CURIOSITY CREEK

WATERSHED MANAGEMENT PLAN UPDATE

(Known Conditions through October 2005)

Prepared for:

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Table of Contents

Table of Contents

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Table of Contents

LIST OF FIGURES

LIST OF TABLES

** Figures and tables are presented at the end of each chapter.*

LIST OF APPENDICES

CHAPTER 1 INTRODUCTION

1.1 Project Location and General Description

The Curiosity Creek Watershed is approximately 5.48 square miles and is located in the northwest part of Hillsborough County and in the City of Tampa (**Figure 1-1**). The northern two-thirds (approximately 3.54 square miles) of the watershed lies within the limits of Hillsborough County and is bounded by Country Club Drive to the south (Hillsborough County boundary), Interstate I-275 and Nebraska Avenue on the east, Lake Magdalene Boulevard on the north and the lakes of Magdalene, Carroll and Platt on the west. The remaining one third of the watershed lies within the City of Tampa. The system contains many small lakes, ponds and depression areas. The larger lakes in the watershed include Gass, Golden Trout, Butler, Cedar East, Cedar West, Pine, Eckles and Noreast. Lake Gass is the largest lake in the watershed and is approximately 33 acres in area. The entire watershed drains to the Blue Sink, which is a sinkhole located in the City of Tampa. **Figure 1-2** illustrates the watershed and surrounding features.

The watershed is highly developed with a few areas that have not undergone some type of land alteration. Much of the area has been developed with single-family homes that predate the 1960's. The areas near major roadways are highly developed with commercial businesses, apartment complexes and mobile home parks. The land use for these areas has been commercially oriented for decades. The drainage basin is characterized by a mostly flat topography, with high water tables, natural and man-made lakes, many ditched outfalls and few remaining isolated wetlands. As with most highly urbanized watersheds, much of the main channel system has been artificially constrained by manmade developments, culverts, and ditches connect most of the lakes.

The drainage system of Curiosity Creek can be divided into three segments, the Northwest Lake System, the Curiosity Creek Main Channel and the Forest Hills Basin. The Northwest Lake System comprises an area of approximately 530 acres. This area has been developed mostly into residential land use and contains many interconnected lakes. Runoff from the Northwest Lake System originates in the area north of Fletcher Avenue, south of Bearss Avenue and west of Rome Avenue. Most of the lakes in this system transfer flow through pipes and ditches discharging into Curiosity Creek, located approximately one-half mile north of the crossing at Fowler Avenue (Country Club Drive). It should be noted that not all of the lakes in this system (and throughout the watershed) have positive outfalls. These areas are known as "blinds" and may discharge in an out of bank condition during storm conditions. The main channel of Curiosity Creek originates at a borrow pit in the headwaters of the basin and moves through the system in generally a southerly direction until ultimately discharging directly to the Blue Sink area which is located in the City of Tampa. The Blue Sink is a sinkhole located south of Fowler Avenue (Country Club Drive) and west of Florida Avenue. The storage capacity of the sink is limited, although the flood attenuation volume has been expanded by the construction of a large pond to the south. The sink itself currently has very limited seepage characteristics and the water surface elevations within the sinkhole are controlled by a pump station operated by the City of Tampa. At present the Blue Sink has no outfall other than the pump station.

Most of the Forest Hills Basin is in the City of Tampa. However, there is an area within Hillsborough County that contributes runoff to this basin. This area includes those lakes within Hillsborough County that discharge to the Forest Hills Basin either by conveyance, or direct runoff. Round Lake, Mid Lake, and Lake Eckles are part of the Forest Hills Basin. Curiosity Creek was studied in 1982 for the Southwest Florida Water Management District, Hillsborough County and the City of Tampa in response to the severe and prolonged flooding that occurred in September 1979. This master plan was used in the development of the expanded flood storage detention area to the south of the Blue Sink (Curiosity Creek Detention Pond, FLD&E, 1987 for the City of Tampa, Project 10683.00), as well as other improvements in the watershed. The watershed within the County limit and City limit was restudied in 2001 and in 2002, respectively, to address flood protection issues since 1982 study.

1.2 Background and Scope of the Project

Hillsborough County has undertaken a program to develop or update watershed management plans for all of unincorporated Hillsborough County areas. Flood protection issues have been addressed for each of the seventeen watersheds in separate watershed management master plans (WMP), which were completed between 2000 and 2002. Since then, changes have occurred within each of the watersheds and affected the hydrologic and hydraulic features. Furthermore, change in standards and reference elevation datum has been considered. The combined changes warrant updating of the existing models used for the WMP development and associated GIS mapping.

This project is cooperatively funded between Hillsborough County and the SWFWMD's Hillsborough River Basin. Curiosity Creek Stormwater Management Plan update is a part of the County's overall watershed management program. The area of evaluation is concentrated on the watershed area within the Hillsborough County limits, which contain lakes or that actually discharge to the creek. Therefore, the Northwest Lake System and the Curiosity Creek Main Channel have gone through up-to-date modification of the 2001 model while the Forest Hills area was incorporated using the 2002 study information.

The objectives of this WMP update are to identify flooding problems under the existing condition and to perform a Level of Service (LOS) evaluation. Existing conditions are based on: the existing infrastructure and the analysis of computed water surface elevations and flows; latest aerial photographs; and latest topography and land use within the basin. Environmental Resource Permit (ERP) data and "As-Built" drawings were used to identify existing stormwater features. Unless specified otherwise, all elevations have been referenced to North American Vertical Datum (NAVD) 1988. Available land use, soils and topographic maps were employed to derive runoff parameters. Input data for the hydraulic model was then developed based on the physical characteristics of the watershed and was subsequently calibrated to known storms from the past to ensure the accuracy of the model. Updated model input includes development reflected in collected ERPs and "As Built" drawings through October 2005. The results from the calibrated existing conditions model were used to evaluate the location and degree of expected flooding within the study area under the existing conditions for the 2.33-year, 5-year, 10-year, 25-year, 50-year and 100-year design storms. The model results were evaluated to determine the existing conditions LOS for the watershed. Where possible, the output from the model was compared with historical high water marks and flooding complaints registered with Hillsborough County. Historical, documented flooding problems were given priority. Hillsborough County has a targeted LOS for the primary conveyance features that will protect homes as well as limit street and yard flooding during the 25 year 24 hour duration storm event. The calibrated existing condition model was used to evaluate results.

1.3 Data Collection

To properly describe the existing condition of the watershed, available information was compiled from a variety of sources. These data included previous studies, existing aerial photographs and topography, latest land use coverage, recent ERP and construction plans, rainfall data, historical lake stage record, stream gage data, and flooding complaints information. The following agencies were involved during the data collection:

- Hillsborough County
- Southwest Florida Water Management District (SWFWMD)
- City of Tampa (COT)
- Florida Department of Transportation (FDOT)
- Federal Emergency Management Agency (FEMA)
- United States Geological Survey (USGS)

In addition, site visits were conducted for certain areas to confirm the existing conditions within Curiosity Creek watershed.

The following is a discussion of the sources and a listing of the literature review:

Soil Survey of Hillsborough County

The soil data classifies soil types for engineering and planning purposes. This data was in the Geographical Information System (GIS) format and delivered by Hillsborough County.

Land Use

Existing land use coverage was in GIS format and provided by Hillsborough County as obtained from the Southwest Florida Water Management District. This coverage is based on the Florida Land Use Cover Classification System (FLUCCS) 1999.

Roadway Plans

Several county, state and federal roadway drainage systems were reviewed within the study area. Record drawings of these roadways were collected to obtain information on update subbasin delineations as well as identifying new conveyance features. These included:

- Florida Avenue- State Roadway
- Interstate 275- Federal Roadway
- Fletcher Avenue-County Roadway
- Bearss Avenue-County Roadway
- I-275 Widening: South of Fowler to South of Fletcher, Design Document/Design Document/ERP package, September 1998

Aerial Photography and Contour Maps

As part of this study, latest aerial photographs (2004) and 1-foot digital contours (2002) were obtained from Hillsborough County.

Existing Studies

A literature search for documents was performed to collect useful information pertaining to the study area. The literature search yielded the followings:

- Curiosity Creek Watershed Management Plan, Hillsborough County, 2001
- Curiosity Creek Watershed Management Plan Review, Southwest Florida Water Management District, May 2005
- Curiosity Creek Drainage Evaluation, City of Tampa, May 2002
- Flood in Southwest-Central Florida from Hurricane Frances, USGS, September 2004
- Hillsborough River Watershed Management Plan, Hillsborough County, August 2001
- 1982 Study

Construction Plans

Figure 1-3 illustrates the ERPs reviewed during this model update. The following construction plans of significance were obtained for the watershed area:

- Proposed Pine Lake, Roy Haynes Park & Veronica Avenue Outfalls Drainage Improvements, Reynolds, Smith and Hills Inc., 2003 (CIP#47220, 47238 & 47294)
- Hillsborough County Curiosity Creek Phase III Improvements, 2003 (CIP#47069)
- DOT I-275 Fletcher / N. US 41, 2002 (ERP# 017978)
- Ola Avenue Drainage Improvements (ERP#020980)
- Ola Avenue – 131st Avenue Drainage Improvements (ERP#027725)
- City of Tampa, N. Rome/Country Club Drive, 1992 (ERP#10249)
- Jaguar Dealership, 2001 (ERP#021553)
- Cornerstone Mini Storage, 2003 (ERP#024059)
- Georgetown Office Park, 2002 (ERP#006962)
- Napa Distribution Center Florida Ave. Tampa, 2000 (ERP#020394)
- Ed Morse Saturn Tampa, 2004 (ERP#000519)

- Amsouth Bank at Lutz/Bearss at FL crossing, 2000 (ERP#013877)

Problem Area Documentation
Documentation for the reported flood prone areas was obtained through County records. These records were in GIS format and related to the complaints and locations associated with Hurricane Frances, during the month of September of 2004. In addition, Ayres staff performed a limited document search through SWFWMD and USGS regarding this event.

1.4 Report Organization

This report is organized into six chapters describing the existing condition update within the watershed:

- Chapter 1 provides an introduction and an overview of the report along with a description of objectives;
- Chapter 2 provides an overview of the watershed including major environmental features related to stormwater management;
- Chapter 3 describes the basin's major conveyance systems;
- Chapter 4 explains the hydraulic / hydrologic model methodology;
- Chapter 5 characterizes the hydraulic / hydrologic model calibration and verification;
- Chapter 6 describes the existing conditions flood level of service along with analysis and designations.

Any questions, comments, or other inquiries regarding the content of this report or the project in general should be directed to the Hillsborough County Public Works Department, Engineering Division, Stormwater Management Section. The computer model, input/output data files, and drawings developed during the study are available, are attached as appendices of this report.

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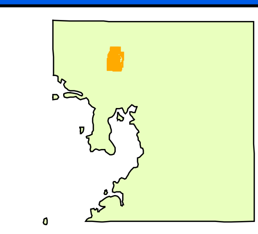


Legend

- Interstate Roads
- Curiosity Creek Watershed

Notes:

This area is used for general map note information such as map accuracy/standards, source information, elevation information, etc.

0 2 4 8 Miles

Figure 1-1: Curiosity Creek Watershed Location Map

Project: 61-0100.04

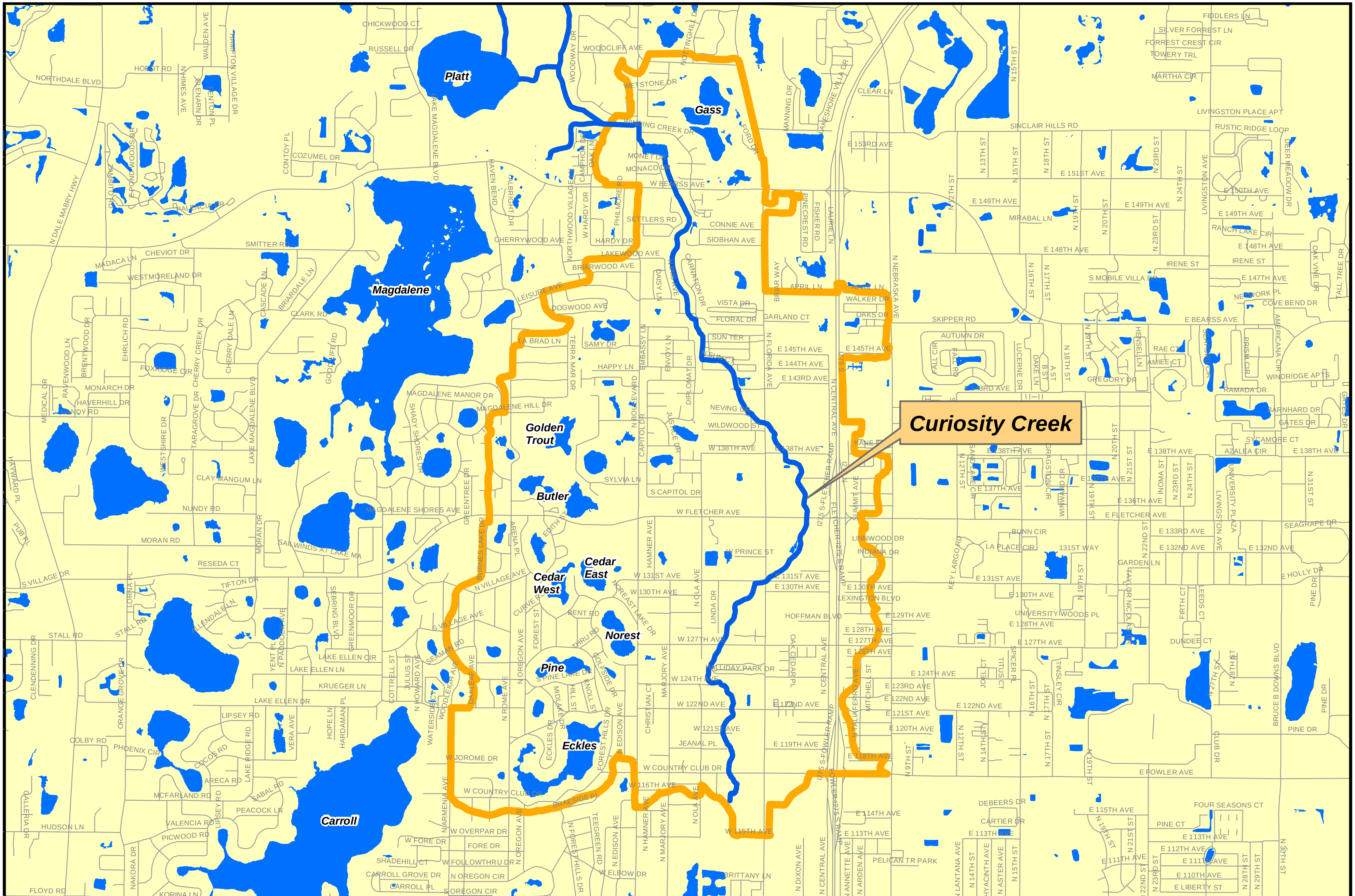
Watershed: Curiosity Creek

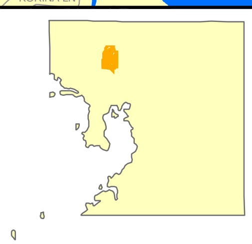
Hillsborough County:
WMP Update Program

Filename:	Map Date:	Map Prepared By:
Figure1-1.mxd	Mar. 31, 2006	Ayres Associates

Date of Photography:

N/A





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Legend

- Water Features
- Curiosity Creek Watershed

Notes:

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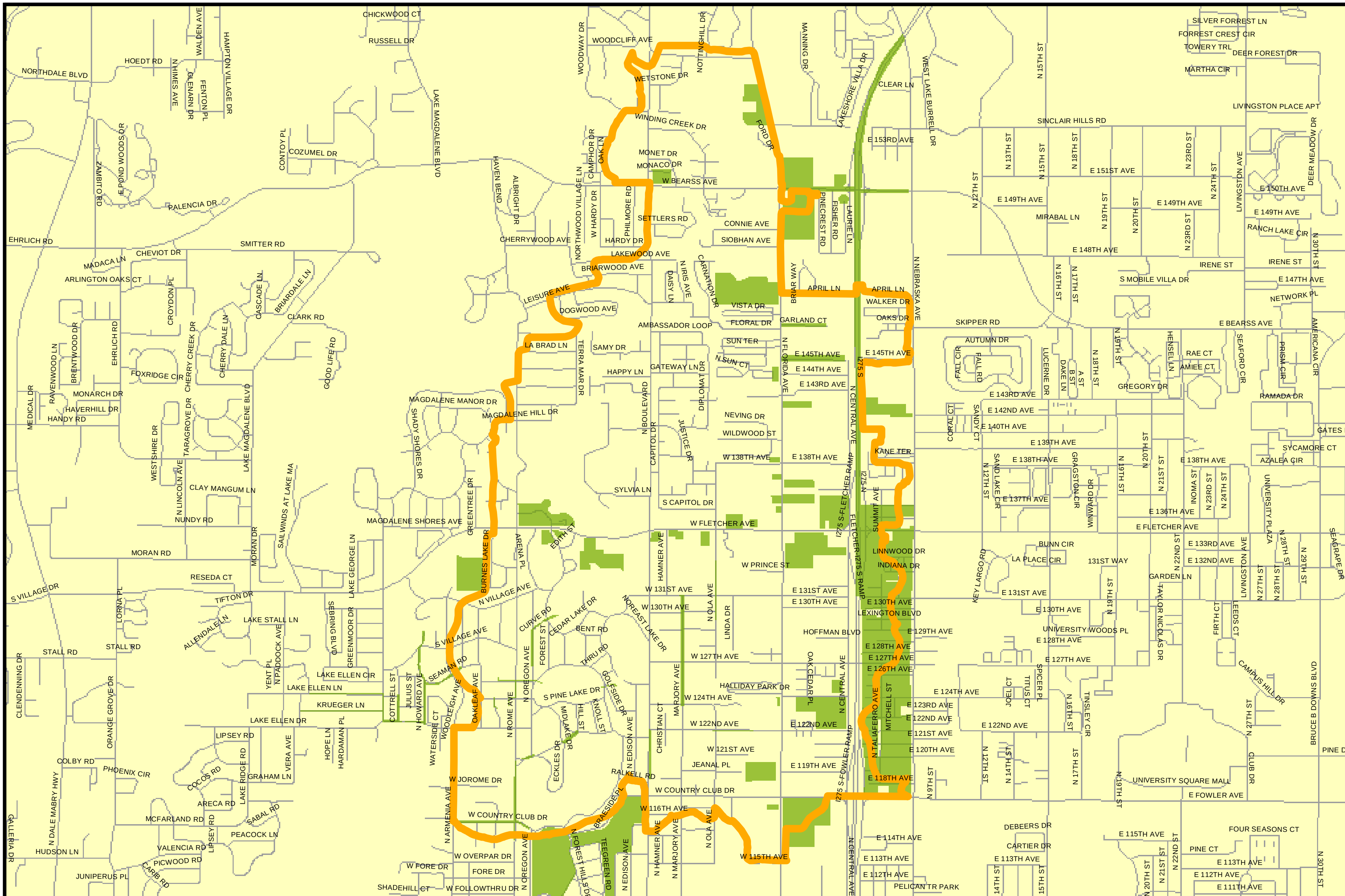
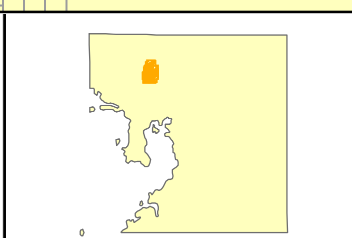
0 0.15 0.3 0.6 Miles

Figure 1-2: Watershed and Surrounding Features	Filename:	Map Date:	Map Prepared By:
Project: 61-0100.04	Figure 1-2.mxd	Mar. 31, 2006	Ayres Associates
Watershed: Curiosity Creek	Date of Photography:		
Hillsborough County: WMP Update Program	N/A		





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Legend

- ERPs_Reviewed
- Curiosity Creek Watershed

Notes:

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0 0.15 0.3 0.6 Miles

Figure 1-3: Locations of ERPs Reviewed for WMP Update	Filename:	Map Date:	Map Prepared By:
Project: 61-0100.04	Figure 1-3.mxd	Mar. 31, 2006	Ayres Associates
Watershed: Curiosity Creek	Date of Photography:		
Hillsborough County: WMP Update Program	N/A		

CHAPTER 2 WATERSHED DESCRIPTION

2.1 General Description

2.1.1 Climate

The climate in Hillsborough County can be classified as subtropical. The average rainfall for the county is approximately 50 inches per year. The rainy season generally begins in the month of June and lasts until September. The summer months are hot and humid with high temperatures in the 90's. During the summer months, late afternoon thunderstorms are common. These storms are generally of high intensity but short duration.

2.1.2 Topography

The topography of Curiosity Creek Watershed can be characterized as relatively flat. Land surface elevations vary from about 20 feet around the Blue Sink to near 70 feet above the North American Vertical Datum (NAVD) of 1988 in the northern portion of the watershed (**Figure 2-1**). This gives the basin area an average slope of approximately 0.0015 feet/feet.

