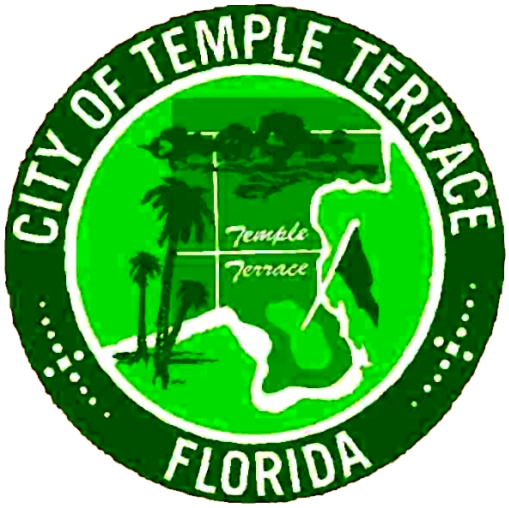

2025 Comprehensive Plan for the City of Temple Terrace Florida

Public Facilities

Potable Water
Sanitary Sewer
Solid Waste
Stormwater Management

Adopted by City Council
June 30, 2009

Effective Date
September 22, 2009

Hillsborough County
City-County
Planning
Commission

THE PLANNING COMMISSION

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City of Temple Terrace Public Facilities

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**These portions of the Element are required by Part II, Chapter 163, Florida Statute, to be adopted by the Temple Terrace City Council. The remainder of the Element contains background information.*

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INTRODUCTION

Healthy Economy - Healthy Environment

The five elements of economic strength are physical resources, human resources, financial resources, community resources and institutional resources. The public facilities of potable water, solid waste, sanitary sewer and stormwater are physical resources that contribute to, and link Temple Terrace's Healthy Economy - Healthy Environment.

As a metro region grows and there is increasing pressure on the natural and manmade environment, the City needs to give priority to actions that protect the various natural and human environments. These include everything from how people travel to how they use water. For example, to address air pollution, it is important to address transit, the walking and biking environment, and other more attractive alternatives to the car. The community can develop alternatives to services like garbage collection and water usage which encourage conservation and environmental sensitivity. An improved stormwater management system helps the rehabilitation of waterways and restores the natural systems.

The four subsystems discussed above are but several examples of the significance of interconnectedness and Temple Terrace's Public Facilities.

- ***Sustainability:*** *The issue captured by this theme is one of recognition that the City is already a distinct and unique place with a special riverside and tree-shaded natural environment, family-friendly safe and secure neighborhoods, strong community and religious organizations, a historic city layout and defining architecture, an efficient government providing good municipal services, a respect for education, positive social connections and networks, and more; all of which the community values and wants to ensure continue to be fostered and nurtured into the future.*

- ***Regeneration:*** *The issue represented by this theme is one that understands that decay in the community's physical environment, as well in its social infrastructure, will inevitably occur with time, if efforts are not continually made to renew and regenerate what is valued. This is a maintenance issue; but it also appreciates preservation of community values and recognizes that continuance is not automatic.*

- ***Interconnectedness:*** *The issue inherent to this theme is one that appreciated that the subsystems of the overall urban system are dependent on successful interconnectedness in order to thrive, especially at key decision points.. This can be applied to public places,*

transportation choices, housing, a healthy economy, and a healthy environment.

A successful city is one that understands the important roles that both sustainability and regeneration have in a city's health and vitality. It describes those roles and determines how it needs to successfully utilize those roles.

A successful city is one that understands how interconnectedness, sustainability, and regeneration applies to such things as public places, transportation choices, housing, a healthy economy, and a healthy environment; and then develops or supports strategies and actions reflective of their application.

Aiming for Success – Public Facilities

The Temple Terrace Asset
The City has a good infrastructure system (water, sewer, stormwater, solid waste) that is well maintained. Generally, all infrastructure services are available to all areas and people throughout the city. Also, the City has capacity and facilities to serve areas outside their corporate boundaries that may be part of the City one day. Temple Terrace is well positioned with its infrastructure. This is a fundamental responsibility of local government.

Building Our Assets for the Competitive Edge- Underlying Ethics of Success
Maximizing Return
Build public facilities so that they maximize value for the community. Revenue is one value, but there may be other values too. The benefit and cost analysis should include variables that may otherwise be left out because they are not easily quantified. For example, a drainage pond creates less flooding for a neighborhood (benefit), less non-point pollution into the river (benefit) and possibilities for a park around the pond (benefit).

Quality matters
Build well. Enough said.

Private investment follows public investment
Private investment in a city almost always needs public investment first, otherwise the return on the private investment is diminished. Build a house without sewer and water nearby and the owner needs more land in order to install a well and septic tank. Where there is only one house, there may have been an opportunity for two if public investment had been made and public sewer and water lines were nearby.

Part of maximizing return should include assessing how much private investment could be spun-off with a public investment project. Enterprise

funded infrastructure is easy to determine because the number of customers needed to fund the infrastructure is determined up front (actual and future demand). The concept can also be used for public school and parks and recreation facilities. (e.g. well designed and placed parks can increase surrounding home values)

By using the above **Aiming for Success**, understood through Interconnectedness, the City can assess and tell its "story" as it grows, thereby creating the future it wants to be in 2025 and beyond. That story is one that recognizes the City as a complex and rich set of interrelated subsystems of the larger urban system, with assets unique and distinctive to Temple Terrace; the following recognizes the importance of sustainability, regeneration, and interconnectedness in improving and projecting forward those subsystems within the City.

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POTABLE WATER SUB-ELEMENT

INTRODUCTION

This sub-element has been prepared to meet the requirements of Florida Statute 163.3177 and Chapter 9J-5 of the Florida Administrative Code (FAC). It addresses existing and future potable water needs for the City of Temple Terrace in 5-year increments from year 2004 to 2014.

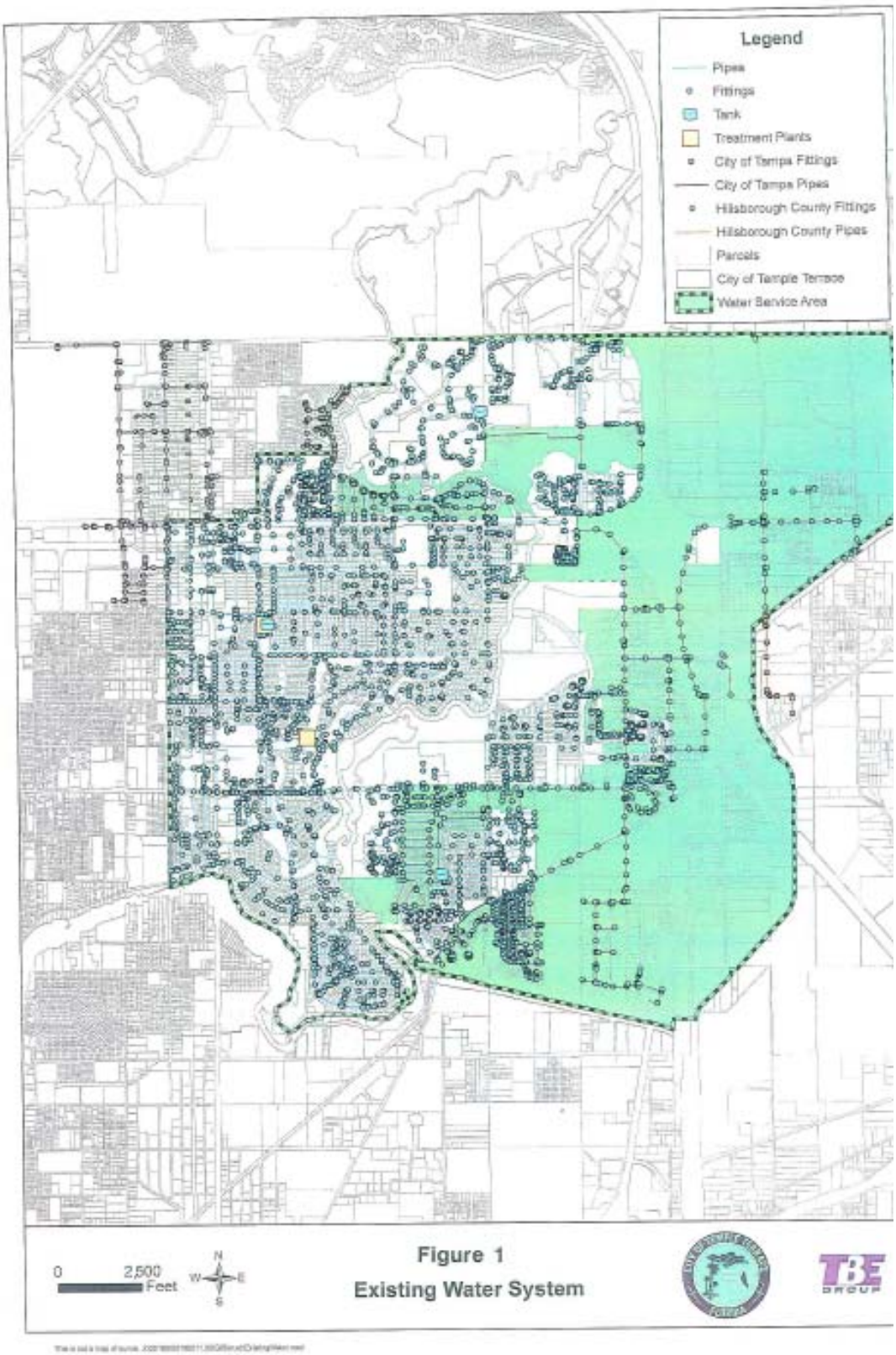
The City of Temple Terrace operates a water treatment and distribution system which serves the entire City and extends beyond its limits north of Fowler Avenue and east of the Hillsborough River. The City's water source is the Floridan Aquifer, a sub-surface source of excellent quality. The water distribution system is composed of a network of pipes and storage tanks which convey potable water from the City's wells and treatment plant facilities to individual establishments. The components of the piping network divide the system into nested demand areas. The largest divisions of the service area are supplied by transmission mains, which, in turn, are interconnected by localized networks of smaller diameter distribution mains that eventually provide individual service connections. The interconnection of these components into nested flow loops maintains the City's drinking water quality by providing multiple routes by which water can be circulated within the system in response to shifts in the location of demand.

In addition to location shifts, potable water demand also varies with time. The primary temporal variance in demand occurs daily among morning peak, evening peak and general usage periods corresponding to the routines and rhythms of the population served. Superimposed on this daily variance is a weekly and seasonal pattern of water usage. The summation of these patterns will determine the demand range of a particular system. The parameters used to define the system demand are the peak hour, maximum daily and average daily demand. A special peak demand can occur at any time in any location when water is required to fight fires. This demand is measured as fire flow.

The transport of water depends on pressure within the system. Thus, adequate water pressure will allow suitable quantities to be delivered to areas of demand. To provide for reserves in water quantity, storage tanks are integrated into the system. During low-demand periods the storage tank is filled and its supply is then retrieved during peak-demand periods.

Figure 1 illustrates the Temple Terrace water service area, including water treatment facilities, storage, booster stations, transmission piping and distribution piping. **9J-5.011(1)(a)**

FIGURE 1


Legend
Pipes
Fittings
Tank
Treatment Plants
City of Tampa Fittings
City of Tampa Pipes
Hillsborough County Fittings
Hillsborough County Pipes
Parcels
City of Temple Terrace
Water Service Area
0
2,500
Feet
N
W
E
S
Figure 1
Existing Water System
TBE GROUP

WATER SYSTEM DEVELOPMENT

The Temple Terrace water system was originally constructed around the Temple Terrace Golf Course between 1922 and 1925 by the original developers. In 1925, when the City was incorporated, the water system was transferred to City ownership. Numerous water main extensions were constructed in subsequent years. The distribution system was expanded using monies from bond issues in 1962 and 1964. Additional water supply facilities were also constructed with these bond funds. Many of the water main extensions after 1964 were installed by real estate developers and dedicated to the City. Others were built by Temple Terrace using Improvement Charge funds, Federal Community Development Block Grant (CDBG) funds and other monies. In the 1970's and 1980's, the majority of the City's water system growth occurred, with the completion of additional water supply, storage, treatment facilities (Whiteway Water Treatment Plant), and distribution expansions. A second water treatment facility (Sunningdale Water Treatment Plant) was completed in the 1990's.

The storage facilities for the City of Temple Terrace have also been expanded over various project periods. During the 1980-1981 installation at Whiteway, the storage capacity was increased by 0.70 million gallons (MG) with a new finished water ground storage tank (GST), and conversion of a raw water tank to a finished water GST. The 0.5 MG Chinaberry storage facility was completed in the 1980's. Later in the 1993-1994 expansion at Whiteway, a 1.0 MG finished water GST was added to increase the storage capacity of the system. The latest storage expansion project occurred in 2003 with the addition of a 0.6 MG GST and high service pump station at Telecom Park. This expansion services the newly-developing business district known as Telecom Park and the surrounding growth areas.

In the year 2004, the average total population receiving water service from Temple Terrace was approximately 55,459, which includes a residential population of 31,456 and a non-residential population of 24,003. The vast majority of demand is generated by residential development within and outside the City. However, non-residential water use has become significant with increased commercial development. **9J-5.011(1)(e)2.**

CONTEXT FOR SERVICE PROVISION

The Federal government has established quality standards for the protection of water for public use including operating standards and quality controls for public water systems. These regulations are provided in the Safe Drinking Water Act (SDWA), Public Law 93-523, implemented by the U.S. Environmental Protection Agency (EPA). The EPA established the following drinking water standards:

- National health-related primary drinking water standard maximum contaminant levels (MCLs)
- Drinking water standard secondary maximum contaminant levels (SMCLs) for contaminants that may adversely affect the aesthetic quality of drinking water

In addition to implementing health-related primary drinking water regulations, the SDWA also authorized the EPA to develop secondary regulations for contaminants that may adversely affect the aesthetic quality of drinking water. These SMCLs were promulgated in 1979 without federal enforcement provisions; however, they allow individual states to enforce the standards if so desired**.** Currently in Florida (a primacy state), the Florida Department of Environmental Protection (FDEP) is responsible for enforcing the Federal MCLs and SMCLs.

In 1986, Congress passed legislation that amended most of the original 1974 SDWA. The 1986 amendments added six new sections to the original SDWA. Additional regulations passed by Congress in 1996 were created to strengthen existing regulations, to provide new drinking water quality regulations, and included public involvement and annual reporting requirements. The EPA is still in the process of creating, proposing, reviewing and promulgating new drinking water quality regulations, which will continue to significantly impact water treatment practices and water utility operations. The 1996 SDWA Amendments revised the requirements for the EPA's long-term regulatory agenda in terms of identification of contaminants for regulatory consideration. The Amendments required EPA to identify contaminants that would be candidates for regulatory consideration, and determine whether regulatory action is appropriate or inappropriate for at least five contaminants within five-year increments. The first regulatory determinations must occur within five years of the SDWA Amendments, and every five years thereafter.

The Florida Department of Environmental Protection (FDEP) is in charge of regulatory programs and permitting for the State of Florida air, water and wastewater management. The State has enacted FAC Chapter 62-555, which includes rules and regulations governing statewide activities related to drinking water programs. The Southwest Florida Water Management District (SWFWMD) is responsible for managing water supplies to meet existing and future demands. Regulation of consumptive use is achieved by a permitting system through which water resources are allocated among the permitted consumers. The SWFWMD rules pertinent to Temple Terrace are contained in Chapter 40D-2, FAC. SWFWMD has established watering restrictions as part of a comprehensive plan to protect water resources in the Tampa Bay area. Except under certain circumstances, the City has restricted lawn and landscape irrigation to one day per week. This applies to all water sources including

private wells, surface water, and any person or business within the city limits of Temple Terrace.

Evaluation of public service demands generated by new development and redevelopment is required through the City's site plan approval process. The Community Services Department requires connection to the City's water system as a condition of approval for subdivisions and site development plans within the municipal limits. Chapter 21 of the Temple Terrace Code of Ordinances (Water and Sanitary Sewer Systems) requires mandatory connection to City water once service becomes available for all property within the City, whether new or existing development. Enforcement of these current Federal, State and local regulations will ensure that water demands generated by development will not exceed the City's ability to provide service.

EXISTING CONDITIONS

The majority of areas served by the Temple Terrace water system are built out with single-family detached or multi-family housing. Little change in the water demand generated by those areas is likely during the planning period. Private wells provide water to a small number of residential and commercial properties within the City's water service area. Well data from SWFWMD was reviewed and revealed that only 68 residents and 120 commercial users were served from wells within the water service area in the year 2005.

The City currently has two water treatment plants: Whiteway Water Treatment Plant (WTP) and Sunningdale WTP. Water is supplied to the treatment plants by ten wells under SWFWMD's Water Use Permit #200450.08. Treatment includes aeration, multi-media filtration, lime softening, fluoridation, chlorination and corrosion-control additives. Treatment operations are monitored twenty-four hours a day by City personnel who are State certified water treatment plant operators. **9J-5.011(1)(e)1** In 2004, approximately 1,195 million gallons of water was pumped and treated with an average daily flow of 3.39 MG to distribution. Water pressures from the treatment plants typically range from 55 to 65 pounds per square inch (psi), and the treated water consistently meets or exceeds the quality parameters established and monitored by the FDEP.

