollutant loading for waste load allocation studies



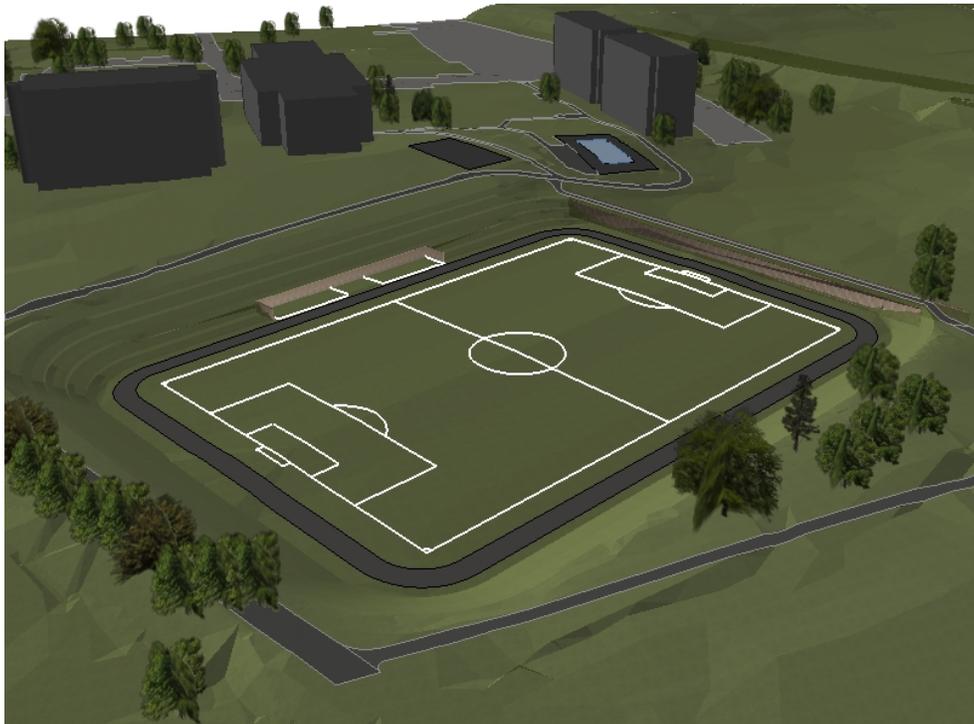
The improvements made to Lenox Bayou would drastically improve these citizen's lives. None of the homes have a finished floor elevation in the 10 or 100-year flood zone and all of the property has been taken out of the 100-year flood zone completely. Prior to these programs, the improvements made could be expected to help the situation but there would be no way to know exactly how much it would help and if more or less could be done to sufficiently improve the area.

---

### 8.03 Impacts of Incoming Developments

Another major benefit of stormwater modeling is to see the impact of incoming development. After receiving the plans for any new development, the survey data could be entered into our existing model and show the effects of cut and fill, new drainage and detention and other concerns. This would allow the town to make sure that the current citizens are protected and not put in the situation where a new development might put them in a flood zone where they have to pay for additional insurance or end up underwater in a major storm event.

In addition to the calculations done by the program, a model of the proposed improvements can be developed to allow for a better understanding of the effects to the landscape. Referring back to the Memphis example, the following picture depicts the proposed detention area incorporated into the soccer field at Christian Brothers University.



This not only shows the effects on the landscape, but it also provides a visualization of the aesthetically pleasing results these stormwater improvements can have.

The stormwater modeling programs have many uses. They can predict the impact of development, storm events, stormwater system improvements and many other situations. The Engineering Division of Collierville plans to implement a similar modeling capability that will help us predict the impacts of new developments in Town.