2.1.3 Soils

According to the Natural Resource Conservation Service (NRCS) classification, there are 15 different types of soils that occur within the area. Hydrologic Soil Group (HSG) is commonly used for hydrologic analysis to estimate infiltration rates and soil moisture capacities. Typically, soils are grouped into four categories, A through D, with the runoff potential increasing. These groups are used in watershed planning to estimate runoff from rainfall. Soil properties that determine the group that a soil will be placed into are: depth to seasonal high water table, infiltration rate and permeability after prolonged wetting, and depth to confining layer.

A description of these groups is as follows:

- **Hydrologic Soil Group A (low runoff potential):** Soils that have high infiltration rates even when thoroughly wetted and a high rate of water transmission.
- **Hydrologic Soil Group B (moderately low runoff potential):** Soils that have moderate infiltration rates when thoroughly wetted and a moderate rate of water transmission.
- **Hydrologic Soil Group C (moderately high runoff potential):** Soils that have a slow infiltration rate when thoroughly wetted and a slow rate of water transmission.
- **Hydrologic Soil Group D (high runoff potential):** Soils having very slow infiltration rates when thoroughly wetted and a very slow rate of water transmission.

Some soils are classified as belonging to dual hydrologic groups (for example B/D, the first letter in the designation applies to the drained condition). These soils are rated as D when wet in their natural condition and can be adequately drained; drainage can improve the hydrologic soils group by at least two classes (for example from D to B).

The soil coverage is intersected with the watershed boundary in GIS resulting in the distribution of hydrologic soil groups illustrated in **Figure 2-2** and **Table 2.1**. One can conclude that 49% of the watershed is comprised of soils that classified as HSG C predominated by Zolfo Fine Sand; approximately 32% is classified as HSG A with Tavares-Millhopper Fine Sand and Tavares-Urban Land Complex as the majority; HSG B/D soils cover 11% of the watershed and consist mostly of Myakka Fine Sand; HSG D soils account for 5% of the watershed and present in Basinger/Holopaw/and Samsula Soils/Depressional.

2.1.4 Land Use/Land Cover

The existing (1999) land use coverage is obtained from the Southwest Florida Water Management District (SWFWMD) Geographical Information System database and based on the Florida Land Use and Cover Classification System (FLUCCS). Also, major ERP (Environmental Resource Permit) plans since 1999 are incorporated to update the land use. The modified existing land use coverage within the watershed is presented in **Figure 2-3**.

The Curiosity Creek Watershed is generally highly developed with a combination of residential and commercial/institutional land use around 88%. The updated FLUCCS mapping database indicates that approximately 65% of the watershed is classified as residential and 23% as commercial and institutional. Only around 1% of the watershed remains as open land. Approximately 7% of the watershed is made up of water bodies and wetlands which serve to store stormwater runoff during extreme flooding events. **Table 2.2** presents a composite breakdown of acreage and percentage for each type of land use within the watershed.

2.2 Features

The most notable natural features in the watershed area are the lakes and the channel of Curiosity Creek. The largest lakes that are totally contained within the limits of Hillsborough County are Lake Gass and Lake Butler. Lake Gass has a surface area of approximately 33 acres. Lake Butler is a smaller lake that lies to the south of Lake Gass and has a surface area of approximately 16 acres. The most notable roadway features in the study area are Florida Avenue and Interstate 275. Florida Avenue is a four-lane state highway that gives access to many commercial and residential centers in the study area

2.3 Historical Synopsis of Flooding in the Watershed

March 1960 – Heavy rains caused flooding in the Forest Hills area. Many families were forced to evacuate. References indicate that flooding also occurred during the previous fall of 1959 in the Forest Hills area.

May 1979 – Rainfall totals from May 7, 1979 were reported as 11.45 inches in 24 hours, and may have been as high as 15 inches. However, only minor and localized flooding was reported. This was attributed to the relatively dry conditions of the basin during the time the storm occurred.

September 1979 – Approximately 36 to 38 inches of rain fell in the months of August and September. Heavy rainfall (similar to that of May 1979) caused severe flooding in areas of the Curiosity Creek basin, which was already saturated from previous rainfall events. Widespread flooding of Forest Hills and the Tyrone Trailer Park forced residents from their homes.

September 1997 to January 1999 – The El Niño winter of 1997 was arguably the strongest El Niño on record. The normal total average rainfall for the month of December is 2.14 inches. December of 1997 produced 15.01 inches of rainfall, which is 701% higher than normal for that month (ref. SWFWMD Daily Rainfall Report 29-Dec-97; Regional Summary, Northwest Hillsborough). This event produced records of reported flooding problems that are mostly related to areas with no outfall or maintenance issues within the creek. These flood reports were concentrated around the lakes in the Northwest Lake System. Although there did not appear to have been any house flooding, there were reports of prolonged street and yard flooding. Ground saturation led to problems with septic systems, and concerns about well contamination.

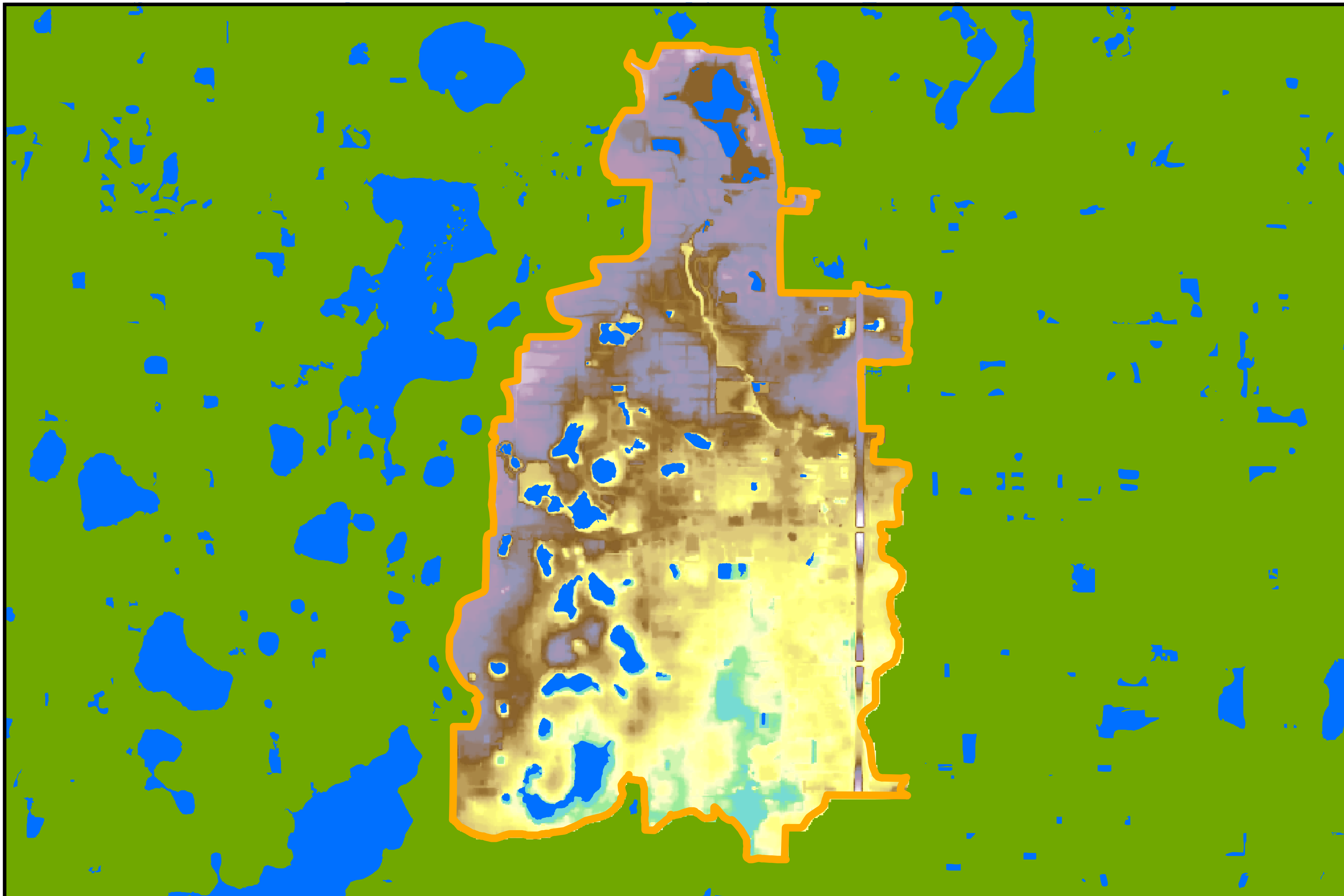
September 2004 – Hurricane Frances brought heavy rainfall and widespread flooding to southwest-central Florida September 4-14, 2004. The hurricane moved across the Florida Peninsula generating 5 to 11 inches of rain over already saturated ground. Record flooding occurred in the parts of Hardee, Hillsborough, Pasco, and Polk Counties. Based on the USGS data, a peak discharge of 205 ft^3/s and a peak stage of 35.15 ft occurred at Curiosity Creek at 122nd Avenue near Sulphur Springs. Many places within the watershed are recorded flooding, including but not limited to: W 131st Avenue, Cedar Lake, North Ola Avenue bewteen 131st Avenue and Fletcher Avenue, Forest Hill Drive, North Rome Avenue, crossing of North Bloulevard and Leisure Avenue.

2.4 Hydrogeology

Undifferentiated surficial deposits of silt, sand, and clay that vary in thickness from 40 to 70 feet underlie the Curiosity Creek Watershed area. The lower part of these deposits consists of clay, sandy clay, and clayey sand and act as a confining layer over the Floridan acquifer throughout most of the area (Stewart and Mills, 1984). The Floridan acquifer system consists of several hundred feet of limestone and dolomite formations and is separated into the Upper Floridan Acquifer, the Middle Confining Unit, and the Lower Floridan Acquifer. The formations that make up this system include in descending order, the Tampa Limestone, the Suwannee Limestone, Ocala Limestone, Avon Park Limestone, and the Oldsmar Limestone.

Groundwater flow within the surficial acquifer is generally south, but will vary locally in relation to Curiosity Creek and the many lakes and ponds in the area. Flow within the Floridan is generally to the south also, but can vary due to extensive cavity systems that occur within the upper part of the Floridan acquifer. Due to the cavernous nature of the upper limestone units, many sinkholes occur in the watershed, especially in the southern part. These include Blue Sink into which the creek discharges, and numerous other sinkholes, most of which occur to the south and east of Blue Sink. Several dye tracer studies have been performed in Blue Sink dating back at least to the 1950's. These tests have shown that many of the sinkholes are connected via underground cavities, and that the groundwater eventually discharges to Sulphur Springs in the City of Tampa. The velocity of the groundwater within these cavity systems is very high, and based on the past dye tests have shown ranged from approximately 5,000 feet/day to over 7,000 feet/day (Cardinale, 1993). However, the connection from Blue Sink to Sulphur Springs has been severely impacted over the years due to increasing clogging of the sink from erosion and sedimentation, trash, and other debris.

A general hydrogeologic cross-section of the Tampa Bay region is shown in **Figure 2-4.**



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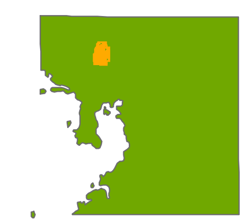

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68.0 NAVD
43.0 NAVD
17.0 NAVD

Notes:

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0 0.15 0.3 0.6 Miles

Figure 2-1: Topology Map

Project: 61-0100.04

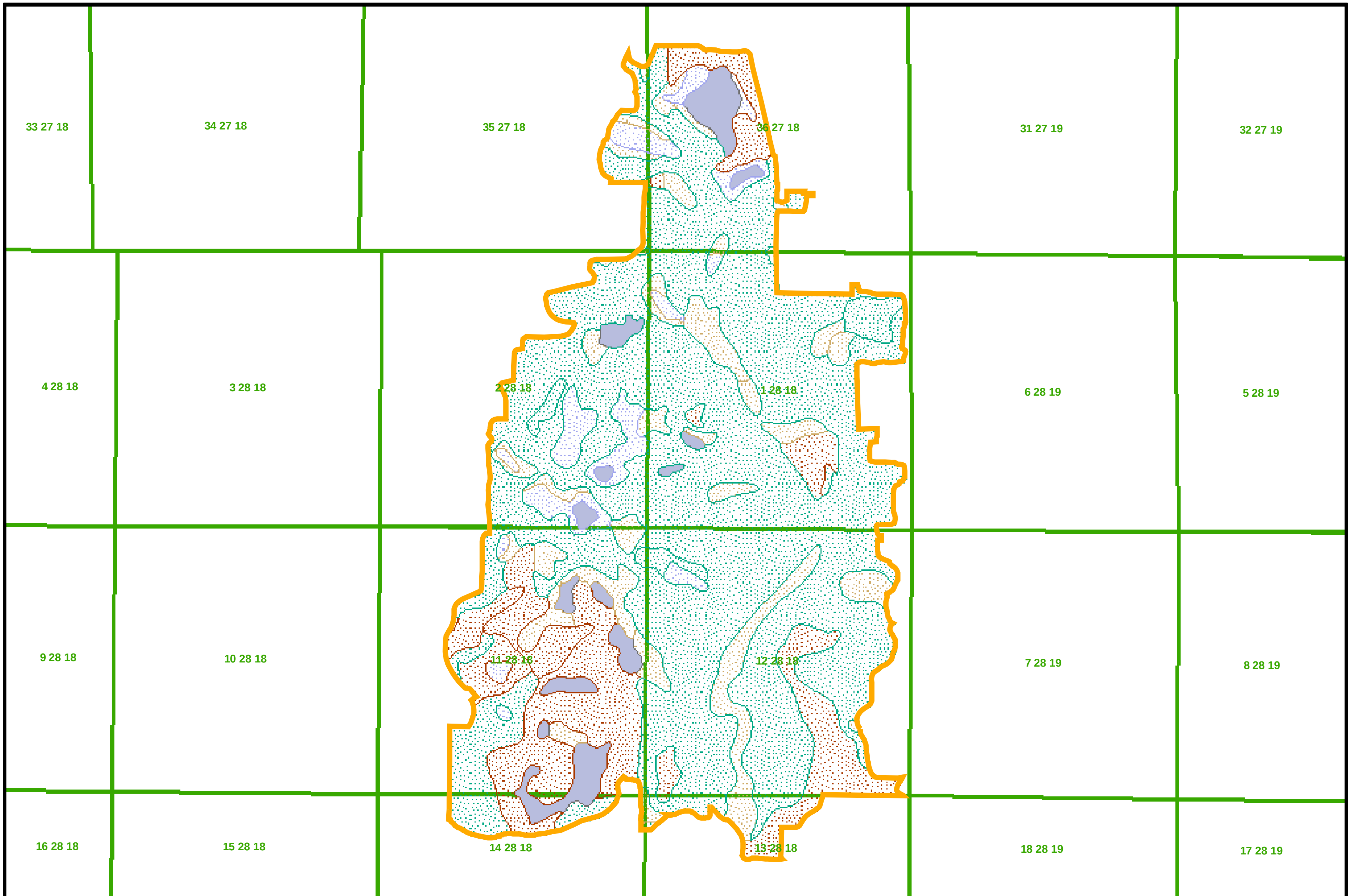
Watershed: Curiosity Creek

Hillsborough County:
WMP Update Program

Filename:	Map Date:	Map Prepared By:
Figure 2-1.mxd	Mar. 31, 2006	Ayres Associates

Date of Photography:

N/A



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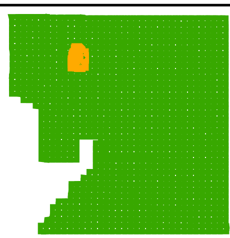

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- A
- B/D
- C
- D
- W

Notes:

This area is used for general map note information such as map accuracy/standards, source information, elevation information, etc.

0 0.15 0.3 0.6 Miles

Figure 2-2: Hydrologic Soil Groups

Project: 61-0100.04

Watershed: Curiosity Creek

Hillsborough County: WMP Update Program

Filename:	Map Date:	Map Prepared By:
Figure 2-2.mxd	Mar. 31, 2006	Ayres Associates

Date of Photography:

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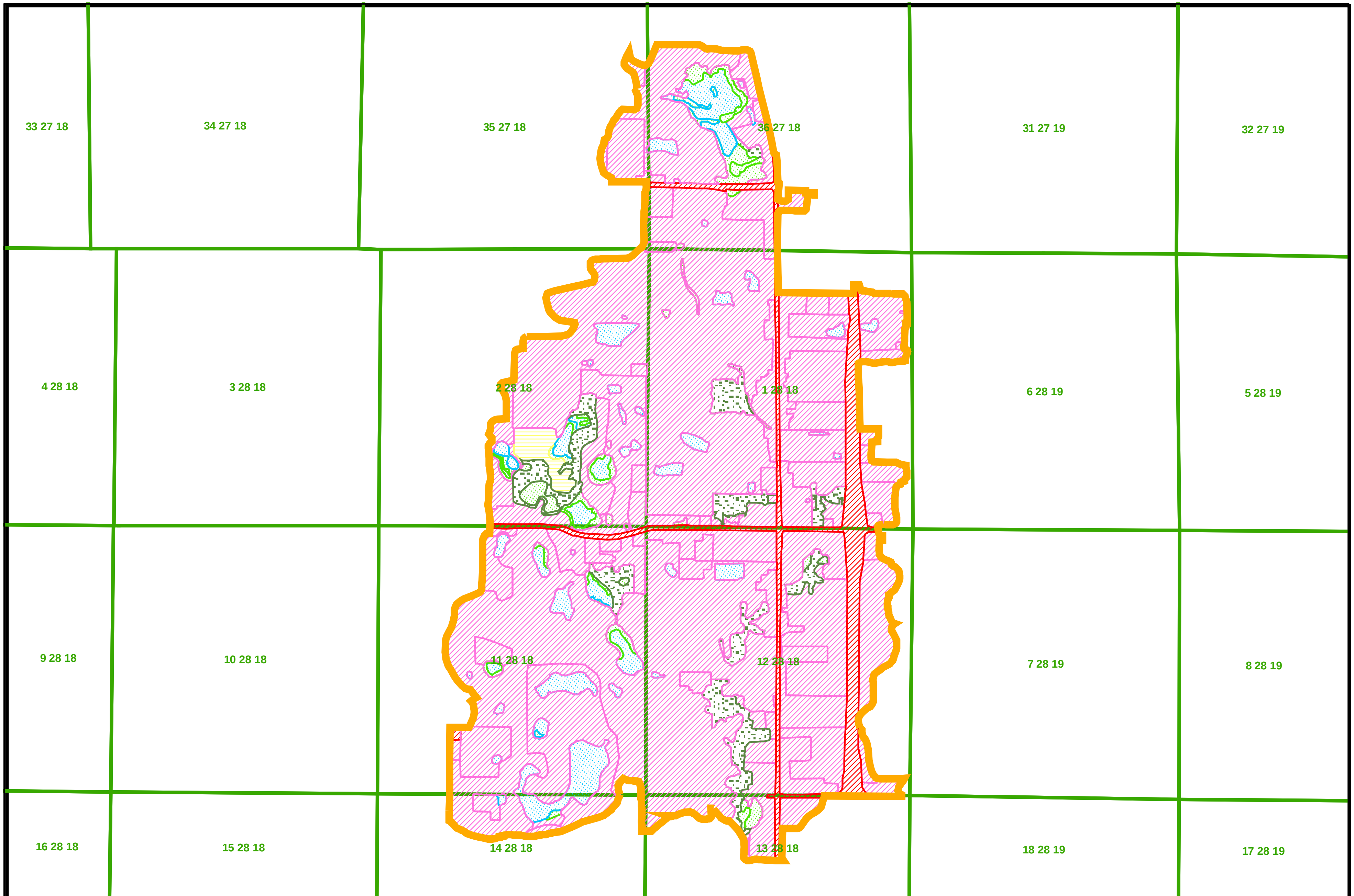

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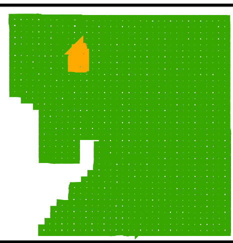

Legend

- Urban and Built-Up
- Agriculture
- Rangeland
- Upland Forests
- Water
- Wetlands
- Barren Land
- Transportation
- Special Classifications

Notes:

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0 0.15 0.3 0.6 Miles

Figure 2-3: Updated SWFWMD 1999 Land Use/Land Cover

Project: 61-0100.04

Watershed: Curiosity Creek

Hillsborough County:
WMP Update Program

Filename:	Map Date:	Map Prepared By:
Figure 2-3.mxd	Mar. 31, 2006	Ayres Associates

Date of Photography:

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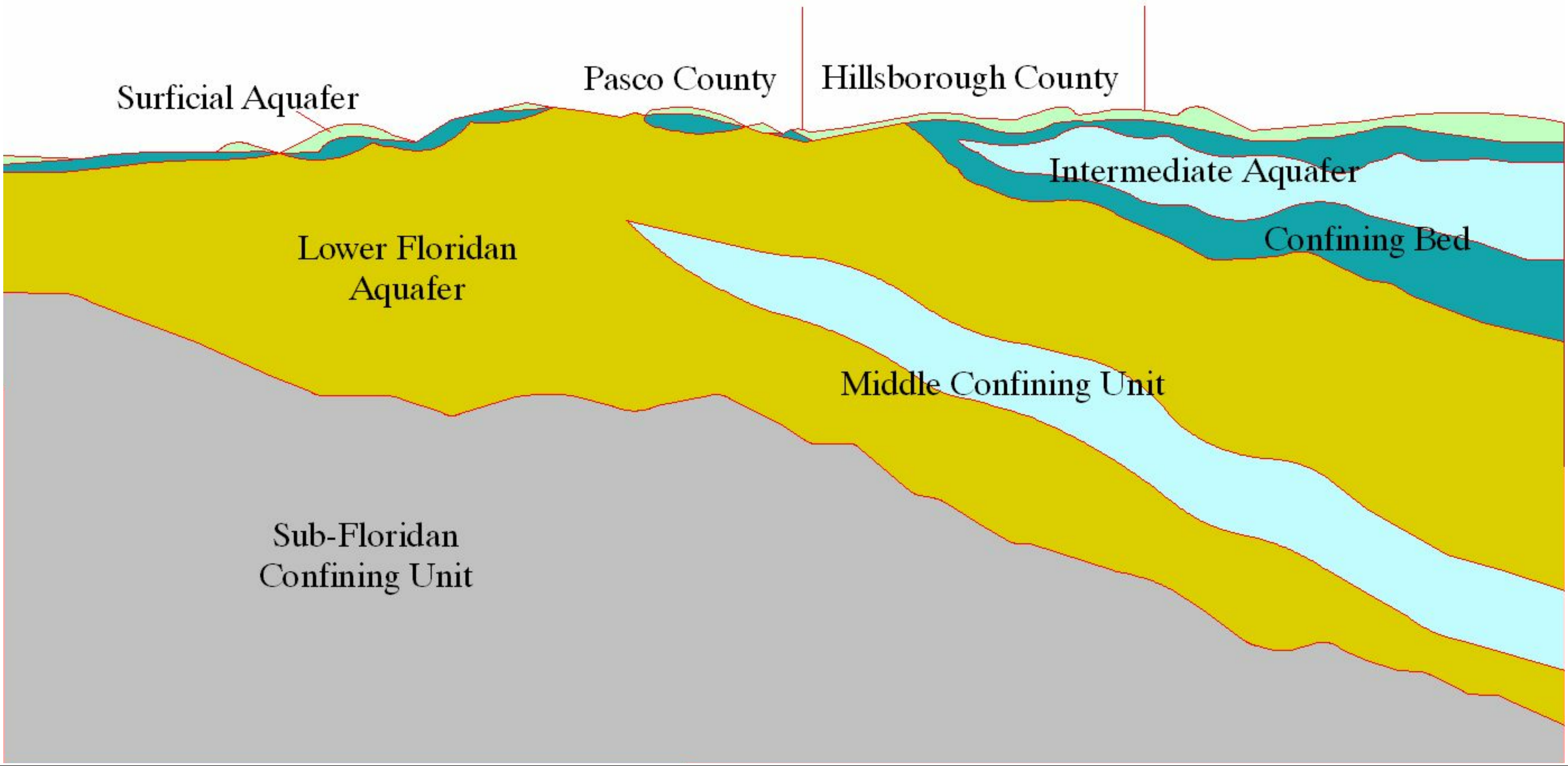

Curiosity Creek Watershed Management Plan Update

SWFWMD Hydrogeologic Cross-Section

Figure 2-4

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TABLE 2.1 Summary Statistics of Soils Information

Hydrologic Soil Group	Area (acres)	Percentage
A	1118.34	32%
B/D	382.54	11%
C	1723.64	49%
D	180.28	5%
W	102.08	3%
Total	**3506.88**	**100%**

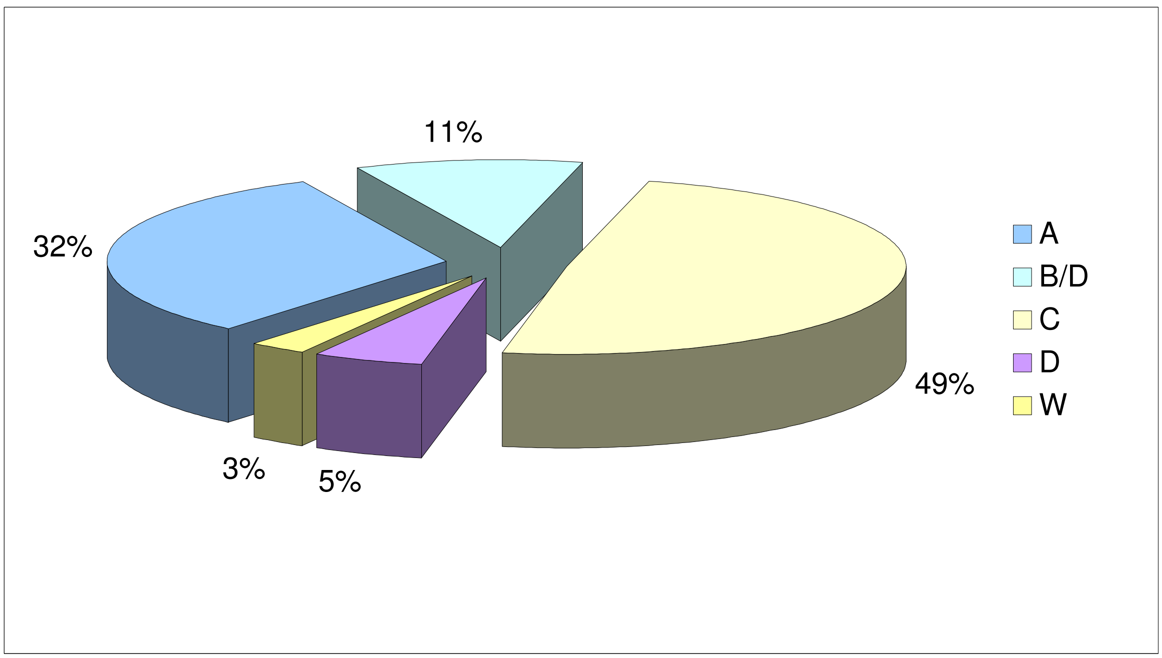
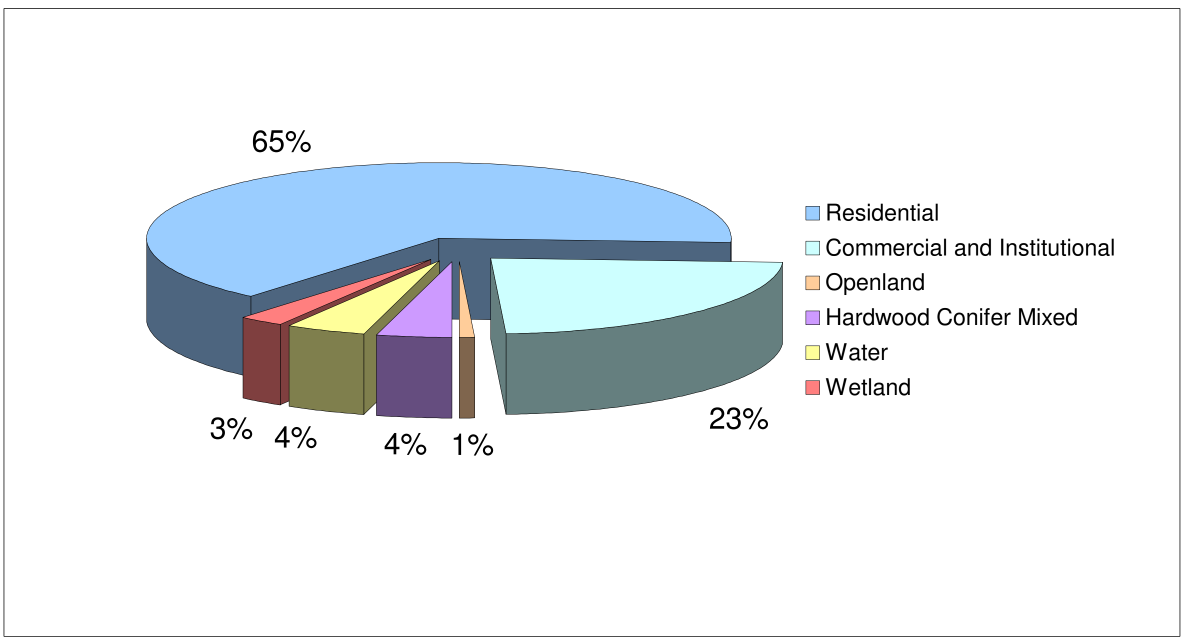


TABLE 2.2 Summary Statistics of Land Use/Land Cover

Land Use/Land Cover	Area (acres)	Percentage
Residential	2269.81	65%
Commercial and Institutional	817.91	23%
Openland	28.97	1%
Hardwood Conifer Mixed	143.00	4%
Water	157.41	4%
Wetland	89.78	3%
Total	**3506.88**	**100%**



CHAPTER 3 MAJOR CONVEYANCE SYSTEM

3.1 Introduction

The purpose of this chapter is to describe and define the area of analysis presented in this report. The major conveyance areas of the Curiosity Creek Watershed area are as follows:

- The Northwest Lake System
- The Curiosity Creek Main Channel
- The Forest Hills Basin

Figure 3-1 illustrates the major conveyance systems of the watershed.

3.2 The Northwest Lake System

The system of lakes lies in the northwest section of the watershed. It is bounded by Leisure Avenue to the north, Rome Avenue to the west, North Boulevard to the east, and to the south by Pine Lake and Village Drive. The total drainage area for this portion of the watershed is approximately 530 acres. The major lakes in the system are Golden Trout, Butler, Dorset, Cedar West, Cedar East, Noreast and Pine.

The upper most lake in the Northwest Lake System is Lake Golden Trout. This lake is approximately 6 acres and discharges to an unnamed lake that is located to the southeast of Golden Trout. Lake Golden Trout does not have a stormwater control structure to regulate water levels. At stages above elevation 44.97 feet NAVD, this lake will discharge in an overland manner to the unnamed lake. Water from the unnamed lake discharges through a 24-inch Corrugated Metal Pipe (CMP) to Lake Butler. This lake has a control structure and delivers excess runoff through a pipe system under Fletcher Avenue to a small lake immediately to the south. There is a series of small lakes with interconnected pipes that ultimately, deliver water to Lake Cedar East. From Cedar East, water is discharged through a pipe to Lake Noreast that is located to the southeast. Lake Noreast has a set of discharge pipes that are connected to Curiosity Creek.

Lakes Dorset, Cedar West, Pine, Sophia, Burnes, Pine Pond, as well as several other unnamed lakes, are all land locked water bodies with no outfall. These lakes accumulate rainfall during the wet months and have historically been slow to recover. Toward the end of the rainy season many of these lakes have lost considerable storage volume due to the compounding of storm events. It is at this time that the system has the greatest potential for flooding.

3.3 The Curiosity Creek Main Channel

3.3.1 The Main Channel

The headwater of Curiosity Creek begins at a small pond north of Bearss Avenue and east of North Boulevard. Historically, the headwaters were connected to the Sweetwater Creek watershed at a point somewhere between Lake Platt and Lake Magdalene. This connection appears to have been severed sometime in the late 1950's. From the small pond, the channel flows southeast and passes under Bearss Avenue. This section of channel is straight and has steep sideslopes, with a flat bottom, and is typical of urban ditch conveyance systems. After Bearss Avenue the channel receives discharge from Lake Gass and Lake Blue Gill. This runoff is discharged to the creek through an 18-inch RCP (Reinforced Concrete Pipe) and enters the creek from the east at a point about 500 feet south of the Bearss Avenue crossing.

The channel continues to flow to the south and enters an area bounded by residential land use. This portion of the creek widens and has been excavated. The system is mostly straight, and is wet, with very little apparent flow during the normal condition. The survey of this portion of the creek indicated that the depth of the water in some areas under normal conditions was approximately 6 feet. The channel vegetation is made up of wetland type species and is very heavily saturated with algae. The sideslopes are steep and there is evidence of erosion. This section of the channel has a silty bottom. The creek continues to flow to the southeast until after it crosses under the roadway of Floral Drive.

At a point approximately 500 feet downstream of the Floral Drive crossing, the creek turns due south. This appears to be an unnatural change in direction. There is a mobile home community at this location, which altered the creek as a result of development (Hydrologic Investigation and Stormwater Management Plan for the Curiosity Creek Watershed; Reynolds, Smith and Hills 1982). The creek follows the western edge of the development and turns sharply to the east passing through the mobile home community. This portion of the channel is well maintained. The difference in elevation from the top of bank on the right to that on the left is approximately 5 feet. The contour maps, which predate the portion of the development to the south, indicate that this large difference in elevation is a natural condition and not totally the result of fill. It also appears that the mobile homes that are to the north of the channel may be located within the floodplain limits.

After passing under a private roadway within the mobile home community, the creek turns again to the south. It is bordered to the east by the berm of a FDOT stormwater detention pond. This pond serves the roadway of Florida Avenue and discharges through a pipe system to a point immediately upstream of the crossing at Curiosity Creek and Florida Avenue (north crossing). The creek continues to flow toward the southeast and passes under a private dirt drive. Approximately 200 feet downstream of the dirt driveway crossing, the creek flows adjacent to a non-regulated dumping site. Field reconnaissance did not determine the exact nature of the debris but it appears to be comprised of construction and non-garbage related materials. The channel in this portion is straight with a silty bottom and has sideslopes that are vegetated with small brush and trees.

The channel continues to flow to the southeast and eventually passes under Florida Avenue through twin 7-foot by 3.5-foot box culverts. Downstream of the Florida Avenue crossing, the channel takes on a more natural appearance. The channel begins to meander and is very incised and is narrower than the upstream sections. This configuration continues as it flows through an apartment complex development and toward the crossing at 138th Avenue. The creek begins to turn due south after passing under 13th Avenue where another FDOT roadway detention pond for Florida Avenue discharges to the system. This was the location of a USGS gaging station from 1981 to 1988.

The system continues and passes under Fletcher Avenue via twin 7-foot by 6-foot box culverts. These box culverts are set very deep. The culvert inverts at Fletcher Avenue are approximately 4.6 feet deeper than the next downstream structure (driveway crossing for an automobile dealership) and approximately 5.1 feet deeper than the next upstream structure (138th Avenue). The channel bottom, in the vicinity of the Fletcher Avenue crossing, is approximately 4 feet higher than the inverts of the box culverts.

After passing under Fletcher Avenue, the channel straightens again and passes under two driveway crossings. The first is a driveway crossing for an automobile dealership and the second is a driveway crossing for a mobile home community. It is interesting to note that the structure under the upstream driveway (the dealership) utilizes a 4-foot by 9-foot box culvert while the downstream driveway structure (the mobile home community) utilizes 3-foot diameter CMP with a cover of less than 1 foot. It would generally be expected that the smaller pipes in a conveyance system would be found upstream as flow generally increases in a system from upstream to downstream. The creek at this point begins to turn to the southwest. The sideslopes are rather steep with little vegetation in the actual bottom, but the channel is vegetated with brush and trees along the top of bank. The system then passes under Florida Avenue at 131st Avenue via twin 72-inch RCP's. Downstream of the southern Florida Avenue crossing, the channel appears to have been altered and the flow area encroached upon by fill. It is noticed that approximately 200 feet downstream of the Florida Avenue crossing, are the remains of a washed-out road crossing mentioned in the 1982 RS&H study as existing and apparently functional at that time. A field visit conducted by Ayres staff indicates that the road crossing is now abandoned. Also, the "nearly totally exposed 60-inch RCP in the streambed" mentioned in the original report does not exist anymore.

Between 131st Avenue and 122nd Avenue the stream receives discharge from two additional systems. The first is a FDOT detention pond that is located north of 131st Avenue and south of Fletcher Avenue. This pond receives runoff from both Fletcher Avenue and Florida Avenue. The second is the Northwest Lake System that discharges to Curiosity Creek through a 36-inch RCP from Noreast Lake at a point approximately 2300 feet north of Country Club Drive. This section of the creek system has several crossings ranging from small wooden footbridges to driveway crossings. All of these crossings appear to be privately owned and constructed. There are some older mobile home communities existing in very close proximity to the top of bank of the creek. Much of the creek system appears to have been constrained by development.

Downstream of the crossing of 122nd Avenue the channel is well vegetated with a rather narrow bottom width (approximately 7 feet). The creek passes behind many private residences as it flows in a southerly direction to Country Club Drive. At Country Club Drive the creek receives direct runoff from Florida Avenue and the adjacent residential areas. The creek delivers runoff to the Blue Sink south of this location. When the Blue Sink exceeds its retention capacity it discharges over an earthen berm of over 80 feet in width to a large retention facility owned by the City of Tampa. The retention area also receives runoff from the basin containing Forest Hills. 21.17 feet NAVD is the overflow elevation per the City of Tampa Curiosity Creek Drainage Study by URS.

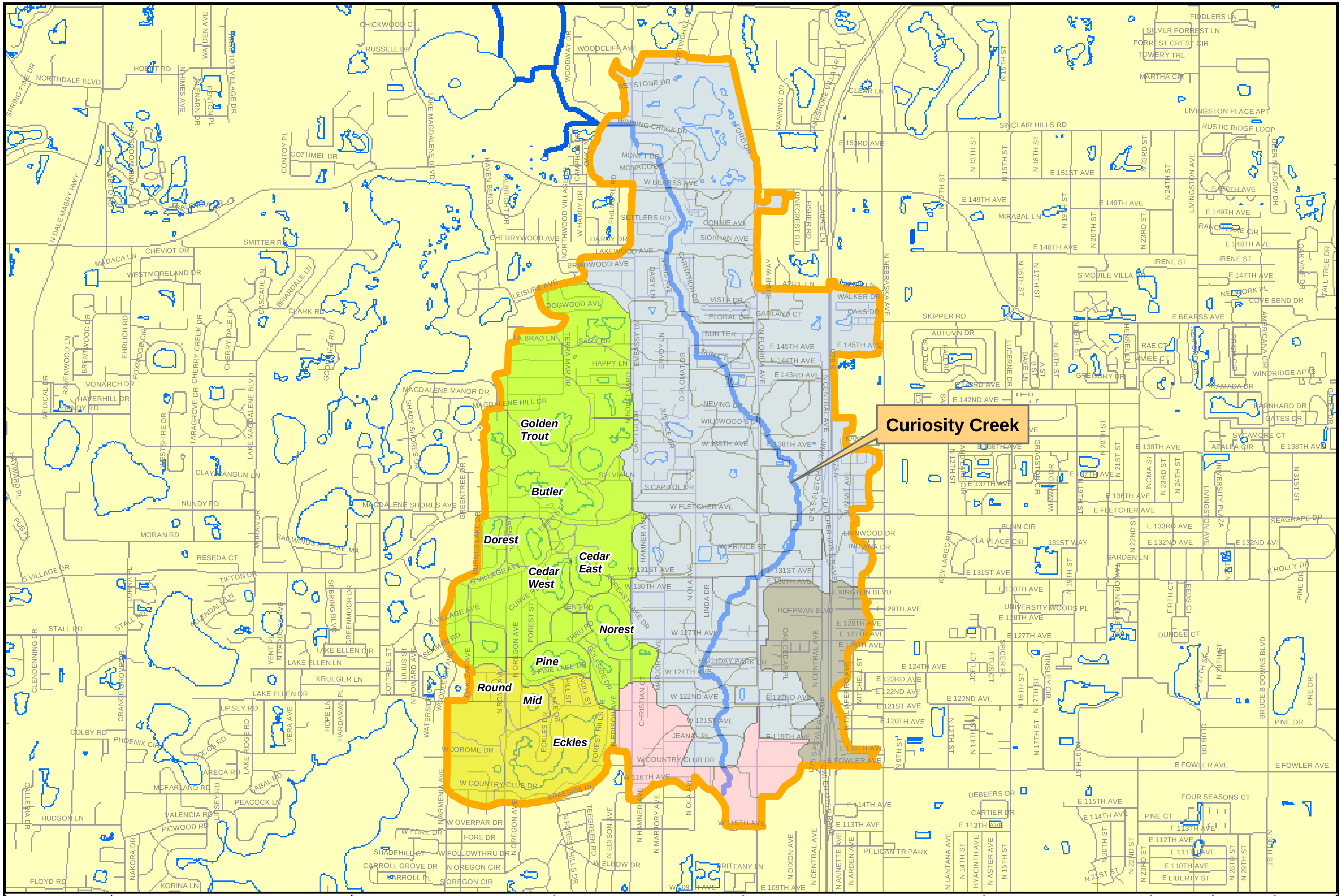
A summary of the main channel conveyance features is shown in **Figure 3-2** and **Table 3.1**.