The Temple Terrace water system has a total of ten groundwater wells that pump water from the Floridan Aquifer to its two water treatment facilities. Six of the wells provide raw water to the Whiteway WTP, while the remaining four wells supply water to the Sunningdale WTP. The combined capacity of the ten

wells is approximately 9.3 million gallons per day (mgd). The Whiteway Water Treatment Plant was built in 1980-81 on the City's existing water storage facility site at 6009 Whiteway Drive. The plant is fed from the Richlyne well field (Well Nos. 7, 8, 9 and 12), and also Well Nos. 4 and 5, located within the treatment plant site. The Whiteway WTP has a design capacity of 5.0 mgd, while the wells supplying raw water to the plant have a combined total capacity of 6.34 mgd. The normal daily operating conditions at Whiteway produce an average of 3.0 mgd for distribution. When the Whiteway facility is undergoing repairs or during periods of high usage, the Sunningdale facility makes up the difference in demand. The Sunningdale WTP was built in 1994 on the base site of Well Nos. 1 and 2 located at 520 Belle Terre Avenue and Sunningdale Avenue. Well Nos. 6 and 11, located nearby, also supply raw water to the facility. The Sunningdale facility has a capacity to treat and distribute an average of 4.0 mgd in support of system operations. A summary of the Temple Terrace wells is provided in **Table 1**. **9J-5.011(1)(e)3.**

Table 1

Well Field Summary									
Richlyne Well Field, 10905 Richlyne Street									
Well	**HP**	**RPM**	**Voltage**	**Type**	**Pump Size**	**Stages**	**Head**	**Drilled**	**Rating**
Well No. 7	30	1760	440	Vertical	10" x 8"	4	110'	1963	875 GPM (1.26 MGD)
Well No. 8A	30	3450	440	Submersible	10" x 8"	1	110'	2002	875 GPM (1.26 MGD)
Well No. 9	30	1760	440	Vertical	8" X 8"	3	120'	1963	650 GPM (0.94 MGD)
Well No. 12	25	1765	240	Submersible	6" x 6"	4	134'	1982	500 GPM (0.72 MGD)
Whiteway Water Treatment Plant & Well Field, 6009 Whiteway Street									
	HP	**RPM**	**Voltage**	**Type**	**Pump Size**	**Stages**	**Head**	**Drilled**	**Rating**
Well No. 4	40	1775	440	Vertical	6" x 6"	4	106'	1958**	1,000 GPM (1.44 MGD)
Well No. 5	40	*	440	Submersible	8" x 8"	*	94’	1998	500 GPM (0.72 MGD)
Sunningdale Water Treatment Plant & Well Field, 520 Belle Terre Avenue									
	HP	**RPM**	**Voltage**	**Type**	**Pump Size**	**Stages**	**Head**	**Drilled**	**Rating**
Well No. 1	40	1750	440	Vertical	6" x 6"	12	250'	1920	500 GPM (0.72 MGD)
Well No. 2	75	1800	440	Vertical	8" x 8"	8	250'	1954	900 GPM (1.3 MGD)
Florida College Campus Well Field									
	HP	**RPM**	**Voltage**	**Type**	**Pump Size**	**Stages**	**Head**	**Drilled**	**Rating**
Well No. 6	40	1750	440	Vertical	6" x 6"	10	200'	1963	500 GPM (0.72 MGD)
Woodmont Clubhouse Well Field									
	HP	**RPM**	**Voltage**	**Type**	**Pump Size**	**Stages**	**Head**	**Drilled**	**Rating**
Well No. 11	60	3600	440	Submersible	9LA	2	200'	1974	850 GPM (1.22 MGD)

*Unknown
** Plugged at 180 feet in 1973

Whiteway WTP

The Whiteway WTP indicated in **Figure 2** uses a lime softening process designed to remove hardness, iron, sulfide, color and turbidity, along with other secondary contaminants, from the raw water. The treatment process adds fluoride and corrosion inhibitors to the water, along with chlorine disinfection to the finished water. The unit processes in the plant include raw water blending and aeration, lime softening, multimedia filtration, corrosion control, fluoridation and disinfection. Corrosion control utilizes zinc orthophosphate feed to the softened water. Fluoridation is accomplished by adding hydrofluorosilicic acid to the filter effluent. Disinfection is a two-stage process of adding chlorine to the raw water prior to softening with trimming of the residual by adding chlorine to the finished water just prior to storage and distribution. In addition to the process units, the plant utilizes transfer pumps to move the water between ground storage tanks and high service pumps to pressurize the distribution system. Chemical feed systems and a lime silo storage/feed system complement the primary process operations. The facility is supplied power from the power grid. Should a failure occur a diesel powered emergency generator provides back-up power for the entire plant, which includes the high service pumps for distribution of water to consumers.

The Whiteway WTP currently stores approximately 1.7 MG of finished water. Water from the filters is stored in two ground storage tanks (0.2 MG and 0.5 MG) and then transferred to a 1.0 MG storage tank by three transfer pumps. Finished, fully chlorinated water is pumped to the distribution system from the 1.0 MG tank via six high service pumps. Alternatively, the valving is configured so the high service pumps can pump water from the smaller tanks directly into the distribution system during high demand periods or when the larger tank requires maintenance. The six high service pumps provide the flow and pressure required in the distribution system from this facility. Pump Nos. 1, 2 and 3 each have a capacity of 1,200 gallons per minute (GPM), while pumps 4, 5 and 6 are rated at 2,000 GPM each. Pump Nos. 2 and 4 have variable frequency drives (VFD) units to meet varied flow and pressure demands.
9J-5.011(1)(f)2

Sunningdale WTP

The Sunningdale WTP indicated in **Figure 3** provides backup for high demand periods such as dry weather when excessive water use occurs. Raw water from four wells located in the immediate vicinity of the facility has chlorine and fluoride added before being re-pumped to the distribution system. Well Nos. 1 and 2 are located on the treatment facility site, while Well Nos. 6 (located on Florida College's Campus) and 11 (located near the City golf course clubhouse) are located off-site. The wells were self-contained units until the 1993-1995 expansion of the water treatment system. During the expansion a chlorine contact tank, chemical storage and high service pumps were added to the site. Raw water is routed to the covered chlorine contact basin, where chlorine gas

is injected and flow-paced. A chlorine gas containment and scrubbing system is used to remove any chlorine fumes that may result from bottle changes and leaks in the chlorine gas dispensing room. Four vertical turbine high service pumps are used to pump chlorinated water into the distribution system. An auxiliary generator is located on-site to provide emergency power should the facility lose its normal power supply. **9J-5.011(1)(f)2**

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Figure 2

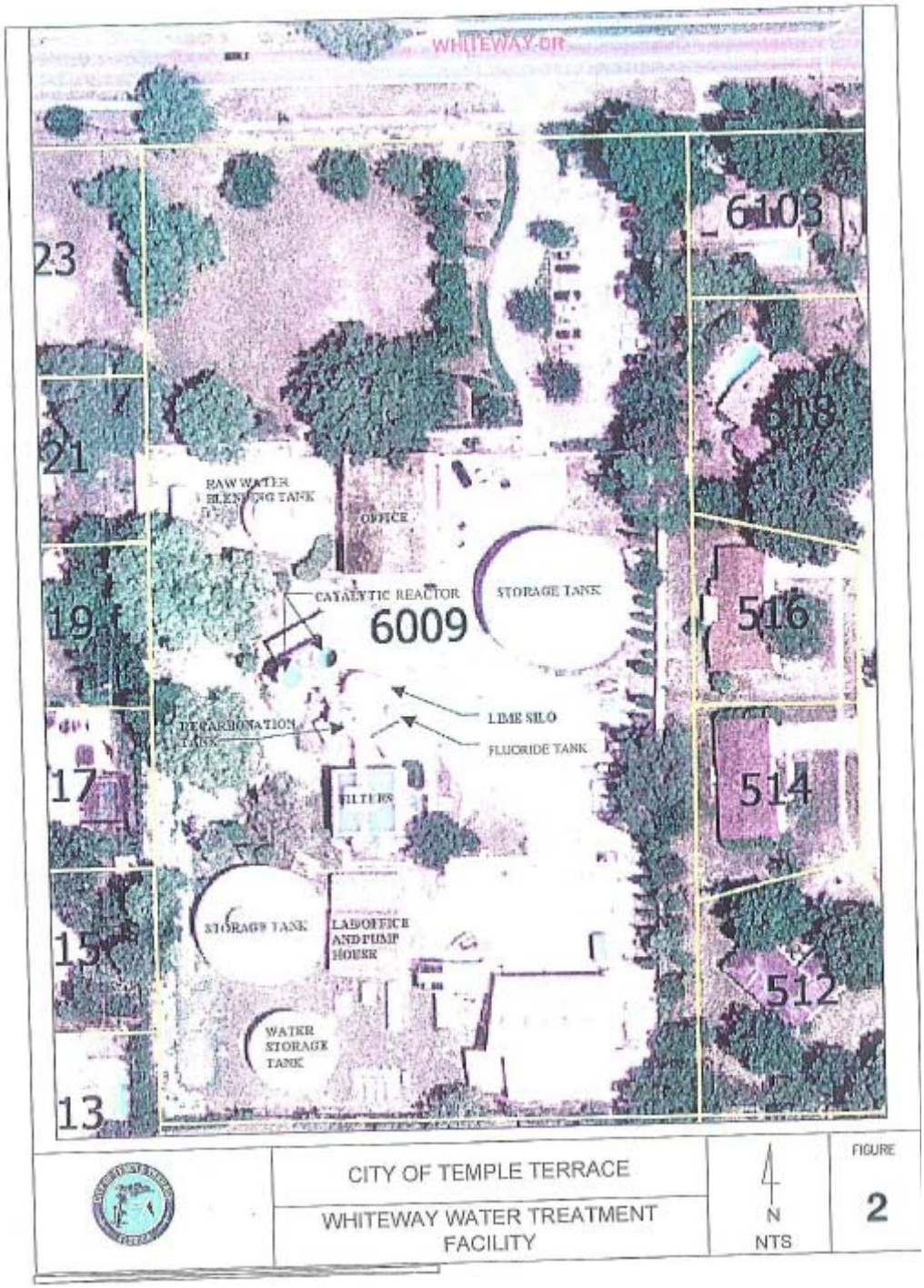
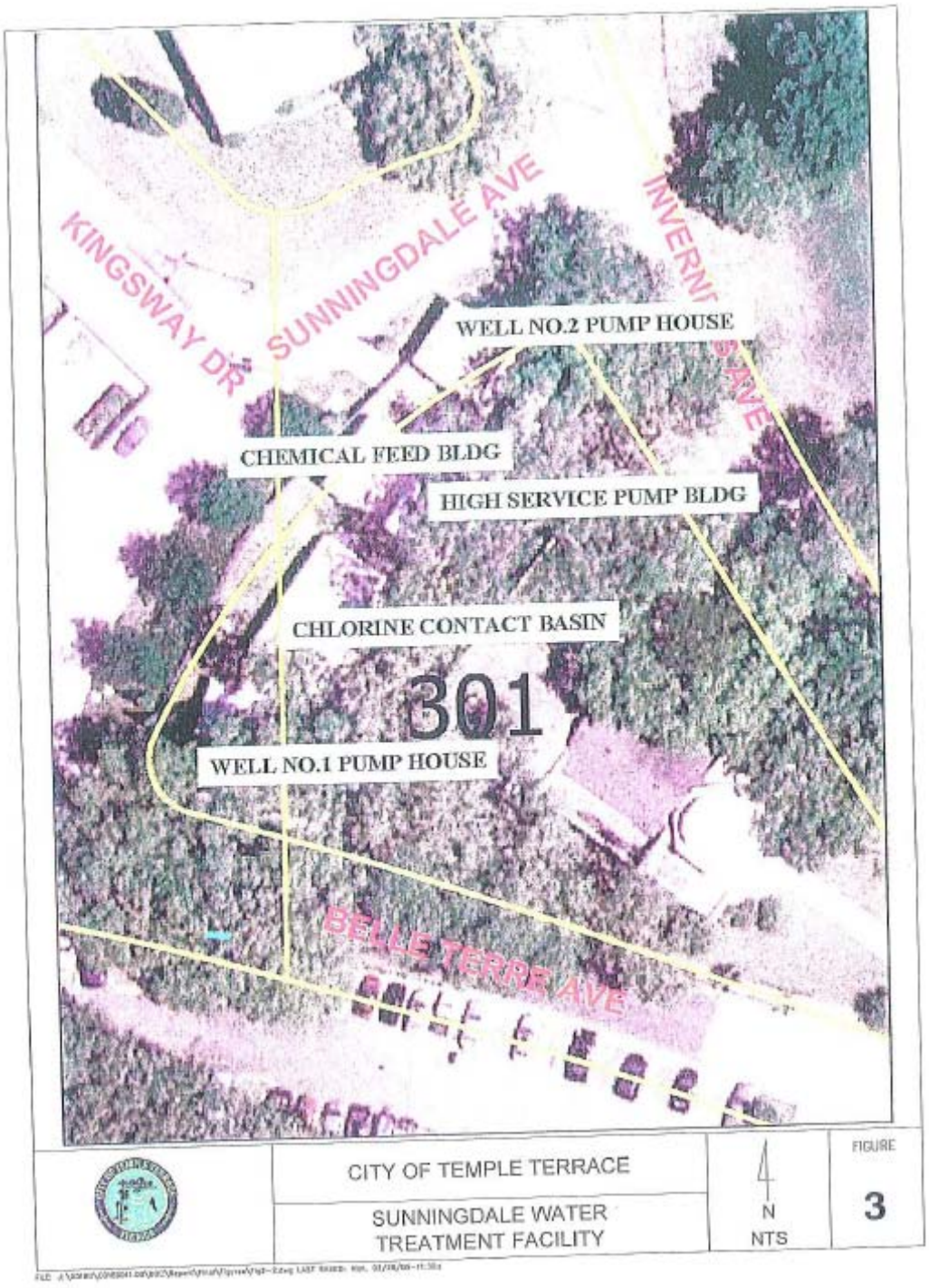

WHITEWAY DR
6103
23
21
518
RAW WATER BLENDING TANK
OFFICE
CATALYTIC REACTOR
6009
STORAGE TANK
516
19
DECARBONATION TANK
LIME SILO
FLUORIDE TANK
17
FILTERS
514
STORAGE TANK
LAB/OFFICE AND PUMP HOUSE
15
512
WATER STORAGE TANK
13
CITY OF TEMPLE TERRACE
WHITEWAY WATER TREATMENT FACILITY
N
NTS
FIGURE
2

Figure 3


KINGSWAY DR
SUNNINGDALE AVE
WELL NO.2 PUMP HOUSE
CHEMICAL FEED BLDG
HIGH SERVICE PUMP BLDG
CHLORINE CONTACT BASIN
301
WELL NO.1 PUMP HOUSE
BELLE TERRE AVE
CITY OF TEMPLE TERRACE
SUNNINGDALE WATER TREATMENT FACILITY
N
NTS
FIGURE
3

Auxiliary Storage and Pumping Facilities

Booster stations with storage tanks are integrated into the distribution system to provide water pressure, equalize supply and demand over periods of high consumption, provide surge relief, and furnish water during fires and other emergencies when power is disrupted. During low demand periods the storage tanks are filled and supply is then retrieved during peak demand periods. The City currently has two auxiliary storage tanks within the distribution. The Telecom Park Storage Facility, located at 12303 East Telecom Parkway, includes a 0.6 MG GST and booster pump station. Two pumps (one as emergency backup) are utilized during high demand periods to boost stored water from the tank into the distribution system. The Chinaberry Storage Facility includes a 0.5 MG GST and booster pump station, and is located at 7303 Sarvis Street. This pump station includes two high service pumps and one recirculating pump. Storage tank dimensions and capacities are summarized in **Table 2**.

Table 2

Water Storage Summary					
Facility	**Diameter (ft)**	**Nominal Capacity (MG)**	**Minimum Water Level (ft)**	**High Water Level (ft)**	**Usable Storage Volume (Gallons)**
Whiteway WTP	70	0.5	6*	17.42	330,000
Whiteway WTP	50	0.2	6*	13.58	112,000
Whiteway WTP	80	1.0	10	26.58	630,000
Telecom Parkway	70	0.6	6	21.83	460,000
Chinaberry	70	0.5	6	17.33	330,000
TOTAL (MG)		**2.8**			**1.9**

*Assumed minimum water level

Distribution System

As previously mentioned, the City of Temple Terrace currently pumps water from the treatment facilities into the distribution system at a pressure of 55 to 65 psi. The distribution system consists of several hundred fire hydrants and approximately 149 miles of pipeline that deliver water to a residential population of over 31,000 throughout the water service area. The distribution system piping generally consists of ductile iron pipe (DIP), cast iron pipe (CIP) and polyvinyl chloride pipe (PVC).

Population Projections

Water supply and distribution needs of a community are directly affected by changes in the population within a community. For that reason, population trends must be accounted for in order to thoroughly evaluate the City's water system. The City's water service area population projections are presented in **Table 3**.

Table 3

Population Projections for the City of Temple Terrace's Water Service Area			
Year	**Residential Population**	**Non-Residential (or Employment) Population**	**Total Population**
2004	31,456	24,003	55,459
2009	35,810 (1)	21,240 (1)	57,050
2014	39,359 (1)	24,020 (1)	63,379

Notes: (1) Year 2009 and Year 2014 residential/non-residential population projections were determined using the City's and Hillsborough County's Future Land Use Plan designations. Hillsborough County Future Land Use designations included the following mixed-use categories:

CMU-12	(Community Mixed Use, 12 units per acre)
CMU-35	(Community Mixed Use, 35 units per acre)
SMU-6	(Suburban Mixed Use, 6 units per acre)
UMU-20	(Urban Mixed Use, 20 units per acre)

These categories were chosen for residential projections even though there is a potential for commercial or industrial use. The reason for this is that residential water demand is typically greater than non-residential water demand, thus creating a worst-case scenario for water demand.

The residential population projections shown above were based on Year 2000 Census Block data. An average annual growth rate of about 2.5% was applied to the Year 2000 population data in order to determine the current Year 2004 population and the future population per census tract for Year 2009 and Year 2014. This projected residential population data was then attributed into a Geographic Information System (GIS) Census Block layer. Through a series of GIS overlays using census blocks, existing land use, future land use and water service area layers, the projected census tract residential population data was calculated and distributed over the City's water service area. **9J-5.011(1)(f)1.b.**

The employment population projections were calculated in a similar manner. Employment data by Traffic Analysis Zone (TAZ) from the Urban Land Use Allocation Model (ULAM) was used to attribute the Hillsborough County TAZ GIS layer. Again, through a series of GIS overlays using TAZs, existing land

use, future land use and water service area layers, the projected employment population data was calculated and distributed over the City's water service area. The employment population decreases from 2004 to 2009 then increases from 2009 to 2014 because of changes in the future land use plan.

The total population presented in **Table 3** is a result of adding the total residential population for each year with the total employment population for each year. Although private wells provide water to a small number of residential and commercial properties within the City's water service area, the reduction in the functional population receiving water from the City is negligible. Based on the City's 2003 distribution pumpage report, the annual average day demand was approximately 3.39 mgd. The total pumpage from the plant was approximately 0.27 million gallons greater than the total consumption billed, which indicated a system water loss. Water loss includes authorized unmetered water use for activities such as firefighting or main flushing and unauthorized water use from leaks, illegal connections, inaccurate meters, etc.

Water Demand Analysis Methodology

For the purposes of master planning, the population within the City's water service area is considered for analysis, while the population served by the City of Tampa is not. The population served by the City can be expressed as an Equivalent Residential Connection (ERC). This is equivalent to the population and water use from a single family dwelling unit. The notation ERC-R and ERC-NR will be used to denote residential and non-residential ERCs, respectively. Single-family residents equal one (1) ERC by definition. The City's 2004 parcel database shows 6,858 single-family residents, totaling 6,858 ERCs. Adding in 5,563 multi-family dwelling units, at 0.40 ERCs per dwelling unit, yields 2,246 multi-family ERCs for 2004, which results in 9,104 ERC-Rs. The multi-family ERC conversion factor was calculated by dividing the average water use per multi-family unit of 123 gallons per day (GPD) by the average water use per single-family unit of 307 GPD, equaling 0.40. **Table 4** summarizes the persons per ERC and ERC-R for the planning years.