3.3.2 Tyrone Mobile Home Park Area

The Tyrone Mobile Home Park area lies north of Fletcher Avenue and west of Florida Avenue. This area includes the mobile home park and the five lakes and ponds that store runoff from the adjacent basins. This area does not have an outfall. Runoff from the surrounding area drains into the small retention area within the park. The capacity of this small pond is quickly diminished and subsequent flooding occurs. The lakes adjacent to the mobile home park also do not have the ability to adequately store flood volume. Therefore, when these adjacent lakes exceed their ability to store water they overtop and discharge floodwater over the roads and into the mobile home park, where the natural depressional storage for this area is located. The pond on Arkwright Street (north of the Tyrone Mobile Home Park) also lacks sufficient volume to store significant storm events, and therefore, will also overtop and contribute to the flooding being experienced at the mobile home park. Should the capacity of the storage volume in this area be exceeded, Fletcher Avenue may be overtopped and flood water will sheetflow to the south and into the FDOT retention pond that is south of Fletcher Avenue. Flood stages must reach an approximate elevation of 43.67 feet NAVD before the overtopping of Fletcher Avenue is possible.

3.4 Forest Hills Basin

The Hillsborough County portion of the Forest Hills Basin contains Lake Eckles, Mid Lake, and Round Lake. In addition, there is a small area to the north of Country Club Drive and west of the main channel of Curiosity Creek that discharges through a collection system to the south side of the crossing of Country Club Drive and Curiosity Creek. Round Lake is landlocked but may discharge floodwater (overland) to Mid Lake. Mid Lake is southeast of Round Lake and has a pipe connection to Lake Eckles. Lake Eckles is also a land locked water body that has experienced flooding due to a lack of an adequate outfall. This lake is split by the political boundaries of Hillsborough County and the City of Tampa. At the present time, a pump station operated by the City of Tampa maintains water elevations on the lake. Lake Eckles has a high out of bank overflow to the south at approximate elevation of 34.67 feet NAVD. Should the lake overflow, it will discharge to Penalty Lake to the south which is located within the City limits.



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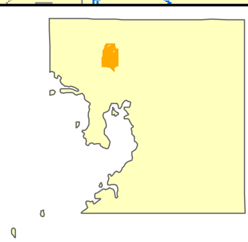


Legend

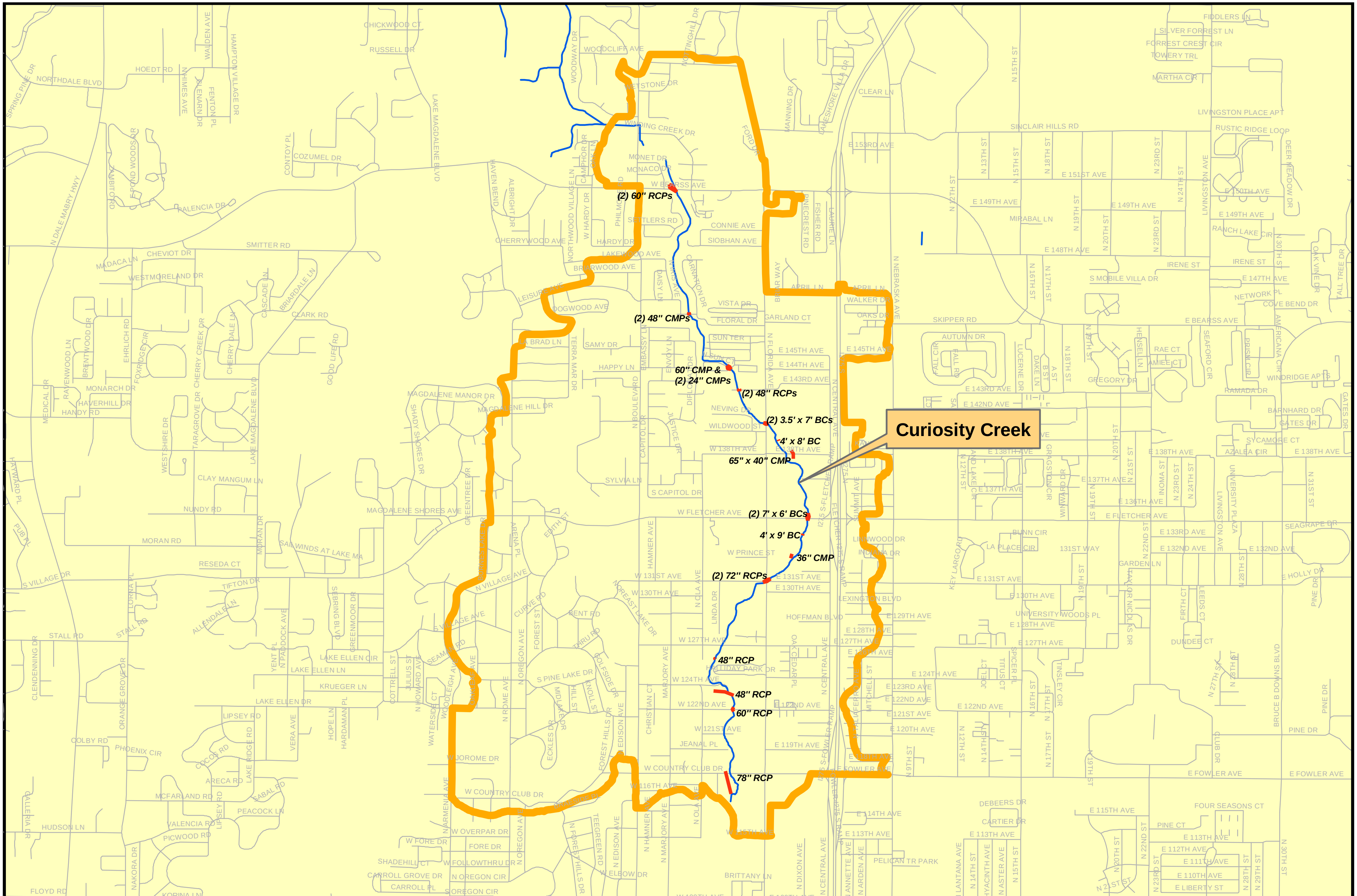
- Northwest Lake System
- Curiosity Creek Main Channel
- Forest Hills Basin
- Not in County Jurisdiction
- Non-Contributing Subbasin

Notes:

This area is used for general map note information such as map accuracy/standards, source information, elevation information, etc.

0 0.15 0.3 0.6 Miles

Figure 3-1: Major Conveyance System	Filename:	Map Date:	Map Prepared By:
Project: 61-0100.04	Figure 3-1.mxd	Mar. 31, 2006	Ayres Associates
Watershed: Curiosity Creek	Date of Photography:		
Hillsborough County: WMP Update Program	N/A		



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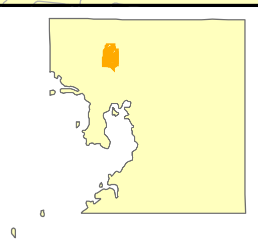


Legend

Major Conveyance Features

Notes:

This area is used for general map note information such as map accuracy/standards, source information, elevation information, etc.

0 0.15 0.3 0.6 Miles

Figure 3-2: Major Conveyance Features of Curiosity Creek Main Channel	Filename:	Map Date:	Map Prepared By:
Project: 61-0100.04	Figure 3-2.mxd	Mar. 31, 2006	Ayres Associates
Watershed: Curiosity Creek	Date of Photography:		
Hillsborough County: WMP Update Program	N/A		

TABLE 3.1 Summary of Major Conveyance Features of Curiosity Creek Main Channel

Model Reach ID	Description	Length (ft)	Manning n	Inv. Upstream	Inv. Downstream
1550100	78" RCP at Country Club Drive	40	0.013	18.45	17.89
1550300	60" RCP at 122nd Avenue	33	0.013	24.04	23.95
1550500	48" RCP at Dirt Road	20	0.013	27.78	27.71
1550700	48" RCP at Dirt Road within Tyrone MHP	20	0.013	27.85	27.56
1550900	(2) 72" RCP at North Florida Avenue and W 131st Avenue Crossing	152	0.013	30.90	30.68
2550900		152	0.013	31.13	30.70
1551100	36" CMP at Dirt Road within a MHP	21	0.024	35.47	34.55
1551300	4' x 9' Box Culvert at an auto dealer	54	0.013	34.58	34.87
1551400	(2) 7' x 6' Box Culvert at Fletcher Avenue	86	0.013	30.49	30.69
2551400		86	0.013	30.45	30.67
1551800	65" x 40" CMP at 138th Avenue	51	0.024	36.70	35.65
1551900	4' x 8' Box Culvert at an apartment complex	55	0.013	37.95	37.61
1552150	(2) 3.5' x 7' Box Culvert at North Florida Avenue	83	0.013	39.49	39.72
2552150		83	0.013	39.55	39.46
1552300	(2) 48" RCP at Jennings Road	20	0.013	38.61	38.75
2552300		20	0.013	38.29	38.58
1552400	60" CMP at Sun Valley Lane within a MHP	24	0.024	39.17	39.14
2552400	(2) 24" CMP at Sun Valley Lane within a MHP	24	0.024	41.88	41.67
3552400		24	0.024	42.01	41.70
1552600	(2) 48" CMP at Floral Drive	39	0.024	39.88	39.92
2552600		39	0.024	39.91	39.87
1553000	(2) 60" RCP at Bearss Avenue	91	0.013	43.91	42.95
2553000		92	0.013	44.20	42.90

Note:

1. Elevations shown are in NAVD 88 (North American Vertical Datum); to convert to NGVD 29 add 0.83.

2. Conduits listed in this table are from downstream to upstream along the Curiosity Creek main channel.

3. MHP stands for Mobile Home Park.

CHAPTER 4
HYDROLOGIC /HYDRAULIC MODEL METHODLOGY

4.1 General Hydrologic/Hydraulic Model – Database Development

The U.S. Soil Conservation Service (SCS) Runoff Curve Number (CN) method was used to convert storm rainfall into runoff. This method uses soil and land cover characteristics to estimate runoff. The runoff hydrographs were developed using the U.S. Soil Conservation Dimensionless Unit Hydrograph Method. A modified version of the HEC-1 (U.S. Army Corps of Engineers) computer program was utilized to generate runoff hydrographs.

The inflow hydrographs were then assigned to the hydraulic model at corresponding node-basin junctions. The discharges were routed through the hydraulic system utilizing a modified version of the EPA Stormwater Management Model v4.31b (SWMM) Extended Transport Block (EXTRAN).

4.2 Hydrology

4.2.1 Hydrologic Model

The HEC-1 hydrologic computer model was modified by Hillsborough County staff to account for the flat terrain of the County. The Hillsborough County Stormwater Technical Manual specifies that a shape factor of 256 be utilized for hydrologic analysis relating to areas within the County because of the flat terrain. Therefore, the HEC-1 hydrologic model was modified to utilize a 256 shape factor instead of the 484 factor that is normally associated with this hydrologic package. An initial abstraction of 0.2 was utilized throughout the study area as the initial soil abstraction. This value was not altered during calibration. The soil storage was computed as a function of the curve number according to SCS guidelines and literature.

4.2.2 Rainfall Depth, Rainfall Distribution and Initial Abstraction

The rainfall depths used for the design events were taken from the SWFWMD isoheytal maps published in the Environmental Resource Permitting Information Manual (ERPM). The rainfall depths shown are for the 24-hour event (see the chart below):

Storm Event – 24 hour Duration	2.33-year	5-year	10-year	25-year	50-year	100-year
Rainfall Depth (inch)	4.5	5.6	7.0	8.0	10.0	11.0

The design storm events utilized the SCS Type II Florida Modified rainfall distribution as specified by Hillsborough County and by the SWFWMD.

4.2.3 Subbasin Delineations

The determination of the subbasin boundaries within the watershed was made on the basis of the existing physical features such as the drainage areas (topography), storage areas and conveyance elements (pipes, control structures etc.), which make up the system network. A number of sources of information were used to define the individual subbasins based on this network. The main source was the SWFWMD 1-foot contour aerial topographic maps (1"=200' scale). The SWFWMD aerial contour mapping used in the development of the subbasins for the Curiosity Creek Watershed Management Plan are dated 1981. This information was used to determine most of the subbasin delineations and the overland connections between subbasins. During the model update, Ayres staff collected most latest aerial photographs and 1-foot digital contours, as well as major ERP plans ("As-Built") of new developments and roadway projects within the watershed since 1999, to verify and update the delineations from the original model.

In some instances, development or re-development have occurred after the date of completion of the original model. Development in the watershed sometimes resulted in the construction of stormwater ponds, or additional conveyance features (pipe systems gutters, ditches, etc.) which potentially altered the indicated flow patterns as determined from the aerial contour maps. In these cases, construction plans (when obtainable) were used to assist in updating the subbasin delineations, by taking into account land use alteration activities. Available data used to assist in the development of the subbasin delineations included State and County roadway plans, private development plans, and County inventories of stormwater collection systems and road crossings. A limited review of the permitted activities on file with the SWFWMD and the Hillsborough County Planning and Growth Management Department to evaluate potential developments of significance was also performed.

In addition, a limited field verification of the subbasin delineations was conducted to resolve conflicting information from data sources, to inspect for additional large developments and for potential new large scale construction not yet permitted, to verify outer limits of the watershed area, and to resolve questions related to subbasin delineations. Most latest aerial photographs were also used as a tool to indicate potential updates of the subbasin delineations. These aerial photographs were obtained from Hillsborough County and were dated 2004. The aerial photographs indicated new constructions, land use/cover changes, additional creek crossings, and potential alterations to the drainage patterns indicated in the 1981 aerial contour maps. It should be noted that the detail of the subbasin delineations represented in this report reflect planning level functions. Should it become necessary to evaluate specific, individual developments, a higher degree of definition may be required.

A Quality Assurance/Quality Control (QA/QC) process was performed when finalizing the subbasin delineations. The Triangular Irregular Network (TIN) through GIS 3D rendering was overlaid with the delineations to resolve the potential inconsistencies, such as conflicts with ridgelines, depressions, etc.

Figure 4-1 shows the subbasin delineations in GIS environment. The file is stored as personal geodatabase (*.mdb) format, with an associated polygon attribute table. In addition, each subbasin was given a unique 6- digit character nomenclature as specified by the Hillsborough County Stormwater Management Master Plan Hydrologic and Hydraulic Model Set-Up Standard (Hillsborough County Stormwater Management Section, Engineering Division, Public Works Department, 2/11/99). The attribute table was then enhanced to include the necessary data fields to bring it into compliance with the GIS data format outlined by the Southwest Florida Water Management District Watershed Data Management System for Engineering (SWFWMD Engineering and GIS Section, January 2000). **Table 4.2** summarizes the updated hydrologic parameters for each subbasin within the watershed. **Figure 4-2** compares the subbasin delineations during the update.

4.2.4 Runoff Curve Numbers

The SCS Runoff Curve Number (CN) method was used to generate runoff from rainfall. The method estimates runoff on the basis of soil and land cover characteristics. Runoff curve numbers are related to land use and hydrologic soil group. Land use polygon, hydrologic soil group polygon, and subbasin delineation polygon coverages were overlaid utilizing GIS intersection techniques. This procedure generated unique polygons within subbasin polygons that were assigned a land-use, subbasin number and soil type. These polygons were aggregated into a weighted CN for each subbasin using a database script and a lookup table. The procedure calls for a polygon element within a subbasin to be assigned a CN value based on soil type and land use (**Table 4.2**). Based on this, a composite (area weighted) CN for each subbasin was calculated and assigned.

4.2.5 Time of Concentration

The time of concentration (Tc) is defined as the time for the runoff to travel from the hydraulically most distant point in the drainage basin to the point of interested, usually the basin outlet. TR-55 provides the methodology for calculating Tc in three types of flow regimes: sheet flow (overland flow), shallow concentrated flow, and open channel flow. The time of concentration for each subbasin was calculated based on the guidelines specified in the Hillsborough County Stormwater Technical Manual. The components that make up the travel time for each subbasin were derived from the following:

Flow Regime	**Method/Assumptions**
Overland Flow	Kinetic Wave Equation
Shallow Concentrated Flow - Paved	SCS Equations Relating Velocity to Watercourse Slope
Shallow Concentrated Flow - Unpaved	SCS Equations Relating Velocity to Watercourse Slope
Channel Flow	Assume 2 ft/sec
Pipe Flow	Assume 3 ft/sec

4.3 Hydraulics

4.3.1 Hydraulic Model

A modified version of the U.S. EPA SWMM model was used to route the hydrographs generated by the HEC-1 program through the hydraulic system. The version utilized in this study is Hillsborough County SWMM 4.31b. This version of the model employs the EXTRAN block to calculate water surfaces and flow rates as time dependent values. Modifications within the County version included provisions for assigning reach numbers to orifices and weirs, the ability to utilize elevations rather than depths above junction inverts, submergence criteria for weirs, assigning entrance and exit loss coefficients and enhancements to error trapping capability. This version required that all elliptical pipes be converted to equivalent round pipes based on cross-sectional area. Natural channel geometry is treated as a prismatic conduit with an irregular shape. This version also includes a multiplier to elongate conduits that experience instability. This preserves the original roughness coefficient data as conduits are adjusted by this factor to accomplish conduit elongation.

4.3.2 Natural Channels

The data for the channel geometry was derived mostly from the channel cross-section survey data. Natural channel reaches were evaluated for out of bank conveyance capability based on aerial photographs, field photographs of the actual channel, and field evaluations. In some cases channel cross-sections were modified to account for encroachment into the conveyance portion of the channel by buildings or other obstructions. In those cases, the portion of the channel outside of the conveyance area was treated as floodplain storage with no conveyance capability. Thus, each channel was evaluated for a friction loss that related to the roughness conditions at the bottom, and the right and left out of bank. Channel roughness (Manning's coefficients) values were evaluated from literature sources provided by Hillsborough County, sources obtained from the USGS based on Manning's coefficient studies for natural channels, and from previous experience with channel systems in Hillsborough County. Initial Manning's roughness values were either confirmed or adjusted during the calibration phase of the study.

4.3.3 Conduits

The approach used in the Hillsborough County version of the EXTRAN block to calculate friction loss in conduits differs from the original program by the EPA. The original version had an input for the friction loss coefficient that was the only basis for the total head loss in a conduit. It was necessary to adjust this coefficient to account for the other minor losses of the conduit such as entrance, exit, and conduit transitions. In addition, if a conduit experienced instability during a simulation, an equivalent conduit (elongated) would possibly have to be used. In such cases, the friction loss coefficient would again have to be manipulated to account for the additional "length" of the new conduit. The County version of EXTRAN has four additional data fields that allow the user to input entrance, exit, conduit transitions and an elongation factor. This allows for the preservation of the friction loss and the input data, and thus the Manning's "n" value represents the roughness of the conduit only. The creation of the equivalent conduit is internal to the model.

4.3.4 Storage Facilities

The EXTRAN model allows the user to input variable relationships between stage and area. These areas can represent the flood storage created by depressions, lakes, wetlands, retention/detention ponds or out of bank storage. This relationship is assigned to a specific junction within the model schematic. This storage is especially important in the Curiosity Creek Area because many areas which contain lakes experience out of bank conditions during high flow. During the model update, Ayres Associates reestablished the stage-area curves with latest 1-foot contours dated 2002. The relationship between stage and area was derived from a spatial analysis of the DEM generated through GIS Spatial Analyst rendering. These data were then input into the computer model to represent the basin storage available during storm simulations. In those cases where development occurred after the contours and aerial mapping, construction drawings were employed to estimate storage facilities. Also, a nominal storage was defined for manhole junctions where necessary to stabilize the model.

4.3.5 Weirs

The overtopping of roadways at channel crossings was simulated using broad crested weirs as the conveyance mechanism. The weir invert elevations were obtained from survey or from the SWFWMD aerial contour maps if survey data was not available. The width of the weir was scaled from the aerial contour maps. After preliminary simulations were made, the weir widths were evaluated to verify or modify these initial values. Hillsborough County specified that the weir coefficients for roadway overtopping should be 2.0.

In some areas of the watershed, broad crested weirs were used to simulate flow that may occur in an overland fashion from basin to basin. The weir invert elevations were obtained from the SWFWMD aerial contour maps. Hillsborough County staff specified that the weir coefficients for the basin-to-basin interconnections should be 1.0. The data for weir invert elevations, and widths used in conjunction with control structures were obtained from survey data, construction plans, or field estimates.

Control structure weir information was also verified with construction plans and supplemented for missing ones or new constructed ones. A coefficient of 3.2 is selected for a structure weir.