Table 4

Equivalent Residential Connections – Residential (ERC-R)		
Year	**Persons per ERC**	**Number of ERC-R**
2004	2.73	9,104
2009	2.67	11,123
2014	2.67	12,174

Non-residential water use has become significant with increased commercial development. The non-residential users are converted to ERCs in order to

calculate water use on an equivalent basis. Briefly, each 16,229 square feet of non-residential property area was considered equal to one (1) ERC for 2004. This conversion factor was estimated from a GIS analysis of non-residential properties and water billing data. **Table 5** presents the non-residential ERCs.

Table 5

Equivalent Residential Connections – Non-Residential (ERC-NR)	
Year	**Number of ERC-NR**
2004	1,938
2009	2,656
2014	2,939

Table 6 presents the combined total ERCs in the water service area.

Table 6

Combined Equivalent Residential Connections	
Year	**Number of ERCs**
2004	11,042
2009	13,779
2014	15,113

The City is currently in the planning stages of a Downtown Redevelopment. Although the initial focus is southeast of Bullard Parkway and 56th Street where the City intends to build a modern Town Center, the redevelopment will also include residential and commercial development around the same area. The initial projected water demands were adjusted, since the land use data, employment projections, and land use allocation model did not account for the redevelopment. Demands from the redevelopment area were projected using preliminary densities and commercial square footage information provided by the developers. Based on the GIS Census analysis, standard engineering practice, Ten State Standards and development data provided by Torti-Gallas, average daily water demands were estimated for residential areas assuming 2.2 persons per each new residential unit at 100 GPD per capita (220 GPD per unit), while 0.1 GPD per sq. ft was used for proposed commercial space. These planning standards were used for the Redevelopment Area's water use analysis, instead of the ERCs, because the standards are more applicable to the data provided in the Torti-Gallas plan. The developers estimated a total of 318,000 sq. ft. of commercial space and 1,066 residential units during the preparation of this report. **Table 7** shows the projected total average daily water demand for each planning period, both with and without the Downtown Redevelopment project.

Table 7

Projected Total Average Daily Demand					
Year	**ERC-R**	**ERC-NR**	**GPD/ERC**	**Average Water Demand (mgd)**	**Adjusted Average Water Demand (mgd)***
2004	9,104	1,938	307	3.39	N/A
2009	11,123	2,656	307	4.0	4.23
2014	12,174	2,939	307	4.4	4.64

* Includes Downtown Redevelopment Project

Maximum day demand is defined as the largest 24-hour demand during the course of a year. The maximum day demand is a crucial component in the assessment of water storage and pumping facilities. The maximum day demand multiplier is typically expressed as the maximum day demand divided by the average day demand. Ratios typically range from 1.5 to 2.0, and in Temple Terrace, occur before the rainy summer season. This is due to increased lawn watering, frequent showers, car washing, etc. The impact of maximum day to average day demand ratio is highly dependent upon the characteristics of the individual community water system. **Table 8** presents a summary of average day, maximum day, and demand ratios from 2000 to 2003 for the City of Temple Terrace. During this period, the average maximum day to average day demand ratio was approximately 1.7.

Table 8

Historical Water Demand			
Calendar Year	**Annual Average Day Demand (mgd)**	**Maximum Day Demand (mgd)**	**Demand Ratio**
2000	3.62	6.53	1.80
2001	3.47	6.31	1.82
2002	3.52	5.46	1.55
2003	3.39	5.73	1.69
Average Demand Ratio (Maximum Day / Average Day)			**1.7**

Peak hour demand is defined as the maximum volume of water used within a 60-minute period. Peak hour demand usually occurs concurrently with the maximum day demand. Peak hour demands typically last for short durations and can be extremely variable. For these reasons, it is common practice to

meet these demands with distribution storage rather than supply sources. Therefore, peak hour demand will be considered when evaluating the sufficiency of Temple Terrace's water distribution storage. An analysis of daily pumping records is typically used to determine peak hour demands. The peak hour multiplier is defined as the peak hour demand divided by the average day demand, and typically ranges from 2.0 to 3.0. Based on Temple Terrace's serviceable population, it is estimated that peak hour demand for the City is 3.0 times the average day demand. **Table 9** summarizes the City's projected average day, maximum day and peak hour demands. As mentioned previously in this report, future projected water demands are based on proposed population growth and an evaluation of historic pumping records.

Table 9

Projected Water Demand Summary			
Year	**Average Day Demand (mgd)**	**Maximum Day Demand (mgd)**	**Peak Hour Demand (mgd)**
2003/4	3.39	5.76	9.96
2009	4.23	7.19	12.69
2014	4.64	7.89	13.92

9J-5.011(1)(e)4.

Water Supply

In determining the adequacy of water supply facilities, the water supply source must be capable of meeting various water demand conditions. At a minimum, the City's well production should be able to meet the maximum day system demand. Relying on storage to make up any deficit in supply under the maximum day condition is not recommended. However, some communities provide a water supply that meets the maximum day demand, while supplying the additional peak hour demand from storage. It is considered good practice to design a standby capability in water supply source. For instance, if the system has been designed so that the total well production capacity is required to meet the maximum demand, any well that is placed out of service because of contamination or pump maintenance will result in a deficient supply. The City's water supply analysis is therefore based on the existing and future maximum day demands versus the current well production with the largest well out of service. The largest water producing well is No. 4, which is located at Whiteway WTP and is rated at 1,000 gpm. **Table 10** summarizes the water supply analysis for the planning period.

Table 10

Water Supply Analysis			
Year	**Maximum Day Demand (mgd)**	**Well Production with Largest Well Out of Service (mgd)**	**Production Surplus or (Deficit)**
2004	5.76	8.86	3.1
2009	7.19	8.86	1.67
2014	7.89	8.86	0.97

9J-5.011(1)(f)1.b. and c.

As indicated in the above table, the City's supply will adequately meet the projected maximum day water demands for the next 10 years.

Facility Design Parameters

The production, distribution and sale of water in the City of Temple Terrace is regulated by Federal and State laws that are designed to protect the health and safety of the public as well as preserve the environment for future generations. The City withdraws water from groundwater wells, adjusts the chemistry and quality before distributing it for public consumption**.** This action classifies the City as a Community Water System (CWS) with groundwater supply under the regulations. **Table 11** provides a summary of the FDEP rules and their impacts to the City.

Table 11

FDEP Chapter 62-555 Impacts on City					
	Requirement	**Facility Design Compliance Issues**	**In Com-pliance**	**Not in Com-pliance**	**Requires Change per Rule**
Monitoring	Hydrogen Sulfide, H_2S	Wells prior to 8/28/03 New wells permitted after 8/28/03	✓ ✓		Compliance by adding treatment in new construction permits August 28, 2003
Facilities	Standby Power for Average Daily Flows	Source – Wells Treatment High-Service Pumping	✓		Confirm compliance by December 31, 2005
	Finished Water Storage (25% of max daily production)		✓		August 28, 2003
	Capacity Analysis		✓		August 28, 2004.

FDEP Chapter 62-555 Impacts on City					
	Requirement	**Facility Design Compliance Issues**	**In Com-pliance**	**Not in Com-pliance**	**Requires Change per Rule**
	Chemical Systems – Materials need to be NSF 61 approved.		✓		For new construction (after August 28, 2003)
	Flood Protection: Accessible at 25-year flood level	Source Treatment Pumping Facilities	✓		August 28, 2003
Maintenance	Hydrant maintenance and Valve Program		✓		2007
	Ground Storage Tanks and hydropneumatic tanks: Maintained annually Cleaned/inspected every 5 yrs.		✓		Cleans annually, work is in progress to formalize the SOP. August 28, 2003
Disinfection	4 log inactivation for bacteria and viruses per CT requirements Disinfection for open tanks.		✓		Evaluate disinfection scheme for vessels that are open to atmosphere and contamination.
1 Dates indicate the start date for compliance.					

Table 12 provides summary of applicable EPA rules and their impacts to the City.

Table 12

U.S Environmental Protection Agency Rule Impacts on City					
	Requirement	**Facility Design Compliance Issues**	**In Com-pliance**	**Not in Com-pliance**	**Requires Change per Rule**
Effective Rules	Consumer Confidence Reports (CCRs)		✓		January 23, 2005 include arsenic[2]
	Unregulated Containment Monitoring Rule, UCMR Started?	Sampling program underway	✓		January 11, 2001
	Disinfection/Disinfectant By Products rule (D/DBPR) Disinfection – see compliance Under FDEP Chapter 62-555 THMs – 80 µ/L MCL HAAs – 60 µ/L MCL		 ✓ ✓ ✓		DBPs = both THMs & HAAs January 1, 2002[1]

U.S Environmental Protection Agency Rule Impacts on City					
	Requirement	**Facility Design Compliance Issues**	**In Com-pliance**	**Not in Com-pliance**	**Requires Change per Rule**
	Vulnerability Assessment		✓		June 30, 2004
	Radionclides: Gross Alpha Uranium		 ✓ ✓		Monitoring not required until gross alpha >5 pCi/L December 8, 2003
	Arsenic:		✓		January 23, 2005
Proposed Rules:	Ground Water Rule		✓		2006
	Radon Rule				Sampling program has not begun December 2007 (proposed)
	Stage 2 D/DBPR IDSE sampling program and analysis				IDSE completed in 2007. Sampling to start in November 2008.

[1] The RAA of TTHM samples must be below 80 µg/L and the RAA of HAA5 samples must be below 60 µg/L. The RAA represents the average over the last quarters. The arithmetic average of the samples taken during each quarter for TTHMs and HAA5 is used to calculate the RAA.
[2] Arsenic is on CCRs and is below proposed MCL.
[3] Dates indicate the start date for compliance.

Water System Evaluation

Evaluation criteria was established for the potable water facilities based upon existing system performance characteristics, City of Temple Terrace Code, and current industry and area standards. Evaluation criteria standards for demand peaking factors, system pressures, pipelines, fire flows, and storage requirements and are summarized in **Table 13**. These standards are the basis for evaluating the City's water system performance and determining improvements required to serve future development.

Table 13

Evaluation Criteria Summary	
Type	**Criteria**
Water Demand Peaking Factors	1.7 x Add – Maximum Day Demand 3.0 x ADD – Peak Hour Demand
System Pressures	With Reservoir levels half full: 40 psi – minimum pressure during Peak Hour Demand 20 psi – minimum residual pressure for Max Day Demand plus fire flow
Pipelines	8 fps – maximum allowable velocity at Peak Hour Demand
Fire Flows	Residential – 500 GPM for 2 hours Commercial – 1,000 GPM for 2 hours (from each of 2 hydrants simultaneously)
Daily Storage	Equal to the total of the following: Equalization – 20 Percent of Maximum Day Demand Fire Flow – Maximum fire flow for the required duration

The range of water pressures experienced at any location is a function of the hydraulic grade and the service elevation. Hydraulic grade is affected by storage water levels, valve settings, and friction losses in the system. According to the City's Code for Water and Sewer Systems, the City does not guarantee a water supply at any particular pressure. However, for evaluation and planning purposes, a minimum allowable pressure of 40 psi under peak hour flow conditions was established. A minimum residual pressure of 20 psi under maximum day demand plus fire flow condition was also established. Although a maximum pressure was not established, high pressures were monitored throughout the system because of the decrease in elevation from the main treatment plant (Whiteway) to the east side of the system.

Criteria for pipeline sizing are based on keeping velocities low to minimize wear on valves and scouring of pipe interiors, and limit head loss in the distribution system. Water distribution mains should be designed to supply peak flows at velocities below 8 feet per second (fps); however, this criterion may be exceeded during fire flow situations. Generally, looping is highly desirable in a distribution system. Long, dead-end pipelines should be avoided where possible because of reliability and water quality concerns.

Water must be available for domestic and irrigational use, but also for

emergency fire fighting situations. Water used for fire flow must be sustainable for a specific duration at a minimum pressure of 20 psi. General standards establishing the amount of water for fire protection purposes are set by Insurance Services Office (ISO), and these general standards are applied by local jurisdictions. The considerations such as type of occupancy, type of construction, and construction materials, distance from other structures, and other factors can be considered when assigning fire flow requirements. Instead of calculating specific fire flows for individual structures, the City of Temple Terrace Land Development Code establishes minimum fire flows for general building categories as follows:

- *Residential areas:* Each hydrant shall be designed to deliver a minimum flow of 500 GPM at a residual pressure of 20 psi.

- *Apartment and commercial areas four (4) stories or less:* The system shall be designed to deliver a minimum flow of either 500 GPM each from two hydrants at the same time or 1,000 GPM from one hydrant at a residual pressure of 20 psi.

- *Commercial and apartments over four (4) stories:* The system shall be designed to deliver a minimum flow of 1,000 GPM from each of two hydrants at the same time, with a residual pressure of 20 psi.

A municipality must continue to service its domestic, commercial, and industrial customers during a fire. ISO has recommended that a fire system be able to operate with the potable water system operating at the maximum average daily rate plus fire flow as indicated in **Table 14.**

Table 14

Required Durations for Fire Fighting	
Required Fire Flow	**Duration**
Less than 3,000 GPM	2 hours
3,000 to 3,500 GPM	3 hours
4,000 GPM or greater	4 hours

Storage Criteria

Water distribution storage is generally provided to meet peak demands of short duration, allowing for more uniform water pumping rates and system equalization. In addition, water storage provides a reserve to meet fire fighting requirements and emergency situations. Emergency storage provides water during emergency situations, such as pipeline failures, equipment failures, well contamination, etc. The amount of emergency storage included within a particular water distribution system is an owner option based upon an

assessment of risk and desired degree of dependability.

Utilizing 20 percent of the maximum day demand, equalization volumes to meet peak hourly demands were calculated through the year 2014, as shown in **Table 15**.

Table 15

Equalization Storage Requirements		
Year	**Maximum Day Demand (mgd)**	**Equalization Storage (mgd)**
2004	5.76	1.15
2009	7.19	1.44
2014	7.89	1.58

The City's water system must be able to supply enough water to extinguish the worst-case fire that is likely to occur within its service area. Each storage facility should have enough volume to furnish fire flow requirements within its area of influence. The quantity of storage necessary for fire protection is based on the fire flow requirements previously established. Since the City's worst-case fire flow requirement is 2,000 GPM (1,000 GPM from each of two hydrants, per Temple Terrace Land Development Code), a storage volume of this flow rate for 2 hours is required based upon the ISO fire flow and duration in **Table 14.** Under this scenario, the City requires at least 240,000 gallons of fire protection storage.

Emergency or reserve storage provides water during emergency situations, such as pipeline failures, equipment failure, electrical power outages, water treatment facility failures, raw water supply contamination, or natural disasters. The amount of emergency storage included within a particular water distribution area is more difficult to determine, since there is not an exact requirement or formula. The decision is more of an owner option based upon an assessment of risk or vulnerability of the water supply and the desired degree of system dependability. The City has several water supply sources and treatment facilities all equipped with auxiliary power, therefore the vulnerability of the water system is low and the need for emergency storage is small. Therefore, the total amount of storage recommended is the combination of volumes required for equalization and fire protection. These are summarized in **Table 16** on the following page.

Table 16

Total Storage Requirements						
Year	**Maximum Day Demand (mgd)**	**Equalization Storage (mg)**	**Fire Flow Storage (mg)**	**Total Storage Needed (mg)**	**Existing Usable Storage Capacity (mg)**	**Volume Surplus or (Deficit) (mg)**
2004	5.76	1.15	0.24	1.39	1.9	0.51
2009	7.19	1.44	0.24	1.68	1.9	0.22
2014	7.89	1.58	0.24	1.82	1.9	0.08

The system currently has adequate storage to meet the equalization and fire protection requirements for the 10-year planning period. However, additional volume and reliability may become necessary if the City experiences a more accelerated growth rate than that predicted. Since the calculated usable storage capacity accounts for operational low water levels in the tanks, the actual available storage in the tanks is reduced. Additional volume could become available if the high-service pumps are able to operate below the set low water level and still meet the manufacturer's required net positive suction head. Alternatively, the City does have a proposed site at the Whiteway WTP intended for a future 1.0 MG storage tank. The City has also purchased land for potential storage on the east side of the system at two separate locations: south of Fowler Avenue between Jefferson Road and I-75 and west of David Road at the end of Inca Drive. A potable water interconnect with a neighboring utility is also an inexpensive method of increasing reliability and providing flows during emergency situations. TBW and the City have discussed a possible interconnect. Although the original intent was for the sale of potable water from the City to TBW, the project is still a viable means of increasing the dependability of the City's water system.

Hydraulic Evaluation

A hydraulic model of the Temple Terrace water system was used to evaluate both current and projected (2009 and 2014) average day, maximum day, and peak hour demands. The model was also used to determine the availability of fire flow throughout the system. The available fire flow from the hydraulic model results should be interpreted only as an approximation. The actual flow rate available from any given fire hydrant with a 20 psi residual pressure is dependent on the exact location, and type of fire hydrant, and also the physical condition (and resulting friction loss) of the upstream pipelines. Results from the fire flow simulation include the available fire flow at each node with a 20 psi residual pressure. The fire flow simulations were executed with maximum day demands and storage tank water levels set to half full. The available fire flow at each node was then compared to the fire flow required by City code, based on the existing and future land use. The resulting nodes that do not

meet the required fire flow requirements are summarized in **Table 17**.

Table 17

Fire Flow Analysis			
Location	**Land Use**	**Minimum Required Fire Flow per Hydrant (GPM)**	**Available Fire Flow (GPM)**
2004			
N. Glen Arven Ave. (Florida College)	Institutional	1,000	662
N. 56th and E. Riverhills	Commercial	1,000	841
W. River Dr. and Courtney Dr.	Residential	500	398
Vanderbaker Rd. and E. River Dr.	Residential	500	489
2009			
N. Glen Arven Ave. (Florida College)	Institutional	1,000	634
N. 56th and E. Riverhills	Commercial	1,000	788
W. River Dr. and Courtney Dr.	Residential	500	392
Vanderbaker Rd. and E. River Dr.	Residential	500	482
2014			
N. Glen Arven Ave. (Florida College)	Institutional	1,000	616
N. 56th and E. Riverhills	Commercial	1,000	762
W. River Dr. and Courtney Dr.	Residential	500	382
Vanderbaker Rd. and E. River Dr.	Residential	500	468

In addition to identifying areas of deficient fire flow, the model was used to analyze the effectiveness of the large transmission mains in the water distribution system. All sources of water supply and storage should be linked together by these large transmission mains, providing an efficient means for water to enter the distribution system. Without adequate transmission main looping, fluctuations in system pressure and storage tank levels will occur during periods of high demand. In performing this analysis, the model was used to identify existing and proposed transmission mains 10-inch in diameter and greater. The transmission network was then inspected for areas of pipeline diameter discontinuity, where a smaller diameter pipe connects two larger sized diameter pipes. The analysis revealed several areas of discontinuity described below:

1. Approximately 200 feet of 6-inch pipe connect two 10-inch mains along 56th Street between Mission Hills Avenue and 98th Avenue.

2. Approximately 130 feet of 8-inch pipe connect two 10-inch mains across the intersection of 56th Street and Bullard Parkway.

3. Approximately 430 feet of 6-inch cast iron pipe connect two 10-inch mains along N. 78th Street between Renald Drive and Sequoia Boulevard.

4. The 8-inch cast iron pipe along Sarvis Street connects 12-inch distribution

piping from Chinaberry to a 10-inch pipe heading north along Temple Park Drive.

5. Approximately 80 feet of 8-inch ductile iron pipe connects two 12-inch mains along Morris Bridge Road at the Davis Road intersection.

6. Approximately 1,800 feet of 8-inch ductile iron pipe connects the 10-inch main along the power easement to the 10-inch main along Morris Bridge Road.

7. Approximately 570 feet of 8-inch along Navajo Drive connects the 10-inch along the same Drive with a 10-inch along Raulerson Ranch Road.

8. Only an 8-inch line distributes water to the south from Whiteway WTP. Approximately 1,200 feet of 8-inch cast iron pipe connects the treatment plant to a 12-inch pipe on the south side of the plant site.

9. Approximately 1,020 feet of 8-inch line to the west of Sunningdale WTP connects the 12-inch main at Belle Terre and Sunningdale Avenue to the 12-inch main that travels south on N. Greenfield Avenue.

10. Approximately 900 feet of 8-inch pipe connect the 10-inch main along E. Fowler Avenue to the 10-inch main along U.S. Highway 301.

11. Approximately 4,300 feet of proposed 8-inch pipe along US 301 will connect a proposed 12-inch pipe along Harney Road to a proposed 10-inch pipe along Maislin Drive (from 1991 Water Master Plan by Tomasino and Associates).

12. Approximately 1,300 feet of proposed 12-inch pipe along US 301 will connect an existing 10-inch pipe along Fowler Avenue to an existing 10-inch pipe along US 301 (from 1991 Water Master Plan by Tomasino and Associates).

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STRATEGIES FOR IMPLEMENTATION

The five-year Capital Improvement Program (CIP) will be implemented as funds become available. The CIP will be reviewed annually and new priorities will be assigned as necessary to maintain levels of service established in this Comprehensive Plan. Design standards as set forth in this subelement will be enforced for all development approvals.

EXISTING AND FUTURE NEEDS

The assessment of the City's existing water system has identified various deficiencies and performance limiting factors. Water system improvements are identified to address these areas of concern.

Water Supply

Regarding compliance with FDEP's capacity rules (62-555.348(3)) projections indicate that the City should be able to operate both treatment plants without exceeding 75% of the system capacity until the total system maximum day demand equals 6.8 mgd (75% of 9.04 mgd existing max day capacity). Based upon demand projections, this could occur in about 2008. Although reaching the 75% threshold will require submittal of a Capacity Analysis Report (CAR), unless the projections prepared at that time indicate a demand that exceeds the capacity of the water supply system, no expansion or capacity-related improvements should be required.

Water Use, Quality, and Treatment

The water quality has been meeting the needs of the City both in regulatory compliance and expectations of the customers under the current treatment practices. New regulations that focus on the formation of disinfection byproducts (DBPs) in a public water supply are becoming more stringent in both monitoring and treatment methods. The City must develop an Initial Distribution System Evaluation (IDSE) under the guidance established by the EPA to determine the extent that remediation will be required for DBPs. An IDSE is a systematic study of sampling and hydraulic analyses that must be conducted by water system suppliers to identify DBP compliance monitoring sites that represent high DPB levels in the distribution system. The IDSE is to be developed and completed in accordance with the EPA Manual entitled "Stage 2 Disinfectants and Disinfection Byproducts Rule Initial Distribution System Evaluation". After a year of monitoring, new sites will be identified for DBP compliance, rather than continuing to use the Stage 1 DBP sites that were based on residence time only. After the Stage 2 DBP Rule goes into effect, the IDSE must be completed within 2 years.

During the course of the IDSE process, it may be determined that DBP levels are high enough to warrant further studies. The City should at that point

undertake a pilot study at each facility to determine the impact that DBP precursors have on the formation of DBPs in the City's current source waters. Should the early IDSE process show DBPs above the regulatory parameters, the City could elect at that time to convert the current chlorination practices to chloramination. In the event that the IDSE found violations of the DBP formation was not resolved by the utilization of chloramines, a series of studies could be considered for finalizing a treatment approach to the potential violation. Pilot studies can determine the viability of blended water versus total softening with membrane technology versus enhanced lime softening. Pilot studies would also determine the proper membrane selection, the maximum recovery available, and the impact of blending raw water with the softened water to prevent DBP formation. Since the use of membrane filtration may require an increase in groundwater withdrawals, the City must enter into a feasibility study to determine what source water is available from SWFWMD. There is no guarantee that SWFWMD would grant additional groundwater withdrawals. Based on the feasibility study outcome the City could request permission from SWFWMD for withdrawal of additional amounts of water from the City's existing well field.

Approximately two years will be required to complete the IDSE. If required, related disinfection pilot studies, implementation, and testing could take another two years. If modifying disinfection methods proves to be insufficient and more extensive treatment improvements are required, the potential schedule of planning, permitting, and design through construction could take a minimum of five additional years.

The current treatment scheme presents an imbalance of treated water in the distribution system. The tightening of DBP formation regulations and potential future regulations would present a number of challenges for the City to avoid violation of the regulatory requirements, when utilizing water from both Whiteway and Sunningdale. For future planning, a phased approach to treatment is required with consideration of the following alternatives:

a.) Convert the secondary disinfectant (the disinfectant used for the distribution system after the primary disinfectant is added for pathogen inactivation) from free chlorine residual to chloramines. Chloramines do not react as quickly as free chlorine to produce DBPs, thus, chloramines in the distribution system will reduce the potential for formation of disinfectant by-product formation in the distribution system and ensure a margin of safety for DBP compliance.

b.) Modify existing equipment at Whiteway or replace to provide enhanced lime softening treatment of the water supply.

c.) Add membrane treatment to the Whiteway facility to improve the quality of the finished product and reduce the potential for disinfectant by-product precursors available in the treated water.

d.) Add membrane treatment to the Sunningdale facility to improve the quality of the finished product and reduce the potential for disinfectant by-product precursors available in the treated water.

e.) Pump the water supply from the Sunningdale facility to the Whiteway facility for treatment to the same standards as provided at that facility.

The above alternatives approach the problem by reducing potential for formation of these by-products, by changing disinfection practices or improving treatment for precursor reduction. Because of the uncertainty of the IDSE results, specific treatment recommendations cannot be made at this time. Therefore, the City should carefully consider improvements to both the Whiteway and Sunningdale facilities by following the "DBP Decision Chart" in Section 8 of the *Potable Water Master Plan, July 2005*.

Storage

The purpose of distribution system storage is to provide a sufficient supply of water to meet peak hourly demands, while maintaining a reserve for fire protection and other emergencies. Utilizing 20 percent of the maximum day demand, the current demand projections indicate the City has adequate storage for equalization and fire flow purposes for the 10-year planning period. If the City experiences a more accelerated growth rate than that predicted here, additional storage may become necessary. As a result, the City should monitor growth and the resulting maximum day demand rates such that, if the maximum day demand approaches 8.3 mgd at the current fire flow requirement of 0.24 MG, design of additional storage facilities should begin at the Whiteway WTP, Inca Drive, or I-75 and Fowler Avenue locations. Also, an emergency water source, such as an interconnect with Tampa Bay Water (TBW) could be further investigated at this time.

Constructing additional storage tanks may be more cost effective than constructing an interconnect to TBW. The City should revisit the interconnect concept in 2015 should increased demand, fire flows and low pressures warrant it, but for this planning period, the interconnect is not needed. Water quality type issues exist with the interconnect since TBW utilizes chloramines for disinfection and the City uses chlorine gas. Customers would have to be informed and educated about the interconnect and water since chloramines must be removed from water used for dialysis machines and pet fish tanks or ponds.

Distribution Piping

Several projects are recommended to increase the available fire flow capacity in the existing system. The projects involve cleaning or replacement of older cast iron pipes and eliminating dead end pipes. It is recommended that the City conduct hydrant flow tests at the locations identified to confirm the modeling results before constructing the proposed fire flow improvements. As previously stated, the fire flow is dependent on the exact location, elevation, type of hydrant, and the physical condition of the upstream pipelines. Other projects and operational changes include eliminating discontinuities in transmission mains, replacing old pipe in poor condition, improving the interconnection of the water storage tanks with the distribution system network, and formalizing the valve exercise, storage tank inspection and cleaning, and flushing programs.

Also included in the recommended projects are the proposed water system improvements from the 1991 Temple Terrace Water Master Plan by Tomasino & Associates. These improvements include future transmission and distribution lines to accommodate projected growth in the northeast and southeast areas of the City. Although the original proposed pipeline diameters were verified in the hydraulic model, a few modifications are recommended to eliminate pipeline diameter discontinuity. The 12-inch transmission main proposed along US 301 between I-75 and Fowler Avenue would create a connection between two existing 10-inch water mains (the 10-inch on US 301 north of Copeland Road and the 10-inch on US 301 west of Williams Road). A transmission main diameter of 10-inch instead of 12-inch is proposed. The second modification is of the proposed 12-inch and 8-inch pipelines along US 301, which would connect the existing 10-inch pipeline at Copeland Road and the proposed 10-inch pipeline along Maislin Road. A 10-inch diameter pipeline is proposed instead, which would create a complete 10-inch loop. Both modifications were verified in the model to meet the evaluation criteria previously established.

During discussions with the City about future pipeline improvements, the issue of the City's aging system arose, specifically in the downtown redevelopment area. This area is south of Busch Boulevard between Beverly Drive and Sunnyside Road, and contains pipes that are 50 years old or more. Although the hydraulic model verified the pipe diameters are adequately sized for the growth resulting from the redevelopment, the pipes may become out of alignment with the widening and reconfiguring of streets. As a result, pipe replacements are suggested during the construction phases of the redevelopment. Widening of 56th Street has been proposed in addition to several new streets; therefore properly aligned pipes could be installed during the construction of these improvements. Although the estimated cost of replacing these pipes has been added to the capital improvements plan, the City should test the existing pipes to confirm replacements are actually needed before the onset of design. If new pipes are required, the City should also

remain informed on any design or construction time changes in the redevelopment plan, since it is currently only in the preliminary design stage.

Based on the improvements discussed above the following recommendations are proposed: cleaning and pigging of approximately 6,350 feet of CIP, installing approximately 420 feet of pipe to eliminate dead end mains, installing 930 feet of pipe to eliminate pipeline discontinuity, and installing approximately 3,675 feet of pipe to improve the connections between water storage tanks or booster pumps and the distribution system network. The City contains several miles of old CIP that is most likely highly corroded. Pigging and cleaning of water distribution lines can remove scale and debris from pipe segments, while improving the hydraulic flow at a fraction of the cost of rehabilitation methods or replacement. In addition, the northeast and southeast expansions will require approximately 20,350 and 29,200 feet of new pipe, respectively, while the Redevelopment Plan will require roughly 14,900 feet of new pipe.

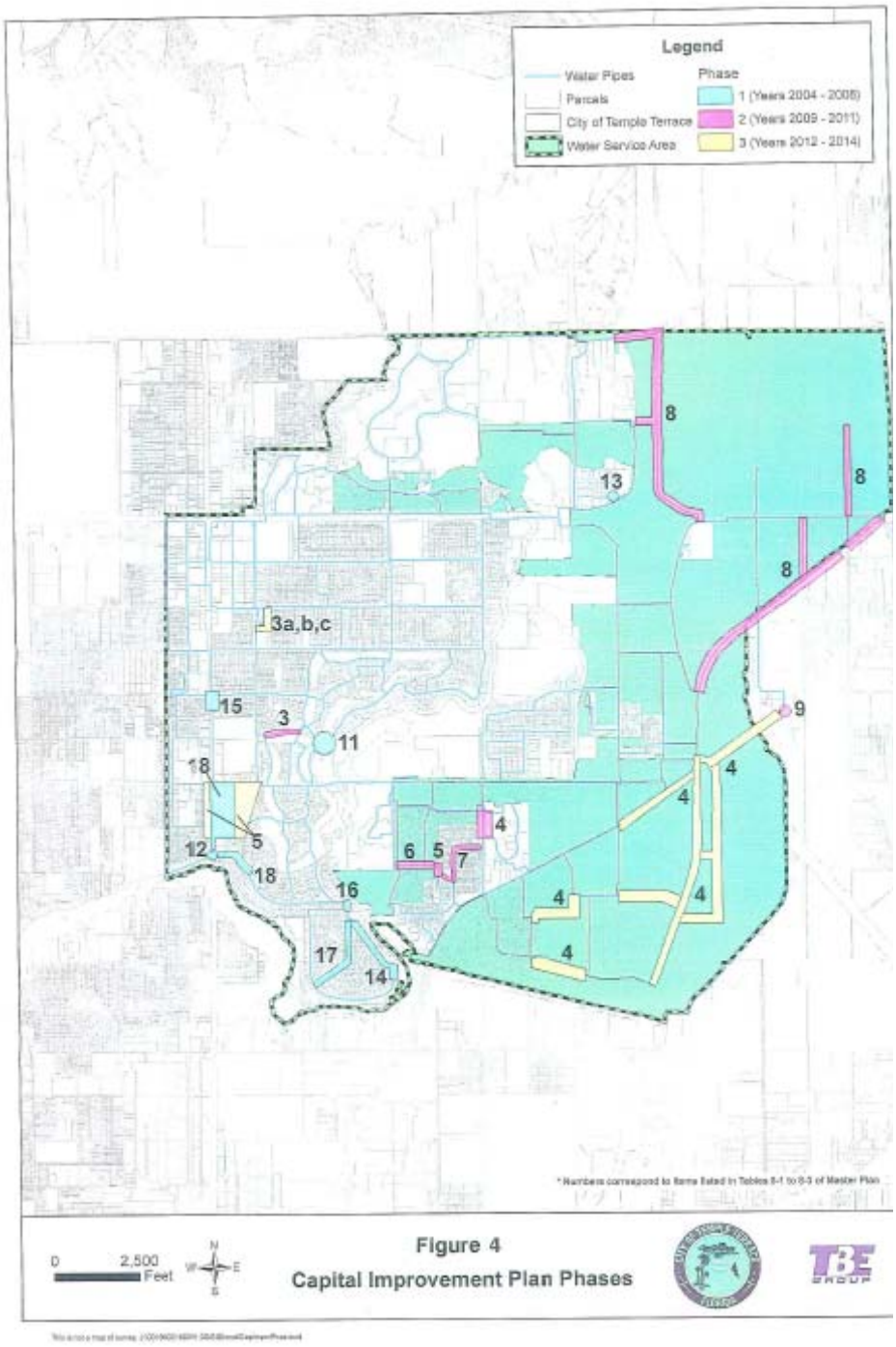
Staffing

The Deputy Director, Utilities, is in direct charge of the Water and Sewer division, which includes a total of 27 positions (including Renewal and Replacement). **9J-5.011(1)(e)1** The 17 positions indicated below are solely dedicated to the City's water system. Eight positions are allotted to the treatment plants, while the remaining 9 positions are designated for the distribution system. In general, the level of staffing for both Whiteway and Sunningdale meets the regulatory requirements and is appropriate for the current facility size.

Capital Improvements Plan

In order to give some priority to the recommended water system improvements and to help the City in financing the proposed program, it is recommended that improvements be implemented in phases. However, it is not necessary that the order listed within this chapter be followed exactly. More importantly, the City should address those issues that respond to local concerns and at the same time are financially feasible. The proposed implementation for recommended improvements has been divided into three phases spread out over the course of 10 years as follows: Phase I improvements should be completed during the years 2004 through 2008, Phase II improvements should be completed during the years 2009 through 2011, while Phase III improvements should be completed during the years 2012 to 2014. The improvements for each phase are described in **Tables 18 through 20** and highlighted in **Figure 4**.

Figure 4


Legend
Water Pipes
Parcels
City of Temple Terrace
Water Service Area
Phase
1 (Years 2004 - 2008)
2 (Years 2009 - 2011)
3 (Years 2012 - 2014)
8
13
8
8
3a,b,c
15
3
11
9
18
4
4
12
5
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18
16
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Figure 4
Capital Improvement Plan Phases
TBE GROUP

Table 18

Phase I Improvements (2004 to 2008)	
Description	
WATER SUPPLY	
1	Prepare capacity Analysis Report when the maximum day demand reaches 6.8 mgd (estimated to occur in 2008).
WATER USE, QUALITY, AND TREATMENT	
2	Implement the Vulnerability Assessment Recommendations (includes conversion from gaseous chlorine to liquid sodium hypochlorite).
3	Operations and Maintenance Manual for water treatment system completed in 2007.
4	Water Use Permit (WUP) renewal submitted. Should be received in November 2008.
5	IDSE completed in 2007.
6	Construct chloramination improvements (if required).
DISTRIBUTION	
7	Formalize the current flushing plan. This will assist in DBP formation reduction.
8	Finalize SOP for cleaning and inspection of water storage tanks.
9	Finalize SOP for valve and hydrant exercise program.
10	Install 300 feet of 6-inch of water main (WM) along North Riverhills Drive. This will eliminate the dead end main at Florida College and remove the fire hydrant deficiency.
11	Install 230 feet of 6-inch WM along 56th Street between West Riverhills Drive and Ridgeway Road. This will remove the dead end, replace the 4-inch water line along 56th Street, and eliminate the fire hydrant deficiency.
12	Install 100 feet of 12-inch WM across the intersection of Davis Road and Morris Bridge Road. This will remove the pipe discontinuity and improve fire flow and hydraulics.
13	Clean and flush approximately 2,700 feet of 6-inch CIP WM along Vanderbaker Road and West River Drive. This will replace the aging cast iron pipe, increase residual pressures, and increase fire flow availability.
14	Install 200 feet of 10-inch WM south of Mission Hills Avenue along 56th Street to replace the 6-inch WM. This will remove the pipe diameter discontinuity and provide better looping and fire flow availability.
15	Install 200 feet of 8-inch WM to replace the 6-inch WM along S. Riverhills Drive (between Biltmore Avenue and Vanderbaker Road). This will remove the pipe diameter discontinuity and improve system hydraulics.
16	Clean and flush the 2,700 feet of 6-inch CIP starting at S. Riverhills Drive and Vanderbaker Road continuing to the end of Belle Meade Avenue. This will improve the hydraulics of the aging CIP and increase fire flow availability to the surrounding area.
17	Replace necessary aging pipelines during the initial phases of the Downtown Redevelopment. This will include replacement of 600 feet of 12-inch WM, 3,900 feet of 8-inch WM, and 2,900 feet of 6-inch WM to improve hydraulics and increase fire flow to the redevelopment area.