4.3.6 Initial Water Surface Elevations

The initial water surface elevations for the lakes in the watershed were obtained through several methods. On storage facilities where a control structure exists, the starting elevation was assumed to be equal to the invert of the control weir. Starting water surface elevations for lakes or water bodies that have an inlet without a weir slot or orifice were assumed to be the normal high water elevation. Starting water surface elevations for land locked water bodies were assumed to be the normal high water elevation. The initial water surface elevations at the various junctions within the Curiosity Creek Main Channel were estimated by evaluating the invert elevations of the channel bottom and conduit inverts. It was assumed that the starting water surface elevation is greater than or equal to the highest invert of the channel downstream for the junction. The minimum depth at the junctions was input as 0.10 feet. This was done for model stability.

4.3.7 Dummy Junctions and Conduits

The practice of utilizing dummy or imaginary conduits within the EXTRAN input data was done to eliminate artificial warning flags in the output files. EXTRAN generates a warning flag in the output file for any junction that does not have a conduit equal to the junction invert. It also generates a flag for any junction that has conduits whose crown is lower than the adjacent conduit inverts. For both of these cases, dummy pipes were added to the input file to keep the output files clear from warning flag clutter. The dummy conduits were noted as such in the input data files. Dummy storage areas are required at any junction that connects two or more conduits or weirs.

4.3.8 Boundary Conditions

In the previous Curiosity Creek Watershed Management Plan, the issue of a reasonable boundary condition for the study required the evaluation of best available information in conjunction with certain restrictions specified within the scope. The scope, at that time, specified that the study would be limited to the area of the watershed that is within Hillsborough County. As such, the boundary conditions at Blue Sink were simulated using varied weir lengths and discharge coefficients for differing design events derived from a 1991 USACOE report entitled "Lower Hillsborough River and Curiosity Creek Tampa, Florida; Reconnaissance Report, USACOE, Jacksonville, FL."

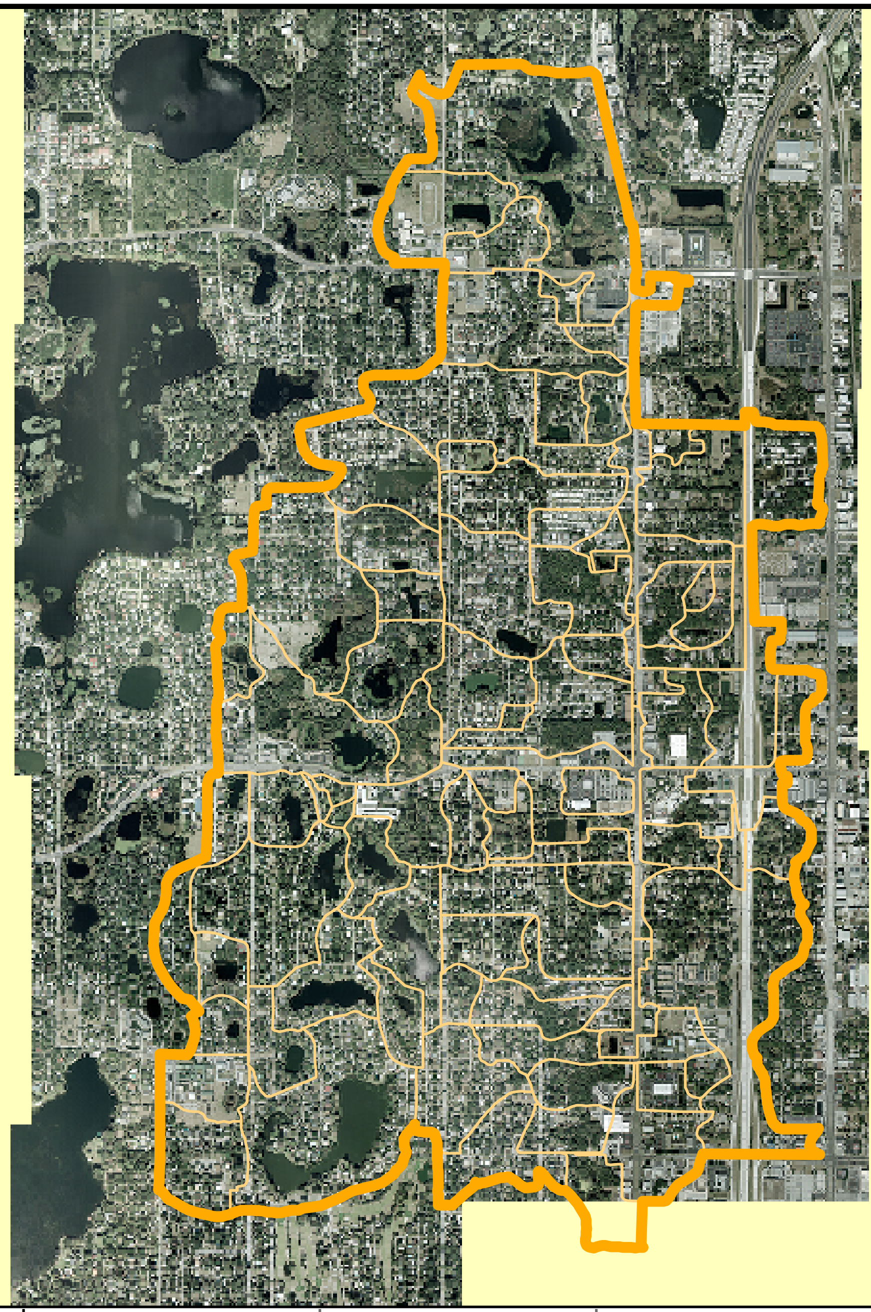
This update of the watershed management model appended the County model network with hydrologic and hydraulic details for the downstream reaches through the City of Tampa (including City operated ponds and pump stations) to the outfall at Hillsborough River. Physical data were provided from XPSWMM model input files developed as part of the City Of Tampa's 2002 study of Curiosity Creek (Curiosity Creek Drainage Evaluation, URS Corporation, May 2002). Model input parameters were translated to the County's SWMM 4.31b format and linked to the updated County watershed model. Boundary conditions at the Hillsborough River are simulated as variable stage-time conditions varying from an initial elevation of 3.17 feet NAVD to a peak elevation of 5.17 feet NAVD.

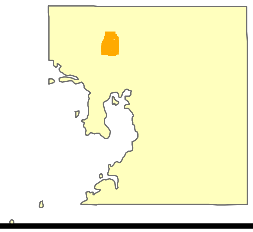
4.3.9 Numerical Instability

The Hillsborough County EXTRAN model is based on the solution of the Saint-Venant equations for unsteady state flow in open channels. These types of hydrodynamic models are subject to numeric instabilities. Producing a stable input data set many times requires the user to adjust the model input parameters. Adjustments can include the use of equivalent pipes, adjusting storage junction values, adjusting pipe slopes, modeling inlet control separately from outlet control on pipes, adjusting weir lengths, adjusting time steps, and adjusting initial water surface elevations. Experienced staff employed various combinations of techniques to achieve model stability. All changes that deviate from field conditions are noted in the hydraulic input data.

4.3.10 Model Schematic

The hydraulic model of the watershed consists of all of the features that make up the primary conveyance network. These features include lakes, wetlands, pipes, natural channels and control structures. The EXTRAN model uses a conduit junction concept to idealize the hydraulics of the system. The junctions within the model are the discrete locations within the watershed where the conservation of mass is maintained. These represent the storage and stage related elements of the model. The conduits are the connections between the junctions. These represent the flow and conveyance related elements of the model.





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Legend

- Curiosity Creek Watershed
- Subbasin Delineations

Notes:

This area is used for general map note information such as map accuracy/standards, source information, elevation information, etc.

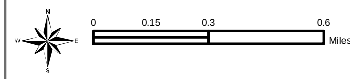


Figure 4-1: Subbasin Delineations

Project: 61-0100.04

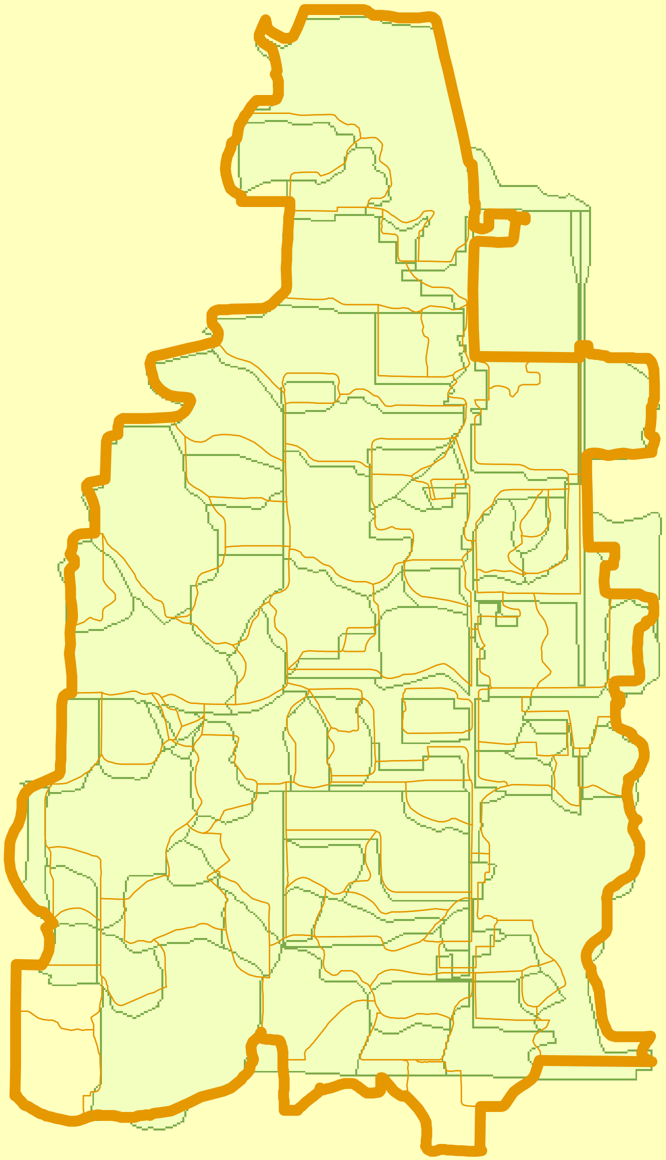
Watershed: Curiosity Creek

Hillsborough County:
WMP Update Program

Filename:	Map Date:	Map Prepared By:
Figure 4-1.mxd	Mar. 31, 2006	Ayres Associates

Date of Photography:

2004



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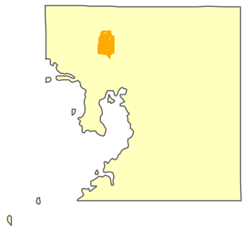


Legend

- Subbasin Delineations Old
- Subbasin Delineations New

Notes:

This area is used for general map note information such as map accuracy/standards, source information, elevation information, etc.

0 0.15 0.3 0.6 Miles

Figure 4-2: Comparison of Subbasin Delineations

Project: 61-0100.04

Watershed: Curiosity Creek

Hillsborough County:
WMP Update Program

Filename:	Map Date:	Map Prepared By:
Figure 4-2.mxd	Mar. 31, 2006	Ayres Associates

Date of Photography:

N/A

TABLE 4.1 Summary of Subbasin Hydrologic Parameters

Subbasin	Junction	Location	Area (Acres)	Time of Concentration (min)	Curve Number	Shape Factor	Initial Abstraction
550100	550100	Hillsborough County	16.38	72	87	256	0.2
550150	550150	Hillsborough County	11.29	30	91	256	0.2
550175	550175	Hillsborough County	6.55	8	78	256	0.2
550200	550200	Hillsborough County	18.29	35	85	256	0.2
550300	550300	Hillsborough County	31.73	86	88	256	0.2
550400	550400	Hillsborough County	10.80	26	87	256	0.2
550500	550500	Hillsborough County	20.51	65	83	256	0.2
550600	550600	Hillsborough County	12.91	56	86	256	0.2
550650	550650	Hillsborough County	6.20	30	90	256	0.2
550700	550700	Hillsborough County	55.87	33	89	256	0.2
550750	550750	Hillsborough County	20.54	65	90	256	0.2
550800	550800	Hillsborough County	11.54	10	88	256	0.2
550900	550900	Hillsborough County	13.37	89	86	256	0.2
550950	550950	Hillsborough County	6.20	46	91	256	0.2
551000	551000	Hillsborough County	16.15	23	91	256	0.2
551100	551100	Hillsborough County	20.08	11	92	256	0.2
551111	551111	Hillsborough County	126.71	45	87	256	0.2
551300	551300	Hillsborough County	14.81	64	92	256	0.2
551400	551400	Hillsborough County	23.89	34	81	256	0.2
551475	551475	Hillsborough County	38.10	75	87	256	0.2
551500	551500	Hillsborough County	13.53	75	86	256	0.2
551700	551700	Hillsborough County	7.08	19	87	256	0.2
551800	551800	Hillsborough County	16.49	79	85	256	0.2
551900	551900	Hillsborough County	15.74	172	89	256	0.2
551950	551950	Hillsborough County	12.29	40	86	256	0.2
552000	552000	Hillsborough County	4.23	81	88	256	0.2
552050	552050	Hillsborough County	44.48	18	89	256	0.2
552060	552060	Hillsborough County	34.04	52	89	256	0.2
552100	552100	Hillsborough County	10.76	120	90	256	0.2
552150	552150	Hillsborough County	28.10	61	85	256	0.2
552200	552200	Hillsborough County	44.23	78	92	256	0.2
552230	552230	Hillsborough County	6.78	33	88	256	0.2
552300	552300	Hillsborough County	5.64	99	90	256	0.2
552400	552400	Hillsborough County	11.23	24	90	256	0.2
552500	552500	Hillsborough County	38.54	85	90	256	0.2
552600	552600	Hillsborough County	64.09	92	90	256	0.2
552700	552700	Hillsborough County	7.50	16	91	256	0.2
552800	552800	Hillsborough County	14.99	68	92	256	0.2
552860	552860	Hillsborough County	12.71	91	91	256	0.2
552900	552900	Hillsborough County	54.57	108	90	256	0.2
553000	553000	Hillsborough County	21.58	52	83	256	0.2
553100	553100	Hillsborough County	39.23	35	88	256	0.2
554100	554100	Hillsborough County	6.15	49	92	256	0.2
554200	554200	Hillsborough County	133.61	101	86	256	0.2
560000	560000	Hillsborough County	33.44	35	88	256	0.2
560100	560100	Hillsborough County	8.58	41	91	256	0.2
560150	560150	Hillsborough County	16.39	37	78	256	0.2
560200	560200	Hillsborough County	35.36	12	76	256	0.2
560300	560300	Hillsborough County	14.00	12	75	256	0.2
560400	560400	Hillsborough County	105.63	59	76	256	0.2
560500	560500	Hillsborough County	18.40	51	82	256	0.2
560600	560600	Hillsborough County	20.73	11	79	256	0.2
560700	560700	Hillsborough County	12.75	103	88	256	0.2
560800	560800	Hillsborough County	22.43	19	85	256	0.2

TABLE 4.1 Summary of Subbasin Hydrologic Parameters

Subbasin	Junction	Location	Area (Acres)	Time of Concentration (min)	Curve Number	Shape Factor	Initial Abstraction
560900	560900	Hillsborough County	34.07	23	86	256	0.2
561000	561000	Hillsborough County	18.76	46	84	256	0.2
561100	561100	Hillsborough County	70.52	23	81	256	0.2
561200	561200	Hillsborough County	2.45	42	81	256	0.2
561300	561300	Hillsborough County	27.89	18	85	256	0.2
561400	561400	Hillsborough County	3.28	31	82	256	0.2
561500	561500	Hillsborough County	2.32	6	83	256	0.2
561600	561600	Hillsborough County	19.68	84	87	256	0.2
561700	561700	Hillsborough County	15.58	32	84	256	0.2
561800	561800	Hillsborough County	68.84	57	88	256	0.2
561900	561900	Hillsborough County	16.74	39	86	256	0.2
562000	562000	Hillsborough County	31.19	37	86	256	0.2
562100	562100	Hillsborough County	79.52	63	87	256	0.2
562200	562200	Hillsborough County	13.80	31	90	256	0.2
562300	562300	Hillsborough County	14.86	50	83	256	0.2
562400	562400	Hillsborough County	25.10	17	86	256	0.2
562500	562500	Hillsborough County	45.43	18	92	256	0.2
570000	570000	Hillsborough County	12.64	55	91	256	0.2
570100	570100	Hillsborough County	44.10	47	92	256	0.2
570200	570200	Hillsborough County	13.24	11	94	256	0.2
570300	570300	Hillsborough County	11.38	39	85	256	0.2
570350	570350	Hillsborough County	7.41	10	93	256	0.2
570400	570400	Hillsborough County	14.53	54	91	256	0.2
570500	570500	Hillsborough County	44.02	145	87	256	0.2
570600	570600	Hillsborough County	2.76	28	90	256	0.2
570700	570700	Hillsborough County	34.09	83	90	256	0.2
570800	570800	Hillsborough County	51.46	61	90	256	0.2
559100	559100	City of Tampa	85.37	31	79	256	0.2
559120	559120	City of Tampa	37.32	18	78	256	0.2
559150	559150	City of Tampa	50.75	126	77	256	0.2
559180	559180	City of Tampa	61.69	47	79	256	0.2
559200	559200	City of Tampa	55.64	49	86	256	0.2
559210	559210	City of Tampa	58.17	35	70	256	0.2
559250	559250	City of Tampa	478.27	60	80	256	0.2
559320	559320	City of Tampa	34.16	52	66	256	0.2
559340	559340	City of Tampa	23.29	20	65	256	0.2
559355	559355	City of Tampa	21.72	32	71	256	0.2
559360	559360	City of Tampa	23.51	20	78	256	0.2
559395	559395	City of Tampa	15.80	11	84	256	0.2
559400	559400	City of Tampa	52.51	16	89	256	0.2
559410	559410	City of Tampa	12.36	55	82	256	0.2
559420	559420	City of Tampa	9.79	40	89	256	0.2
559430	559430	City of Tampa	14.75	17	90	256	0.2
559500	559500	City of Tampa	21.86	10	90	256	0.2
559650	559650	City of Tampa	41.73	42	87	256	0.2
559655	559655	City of Tampa	10.00	18	87	256	0.2
559660	559660	City of Tampa	21.17	10	85	256	0.2
559675	559675	City of Tampa	26.46	14	85	256	0.2
559700	559700	City of Tampa	55.55	35	81	256	0.2
559810	559810	City of Tampa	31.88	24	88	256	0.2
559820	559820	City of Tampa	48.42	66	84	256	0.2
559830	559830	City of Tampa	37.46	70	86	256	0.2
559900	559900	City of Tampa	34.38	14	90	256	0.2

TABLE 4.2 Curve Number Lookup Table for Land Use Code and Soil Hydrologic Group

FLUCSID	A	B	C	D	B/D	W	Description
1100	50	68	79	84	81.5	100	Residential, low density
1200	57	72	81	86	83.5	100	Residential, medium density
1300	77	85	90	92	91	100	Residential, high density
1400	89	92	94	95	94.5	100	Commercial and services
1500	81	88	91	93	92	100	Industrial
1600	77	86	91	94	92.5	100	Extractive
1700	69	81	87	90	88.5	100	Institutional
1800	49	69	79	84	81.5	100	Recreational
1900	39	61	74	80	77	100	Open land (Urban)
2100	49	69	79	84	81.5	100	Cropland and pastureland
2140	49	69	79	84	81.5	100	Cropland and pastureland
2200	44	65	77	82	79.5	100	Tree crops
2300	73	83	89	92	90.5	100	Feeding operations
2400	57	73	82	86	84	100	Nurseries and vineyards
2500	59	74	82	86	84	100	Specialty farms
2550	59	74	82	86	84	100	Aquaculture
2600	30	58	71	78	74.5	100	Other open land (Rural)
3100	63	71	81	89	85	100	Rangeland
3200	35	56	70	77	73.5	100	Shrub and brushland
3300	49	69	79	84	81.5	100	Mixed rangeland
4100	45	66	77	83	80	100	Upland coniferous forests
4110	57	73	82	86	84	100	Upland coniferous forests
4120	43	65	76	82	79	100	Upland coniferous forests
4200	36	60	73	79	76	100	Upland hardwood forests
4340	36	60	73	79	76	100	Mixed coniferous/hardwood
4400	36	60	73	79	76	100	Tree plantations
5100	100	100	100	100	100	100	Streams and waterways
5200	100	100	100	100	100	100	Lakes
5300	100	100	100	100	100	100	Reservoirs
5400	100	100	100	100	100	100	Bays and estuaries
6100	98	98	98	98	98	98	Wetland hardwood forests
6110	98	98	98	98	98	98	Bay swamps
6120	98	98	98	98	98	98	Mangrove swamps
6150	98	98	98	98	98	98	Stream and lake swamps
6200	98	98	98	98	98	98	Wetland coniferous forests
6210	98	98	98	98	98	98	Cypress
6300	98	98	98	98	98	98	Wetland forestedmixed
6400	98	98	98	98	98	98	Vegetated non-forested wetlands
6410	98	98	98	98	98	98	Freshwater marshes
6420	98	98	98	98	98	98	Saltwater marshes
6430	98	98	98	98	98	98	Saltwater marshes
6440	98	98	98	98	98	98	Emergent aquatic vegetation
6500	98	98	98	98	98	98	Non-vegetated
6510	98	98	98	98	98	98	Tidal flats
6520	98	98	98	98	98	98	Tidal flats
6530	98	98	98	98	98	98	Intermittent ponds
7100	77	86	91	94	92.5	100	Beaches
7400	77	86	91	94	92.5	100	Disturbed land
8100	81	88	91	93	92	100	Transportation
8200	81	88	91	93	92	100	Communications
8300	81	88	91	93	92	100	Utilities

CHAPTER 5 HYDROLOGIC/HYDRAULIC MODEL CALIBRATION AND VARIFICATION

Model calibration is the process of comparing simulated computer model results with a set of measured data. Streamflow and water surface elevations are obtained from gage data for a rain event from the past. The input hydrologic parameters are adjusted (rainfall and distribution) to the measured rainfall values and then the water surface elevations and flows from the model are compared to the measured values. The hydraulic model can then be adjusted so that the calculated values and the measured values closely match. Computer models are considered well calibrated when the results from the simulation are in reasonable agreement with the recorded data from the gage station. Model verification is the process of testing the calibrated model against measured data from storms of varying intensity without making model adjustments.