Table 19

Phase II Improvements (2009 to 20011)	
Description	
Water Supply	
1	Begin planning associated with improved treatment (if required).
Water Use, Quality, Treatment, and Staffing	
2	Begin planning associated with improved treatment (if required)
DISTRIBUTION	
3	Replace 1,050 LF of 8-inch WM along Belle Terre Avenue with 12-inch WM. This will remove the pipeline discontinuity between Sunningdale and the distribution system and improve system hydraulics.
4	Replace 430 Lf of 6-inch CIP with 10-inch WM along N. 78th St. between Renald Drive and Sequoia Boulevard. This will remove the pipeline discontinuity and improve hydraulics and fire flow availability in the area.
5	Install approximately 300 feet of 10-inch water main along Sarvis Street to Temple Park Drive. This will replace the existing aging 8-inch cast iron pipe and provide improved hydraulics, connectivity, and fire flow from the Chinaberry water storage tank.
6	Clean, flush and pig 800 feet of existing 8-inch CIP along Sarvis Street between Temple Park Drive and Tupelo Drive. This will improve the hydraulics of the aging CIP and increase fire flow availability
7	Install approximately 2,200 feet of 10-inch water main along Willow Park drive and Renald Boulevard. This will improve the connectivity of the Chinaberry GST with the transmission main system and increase fire flow availability.
8	Install pipelines necessary for the Northeast expansion. This will include installation of approximately 650 feet of 12-inch WM, 17,000 feet of 10-inch WM, and 2,700 feet of 8-inch WM in the areas north and east of I-75 and US 301.
9	Discontinue Hillsborough County master meter. Based on discussions with the County's Water Department, the necessary water lines will be installed by 2009 in this area so that water supplied by Temple Terrace will no longer be required by the County.

Table 20

Phase II Improvements (2012 to 2014)	
Description	
Water Supply	
1	Continued implementation related to improved treatment (if required).
Water Use, Quality, Treatment, and Staffing	
2	Continue implementation related to improved treatment (if required).
Distribution	
3a	Piping modifications at Whiteway WTP to increase pressures and fire flow availability along the west side of the water system. Install a 16-inch connection to the existing 16-inch water main leaving the north side of the property. Install approximately 125 feet of 16-inch WM from the new connection west along Whiteway Drive to the existing 8-inch CIP.
3B	Replace the existing 8-inch CIP along the east side of the Whiteway WTP property with approximately 800 feet of 12-inch WM.
3c	Clean, flush and pig 150 feet of the existing 12-inch CIP along the south side of the Whiteway WTP property that currently connects to the 8-inch CIP on the east side of the property.
4	Install pipelines necessary for the Southeast expansion. This will include installation of approximately 6,500 feet of 12-inch WM, 8,700 feet of 10-inch WM, and 14,000 feet of 8-inch WM in the areas north and east of I-75 and US 301.
5	Replace necessary aging pipelines during the final phases of the Downtown Redevelopment. This will include replacement of approximately 800 feet of 12-inch WM, 230 feet of 8-inch WM, and 6,500 feet of 6-inch WM to improve the hydraulics and increase fire flow to the redevelopment area.

ESTIMATED CAPITAL COSTS

The estimated capital costs presented in this section represent associated costs for construction and include a 30 percent addition for engineering, administrative work, legal fees, and contingencies. Each estimated project cost in **Tables 21 through 23** is shown in 2004 dollars. The percent increase of the annual average Engineering News Record (ENR) Construction Cost Index over the past 20 years was approximately 2.5 percent, therefore to estimate future costs, this rate was used to account for inflation between today and the proposed year of the project. The unit costs utilized in this report for new water main construction, includes the cost for pipe design and engineering, installation, valves, hydrants, paving and appurtenant items required for a complete project. These costs are based on recent bid tabulations for similar type projects. The estimated costs for completing the recommended improvements are presented in **Tables 21 through 23**, and summarized in **Table 24**.

Table 21

Estimated Cost of Phase I Improvements (2004 to 2008)						
	Description	**Unit Cost**	**Capital Cost**	**Engineering, Admin, Legal, Contingencies, 30%**	**Total Cost (in 2004 $)**	**Year**
Water Supply, Quality, and Treatment						
1	Implement Vulnerability Assessment recommendations.	LS	$807,000	-	$807,000	2005-2007
2	IDSE Survey and Precursor Survey & Precursor Study.	LS	$0	$50,000	$50,000	2005
3	Prepare O&M Manual.	LS	$0	$50,000	$50,000	2005
4	Prepare Water Use Permit.	LS	$0	$50,000	$50,000	2007
5	Construct chloramination improvements (if required).*	LS	$40,000	$12,000	$52,000	2007-2008
6	Prepare Capacity Analysis Report.	LS	$0	$25,000	$25,000	2008
Water Distribution						
7	Install 300 LF 6-inch WM along North Riverhills Drive (at Florida College).	$50/LF	$15,000	$4,500	$19,500	2006
8	Install 120 LF 6-inch WM at West Riverhills Drive and 56th Street.	$50/LF	$6,000	$1,800	$7,800	2006
9	Clean, flush, and pig 2,700 LF 8-inch and 6-inch CIP WM along Vanderbaker Road and W. River Drive.	$4.5/LF	$12,150	$3,645	$15,800	2006
10	Clean, flush, and pig 2,700 LF of 6-inch CIP at South Riverhills Drive and Vanderbaker Road to the end of Belle Meade Avenue.	$4.5/LF	$12,150	$3,645	$15,800	2006
11	Abandon and replace 200 LF 6-inch WM with 10-inch WM south of Mission Hills Avenue along 56th Street.	$70/LF	$14,000	$4,200	$18,200	2007
12	Install 200 LF 8-inch WM along South Riverhills Drive (between Biltmore Avenue and Vanderbaker Road).	$60/LF	$12,000	$3,600	$15,600	2007
13	Install 600 LF 12-inch WM, 3,900 LF 8-inch WM, and 2,900 LF 6-inch WM for initial phases of the Downtown Redevelopment Plan.	**	$427,000	$128,100	$555,100	2007
14	Replace 100 LF of 8-inch WM with 12-inch WM at Davis Road and Morris Bridge Road.	$80/LF	$8,000	$2,400	$10,400	2008
	TOTAL COST				**$1.69 M**	
	FUTURE COST				**$1.73 M**	

* Action taken depends on IDSE study results, as discussed in Section 8 of the *Potable Water Master Plan, July 2005.*

**Unit costs of $60/LF of 8-inch, $70/LF of 10-inch, and $80/LF of 12-inch

Table 22

Estimated Cost of Phase II Improvements (2009 to 2011)						
	Description	**Unit Cost**	**Capital Cost**	**Engineering, Admin, Legal, Contingencies, 30%**	**Total Cost (in 2004 $)**	**Year**
Water Supply, Quality, and Treatment						
1	Initiate planning (if required)*	LS	$0	$250,000	$250,000	2011
Water Distribution						
2	Replace 1,050 LF of 8-inch WM along Belle Terre Avenue with 12-inch WM.	$80/LF	$84,000	$25,200	$109,200	2009
3	Replace 430 LF of 6-inch CIP with 10-inch WM along N. 78th Street between Renald Drive and Sequoia Boulevard.	$70/LF	$30,100	$9,030	$39,200	2009
4	Install 650 LF 12-inch WM, 17,000 LF 10-inch WM, and 2,700 LF 8-inch WM to expand the Northeast water service area.	**	$1.4 M	$421,200	$1.83 M	2009
5	Abandon and replace 300 LF 8-inch WM with 10-inch WM along Sarvis Street west of Chinaberry GST.	$70/LF	$21,000	$6,300	$27,300	2010
6	Clean, flush and pig 800 feet of existing 8-inch CIP along Sarvis Street between Temple Park Drive and Tupelo Drive.	$4/LF	$3,200	$960	$4,200	2010
7	Install approximately 2,200 feet of 10-inch WM along Willow Park Drive and Renald Boulevard.	$70/LF	$154,000	$46,200	$200,200	2011
TOTAL COST					**$2.46 M**	
	FUTURE COST				**$2.74 M**	

*Action taken depends on IDSE study results, as discussed in Section 8.
**Unit costs of $60/LF of 8-inch, $70/LF of 10-inch, and $80/LF of 12-inch.

Table 23

Estimated Cost of Phase II Improvements (2009 to 2011)						
	Description	**Unit Cost**	**Capital Cost**	**Engineering, Admin, Legal, Contingencies, 30%**	**Total Cost (in 2004 $)**	**Year**
Water Supply, Quality, and Treatment						
1	Design/Construct facilities related to improved treatment	LS	**	**	**	2012-2016
Water Distribution						
2a	Piping modifications at Whiteway to include installation of a 16-inch connection to the existing 16-inch WM leaving the north side of the plant. Install approximately 125 feet of 16-inch WM west along Whiteway Drive.	$125/LF	$15,625	$4,700	$20,400	2012
b	Replace the existing 8-inch CIP along the east side of the Whiteway WTP property with approximately 800 feet of 12-inch WM.	$80/LF	$64,000	$19,200	$83,200	21012
c	Clean, flush, and pig 150 feet of the existing 12-inch CIP along the south side of the Whiteway WTP property	$8/LF	$1,200	$360	$1,600	2012
3	Install 800 LF 12-inch WM, 230 LF 8-inch WM, and 6,500 LF 6-inch WM for the final phases of the Downtown Redevelopment Plan	*	$403,000	$120,900	$523,900	2012
4	Install 6,500 LF 12-inch WM, 8,700 LF 10-inch WM, and 14,000 LF 8-inch WM to expand the Southeast water service area.	*		$590,700	$2,56 M	2014
	TOTAL COST				**$3.19 M****	
	FUTURE COST				**$3.95 M****	

* Unit costs of $50/LF of 6-inch, $60/LF of 8-inch, $70/LF of 10-inch, and $80/Lf of 12-inch.

** Since treatment improvements may not be necessary during the planning horizon, and funding would come from various sources, a cost for treatment improvements has not been included in either the "total" cost or "future" cost for Phase III. For information purposes, however, it is reasonable to note that treatment improvements could cost, if required, from about $1 per gallon for various upgrades/enhancements to the 10-mgd of existing facilities (i.e., $10 million) up to about $3 per gallon for a brand new 10-mgd nanofiltration facility considering components such as wells, plant, and concentrate disposal (i.e., $30 million).

All costs are estimates based on pre-design information currently known about the City's facilities. Additional information on the availability of land and associated siting has not been included.

Table 24

Capital Improvement Cost Summary		
Phase	**Estimated Capital Cost (2004 Dollars)**	**Estimated Capital Cost (Future Dollars)**
I	$1.69 M	$1.73 M
II	$2.46 M	$2.74 M
III	$3.19 M	$3.95 M

Table 25 presents the operating income, expenses and capital improvement project financials from 2005 to 2014. **Table 26** presents the Financial Summary. Several assumptions are made in estimating these future operating income and expense figures, which include:

- Straight line projection method used to estimate water demands (2004 to 2009 and 2009 to 2014).
- The 2005 percent increase, of 6.12%, in water consumption includes 2003 and 2004.00000
- Irrigation flows increase at same rate as water demand.
- Improvement Fund 2005 Beginning Balance: $ 1,600,000
- 6-Year Historical Water Improvement Fee – Annual Average: $ 330,226
- Actual Wastewater Volume Billed for FY 03/04 (gallons): 829,405,256
- Water loss per year in distribution system: 7%
- Increase in sewer rate begins in 2004: 38%
- Increase in Water Rate (to be presented to City Council in 2009): 10.00%
- Increase in Discretionary Water Rate (starting in 2005): 10.00%
- Increase in Irrigation Rate (starting in 2005): 10.00%
- Increase in water impact fees (starting in 2005): 30.00%
- Increase in operating expenses per year: 3.50%
- Revenue labeled as "Other" und00er City's operating revenue on 2003 statement of expenses was projected as a constant through 2014 per Finance Department
- Percent increase in water consumption matches population growth and land use changes in the City's Comprehensive Plan Future Land Use Element and Metropolitan Planning Organization's Comprehensive Plan.

- Impact fees collected for Northeast and Southeast developments will cover costs of water system expansion in those areas.
- Impact fees collected for Redevelopment Area projects will cover costs of water system improvements.
- Average Daily Water Demand (in GPD):

2003/2004	2009	2014
3,390,000	4,230,000	4,640,000

TABLE 25

PROJECTED FINANCIAL ANALYSIS											
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Water Demand, gallons per year (GPY)	1,237,350,000	1,298,600,000	1,359,920,000	1,421,240,000	1,482,560,000	1,543,950,000	1,574,300,000	1,604,230,000	1,634,160,000	1,664,090,000	1,693,600,000
Distribution System Water Loss, GPY	86,614,500	90,902,000	95,194,400	99,486,800	103,779,200	108,076,500	110,201,000	112,296,100	114,391,200	116,486,300	118,552,000
Water Billed, GPY	1,138,054,598	1,207,698,000	1,264,725,600	1,321,753,200	1,378,780,800	1,435,873,500	1,464,099,000	1,491,933,900	1,519,768,800	1,547,603,700	1,575,048,000
Irrigation Billed, GPY	308,649,342	327,537,179	343,003,512	358,469,845	373,936,178	389,420,166	397,075,144	404,624,187	412,173,230	419,722,274	427,165,384
Wastewater Billed, GPY	829,405,256	880,160,821	921,722,088	963,283,355	1,004,844,622	1,046,453,334	1,067,023,856	1,087,309,713	1,107,595,570	1,127,881,426	1,147,882,616
% Increase in Water Consumption	n/a	6.12%	4.72%	4.51%	4.31%	4.14%	1.97%	1.90%	1.87%	1.83%	1.77%
Water Rate per 1,000 gallons (see City's Utility Rate Schedule)	$1.53	$1.68	$1.68	$1.68	$1.68	$1.68	$1.68	$1.68	$1.68	$1.68	$1.68
Water Rate per 1,000 gallons over 8,000 GPM (see City's Utility Rate Schedule)		$1.53	$1.53	$1.53	$1.53	$1.53	$1.53	$1.53	$1.53	$1.53	$1.53
	2003/2004	$1.53	$1.53	$1.53	$1.53	$1.53	$1.53	$1.53	$1.53	$1.53	$1.53
Wastewater Rate per 1,000 gallons (see City's Utility Rate Schedule)	$ 5.27	$ 6.10	$ 6.10	$ 6.10	$ 6.10	$ 6.10	$ 6.10	$ 6.10	$ 6.10	$ 6.10	$ 6.10
Estimated Future Billing Revenue	$ 6,232,819	$ 8,184,827	$ 8,571,315	$ 8,957,804	$ 9,344,292	$ 9,731,221	$ 9,922,511	$ 10,111,154	$ 10,299,798	$ 10,488,441	$ 10,674,436
Tapping Fees	$ 17,515	$ 18,587	$ 19,465	$ 20,342	$ 21,220	$ 22,099	$ 22,533	$ 22,961	$ 23,390	$ 23,818	$ 24,240
Other Revenue	$ 195,398	$ 195,398	$ 195,398	$ 195,398	$ 195,398	$ 195,398	$ 195,398	$ 195,398	$ 195,398	$ 195,398	$ 195,398
Improvement Fund Revenue (Water only)	$ 494,000	$ 429,293	$ 429,293	$ 429,293	$ 429,293	$ 2,429,293	$ 429,293	$ 429,293	$ 429,293	$ 429,293	$ 3,629,293
Total Revenue	$ 6,939,732	$ 8,828,105	$ 9,215,471	$ 9,602,837	$ 9,990,203	$ 12,378,011	$ 10,569,736	$ 10,758,807	$ 10,947,879	$ 11,136,950	$ 14,523,368
Operating Expenses	$ 7,303,626	$ 7,559,253	$ 7,823,827	$ 8,097,661	$ 8,381,079	$ 8,674,417	$ 8,978,021	$ 9,292,252	$ 9,617,481	$ 9,954,093	$ 10,302,486
Operating Income (Loss)	**$ (363,894)**	**$ 1,268,852**	**$ 1,391,644**	**$ 1,505,176**	**$ 1,609,124**	**$ 3,703,594**	**$ 1,591,715**	**$ 1,466,555**	**$ 1,330,398**	**$ 1,182,857**	**$ 4,220,883**
Debt Service		$ 661,000	$ 813,000	$ 813,000	$ 813,000	$ 813,000	$ 813,000	$ 813,000	$ 813,000	$ 813,000	$ 813,000
TOTAL		**$ 607,852**	**$ 578,644**	**$ 692,176**	**$ 796,124**	**$ 2,890,594**	**$ 778,715**	**$ 653,555**	**$ 517,398**	**$ 369,857**	**$ 3,407,883**

Table 9-9 of the *Potable Water Master Plan, July 2005* presents the estimated remaining operating income balance after the capital improvement projects are taken into consideration. These figures should be updated as necessary, or at a minimum, annually.

TABLE 26

FINANCIAL SUMMARY										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Water and Sewer Operating Income (Loss) after Debt Service	$ 607,852	$ 578,644	$ 692,176	$ 796,124	$ 2,890,594	$ 778,715	$ 653,555	$ 517,398	$ 369,857	$ 3,407,883
CIP Totals	$ 1,155,000	$ 1,179,400	$ 887,600	$ 11,200	$ 2,939,870	$ 36,100	$ 232,000	$ 748,300	$ -	$ 3,197,000
Difference (Operating Income - CIP Cost)	**$ (547,148)**	**$ (600,756)**	**$ (195,424)**	**$ 784,924**	**$ (49,276)**	**$ 742,615**	**$ 421,555**	**$ (230,902)**	**$ 369,857**	**$ 210,883**

The operating income remaining in the Water and Sewer Fund is about $900,000 based on the assumptions made and cost estimates in the plan.

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A 10 percent increase in the water rate per 1,000 gallons, irrigation rate per 1,000 gallons and discretionary water use per 1,000 gallons over allowance and a 30 percent increase in water system impact fees are needed to cover the estimated costs of water system improvements through the planning horizon. The City may consider increasing the water rates or impact fees before 2014 to build capital for water system improvements after 2014. **Table 27** presents the City's current and recommended impact fee structure for water.

Operating expense increases over 3.5 percent annually need to be balanced with appropriate rate or impact fee increases. Water system improvements suggested in this plan are based on 2004 information provided by the Tampa Bay Regional Planning Council, the Metropolitan Planning Organization, the Redevelopment Plan and City staff. City staff needs to update the water model and master plan financials as needed, or at a minimum, annually.

Pipe improvements in the Redevelopment Area are projected to occur in 2007 and 2012. These planning years may change based on the developer's schedule. The City should make improvements to the Redevelopment Area water system when the appropriate development occurs or based on the developer's schedule.