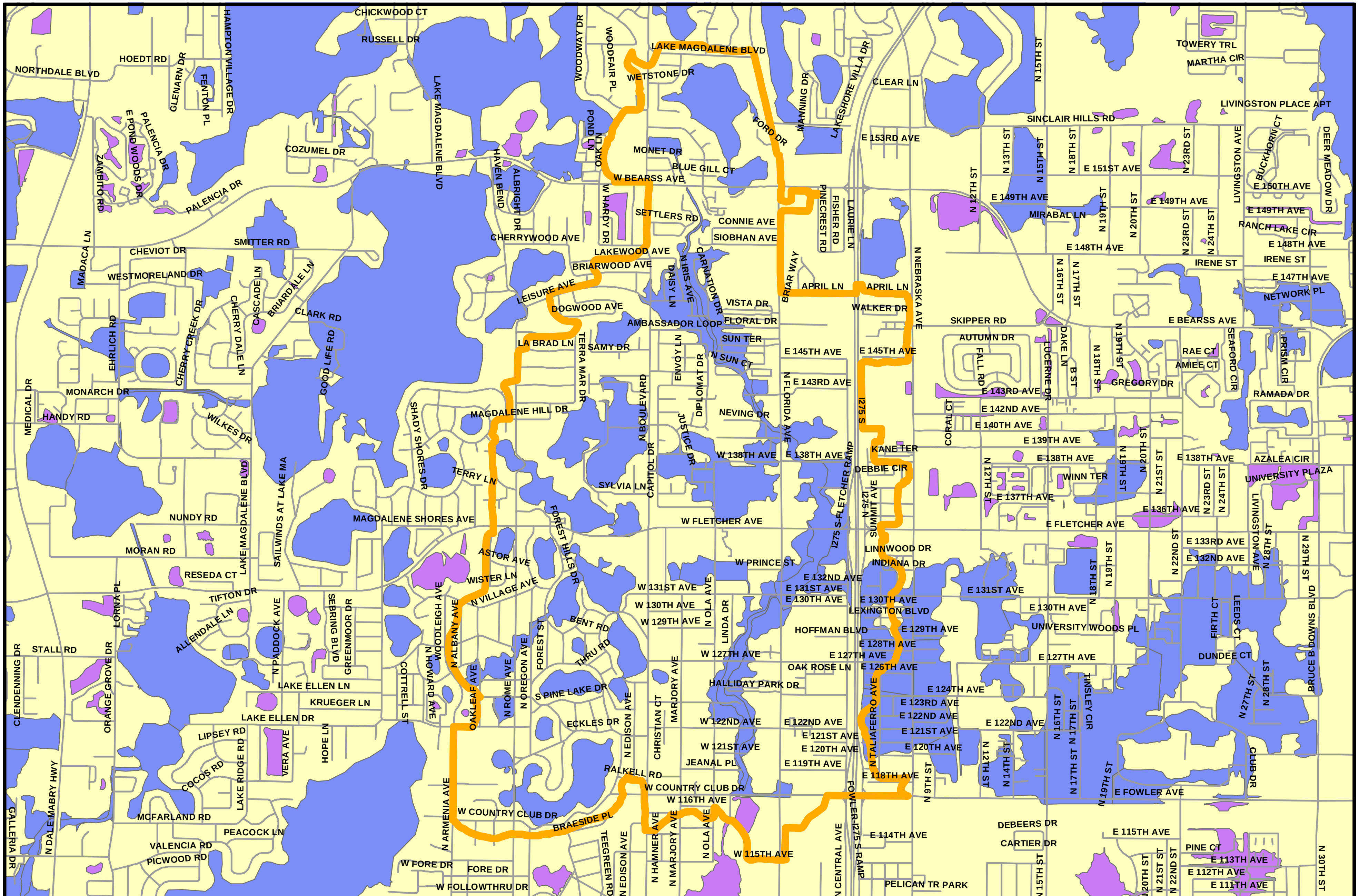
Due to less than adequate data availability from recent storm events, model calibration and verification were not performed during this model update. However, verifications were performed with proposed 100-year floodplain and a couple of known lake stages for model reasonableness purposes.

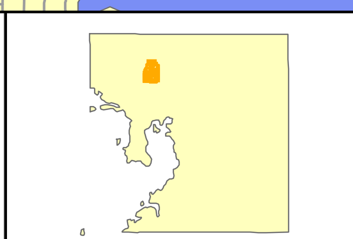
5.1 Proposed 100-year Floodplain Verification

Figure 5-1 illustrates the proposed 100-year floodplain provided by Hillsborough County. Comparison of simulated 100-year peak stage with the proposed floodplain is tabulated in **Table 5.1** and shows very good correlation for most locations. It is also noted that many locations have lower simulated 100-year flood stage for updated model conditions than the previous modeled flood stage. This is because the drainage condition has been considerably improved by many drainage improvement projects constructed since last stormwater management plan.

5.2 Lake Stage Verification

Comparisons of simulated stages for Lake Gass (upstream, junction 554200) and Lake Eckles (downstream junction 560400) are shown in Figure **5-2a** and **5-2b**, respectively. They also verified the reasonableness of the updated model.





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Legend

Proposed_100yr_Floodplain

Flood Zone

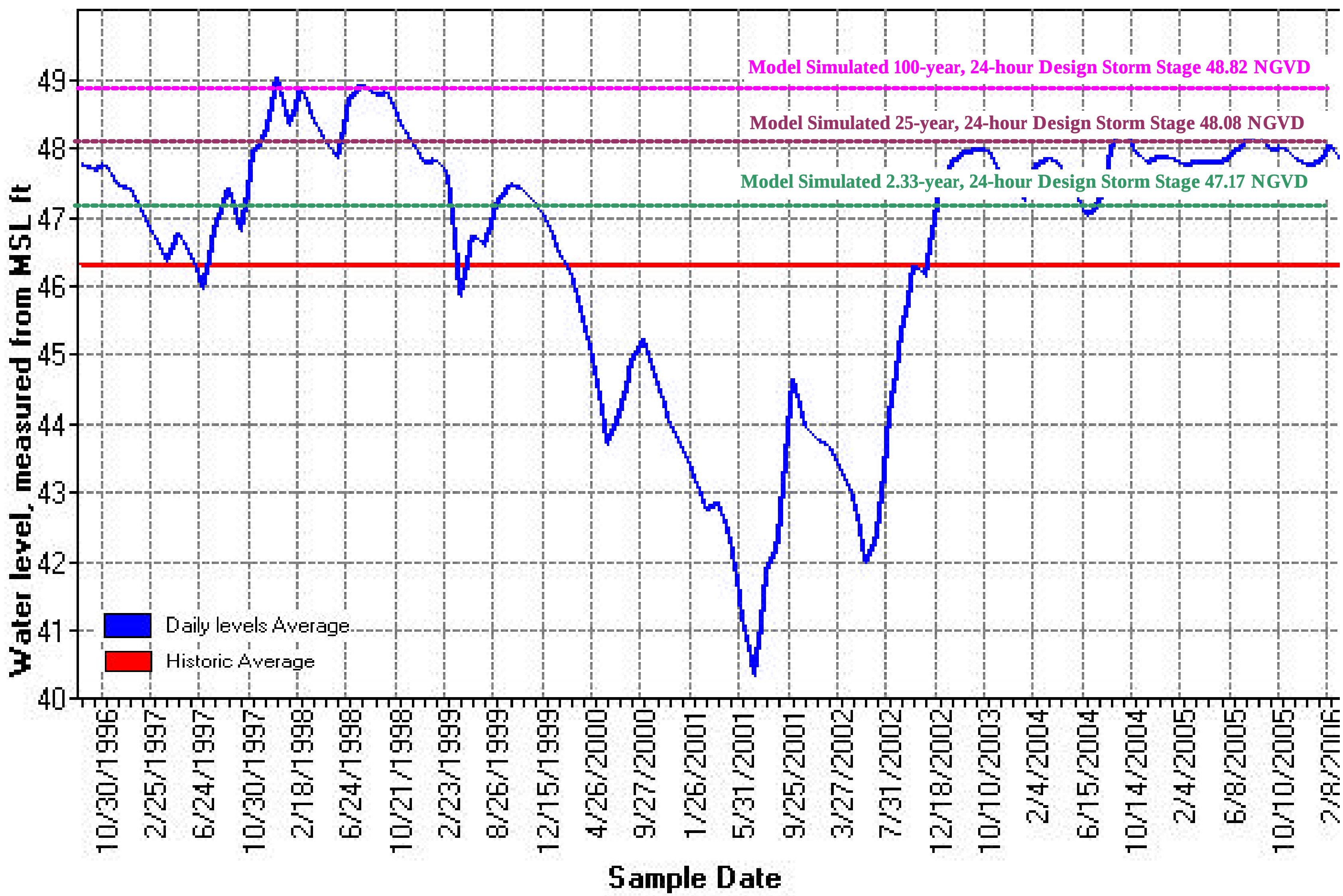
- Zone A (no BFE's determined)
- Zone AE (BFE's determined)

Notes:

This area is used for general map note information such as map accuracy/standards, source information, elevation information, etc.

0 0.15 0.3 0.6 Miles

Figure 5-1: Proposed 100-year Floodplain	Filename:	Map Date:	Map Prepared By:
Project: 61-0100.04	Figure 5-1.mxd	Mar. 31, 2006	Ayres Associates
Watershed: Curiosity Creek	Date of Photography:		
Hillsborough County: WMP Update Program	N/A		



Curiosity Creek Watershed Management Plan Update - Model Verification
Simulated Stages vs. Historic Stages for Lake Gass
(Sample Data Source: Hillsborough County Water Resources Atlas Website)

Figure 5-2a

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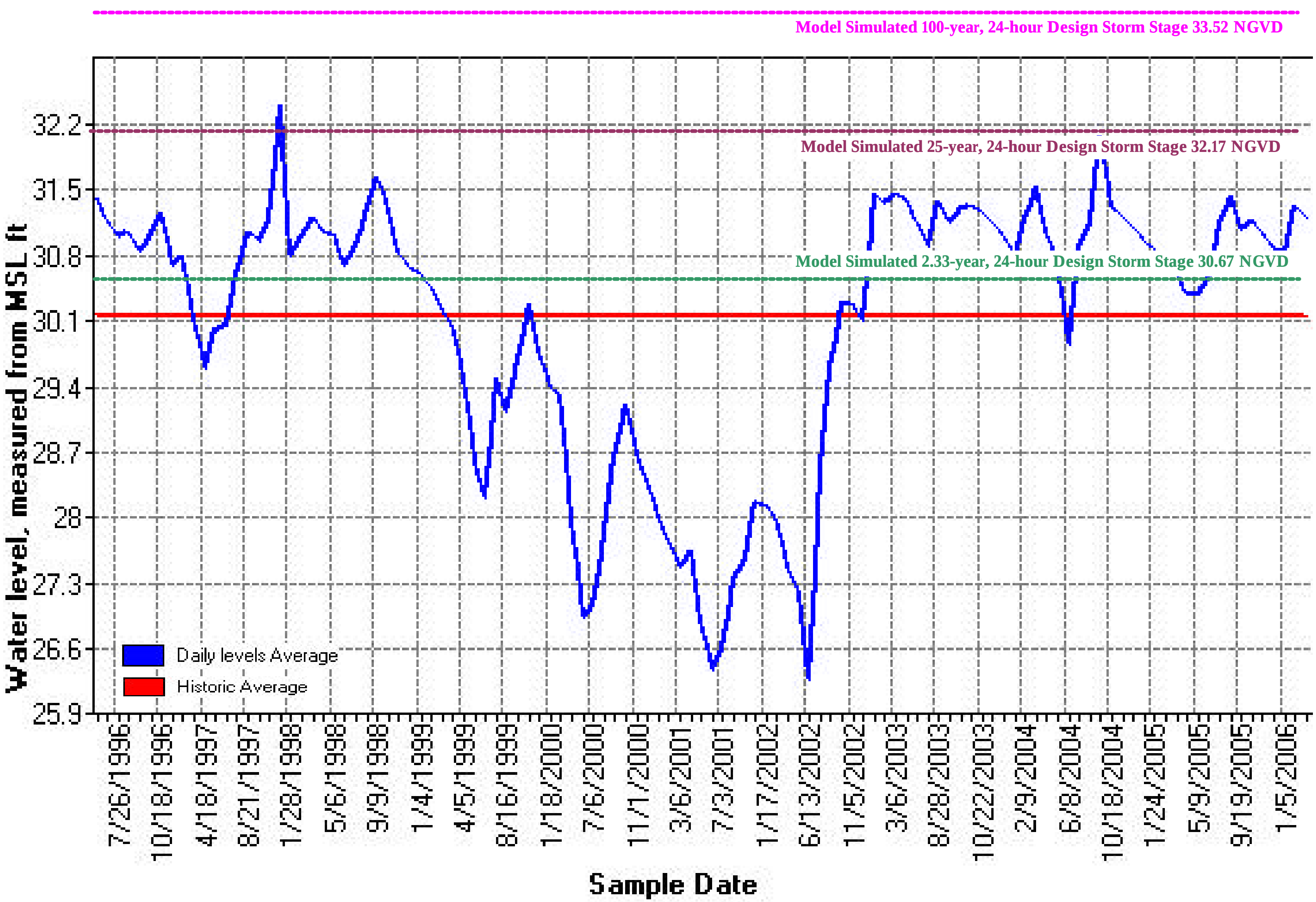

Curiosity Creek Watershed Management Plan Update - Model Verification
Simulated Stages vs. Historic Stages for Lake Eckles
(Sample Data Source: Hillsborough County Water Resources Atlas Website)

Figure 5-2b

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TABLE 5.1 Comparison of Simulated 100-year Peak Stages with Proposed 100-year Floodplain

Junction	Ftype	Water Feature	Model Zmax 100 yr Design Storm	Proposed 100 yr Floodplain Stage (Estimated)	Zmax - Floodplain Stage
550000	Stage-Area		31.23	32	-0.77
550100	AMEN		31.26	33	-1.74
550200	AMEN		31.27	33	-1.73
550250	AMEN		31.28	33	-1.72
550300	AMEN		32.86	34	-1.14
550350	AMEN		33.24	34	-0.76
550500	AMEN		33.48	34	-0.52
550600	AMEN		33.51	34	-0.49
550675	AMEN		33.54	34	-0.46
550700	AMEN		33.65	34	-0.35
550800	AMEN		35.58	37	-1.42
550825	AMEN		35.64	37	-1.36
550875	AMEN		37.39	39	-1.61
550900	AMEN		38.50	39	-0.50
550925	AMEN		39.03	40	-0.97
550950	Stage-Area		39.01	40	-0.99
551000	Stage-Area		39.04	40	-0.96
551100	AMEN		39.11	40	-0.89
551250	AMEN		39.87	41	-1.13
551300	AMEN		41.39	42	-0.61
551350	AMEN		41.55	42	-0.45
551400	Stage-Area		41.92	42	-0.08
551450	AMEN		42.14	43	-0.86
551475	Stage-Area		43.10	44	-0.90
551700	Stage-Area		42.66	43	-0.34
551875	AMEN		43.62	45	-1.38
551900	AMEN		45.45	45	0.45
551925	AMEN		45.54	46	-0.46
551950	Stage-Area		45.47	46	-0.53
552100	Stage-Area		44.51	45	-0.49
552150	AMEN		45.98	46	-0.02
552175	AMEN		46.46	47	-0.54
552200	Stage-Area		49.06	50	-0.94
552300	AMEN		46.95	47	-0.05
552350	AMEN		47.02	48	-0.98
552400	AMEN		48.33	48	0.33
552500	AMEN		48.34	48	0.34
552550	AMEN		48.40	49	-0.60
552600	AMEN		48.51	49	-0.49
552650	AMEN		48.51	49	-0.49
552700	Stage-Area		48.51	49	-0.49
552900	AMEN		48.51	49	-0.49
552950	AMEN		48.56	52	-3.44
553100	Stage-Area	Country Lakes	48.75	49	-0.25
554150	Stage-Area		47.97	50	-2.03
554200	Stage-Area	Blue Gill Lake	47.98	50	-2.02
560000	Stage-Area	Noreast Lake	37.82	38	-0.18
560025	AMEN		37.84	38	-0.16
560050	AMEN		37.85	38	-0.15
560100	Stage-Area		37.93	38	-0.07
560150	Stage-Area	Pine Pond	37.88	39	-1.12
560165	AMEN		38.02	39	-0.98
560180	AMEN		38.57	39	-0.43
560200	Stage-Area	Pine Lake	38.59	39	-0.41
560250	AMEN		45.89	48	-2.11
560260	AMEN		47.01	48	-0.99
560265	AMEN		47.83	48	-0.17
560280	AMEN		44.06	48	-3.94
560285	AMEN		44.99	48	-3.01
560290	AMEN		46.23	47	-0.77
560295	AMEN		46.77	47	-0.23
560300	Stage-Area	Lake Sophia	47.85	48	-0.15
560400	Stage-Area	Lake Eckles	32.68	33	-0.32
560450	AMEN		32.73	34	-1.27
560500	Stage-Area		51.04	52	-0.96
560600	Stage-Area	Mid Lake	36.14	37	-0.86

TABLE 5.1 Comparison of Simulated 100-year Peak Stages with Proposed 100-year Floodplain

Junction	Ftype	Water Feature	Model Zmax 100 yr Design Storm	Proposed 100 yr Floodplain Stage (Estimated)	Zmax - Floodplain Stage
560700	Stage-Area	Round Pond	46.79	49	-2.21
560800	Stage-Area	Lake Magdalene Ele	43.45	48	-4.55
560850	AMEN		33.73	38	-4.27
560900	Stage-Area		36.50	38	-1.50
561000	Stage-Area	Cedar East Lake	41.32	42	-0.68
561100	Stage-Area	Cedar West Lake	41.81	43	-1.19
561200	Stage-Area		42.91	43	-0.09
561275	AMEN		43.65	43	0.65
561300	Stage-Area		41.32	42	-0.68
561400	Stage-Area		43.67	43	0.67
561500	Stage-Area		43.78	43	0.78
561600	Stage-Area	Dorset Lake	44.65	47	-2.35
561700	Stage-Area		50.84	51	-0.16
561775	AMEN		44.09	43	1.09
561800	Stage-Area	Lake Butler	44.23	45	-0.77
561900	Stage-Area		44.97	45	-0.03
562000	Stage-Area		45.48	45	0.48
562100	Stage-Area	Golden Trout Lake	45.49	47	-1.51
562200	Stage-Area		48.75	49	-0.25
562300	Stage-Area		45.96	47	-1.04
562350	AMEN		45.96	47	-1.04
562400	Stage-Area		46.41	49	-2.59
562500	Stage-Area		47.68	50	-2.32
570000	AMEN		35.89	36	-0.11
570100	Stage-Area		38.63	40	-1.37
570300	Stage-Area		39.91	40	-0.09
570400	Stage-Area		42.58	40	2.58
570500	Stage-Area		43.73	44	-0.27
570600	Stage-Area		43.73	44	-0.27
570700	Stage-Area	Lake Morris	44.11	45	-0.89
570800	Stage-Area	Russell Lake	45.37	46	-0.63

Note: All elvations are in feet NAVD

CHAPTER 6
EXISTING CONDITIONS LEVEL OF SERVICE

Hillsborough County specifies that six design storm events be applied to the Curiosity Creek watershed and the system response evaluated. The design storms are as follows:

- 100 year, 24-hour duration, total rainfall depth 11.0 inches
- 50 year, 24-hour duration, total rainfall depth 10.0 inches
- 25 year, 24-hour duration, total rainfall depth 8.0 inches
- 10 year, 24-hour duration, total rainfall depth 7.0 inches
- 5 year, 24-hour duration, total rainfall depth 5.6 inches
- 2.33 year, 24-hour duration, total rainfall depth 4.5 inches

The rainfall distribution that was used for the various storm events was the SCS Florida Modified type II and the antecedent moisture condition was specified as AMC II. It should be noted that design elevations may be exceeded for longer duration, higher volume storms of the same frequency and under very wet conditions.

6.1 Existing Conditions Model Simulation Results

The summary in **Table 6.1** shows the peak elevations for the model regardless of time. Time varying output from the model is found in the complete output file for each of the storms modeled.

This section describes the methodology utilized in defining the Level of Service (LOS) for the various subbasins within the Curiosity Creek Watershed study area. **Figure 6-1** contains a graphical representation of the LOS for this watershed based on the 25-year, 24-hour storm event.

6.2 Level of Service Analysis

6.2.1 Level of Service Methodology

The Hillsborough County Comprehensive Plan, Stormwater Element contains definitions for the level of service flood protection designations. These definitions specify that a storm return period, storm duration and a letter designation are required to define a level of flood protection. The flood level of service designations contained in the Comprehensive Plan are A, B, C, and D. A is the highest service level and D is the lowest. However, these criteria are somewhat subjective in what is termed as "significant" flooding. Therefore, for the purposes of this study, an interpretation of this definition is

assigned to the LOS categories. The following contains the interpretation of the Comprehensive Plan definitions used in the LOS analysis.
Hillsborough County has recently updated the LOS definitions to be used throughout the project area as interpreted in the table below. These definitions are for the 25-year, 24-hour storm event. The desired LOS for Hillsborough County is Level B.

Level	Hillsborough County Comprehensive Plan Definition	Master Plan Definition
A	No significant street flooding. All lanes are drivable.	No flooding.
B	Minor street flooding. At least one lane is drivable.	Street Flooding is more than 3" and 6" or less above crown of road.
C	Street flooding. Flooding depth above the crown of the road is less than one foot.	Street Flooding is more than 6" and 12" or less above crown of road. Site flooding.
D	No limitation on flooding.	Street Flooding is more than 12" above crown of road. Structure flooding.

It was decided that drivable refers to less than or equal to three (3) inches of water above the crown of the road. It was also decided that one (1) lane passable means one (1) lane in each direction for a four (4) lane road or larger, or one (1) lane along the center of the road for a two (2) lane road.

The LOS designations in the Comprehensive Plan assumed that the sites (ground level surrounding adjacent property) are higher than the roads and that the houses are higher than the roads and the sites*. The Comprehensive Plan contains estimated Adopted (existing) and Ultimate (proposed) LOS designations for several watersheds in Hillsborough County.

* *This is not always the case. It is possible to have a subbasin where the road does not flood (LOS A) or has minor flooding (LOS B) yet the site even the structure may flood. These situations are noted in Table 6-2 and Section 6.3.*

6.2.2 Establishment of Landmark Elevations

To establish the LOS for each subbasin and thus the LOS for the major sub areas, landmark elevations were determined. These elevations were established with contour aerials for the most part. In some cases survey elevation data was available and was used in those areas. Elevations relating to road crowns, site elevations and structure elevations were established for each subbasin. The structures in each subbasin were assumed to be constructed at grade. The landmark elevation is reflective of the worst case in each subbasin. **Table 6.2** contains the landmark elevations and the 25-year water surface elevation associated with that subbasin. The LOS designations were assigned to the subbasins, the major subbasins and the overall watershed. The LOS of the Curiosity Creek watershed is reflective of the worst case for each major subbasin and the LOS for each major subbasin is reflective of the worst case for each subbasin.

6.3 Existing Conditions Level of Service

Using flood protection LOS designation criteria contained in the previous section, the landmark elevations for each subbasin are compared to the computed results of the hydraulic model. In general, the computed result for the most downstream junction was used for comparison with landmark elevations. **Table 6.2** states the existing condition LOS for each subbasin within Curiosity Creek watershed within the County's jurisdiction.

To follow the same pattern as Chapter 3, three regions of the watershed described in Chapter 3 will be used as follows:

- The Northwest Lake System
- The Curiosity Creek Main Channel
- The Forest Hills Basin

The following sections present both the areas and major structures where the computer modeling indicates that insufficient drainage conduit capacity exists and flooding is predicted during the 25-year, 24-hour design storm event.

6.3.1 The Northwest Lake System

All subbasins within the Northwest Lake System have LOS of A or B during the 25-year, 24-hour design storm event. The model indicated site and structure flooding might occur at the following locations:

Site, structure flooding during the 25-year, 24-hour design storm event:

- Subbasin 560000 – two to three backyards may be affected at the southeast corner of Lake Noreast just west of N. Boulevard.
- Subbasin 560150 – one or two backyards may be affected at the southwest corner of Pine Pond.
- Subbasin 560200 – several backyards may be affected along the north boundary of Pine Lake.
- Subbasin 560300 – several backyards and swimming pools may be affected around Lake Sophia.
- Subbasin 560500 – two to three homes may be affected. Portion of Oakleaf Drive will be overtopped and sheet flow discharges into Lake Sophia.
- Subbasin 562100 – two to three backyards may be affected at the northwest corner of Lake Golden Trout.
- Subbasin 562300 – two to three homes may be affected between Justice Drive and the unnamed pond west of N. Boulevard.

6.3.2 The Curiosity Creek Main Channel

Some subbasins within the Curiosity Creek Main Channel system have a LOS of C or D due to the anticipated street flooding during the 25-year, 24-hour design storm event. The model predicts street flooding at the following locations:

- Subbasin 550100 (LOS C) – Country Club Drive.
- Subbasin 550175 (LOS D) – E. 121st Avenue; this is because no conduit connectivity is identified to direct runoff out of the subbasin.
- Subbasin 550300 (LOS C) – W. 122nd Avenue.
- Subbasin 550500 (LOS D) – Private Road of Mobile Home Park adjacent to Curiosity Creek; this is due to the insufficient channel capacity.
- Subbasin 550600 (LOS D) – Private Road of Mobile Home Park adjacent to Curiosity Creek; this is due to the insufficient channel capacity.
- Subbasin 550700 (LOS C) – Private Road of Mobile Home Park adjacent to Curiosity Creek.
- Subbasin 551000 (LOS D) – N. Taliaferro Street; this is because the lower topography than the surroundings and no conduit connectivity is identified to direct runoff out of the subbasin.
- Subbasin 551100 (LOS D) – Private Road of Mobile Home Park adjacent to Curiosity Creek; this is due to the insufficient channel capacity.
- Subbasin 551475 (LOS D) – E. 137th Avenue; this is due to the insufficient conduit capacity.
- Subbasin 551500 (LOS D) – E. Orange Avenue and Summit Avenue intersection; this is due to the insufficient conduit capacity.
- Subbasin 551800 (LOS C) – E. 138th Avenue.
- Subbasin 552000 (LOS D) – E. 143rd Avenue; this is because no conduit connectivity is identified to direct runoff out of the subbasin.
- Subbasin 552150 (LOS D) – Wildwood Street; this is due to the insufficient channel capacity.
- Subbasin 552300 (LOS C) – Private Road north of FDOT Pond at N. Florida Avenue.
- Subbasin 552400 (LOS D) – Private Road of Mobile Home Park – Rosewood Estates; this is due to the insufficient conduit capacity.
- Subbasin 552500 (LOS D) – Private Road of Mobile Home Park – Rosewood Estates; this is due to the insufficient conduit capacity.
- Subbasin 552600 (LOS C) – Floral Drive.
- Subbasin 552700 (LOS D) – Leisure Avenue; this is because the lower topography than the surroundings and no conduit connectivity is identified to direct runoff out of the subbasin.
- Subbasin 570350 (LOS D) – N. Ola Avenue; this is because no conduit connectivity is identified to direct runoff out of the subbasin.
- Subbasin 570500 (LOS D) – Private Road of Tyrone Mobile Home Park; this is because no conduit connectivity is identified to direct runoff out of the subbasin.
- Subbasin 570800 (LOS D) – Justice Drive at Lake Russell; this is because no conduit connectivity is identified to direct runoff out of the subbasin.

Furthermore, the model indicated site and structure flooding might occur at the following locations during the 25-year, 24-hour design storm event although a LOS of A or B is assigned to the associated subbasin:

Site, structure flooding during the 25-year, 24-hour design storm event:

- Subbasin 550650 – several mobile homes may be affected west to N. Florida Avenue and Halliday Park Drive intersection.
- Subbasin 550750 – two or three backyards may be affected north to W. 128th Avenue and east to Marjory Avenue.
- Subbasin 550900 – several homes may be affected in low land area northeast of E. 131st Avenue and N. Florida Avenue intersection.
- Subbasin 550750 – two or three backyards may be affected north to W. 128th Avenue and east to Marjory Avenue.
- Subbasin 570400 – several homes may be affected at Unnamed Lake and Hamner Avenue surroundings.
- Subbasin 570700 – several homes may be affected at Lake Morris surroundings west of Tyrone Mobile Home Park.

6.3.3 The Forest Hills Basin

All subbasins within the Forest Hills Basin system have LOS of A or B during the 25-year, 24-hour design storm event. The model indicated site and structure flooding might occur at the following location:

Site, structure flooding during the 25-year, 24-hour design storm event:

- Subbasin 560800 – Lake Magdalene Elem. at N. Rome Avenue and surroundings.

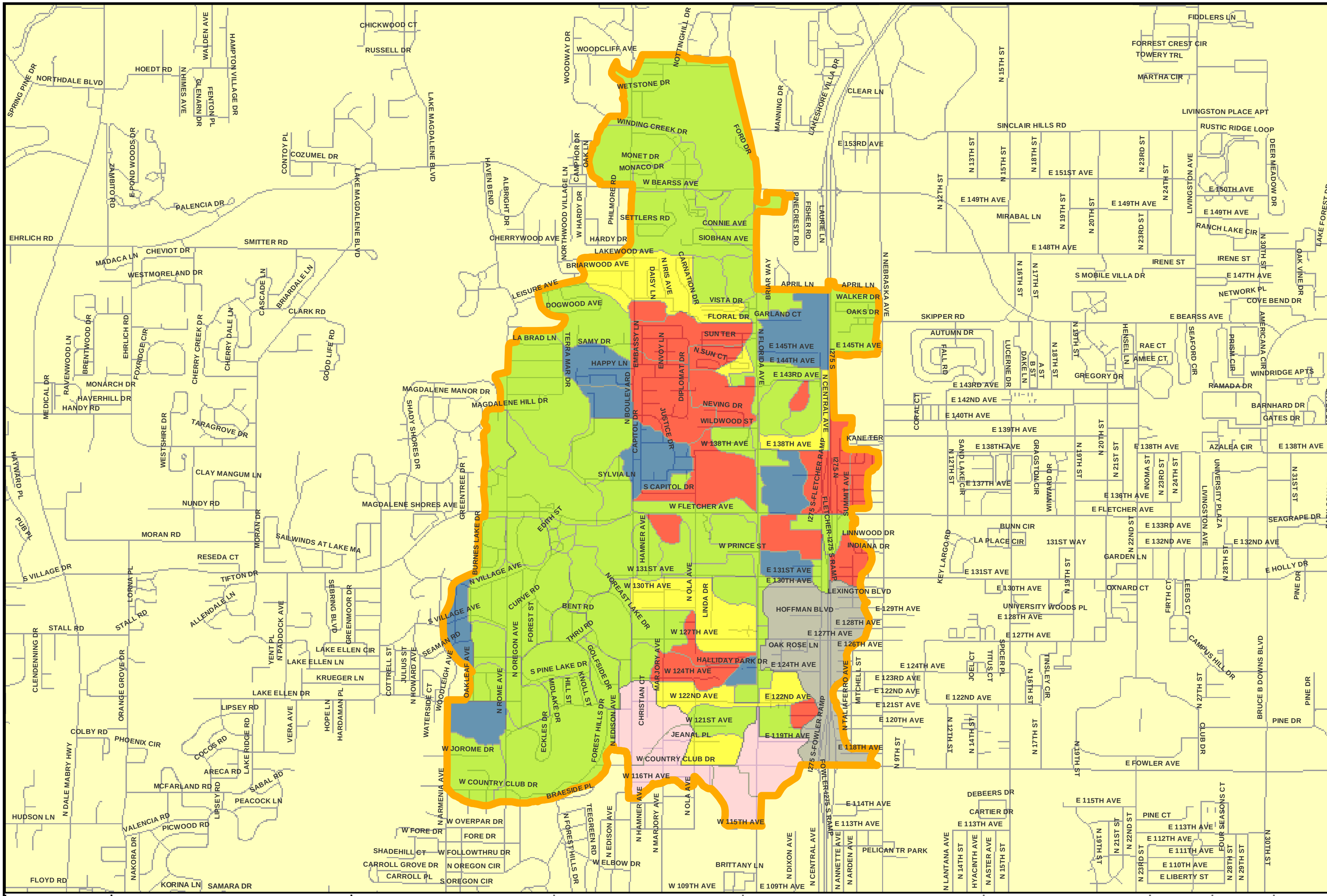
6.4 Floodplain

The 100-yr flood stages are generally used to regulate development with respect to placement of and compensation for fill within the floodplain; protection of buildings through sufficient elevation of the first floor; and federal flood insurance. Two 100-year flood events have been modeled for assessment of flood stages:

- The SCS Type II Florida Modified 24-hour Distribution (total precipitation of 11.0 inches)
- The SWFWMD 5-Day Rainfall Distribution (total precipitation 17.8 inches)

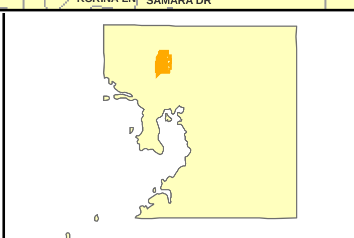
The rainfall distributions vary substantially with regard to both timing and intensity of rainfall, as well as the total volume of precipitation. The 24-hour design event is generally the more severe for ratesensitive watersheds, while the 5-day design event will simulate higher flood stages for volume-sensitive watersheds. It must be noted, however, that the use of the 5-day event, coupled with typical stormwater modeling tools, may be overly conservative for watersheds with a high proportion of closed subbasins or with severely limited discharge (as is the case for Curiosity Creek) that results in substantial surface flooding. Most stormwater models, including ICPR and various SWMM-based models, will not simulate infiltration over pervious surfaces beyond that which occurs during computation of runoff excess. Additionally, large lakes and wetlands will typically percolate significant volumes of water on a daily basis, with higher driving heads increasing the percolation rate even further. For these reasons, the 100-year, 24-hour design event is considered the more realistic gage of 100-year flooding for regulatory purposes. The simulation accuracy of the 5-day design event would be improved by coupling with a 2-D groundwater-surface water model.

Table 6.3 compares the peak simulated flood stage and timing between the 100-year, 24-hour and the 100-year, 5-day design storm events. The average peak stage difference between the two storm events is approximately 0.6 feet and ranges between -0.25 feet and 2.85 feet. It is noted that larger peak stage differences (Z120-Z24>1.0 foot) occur in volume-sensitive basins such as wetlands, lakes, ponds, and closed basins. As expected, peak stages occur much later in the simulation for the 100-year, 5-day event.



Legend

- A
- B
- C
- D
- Not in County Jurisdiction
- Non-Contributing Subbasin



AYRES ASSOCIATES

8875 Hidden River Pkwy,
Suite 200
Tampa, FL 33637

Notes:

This area is used for general map note information such as map accuracy/standards, source information, elevation information, etc.

0 0.15 0.3 0.6 Miles

Figure 6-1: Existing Condition Level of Service

Project: 61-0100.04

Watershed: Curiosity Creek

Hillsborough County: WMP Update Program

Filename:	Map Date:	Map Prepared By:
Figure 6-1.mxd	Mar. 31, 2006	Ayres Associates

Date of Photography:

N/A

TABLE 6.1 Design Storm Event - Existing Conditions (County Portion Only)

Model Junction ID	2.33 Year (ft NAVD)	5 Year (ft NAVD)	10 Year (ft NAVD)	25 Year (ft NAVD)	50 Year (ft NAVD)	100 Year (ft NAVD)
550000	24.97	26.75	28.17	29.13	30.55	31.23
550100	25.47	27.29	29.35	29.80	30.59	31.26
550150	35.97	36.50	36.56	36.64	36.82	36.89
550175	36.78	36.82	36.86	36.88	36.93	36.95
550200	25.68	27.34	29.38	29.83	30.59	31.27
550250	29.14	29.47	29.97	30.24	30.74	31.28
550300	31.09	32.13	32.39	32.54	32.77	32.86
550350	32.20	32.53	32.75	32.88	33.12	33.24
550400	31.14	32.17	32.50	32.72	33.05	33.20
550500	32.28	32.64	32.88	33.04	33.32	33.48
550600	32.31	32.67	32.92	33.08	33.36	33.51
550650	34.48	34.56	34.63	34.68	34.76	34.80
550675	32.32	32.69	32.95	33.11	33.39	33.54
550680	32.79	33.12	33.46	33.63	34.00	34.23
550700	32.43	32.78	33.05	33.21	33.49	33.65
550750	34.70	35.33	36.25	36.79	37.57	37.87
550800	33.66	34.28	34.77	35.04	35.38	35.58
550825	33.69	34.30	34.81	35.09	35.45	35.64
550875	35.46	36.38	36.79	37.11	37.27	37.39
550900	35.65	36.70	37.39	37.84	38.22	38.50
550925	37.22	37.62	38.19	38.55	38.80	39.03
550950	37.31	37.68	38.18	38.49	38.85	39.01
551000	37.33	37.69	38.19	38.51	38.87	39.04
551100	37.92	38.06	38.30	38.64	38.88	39.11
551250	38.31	38.68	39.08	39.37	39.65	39.87
551300	38.72	39.38	39.97	40.36	41.03	41.39
551350	39.17	39.85	40.35	40.67	41.25	41.55
551400	39.22	39.96	40.54	40.92	41.57	41.92
551450	40.37	40.74	41.04	41.22	41.81	42.14
551475	41.43	41.82	42.22	42.47	42.90	43.10
551500	41.12	41.18	41.24	41.28	41.59	41.94
551700	42.39	42.43	42.53	42.57	42.64	42.66
551800	42.76	42.88	42.97	43.03	43.11	43.17
551875	42.83	43.00	43.17	43.29	43.54	43.62
551900	43.15	43.62	44.20	44.62	45.32	45.45
551925	43.53	43.96	44.44	44.79	45.41	45.54
551950	43.16	43.64	44.21	44.64	45.34	45.47
552000	49.12	49.16	49.19	49.21	49.25	49.27
552050	46.10	47.20	48.03	48.45	49.09	49.34
552060	46.34	47.67	48.67	49.13	49.83	50.12
552100	42.44	42.80	43.15	43.35	44.00	44.51
552150	43.66	44.20	44.89	45.35	45.84	45.98
552175	44.34	44.84	45.42	45.78	46.24	46.46
552200	47.46	47.78	48.15	48.39	48.85	49.06
552230	49.71	50.03	50.34	50.51	50.80	50.93
552300	44.59	45.27	45.89	46.20	46.64	46.95
552350	44.66	45.35	45.98	46.29	46.72	47.02
552400	44.96	45.89	46.90	47.45	48.18	48.33
552500	44.97	45.90	46.91	47.46	48.19	48.34
552550	45.09	46.00	46.98	47.52	48.23	48.40
552600	45.35	46.46	47.25	47.62	48.31	48.51
552650	45.35	46.46	47.26	47.63	48.32	48.51
552700	46.34	46.50	47.26	47.62	48.32	48.51
552800	49.17	49.70	50.32	50.73	51.23	51.25
552860	49.17	49.70	50.32	50.73	51.26	51.38
552900	45.35	46.46	47.26	47.63	48.32	48.51
552950	47.25	47.52	47.81	47.99	48.34	48.56
552975	47.26	47.53	47.91	48.14	48.62	48.87
553000	47.26	47.54	47.86	48.07	48.46	48.64
553100	47.36	47.65	47.96	48.17	48.57	48.75
554100	47.40	47.69	47.92	48.15	48.63	48.87
554150	46.86	46.90	46.98	47.24	47.76	47.97
554200	46.33	46.62	46.98	47.24	47.76	47.98

TABLE 6.1 Design Storm Event - Existing Conditions (County Portion Only)