Table 27

Current and Recommended Impact Fee Structure – Water Only					
		Current			
		Distribution System Component	Plant Expansion Component	Total	Recommended*
Single Family Residential Connection		$1,300	$1,450	$2,750	$3,575
Multi-Family Residential Connection Per Unit		$1,300	$1,450	$2,750	$3,575
Commercial/Industrial Connection Meter Size:					
		Current			
	Meter Size	Distribution System	Plant Expansion Component	Total	Recommended*
	5/8"	$1,300	$1,450	$2,750	$3,575
	¾"	$2,925	$3,250	$6,175	$8,050
	1"	$4,550	$5,075	$9,625	$12,525
	1 ½"	$9,750	$10,875	$20,625	$26,825
	2"	$16,900	$18,850	$35,750	$46,475
	3"	$29,900	$33,350	$63,250	$82,225
	4"	$58,500	$65,250	$123,750	$160,875
	6" **	$120,250	$134,125	$254,375	$330,700
Water improvement surcharges for service in the Research Corporate Park					
			Current		Recommended*
Single Family Residential Connection			$350 each		$455 each
Apartment/Other Multi-Family Connection			$250 per dwelling unit		$325 per dwelling unit
Hotel/Motel			$125 per room/suite		$165 per room/suite
Commercial/Industrial Connection			$0.25 per Sq. Ft. of gross leasable floor area		$0.35 per Sq. Ft. of gross leasable floor area

* The recommended total reflects a 30% increase in both the distribution system component and the plant expansion component.

** Charges for meters in excess of 6-inches are established by the City Council upon the recommendation of the City Engineer.

10-Year Water Supply Facilities Work Plan

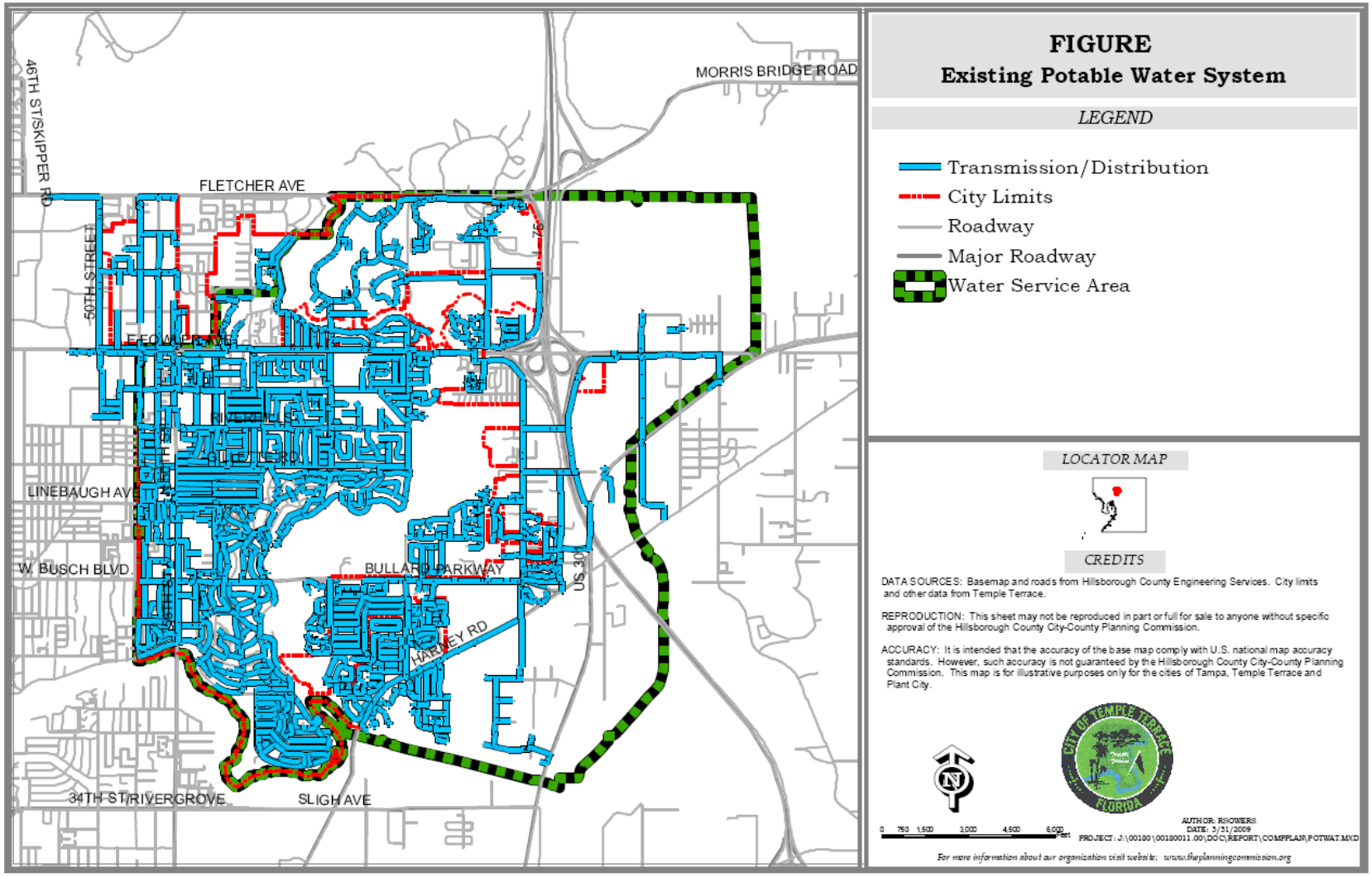
The following 10-Year Water Facilities Work Plan Update, **Table 28**, is adopted pursuant to 163.3177(6)(c), Florida Statutes.

Table 28
2012 CITY OF TEMPLE TERRACE 10-YEAR WATER SUPPLY FACILITIES WORK PLAN

Temple Terrace Water Facilities Work Plan	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Water Treatment Plant Filter /Well Control Rehab	$0	$90,000	$0	$0	$50,000	$0	$0	$0	$0	$0
(funding source)		*B*			*B*					
Water Treatment Plant Rehab & Paint Program	$12,000	$75,000	$75,000	$75,000	$75,000	$13,000	$14,000	$14,000	$15,000	$15,000
(funding source)	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*
Water System Storage Tank Rehab Program	$10,000	$5,000	$0	$25,000	$0	$0	$30,000	$0	$0	$35,000
(funding source)	*A*	*A*		*A*			*A*			*A*
Temple Park Area Water Main Improv.	$500,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
(funding source)	*C*									
South Riverhills Area Water Main Improv.	$0	$177,000	$0	$0	$0	$0	$0	$0	$0	$0
(funding source)		*C*								
Grandview Water Main Improv.	$0	$0	$452,000	$0	$0	$0	$0	$0	$0	$0
(funding source)			*C*							
Live oak Area Water Main Improv.	$0	$0	$0	$300,000	$300,000	$300,000	$0	$0	$0	$0
(funding source)				*C*	*C*	*C*				
Bonnie Brea Water main Improv.	$0	$0	$0	$0	$0	$0	$0	$0	200,000	285,000
(funding source)									*C*	*C*
Minor Water Line Extensions	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
(funding source)	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
Meter Repair/Replacement	$350,000	$350,000	$350,000	$350,000	$350,000	$0	$0	$0	$100,000	$100,000
(funding source)	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*
Waterline Replacement	$0	$0	$0	$0	$0	$0	$51,000	$145,000	$36,000	$150,000
(funding source)							*B*	*B*	*B*	*B*
Waterline Replacement	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
(funding source)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Water Pumping Station Rehab Program	$0	$0	$0	$0	$0	$0	$455,000	$0	$0	$0
(funding source)							*B*			
Sewer Lift Station Rehab Program	$20,000	$0	$0	$650,000	$0	$0	$0	$100,000	$0	$100,000
(funding source)	*D*			*D*				*D*		*D*
Conservation/Alternative Water Supply Projects										
Reclaimed Water System (potential)	$0	$0	$0	$25,000,000	$10,000,000	$0	$0	$0	$0	$0
Brackish Ground Water Treatment (potential)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Fresh Ground Water Sharing Option (potential)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Conservation Pgm & Environ Ed Pgm	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
(funding source)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Legend: Funding Sources *A. Water/Sewer Fund* *B. Water/Sewer RR & I* *C. Water Development Fees* *D. Wastewater Development Fees*										

Source: Temple Terrace Public Utilities, October, 2012

FIGURE 5: CITY OF TEMPLE TERRACE EXISTING POTABLE WATER SERVICE AREA



Source: Temple Terrace Public Utilities, March, 2009

WASTEWATER SUB-ELEMENT

INTRODUCTION

This sub-element has been prepared to meet the requirements of Florida Statutes (FS) 163.3177 and Chapter 9J-5 of the Florida Administrative Code (FAC). It addresses Temple Terrace's existing and future wastewater needs through the year 2015 and also includes analyses for two short term planning periods, 2008 through 2010 and 2010 through 2015.

The City's collection system is composed of a network of pipes which collect wastewater (also called sewage) from individual establishments and convey it to a central location for treatment. Temple Terrace contracts with the City of Tampa for treatment and disposal of the collected wastewater through the Howard F. Curren Advanced Wastewater Treatment (AWT) Plant (formerly Hookers Point AWT) located on McKay Bay, approximately 7 miles southwest of Temple Terrace's city limits.

In 2008, the population of the City and its wastewater service area is about 24,000 and 35,000 respectively. Almost the entire City is sewered and substantial portions of the City's wastewater service area are also included in the City's collection system. The vast majority of wastewater collection system demand is generated by residential development within and outside the City. Figures 1A and 1B depict the current wastewater collection system. By 2010, the system will need to provide about 13,400 equivalent single-family connections and about 14,600 by 2015 to meet projected growth demands.

Wastewater volumes collected by the Temple Terrace system will increase as development occurs in the areas east of the present city limits. By virtue of the interlocal agreement with the City of Tampa, the presently defined service area of the City of Temple Terrace is assured full service over the planning period. Flow limitations are established in the agreement on the gallons of effluent that will be treated by Tampa, which are 2.938

mgd for average daily flow and 6.846 mgd for peak flow. The agreement allows for these flow limitations to be reviewed by the City of Tampa and the City of Temple Terrace to see if any modification to the agreement is needed.

CONTEXT FOR SERVICE PROVISION

The Federal Water Pollution Control Act (PL 92-500), implemented by the U.S. Environmental Protection Agency (EPA), is the controlling national legislation relating to the provision of sanitary sewer service. The goal of this Act is the restoration and/or maintenance of the chemical, physical, and biological integrity of the nation's waters. The Act established a national policy of implementing areawide waste treatment and management programs to ensure adequate control of pollutant sources. Under Section 201 of PL 92-500, grants have been made available to local governments to construct facilities to treat "point sources" of pollution such as effluent from wastewater treatment processes. The Cities of Tampa and Plant City, and Hillsborough County all established Section 201 wastewater planning programs during the 1960s and 1970s. The City of Temple Terrace was included in the Tampa 201 planning area and has established its wastewater collection system in reliance on that program.

The Florida Department of Environmental Protection (FDEP) is responsible for ensuring that the state carries out its responsibilities under PL 92-500. All new wastewater facilities must be designed in accordance with the FDEP's Administrative Rules 62-6 and 62-22, FAC. These rules apply to facilities which treat flows exceeding 5,000 gallons per day for domestic establishments, 3,000 gallons per day for food service establishments, and where the wastewater contains industrial, toxic, or hazardous wastes. The Florida Department of Health (DOH) regulates septic tank and drain field installation. These requirements have been adopted by rule in Chapter 10D-6, FAC.

The City coordinates development permits requiring wastewater collection and disposal with the Environmental Protection Commission of Hillsborough County (EPC), City of Tampa and the Southwest Florida Water Management District (SWFWMD) when necessary. As a matter of policy, City approval of a system connection request is not granted until all other required Federal, State and local permits are obtained by the applicant.

Evaluation of public service demands generated by new development and redevelopment is required through the City's site plan approval process. The Community Development Department requires connection to the City's wastewater collection system as a condition of approval for subdivisions and site development plans within the municipal limits. Chapter 21 of the Temple Terrace Code of Ordinances (Water and Sanitary Sewer Systems) requires connection to City sewer for property within the service area under certain conditions, whether new or existing development, with the exception when the City Engineer determines that a connection to the system cannot reasonably be completed due to system hydraulics or other limitations. The City Manager may grant a waiver of this Section until such time as conditions reasonably permit. The City's ordinance reflects the requirements of Chapter 381.00655, FS. Enforcement of these current Federal, State and local regulations will ensure that wastewater demands generated by development will not exceed the City's ability to provide service.

EXISTING CONDITIONS

Overall, the City's existing wastewater collection system operates at an acceptable level. Suburban scale residential and small commercial developments in the City and service area can generally be served through planned extensions of the City's system. Large scale commercial and industrial developments often require a public-private partnership approach and more elaborate capital project planning by the City. A summary of the system's publicly-owned pipes and structures is shown in **Table 1 and Table 2**.

TABLE 1: Sewer System – Pipe Summary

Gravity Pipe:

Diameter (Inches)	Length (Feet)	Length (Miles)
Unknown	26,661	5.05
4	323	0.06
6	9,994	1.89
8	344,008	65.15
10	22,646	4.29
12	6,634	1.26
15	6,037	1.14
18	4,423	0.84
21	4,273	0.81
24	3,305	0.63
Total	**428,304**	**81.12**

Source: City of Temple Terrace's GIS wastewater pipe layer.

Force Main:

Diameter (Inches)	Length (Feet)	Length (Miles)
Unknown	11,932	2.26
2	6,071	1.15
2.5	116	0.02
3	5,993	1.14
4	21,769	4.12
6	20,181	3.82
8	22,658	4.29
10	22,384	4.24
12	14,110	2.67
16	3,174	0.60
Total	**128,388**	**24.31**

Source: City of Temple Terrace's GIS wastewater pipe layer.

TABLE 2: Sewer System – Structures Summary

Type	Quantity
Air Release Valve	43
Clean Out	98
Lift Station	51
Manhole	1,845

Wastewater Collection System Description

The Temple Terrace wastewater collection system consists of over 81 miles of gravity sewers with diameters ranging from 4 to 24 inches. The system is comprised of 17 collection areas, each served by a City lift station that flows into three master lift stations **(Figures 1A and 1B)**. The inflow from each lift station service area is by gravity sewers and/or privately owned lift stations which pump wastewater from the low point in their respective collection areas to either other collection areas or to one of the City's two interceptors with Tampa's system.

Service Area

The City of Temple Terrace is responsible for the collection and transmission of wastewater to the City of Tampa's system for its municipal area and additional lands within Hillsborough County, generally referred to as the service area. The City's service area constitutes a portion of the Tampa 201 Facilities planning area established in the early 1960s when the Hookers Point, now Howard F. Curren, AWT Plant was originally permitted and built. A set of interlocal agreements between the two cities and with Hillsborough County established Temple Terrace's extra territorial service area during the 1960s and

1970s. The agreement between Tampa and Temple Terrace was approved on August 7, 1962, and amended in February 1976, March 1980 and the latest in June 2008. The latter was adopted by Resolution No.074-08 by City Council on June 17, 2008. That agreement expires in 2043. An agreement with Hillsborough County, approved in September 1977, established a City wastewater service area with slightly different boundaries than that established between the City and City of Tampa. In addition, in 1984 the City approved an ordinance (Number 523) establishing a water and sanitary sewer services zone pursuant to Chapter 180, FS and subsequently expanded to the service area shown of **Figure 2**.

The City of Temple Terrace's wastewater system serves 3,000 acres of land within the City limits as well as over 4,500 4,523 acres in Hillsborough County through these interlocal agreements. The City of Tampa provides wastewater intercepting, treatment, and disposal services for the service area which comprises over 7,500 acres of the City of Tampa's 219 square mile service area. Although Temple Terrace's service area makes up about 7 percent of the total Tampa 201 planning area, it currently accounts for only 2.2 percent, or about 2.144 mgd , of the Howard F. Curren AWT current capacity of 96 mgd . The City's wastewater service areas are mapped in detail on a series of 1":200' City base maps and are kept on file at the Department of Public Works.

Relationship to Existing Land Uses

The developed areas in the City are served by a collection system. The majority of areas served by the Temple Terrace collection system are built out with single-family detached or multi-family housing (see Future Land Use Element). Little change in the wastewater demand generated by these areas is likely during the planning period.

The collection systems serving the City's downtown and the urbanizing fringes north of Fowler and between the Hillsborough River and Tampa ByPass Canal (**Figures 1A and 1B**) are adequate to meet the residential and commercial development or redevelopment needs of the City within the planning horizon (see **Future Land Use Element**).