Model Junction ID	2.33 Year (ft NAVD)	5 Year (ft NAVD)	10 Year (ft NAVD)	25 Year (ft NAVD)	50 Year (ft NAVD)	100 Year (ft NAVD)
560000	34.71	35.20	35.86	36.39	37.31	37.82
560025	34.71	35.21	35.87	36.53	37.48	37.84
560050	34.90	35.27	35.87	36.63	37.61	37.85
560100	33.94	34.86	35.95	36.64	37.72	37.93
560150	34.91	35.30	35.88	36.77	37.78	37.88
560165	34.93	35.31	35.90	36.86	37.89	38.02
560175	34.92	35.31	35.89	37.08	38.13	38.34
560180	34.91	35.30	35.89	37.24	38.30	38.57
560200	36.06	36.48	37.36	37.68	38.32	38.59
560210	37.39	37.46	37.99	38.17	38.72	39.06
560220	39.24	39.31	39.80	39.97	40.05	40.08
560230	40.46	40.51	40.93	41.08	41.16	41.18
560240	42.43	42.43	43.59	44.18	44.45	44.50
560250	42.88	42.88	44.08	45.37	45.81	45.89
560260	43.02	43.02	44.61	46.33	46.91	47.01
560265	43.38	43.38	45.02	47.04	47.72	47.83
560270	41.98	42.35	42.57	42.80	43.13	43.28
560280	42.32	42.82	43.13	43.41	43.86	44.06
560285	42.71	43.38	43.80	44.14	44.72	44.99
560290	43.27	44.13	44.69	45.11	45.88	46.23
560295	43.53	44.45	45.08	45.53	46.38	46.77
560300	45.67	46.52	46.79	47.07	47.74	47.85
560400	29.83	30.25	30.88	31.33	32.25	32.68
560450	29.83	30.26	30.88	31.33	32.27	32.73
560500	50.71	50.80	50.89	50.94	51.01	51.04
560600	34.27	34.69	35.27	35.69	36.01	36.14
560700	44.14	44.47	45.09	45.54	46.40	46.79
560800	42.03	42.69	42.84	42.95	43.29	43.45
560850	31.27	31.46	31.96	32.35	33.27	33.73
560900	35.95	36.12	36.24	36.32	36.45	36.50
561000	35.99	36.72	38.36	39.44	40.55	41.32
561050	35.99	36.77	38.69	39.84	41.19	41.73
561100	38.60	39.36	39.76	40.09	41.27	41.81
561200	37.66	38.27	39.18	39.94	42.43	42.91
561275	37.76	38.48	39.48	40.31	42.88	43.65
561300	39.86	40.01	40.26	40.42	40.66	41.32
561400	40.68	40.88	41.14	41.23	42.90	43.67
561500	40.69	40.89	41.17	41.28	42.97	43.78
561600	43.14	43.40	43.73	43.97	44.43	44.65
561700	47.92	48.50	49.24	49.71	50.51	50.84
561750	40.68	40.88	41.15	41.25	43.05	43.93
561775	40.68	40.88	41.15	41.25	43.14	44.09
561800	42.06	42.48	43.31	43.74	44.13	44.23
561900	43.33	43.68	44.07	44.32	44.77	44.97
562000	42.33	42.80	43.44	43.86	45.05	45.48
562100	43.07	43.62	44.32	44.80	45.27	45.49
562200	47.27	47.59	47.98	48.25	48.72	48.75
562250	42.47	42.90	43.54	44.10	45.42	45.55
562300	44.43	44.74	45.10	45.32	45.72	45.96
562350	44.43	44.74	45.10	45.32	45.72	45.96
562400	46.13	46.18	46.25	46.29	46.37	46.41
562500	45.98	46.44	47.00	47.38	47.60	47.68
570000	33.76	34.32	34.89	35.19	35.65	35.89
570100	36.29	36.79	37.37	37.76	38.42	38.63
570200	37.17	37.63	38.20	38.62	39.41	39.68
570300	38.18	38.53	38.90	39.14	39.73	39.91
570350	40.68	41.02	41.57	41.91	42.43	42.58
570400	40.48	41.02	41.57	41.91	42.43	42.58
570500	41.37	41.93	42.53	42.94	43.64	43.73
570600	41.52	41.91	42.32	42.56	43.64	43.73
570700	42.64	43.26	43.73	43.93	44.03	44.11
570800	44.91	45.02	45.13	45.20	45.32	45.37

TABLE 6.2 Existing Conditions Level of Sevice

Model Subbasin ID	Landmark Elevations			25 Year Design Storm Water Surface (ft NAVD)	Existing Conditio Level of Service	Adjacent Road
	Road Elevation (ft NAVD)	Site Elevation (ft NAVD)	Structure Elevation (ft NAVD)			
550100	28.86	29.66	30.16	29.80	C	W. Country Club Dr.
550150	36.86	36.86	37.16	36.64	A	E. 122nd Ave.
550175	35.46	35.46	35.46	36.88	D	E. 121st Ave.
550200	36.86	32.16	33.16	29.83	A	N. Florida Ave.
550300	31.66	30.66	32.16	32.54	C	W. 122nd Ave.
550400	34.66	N/A	N/A	32.72	A	N. Florida Ave./FDOT Pond
550500	31.66	31.66	31.16	33.04	D	Private Road of Mobile Home Park near Curiosity Creek
550600	31.66	31.66	32.16	33.08	D	Private Road of Mobile Home Park near Curiosity Creek
550650	34.36	33.56	34.56	34.68	B[2]	N. Florida Ave.
550700	32.46	32.46	32.46	33.21	C	Private Road of Mobile Home Park near Curiosity Creek
550750	37.66	36.36	38.16	36.79	A[1]	Marjory Ave.
550800	37.16	37.46	37.46	35.04	A	Linda Dr.
550900	37.56	37.56	37.56	37.84	B[2]	E. 131st Ave.
550950	39.16	39.46	39.66	38.49	A	N. Central Ave.
551000	36.66	36.66	36.66	38.51	D	N. Taliaferro St.
551100	37.56	37.56	37.56	38.64	D	Private Road
551300	41.16	41.16	41.16	40.36	A	Private Road
551400	40.66	40.66	41.16	40.92	B[1]	E. Fletcher Ave./E. 137th Ave.
551475	40.66	N/A	N/A	42.47	D	E. Fletcher Ave./E. 137th Ave.
551500	40.16	39.56	40.16	41.28	D	E. Orange Ave./Summit Ave.
551700	44.56	44.56	44.56	42.57	A	FDOT Pond
551800	42.36	44.16	44.16	43.03	C	E. 138th Ave.
551900	45.76	45.16	45.76	44.62	A	Apartment Complex
551950	45.76	45.16	45.76	44.64	A	Apartment Complex
552000	45.76	45.16	45.76	49.21	D	Apartment Complex
552050	48.00	N/A	N/A	48.45*	B	E. 145th Ave.
552060	52.00	N/A	N/A	49.13*	A	E. 115th Ave.
552100	44.96	44.66	45.16	43.35	A	Arkwright Ave.
552150	42.16	42.16	43.56	45.35	D	N. Florida Ave./Wildwood St.
552200	51.96	N/A	N/A	48.39	A	FDOT Pond/ N. Florida Ave.
552230	51.00	N/A	N/A	50.51*	A	April Lane
552300	45.46	45.66	N/A	46.20	C	Private Road
552400	44.56	45.16	45.16	47.45	D	Private Road
552500	45.16	45.16	45.16	47.46	D	Private Road
552600	46.66	47.16	47.66	47.62	C	Floral Dr.
552700	46.36	46.16	46.46	47.62	D	Pond south to Leisure Ave.
552800	53.00	52.00	N/A	50.73	A	Private Devel
552860	53.00	52.00	N/A	50.73	A	Private Devel
552900	49.96	50.16	50.46	47.63	A	Old Pointe Dr.
553000	50.56	50.16	52.16	48.07	A	Winding Creek Dr.
553100	50.96	51.16	53.66	48.17	A	Winding Creek Dr.
554100	51.46	51.46	52.16	48.15	A	W. Bears Ave.
554200	51.46	51.46	53.36	47.24	A	W. Bears Ave.
560000	37.86	36.16	39.16	36.39	A[1]	North Blvd.

*I-275 subbasins' drainage systems not modeled. Flood elevations may be over-predicted

TABLE 6.2 Existing Conditions Level of Sevice

Model Subbasin ID	Landmark Elevations			25 Year Design Storm Water Surface (ft NAVD)	Existing Conditio Level of Service	Adjacent Road
	Road Elevation (ft NAVD)	Site Elevation (ft NAVD)	Structure Elevation (ft NAVD)			
560100	37.86	37.16	37.16	36.64	A	North Blvd.
560150	37.76	36.46	38.65	36.77	A[1]	Pine Pond @ Norest Lake Dr.
560200	39.96	36.86	40.24	37.68	A[1]	Pine Lake @ Forest Hills Dr.
560300	47.66	46.16	47.16	47.07	A[1]	Lake Sophia @ N. Rome Ave.
560400	33.66	33.16	33.66	31.33	A	Lake Eckles @ Country Club Dr.
560500	50.66	48.66	49.16	50.94	B[2]	Unnamed pond @ Oakleaf Dr.
560600	35.46	37.16	37.66	35.69	A	Mid Lake/Midlake Dr.
560700	47.66	46.16	47.16	45.54	A	Round Pond/Round Pond Dr./N. Rome Ave.
560800	42.66	42.16	42.66	42.95	B[2]	Lake Magdalene Elem. @ N. Rome Ave.
560900	43.96	44.16	45.16	36.32	A	Unnamed Pond @ W. Jorome Ave.
561000	41.66	40.16	40.45	39.44	A	Noreast Lake Dr.
561100	41.66	40.16	42.75	40.09	A	Cedar West Lake @ Townsend Ln.
561200	41.66	42.16	42.16	39.94	A	Dorset Cir
561300	42.66	42.16	N/A	40.42	A	Unnamed Pond/W. 131st Ave.
561400	46.16	N/A	N/A	41.23	A	Unnamed wetland/Edith St.
561500	45.66	45.66	46.16	41.28	A	Unnamed wetland/Forest Hills Dr.
561600	45.66	44.16	45.04	43.97	A	Dorset Lake @ Forest Hills Dr.
561700	50.96	51.16	52.16	49.71	A	Lake Burnes/N. Rome Ave.
561800	45.46	46.16	46.23	43.74	A	Lake Butler/Salvia Ln.
561900	45.66	45.46	45.66	44.32	A	Unnamed wetland/Salvia Ln.
562000	45.66	46.57	46.57	43.86	A	No Named Lake/Salvia Ln.
562100	44.96	44.66	47.49	44.80	A[1]	Golden Trout Lake @ Salvia Ln.
562200	48.66	N/A	N/A	48.25	A	Unnamed Pond @ N. Rome Ave.
562300	44.96	45.16	46.78	45.32	B[1]	Unnamed pond @ Justice Dr.
562400	45.86	47.66	48.16	46.29	B	Happy Ln.
562500	47.56	48.66	48.86	47.38	A	Samy Dr (02-05)
570000	37.56	37.16	37.16	35.19	A	W. 131st Ave.
570100	39.86	39.86	45.16	37.76	A	FDOT Pond/N. Ola Ave.
570200	41.16	39.96	40.66	38.62	A	Private Road
570300	41.00	40.00	N/A	39.14	A	Unnamed wetland/N. Ola Ave.
570350	39.86	41.16	42.66	41.91	D	N. Ola Ave.
570400	41.66	40.66	41.66	41.91	A[2]	Unnamed Lake/Hamner Ave.
570500	40.16	40.16	40.86	42.94	D	Private Road
570600	43.46	43.46	44.66	42.56	A	Capital Dr.
570700	43.46	43.46	43.66	43.93	B[2]	Lake Morris/Capital Dr.
570800	44.16	45.16	45.66	45.20	D	Lake Russell/Justice Dr.

Note:

N/A data not available

A[1]/B[1] site flooding due to lower elevation of the site

A[2]/B[2] both site and structure flooding due to lower elevation of the site and/or the structure

*I-275 subbasins' drainage systems not modeled. Flood elevations may be over-predicted

TABLE 6.3 Comparison of Peak WSEL for the 100-yr, 1-day and 100-yr, 5-day Events

JUNCTION	100 YR/1 DAY PEAK WSEL (ft-NAVD)	100 YR/1 DAY TIME TO PEAK (HR)	100 YR/5 DAY PEAK WSEL (ft-NAVD)	100 YR/5 DAY TIME TO PEAK (HR)	Z_{5D} - Z_{1D} (FT)	NOTES
550000	31.23	26.12	32.71	72.78	1.48	Blue Sink (closed)
550100	31.26	25.83	32.75	72.38	1.49	assoc. w/Blue Sink
550150	36.89	13.63	36.94	61.55	0.05	
550175	36.95	12.50	36.95	61.57	0.00	
550200	31.27	25.82	32.75	72.40	1.48	assoc. w/Blue Sink
550250	31.28	25.67	32.75	72.27	1.47	assoc. w/Blue Sink
550300	32.86	13.85	32.97	64.93	0.11	
550350	33.24	13.90	33.42	64.92	0.18	
550400	33.20	13.73	33.10	62.43	-0.10	
550500	33.48	13.90	33.69	64.90	0.21	
550600	33.51	13.90	33.73	64.88	0.22	
550650	34.80	13.43	34.71	61.78	-0.09	
550675	33.54	13.92	33.77	64.88	0.23	
550680	34.23	14.08	34.49	64.92	0.26	
550700	33.65	13.93	33.91	64.88	0.26	
550750	37.87	14.53	38.25	65.13	0.38	
550800	35.58	15.47	36.13	64.83	0.55	
550825	35.64	15.35	36.02	64.85	0.38	
550875	37.39	15.52	37.46	63.65	0.07	
550900	38.50	15.47	38.61	63.78	0.11	
550925	39.03	15.43	39.15	63.87	0.12	
550950	39.01	16.78	39.18	65.53	0.17	
551000	39.04	17.67	39.21	66.20	0.17	
551100	39.11	15.43	39.23	63.85	0.12	
551250	39.87	15.37	40.01	63.80	0.14	
551300	41.39	15.33	41.45	63.77	0.06	
551350	41.55	15.33	41.62	63.78	0.07	
551400	41.92	15.32	41.99	63.77	0.07	
551450	42.14	15.23	42.22	63.73	0.08	
551475	43.10	27.77	43.39	65.22	0.29	
551500	41.94	15.35	42.01	63.80	0.07	
551700	42.66	12.73	42.56	61.03	-0.10	
551800	43.17	14.68	43.16	63.40	-0.01	
551875	43.62	14.63	43.61	63.40	-0.01	
551900	45.45	14.62	45.43	63.38	-0.02	
551925	45.54	14.62	45.52	63.38	-0.02	
551950	45.47	14.60	45.45	63.37	-0.02	
552000	49.27	13.60	49.24	62.28	-0.03	
552050	49.34	25.18	50.49	121.22	1.15	pond/closed basin
552060	50.12	26.62	51.54	121.38	1.42	pond/closed basin
552100	44.51	16.05	44.78	64.53	0.27	
552150	45.98	14.60	45.96	63.37	-0.02	
552175	46.46	14.63	46.43	63.43	-0.03	
552200	49.06	14.57	48.81	63.13	-0.25	
552230	50.93	25.53	51.66	119.00	0.73	
552300	46.95	14.62	46.93	63.42	-0.02	
552350	47.02	14.60	47.02	63.42	0.00	
552400	48.33	14.55	48.33	63.37	0.00	
552500	48.34	14.55	48.34	63.37	0.00	
552550	48.40	14.53	48.40	63.35	0.00	
552600	48.51	14.50	48.51	63.35	0.00	
552650	48.51	14.50	48.52	63.35	0.01	
552700	48.51	14.53	48.52	63.37	0.01	
552800	51.25	18.93	51.39	63.00	0.14	
552860	51.38	18.75	52.35	65.27	0.97	
552900	48.51	14.50	48.52	63.33	0.01	
552950	48.56	14.37	48.57	63.30	0.01	

TABLE 6.3 Comparison of Peak WSEL for the 100-yr, 1-day and 100-yr, 5-day Events

JUNCTION	100 YR/1 DAY PEAK WSEL (ft-NAVD)	100 YR/1 DAY TIME TO PEAK (HR)	100 YR/5 DAY PEAK WSEL (ft-NAVD)	100 YR/5 DAY TIME TO PEAK (HR)	Z_{5D} - Z_{1D} (FT)	NOTES
552975	48.87	13.80	48.64	66.57	-0.23	
553000	48.64	13.55	48.61	63.27	-0.03	
553100	48.75	13.57	48.62	63.27	-0.13	
554100	48.87	13.80	48.65	66.60	-0.22	
554150	47.97	27.88	49.19	99.08	1.22	Lake Gass
554200	47.98	27.88	49.20	99.08	1.22	Lake Gass
560000	37.82	40.68	40.56	82.20	2.74	Lake Noreast
560025	37.84	40.68	40.55	82.22	2.71	lake-controlled
560050	37.85	38.78	40.54	82.20	2.69	lake-controlled
560100	37.93	22.78	40.56	82.20	2.63	pond
560150	37.88	35.10	40.54	82.20	2.66	Pine Pond
560165	38.02	34.60	40.53	82.18	2.51	lake-controlled
560175	38.34	34.50	40.50	82.18	2.16	lake-controlled
560180	38.57	34.48	40.49	82.18	1.92	lake-controlled
560200	38.59	34.35	40.49	82.03	1.90	Lake Pine
560210	39.06	30.05	40.98	77.77	1.92	lake-controlled
560220	40.08	18.33	41.39	76.33	1.31	lake-controlled
560230	41.18	18.33	42.17	73.98	0.99	
560240	44.50	15.52	44.56	62.32	0.06	
560250	45.89	15.48	46.03	62.28	0.14	
560260	47.01	15.42	47.22	62.23	0.21	
560265	47.83	15.37	48.10	62.18	0.27	
560270	43.28	18.48	43.86	72.33	0.58	
560280	44.06	18.45	44.53	71.68	0.47	
560285	44.99	18.40	45.40	68.43	0.41	
560290	46.23	18.28	46.69	67.43	0.46	
560295	46.77	18.25	47.27	67.18	0.50	
560300	47.85	15.35	48.12	62.18	0.27	
560400	32.68	32.73	35.53	109.63	2.85	Lake Eckles
560450	32.73	24.82	35.53	109.62	2.80	lake-controlled
560500	51.04	13.33	50.98	61.70	-0.06	
560600	36.14	13.15	36.17	61.23	0.03	
560700	46.79	18.22	47.28	67.15	0.49	
560800	43.45	13.45	43.59	61.42	0.14	
560850	33.73	18.13	35.53	109.17	1.80	lake-controlled
560900	36.50	12.78	36.25	61.17	-0.25	
561000	41.32	56.05	42.53	65.38	1.21	Cedar Lake East
561050	41.73	17.27	42.55	65.32	0.82	
561100	41.81	17.10	42.56	65.30	0.75	Cedar Lake West
561200	42.91	42.58	43.49	69.48	0.58	
561275	43.65	42.55	44.27	69.42	0.62	
561300	41.32	56.05	42.54	65.38	1.22	closed basin
561400	43.67	41.85	44.29	69.25	0.62	
561500	43.78	39.12	45.03	69.22	1.25	pond
561600	44.65	18.48	45.77	68.85	1.12	Dorset Lake
561700	50.84	25.82	51.16	62.93	0.32	
561750	43.93	41.97	45.47	69.78	1.54	lake-controlled
561775	44.09	41.97	46.08	70.02	1.99	Lake Butler
561800	44.23	41.97	46.12	70.02	1.89	Lake Butler
561900	44.97	26.18	46.10	70.10	1.13	closed basin
562000	45.48	25.92	46.15	69.63	0.67	
562100	45.49	25.85	46.17	65.88	0.68	
562200	48.75	20.47	49.01	62.40	0.26	
562250	45.55	19.48	46.37	70.02	0.82	
562300	45.96	15.30	46.95	64.40	0.99	
562350	45.96	15.32	46.95	64.45	0.99	
562400	46.41	12.68	46.97	64.35	0.56	

TABLE 6.3 Comparison of Peak WSEL for the 100-yr, 1-day and 100-yr, 5-day Events

JUNCTION	100 YR/1 DAY PEAK WSEL (ft-NAVD)	100 YR/1 DAY TIME TO PEAK (HR)	100 YR/5 DAY PEAK WSEL (ft-NAVD)	100 YR/5 DAY TIME TO PEAK (HR)	Z_{5D} - Z_{1D} (FT)	NOTES
562500	47.68	16.45	48.23	62.22	0.55	
570000	35.89	15.05	36.76	64.85	0.87	
570100	38.63	14.52	39.46	65.08	0.83	
570200	39.68	13.13	39.52	65.32	-0.16	
570300	39.91	30.78	40.13	64.37	0.22	
570350	42.58	25.03	43.03	65.77	0.45	
570400	42.58	25.03	43.04	65.75	0.46	
570500	43.73	20.65	44.01	64.73	0.28	
570600	43.73	20.68	44.01	64.77	0.28	
570700	44.11	16.93	44.32	63.58	0.21	
570800	45.37	13.70	45.27	62.22	-0.10	

Note: elevations are in NAVD 1988