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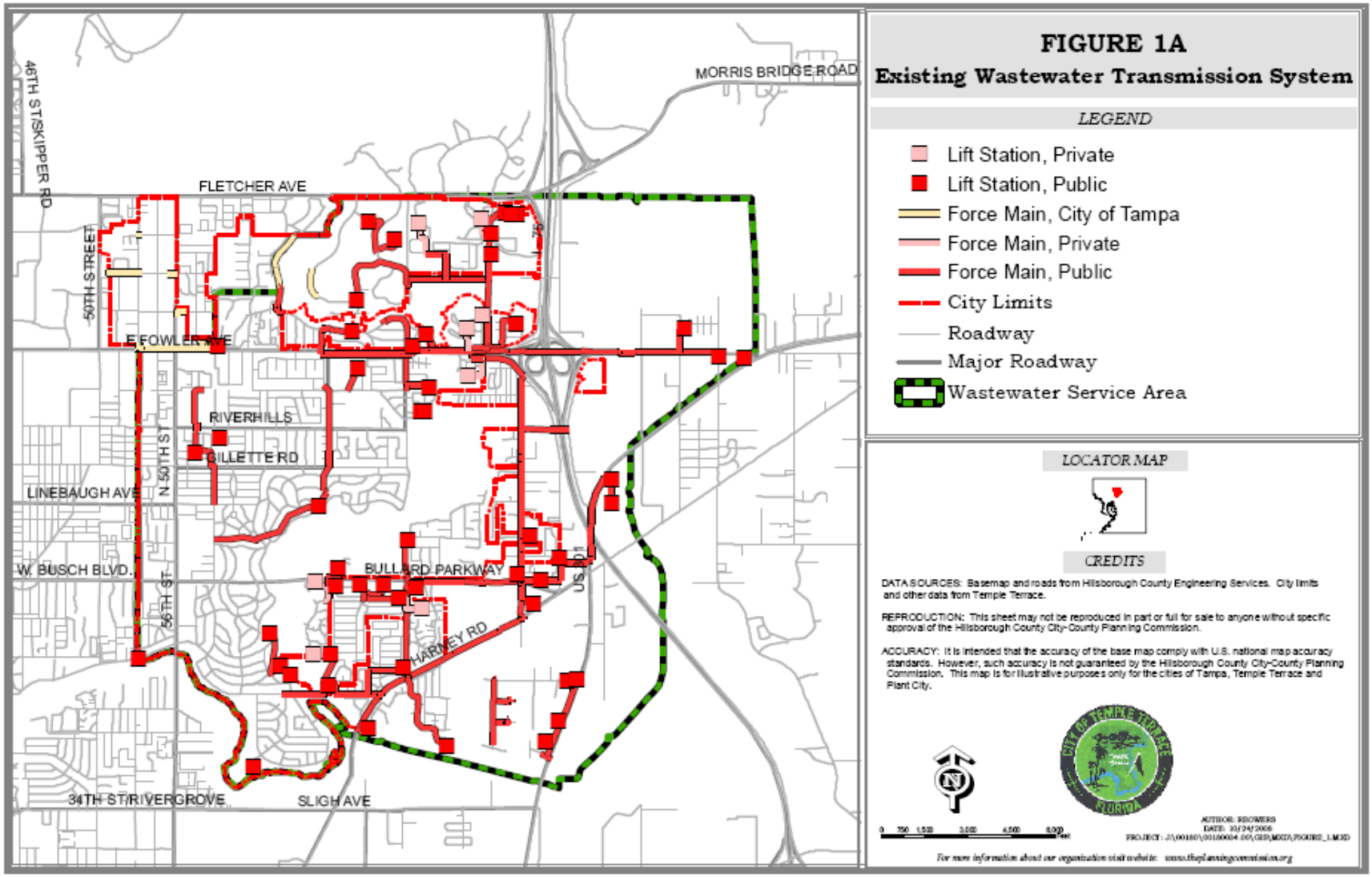
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RIVERHILLS
BILLETTE RD
N 50TH ST
LINEBAUGH AVE
W. BUSCH BLVD.
56TH ST
BULLARD PARKWAY
US 301
HARNEY RD
34TH ST/RIVERGROVE
SLIGH AVE
FIGURE 1A
Existing Wastewater Transmission System
LEGEND
Lift Station, Private
Lift Station, Public
Force Main, City of Tampa
Force Main, Private
Force Main, Public
City Limits
Roadway
Major Roadway
Wastewater Service Area
LOCATOR MAP
CREDITS
DATA SOURCES: Basemap and roads from Hillsborough County Engineering Services. City limits and other data from Temple Terrace.
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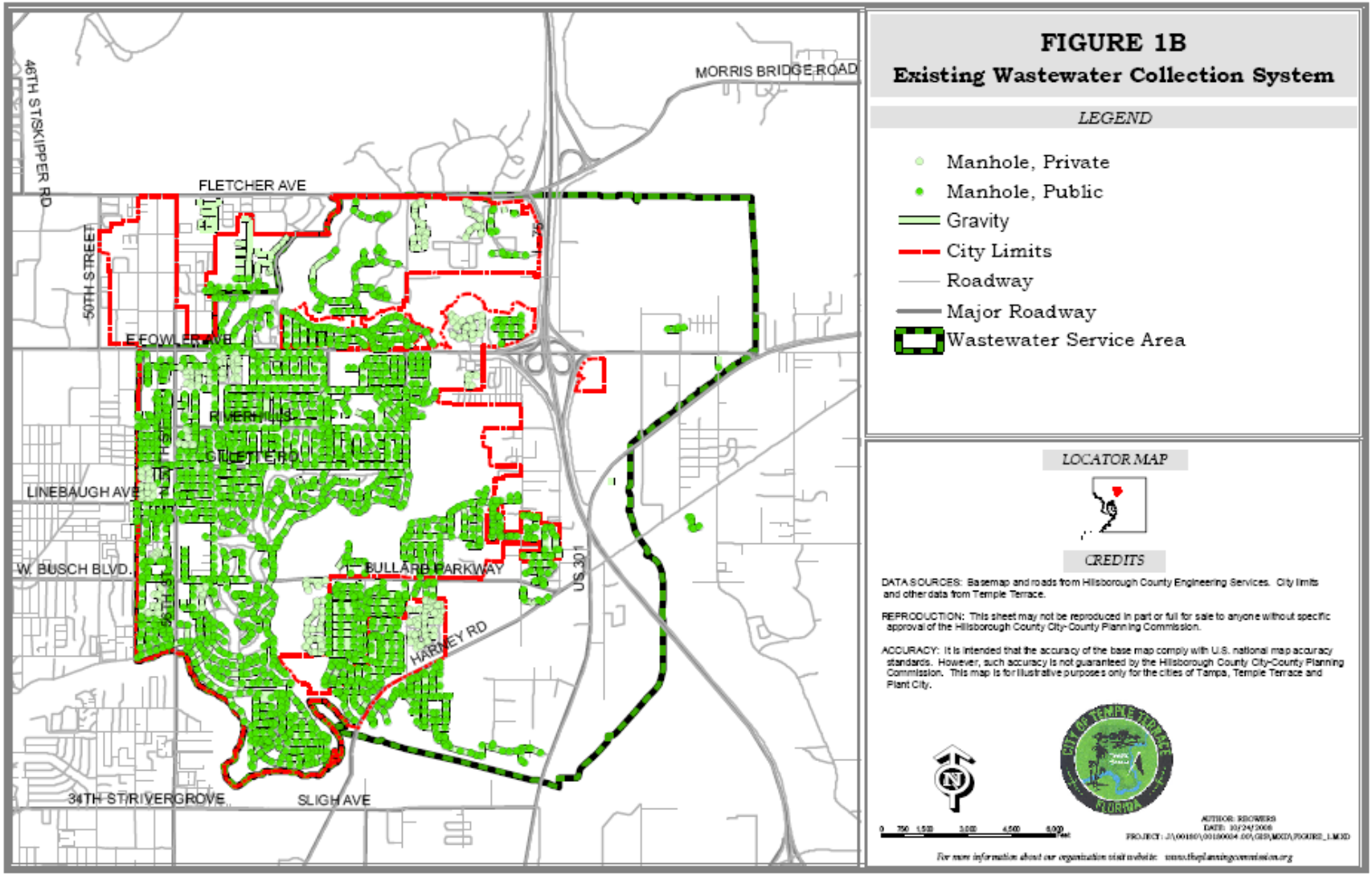
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LITTLETON RD
LINEBAUGH AVE
W. BUSCH BLVD.
BULLARD PARKWAY
US 301
HARNEY RD
34TH ST/RIVERGROVE
SLIGH AVE
FIGURE 1B
Existing Wastewater Collection System
LEGEND
Manhole, Private
Manhole, Public
Gravity
City Limits
Roadway
Major Roadway
Wastewater Service Area
LOCATOR MAP
CREDITS
DATA SOURCES: Basemap and roads from Hillsborough County Engineering Services. City limits and other data from Temple Terrace.
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AUTHOR: RROWERS
DATE: 10/24/2006
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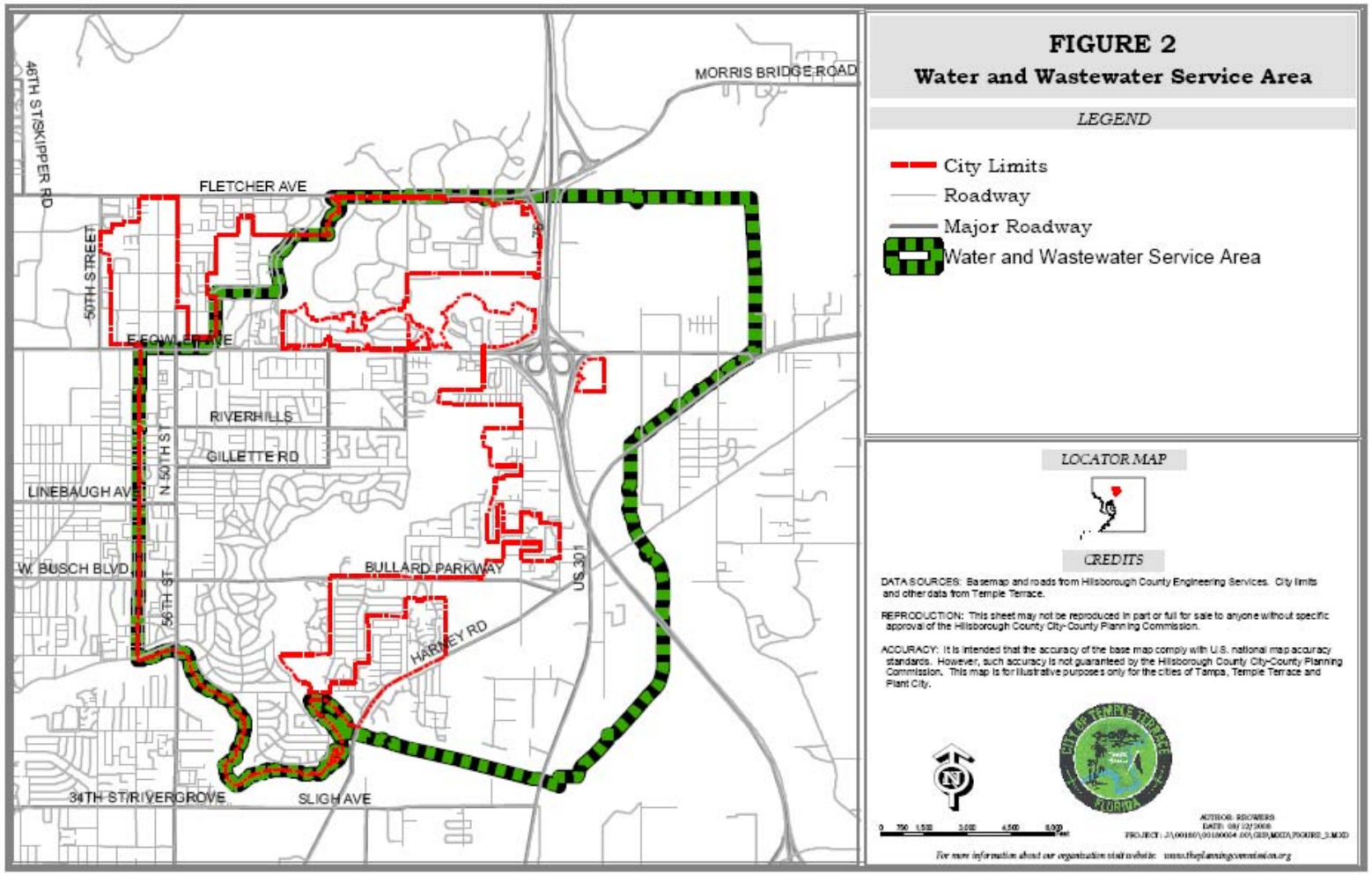
FIGURE 2
Water and Wastewater Service Area
LEGEND
City Limits
Roadway
Major Roadway
Water and Wastewater Service Area
LOCATOR MAP
CREDITS
DATA SOURCES: Basemap and roads from Hillsborough County Engineering Services. City limits and other data from Temple Terrace.
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US 301
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CITY OF TEMPLE TERRACE FLORIDA

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Level of Service Standards

Temple Terrace collects wastewater for transmission to Tampa's treatment and disposal system. Therefore, since the City has established a policy of requiring all development in the City to be served by the centralized wastewater collection system, the quality of treatment of the City's wastewater is a service level established by the City of Tampa. Acceptable levels of service under the City's control then become those which will ensure safe collection and transmission of the City's wastewater to Tampa's system. Levels of service (LOS) have been set on the basis of volume of wastewater generated per capita per day.

TABLE 3: MASTER LIFT STATION FLOW CHARACTERISTICS

Lift Station SA	
Pumping Capacity (2 pumps @ 700 GPM each)	700 GPM
Firm Pumping Capacity	700 GPM
Average Daily Flow	0.50 MGD
Peak Hourly Flows	0.75 MGD
Lift Station B*	
Pumping Capacity (3 pumps @ 1,260 GPM each)	1,260 GPM
Firm Pumping Capacity	1,360 GPM
Average Daily Flow	0.65 MGD
Peak Daily Flow	0.80 MGD
Lift Station SB	
Pumping Capacity (3 pumps @ 1,400 GPM each)	1,400 GPM @ 104 FT
Firm Pumping Capacity	2,800 GPM
Average Daily Flow	0.994 MGD
Peak Daily Flow	1.175 MGD
TOTAL FLOWS	**2.144 MGD**

*Source: *Temple Terrace Evaluation of Flow Capacity - PS B and 21-inch Influent Sewer*, TBE Group, Inc., March 2005.

The total yearly sewer production for fiscal year 2007 was 848.5 million gallons. The year's average equivalent single-family connections were approximately 12,096 which equate to a service area population of approximately 35,000 . Therefore, the approximation of a current LOS is about 66 gallons per capita per day. The maximum daily flow during the same time period was about 2.3 mgd. Design standards generally rely on a standard of 60 to 100

gallons per capita per day, which places Temple Terrace's per capita wastewater generation within the normal design standards scale. If the average daily flow LOS is used in development permitting or in generating future wastewater collection flows, it should be remembered that it assumes the City will continue to provide primarily residential wastewater collection. The addition of significant industrial or commercial users to the City's collection network could require that the gallons per capita per day LOS be increased.

Wastewater Demand Analysis Methodology

Current and future wastewater demands are calculated on the basis of existing and anticipated equivalent single-family connections to the collection system. **Table 4** shows the factors used in calculating average daily contribution in gallons per day (GPD). It should be noted that the per capita per day contribution using these factors equals approximately 72 gallons per capita per day. The wastewater collection demand estimates which appear in the "Future Needs" section of this sub-element are based on the factors described in this section. Therefore, the estimates of future need will provide a level of service in excess of the average level of service of about 66 gallons per capita per day.

TABLE 4: AVERAGE DAY SEWAGE CONTRIBUTION IN GALLONS PER DAY (GPD)

Single-family Dwelling Unit	160 gpd
Multi-Family Dwelling Unit	150 gpd
Commercial Uses	0.12 gpd per sq. ft. of bldg.
Office and Industrial Uses	0.10 gpd per sq. ft. of bldg.

Future wastewater collection demands are derived indirectly from the amount of population and employment growth projected for the City and its service area (see **Overview** and **Future Land Use Element**). The factors described in this section are applied to the estimates of future housing units by type, which appear in the **Housing Element** and acres of commercial and industrial uses projected to be accommodated by the **Future Land Use Element** to estimate future wastewater collection system demands.

Design of collection systems must also take into account peak period demands. Therefore for system design purposes, the average of the maximum day flow is assumed to be 1.6 times the average day flow and the maximum flow rate is assumed to be 2.5 times the average day flow. Multi-family unit demands are assumed to be 0.9 times the value of single-family unit demands. An occupancy rate of 90 percent is assumed in all residential uses. Use of these additional factors will assure collection system designs with sufficient surplus capacity to accommodate peak usage demands.

EXISTING AND FUTURE NEEDS

Temple Terrace has maintained its wastewater system to provide service to the maximum number of customers within the City and its service area. The citizens of Temple Terrace are serviced by the present wastewater system shown on **Figures 1A and 1B**. A few isolated developments in the unincorporated service area are served by package or interim treatment plants. The growth of Temple Terrace's wastewater connection commitments is shown in **Figure 3Error! Reference source not found.**.

Existing Deficiencies

Today, the City's wastewater deficiencies exist in its pump stations and force mains. The advancing age of many City facilities also makes it critical that steps be taken to rehabilitate and maintain functioning collection systems within the City. In some cases, total replacement of aging infrastructure will be necessary within the planning timeframe. The City plans to rehabilitate two pump stations, SA and E, as capital improvement projects in FY 08/09, as well as replace about a half-mile section of 16-inch force main along Harney Road. Infiltration of groundwater into the Temple Terrace system is not a significant issue. Odor problems have developed in some of the sewers which are close to manholes receiving flow from force mains. These types of manholes are more than normally susceptible to odors and chemical deterioration because of the corrosive gases created in the force mains. Odor control measures used by the City have included chemical treatment, flushing and bio-cubes to mitigate any issue. All City manholes are regularly inspected and repaired when needed.

Future Needs

By 2009, the City will rehabilitate lift stations SA and E and replace the 16-inch force main along Harney Road. The City will continue manhole and pipe inspection and rehabilitation through 2015. **Table 6** shows wastewater flow projections.

TABLE 5: ***(Reserved)***

TABLE 6: WASTEWATER FLOW ESTIMATES: WASTEWATER PRODUCED, COLLECTED AND TREATED (AVERAGE DAY FLOW)

Year	Temple Terrace Service Area Total
	Wastewater in mgd
2004	2.27
2008	2.30
2010	2.34
2015	2.62

Source: *Temple Terrace Water Master Plan, July 2005 and 2008 WUP application population projections.*

COSTS

A master wastewater plan update should be prepared before the City makes any more commitments to supply wastewater collection service in its service area. Such a plan would include an analysis of current collection system design standards enforced by the City; detailed engineering studies of the City's 17 wastewater collection subsystems, and a program for providing adequate collection, treatment, and disposal capacity to meet growth demands in the service area. A master wastewater plan will also provide a systematic, objective-oriented approach to capital improvements programming. Planned CIP wastewater projects which are proposed through the year 2015 are shown in **Table 7** and are also listed in the **Capital Improvements Element** of this Comprehensive Plan. A detailed capacity analysis should be developed for the capital improvement program beyond 2015.

The City has identified funding sources for these short-range improvements based on its current revenue structure. The capital improvements program will be reassessed and additional funding sources may be sought to support a more ambitious improvement program if warranted.

TABLE 7: WASTEWATER CAPITAL IMPROVEMENT PROJECTS THROUGH 2015

	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15
Sewer Improvement Fund							
Gravity System Extension	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
❶Lift Station "SA" Rehabilitation	$850,000						
❷Lift Station "E" Rehabilitation	$400,000						
Renewal and Replacement Fund							
Submersible Pump	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Manhole Rehabilitation	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Pipe Rehabilitation	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
❸Harney Road 16" Force Main Replacement	$700,000						
Water and Sewer Utility Fund							
Miscellaneous Projects	$88,400	$189,000	$92,900	$101,000	$15,000	$100,000	$100,000

LEGEND: ❶ CIP PROJECT NUMBER ON **FIGURE 3**.

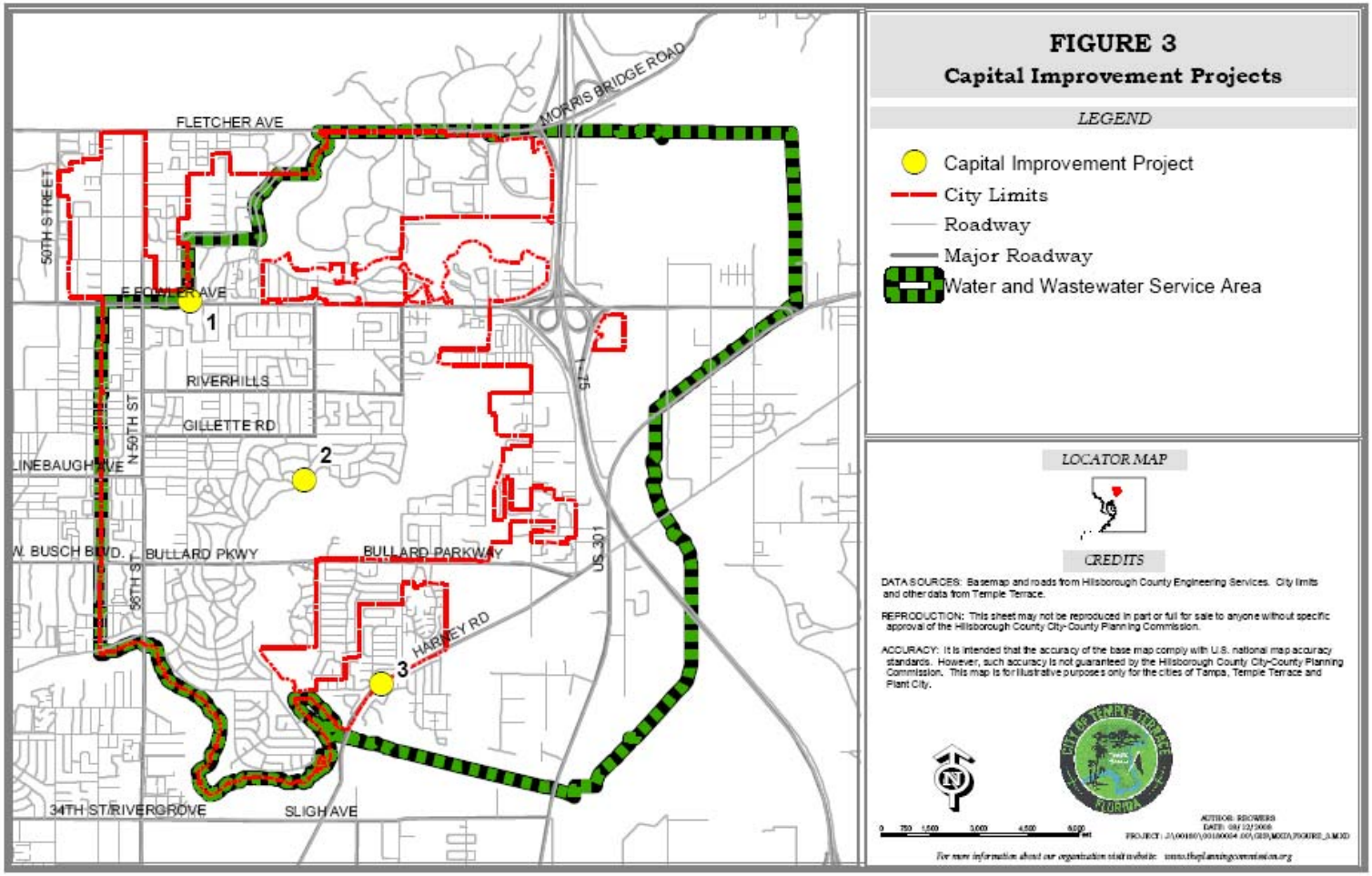
FIGURE 3
Capital Improvement Projects
LEGEND
Capital Improvement Project
City Limits
Roadway
Major Roadway
Water and Wastewater Service Area
LOCATOR MAP
CREDITS
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I-75
US 301
34TH ST/RIVERGROVE
SLIGH AVE
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STRATEGIES FOR IMPLEMENTATION

The five-year Capital Improvement Program will be implemented as funds become available. The CIP will be reviewed annually and new priorities will be assigned as necessary to maintain levels of service established in this Comprehensive Plan. Design standards as set forth in this sub-element will be enforced for all development approvals.

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SOLID WASTE SUB-ELEMENT

INTRODUCTION

This sub-element has been prepared to meet the requirements of Florida Statute (FS) 163.3177 and Chapter 9J-5 of the Florida Administrative Code (FAC). It addresses Temple Terrace's existing and future solid waste disposal needs through the year 2025.

The City of Temple Terrace operates a solid waste collection system with service limited to the municipal area. **9J-5.011(1)(e)2.** Solid waste disposal is accomplished through an interlocal agreement with Hillsborough County which allows the City to use the County's landfills and resource recovery facilities. **9J-5.011(1)(e)1.** In terms of proportional capacity of the County's solid waste facilities, the City of Temple Terrace currently contributes less than three percent of total processable solid waste.

The Public Works Department collected and transmitted to the County facilities over 16,600 tons of solid waste during the 2006-07 fiscal year. Of this material, 6,500 tons were generated by commercial users and 10,100 tons by residential users. The City-wide program includes regular residential and commercial collection, special pickups, spring cleanup and curbside recycling.

CONTEXT FOR SERVICE PROVISION

Virtually all Federal and State regulations relating to solid and hazardous waste address disposal facilities. The Hillsborough County facilities which the City uses through a contractual arrangement with the County are regulated by Federal Environmental Protection Agency (EPA) and Florida Department of Environmental Protection (FDEP) standards (see **Hillsborough County Solid Waste Element**).

For hazardous wastes, the national Resource Conservation and Recovery Act (RCRA) of 1976 directed EPA to develop a national program to regulate and manage hazardous waste and provide incentives for states to adopt consistent programs. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund), passed by Congress in 1980, provided EPA with authority and funds to respond to incidents requiring site cleanup and emergency mitigation. This Act also defined the liability of business

engaged in hazardous waste generation, transport, and disposal and provided enforcement processes.

The Florida Resource Recovery and Management Act (Sec. 403.7, FS), passed in 1980, adopted the Federal guidelines and directed the Florida Department of Environmental Regulation, now the Department of Environmental Protection, to develop a hazardous waste management program. Amendments to the Act in 1983 provided direction and funds to establish a cooperative hazardous waste management program between local, regional and State levels of government. The City of Temple Terrace cooperates with Hillsborough County in these programs.

EXISTING CONDITIONS

The City of Temple Terrace accomplishes solid waste disposal through an interlocal agreement with Hillsborough County that expires September 30, 2028. According to the agreement, "no minimum or maximum tonnage or volume requirement will be imposed upon the City." As of 2005, Temple Terrace contributed less than 1.7 percent of the total solid waste processed by the County. It is not expected to exceed 2.0 percent within the 2025 planning horizon.

The County's solid waste disposal system is described in the Solid Waste Element of the Comprehensive Plan for Unincorporated Hillsborough County. The remainder of this section describes the City's solid waste collection system.
9J-5.011(1)(e)3., 9J-5.011(1)(e)4., 9J-5.011(1)(e)5., 9J-5.011(1)(f)1.a., 9J-5.011(1)(f)2., 9J-5.011(1)(f)3.

Temple Terrace Solid Waste Collection

The City operates a comprehensive collection program which is designed to provide all City residents and businesses with regular and special solid waste collection service. The following sections describe the Public Works Department's services. **9J-5.011(1)(e)2.**

Residential Collection

There are currently 4,800 residential users, which are primarily single-family residences, within the City. These residential users include annexed areas north of Fowler Avenue and east of the Hillsborough River which have been included in the City's residential collection network through an interlocal agreement with Hillsborough County.

Garbage and trash are picked up twice per week at curbside and transported to the Hillsborough County Resource Recovery Facility. Collection is accomplished with four two-man crews using four 30-cubic yard packers. Two spare 30-cubic yard packers are available for backup if a route truck is unavailable due to repairs or maintenance.

Commercial Collection
Most apartment complexes and commercial establishments need containers that require mechanical lifting due to the waste volume they generate. The City currently provides service to 252 commercial users; e.g., apartment complexes and commercial businesses, which use dumpsters ranging from 2- to 8-cubic yards in size. The rate charged includes the cost of the dumpster and the cost of providing collection and disposal.

The collection frequency varies and is based on the needs of the establishment being served. Service is provided up to five days a week and involves the use of one driver and one 40-cubic yard front loading packer. A backup packer is available for use when needed. This service generated 6,500 tons of refuse during fiscal year 2006-07.

Special Pickup
Garbage in prescribed containers and trash in containers or properly bundled are picked up during the regular, twice-weekly pickup. Refuse that does not meet these pre-collection requirements has to be removed by the owner or the owner must request that the City provide a special pickup. There is a charge for this service. This service generates 750 tons of refuse per year and all is transported to a private transfer facility.

Spring Cleanup
Each year during the months of March or April, all residential users receive one free special pickup. All trash, with the exception of building materials, is picked up regardless of the volume. The cost of this service is included in the operating budget and passed on to the City's users in the rate structure. This service generated 860 tons in 2007 and is part of the total tonnage outlined above for residential users. All processable solid waste is transported to the Hillsborough County Resource Recovery Facility and non-processable is transported to a private transfer facility.

Curbside Recycling
In the early 1990's, the City initiated a solid waste curbside recycling program, which includes paper, cardboard, glass, metal cans, aluminum and plastic. The program was aimed at reducing the costs of disposal (predominantly tipping fees at County facilities) to keep user charge increases to a minimum. The program has been a success in achieving this goal. The curbside recycling pickup resulted in an average of 125 tons per month for Fiscal Year 2006/07.

The commercial recycling (cardboard) pickup resulted in an average of 25 tons for the same time frame.

TABLE 1 summarizes the current demands placed on the Temple Terrace solid waste collection system.

Table 1: ROUTE COLLECTION DATA

Current Demand

1. Total Yearly Tonnage	16,600
2. Population of Area Served	24,026
3. Total Routes:	
A. Residential	4
B. Commercial	1
C. Special Pickups	1
4. Equipment Allocation:	
A. Commercial Route Pickups	2
B. Residential Route Pickups	6
C. Trash Truck	1
D. Pickup Truck	1
5. Personnel Allocation:	
A. Commercial Route	1.5
B. Residential Route	8.0
C. Special Pickup and Support	3.5
D. Foreman	1.0

Source: Temple Terrace Dept. of Public Works, FY2006-07
"Table 1. Estimates of Population by County and City in Florida: April 1, 2007," Florida Estimates of Population 2007, Bureau of Economic and Business Research, University of Florida

Levels of Service

Temple Terrace collects solid waste for disposal at the Hillsborough County Resource Recovery and sanitary landfill facilities. Therefore, solid waste disposal is governed by LOS standards established by the County. Hillsborough County adheres to a LOS standard for solid waste of 8.0 pounds of solid waste per capita per day disposition capacity in the Unincorporated Hillsborough County system service area. **9J-5.011(1)(e)5.**

The County accepted 17,796 tons of solid waste from the City in 2005. Based on a projected population of 22,020 in 2005, Temple Terrace generated 4.4 pounds of solid waste per capita per day - well below the County's LOS standard. [**Citations are from HC CIE**] **9J-5.011(1)(f)1.b.**

In 2025, the County projects that Temple Terrace will generate 26,810 tons of solid waste. Based on a projected population of 29,400 in 2025, Temple Terrace will generate 5.0 pounds of solid waste per capita per day—still well below the County's standard. **9J-5.011(1)(f)1.c.**

Furthermore, the County has determined that it has adequate processing and landfill capacity to meet its LOS standard for itself and for the solid waste it accepts from the Cities of Tampa and Temple Terrace [**Citations from HC CIE**]. **9J-5.011(1)(e)4.**

LOS standards relevant to the City of Temple Terrace's financial capacity to provide solid waste services relate to their collection system, i.e., ensuring adequate frequency and volume of collection.

Capacity to ensure adequate collection service is measured on the basis of number of stops per route per day. Temple Terrace has established a residential LOS standard of 1,000 to 1,150 stops per crew-day, a commercial LOS standard of 110 to 130 lifts per day, and a recycling LOS standard of 1,000 stops per crew-day. **9J-5.011(1)(f)1.b.**

These LOS standards are more meaningful for Temple Terrace since they relate directly to the collection system operated by the City, i.e., trucks, dumpsters, etc. Translating stops per route into fiscal levels of service reflects the City's financial responsibilities in providing an adequate solid waste collection system.

EXISTING AND FUTURE NEEDS

Temple Terrace operates its solid waste collection system as an enterprise fund reliant on user fees. The City, with approximately 7 square miles of gross area, is compact and facilitates interconnected collection routes. The few remaining potential annexation areas are contiguous and generally small parcels of land which are easily included in existing routes. **Figures 1, 2 and 3** summarize the future needs projected for the solid waste collection system. Projections of future demand are based on population and employment projections as reported in the City of **Temple Terrace, Evaluation and Appraisal Report** (Part C, page 19, April 2006). **9J-5.011(1)(f)1.b. 9J-5.011(1)(f)1.c.**

Residential Collection

The Temple Terrace solid waste residential collection system has a range of 1,000 to 1,150 stops per crew-day as a LOS standard. In FY04/05, actual service averaged 1,054 stops per crew-day with three crews. In response, the City added a fourth two-man route in FY05/06. With the added crew, the City created significant excess capacity.

In FY06/07, four (4) two-man crews averaged 790 stops per crew-day—below the lower range of the LOS standard.

In 2020, population growth is anticipated to push stops per crew-day into the lower end of the LOS range, but the City can anticipate having adequate capacity throughout the 2025 horizon of the Comprehensive Plan.

Figure 1

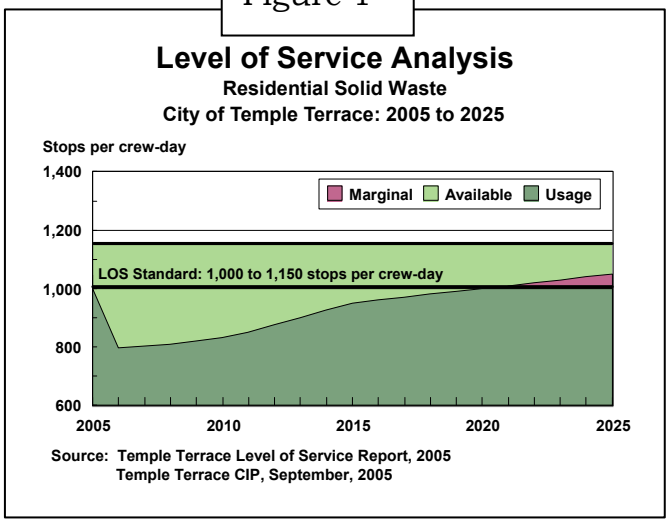
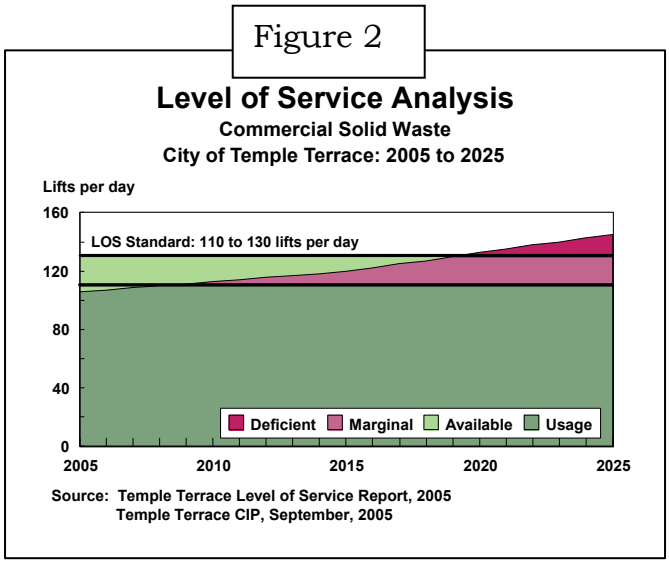


Figure 2



Commercial Collection

The commercial solid waste collection system has a LOS standard based on 110 to 130 lifts per day and 484 to 550 pounds per lift. Both standards are met now and are expected to be met through the 2012 CIE horizon.

9J-5.011(1)(f)1.b, 9J-5.011(1)(f)1.c

In FY06/07, a single one-man commercial dumpster route averaged 533 pounds per lift—representing efficient dumpster sizing in accord with the LOS standard. The route also averaged 118 lifts per day (over five days for a total of 588 lifts) which is within the LOS standard.

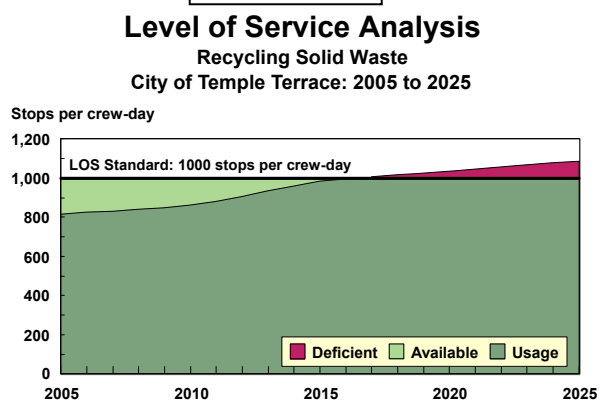
Lifts per day are exceeding the lower range of the LOS standard as of 2007 and are expected to exceed the high end of the range in 2020. The current CIE for FY07-12 may be considered financially feasible, since service levels remain within the LOS range beyond 2012.

The Comprehensive Plan should also be considered financially feasible, since the equipment necessary to remedy the deficiency does not represent high-cost capital investment typically considered for inclusion in a CIE, and the department operates as an enterprise fund. It can be reasonably expected that the City will be able to fund the necessary expenditures at the appropriate time, as they did in FY05-06 for their residential collection system.

Curbside Recycling

The Temple Terrace recycling collection system has a LOS standard of 1,000 stops per crew-day, while actual stops averaged 814 stops per crew-day in FY06/07.

Figure 3



The City is expected to have sufficient service capacity beyond the CIE horizon, and will not exceed the LOS standard until 2017.

The anticipated future deficiencies occur beyond the current CIE horizon, and no plans are made for additional equipment after that date. The Comprehensive Plan should still be considered financially feasible, since the equipment necessary to remedy the deficiency does not represent the high-cost capital investment typically considered for inclusion in a CIE, and the department operates as an enterprise fund. It can be reasonably expected that the City will be able to fund the necessary expenditures at the appropriate time, as they did in FY05/06 for their residential collection system.

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STORMWATER MANAGEMENT SUB-ELEMENT

INTRODUCTION

This sub-element has been prepared to meet the requirements of Florida Statute (FS) 163.3177 and Chapter 9J-5 of the Florida Administrative Code (FAC). It addresses Temple Terrace's existing and future drainage needs through the year 2015 and also includes analyses for two-short term planning periods, 2007 through 2010 and 2010 through2015.

Temple Terrace lies in an area of gently sloping terrain within the plain of the Hillsborough River. The mean sea level elevations in the City vary from a maximum of 80 feet in the northwest to a minimum of 20 feet at the river's edge. The predominant soil types found throughout the City are in the Chandler associations, a highly permeable fine sand. The lands along the Hillsborough River are an exception and are dominated by soils in the Winder-Choobee-St. Johns association, a loamy sand with a high organic content (see **Conservation and Aquifer Recharge Element**).

Rainfall averages 50 to 55 inches annually, with the majority of rainfall occurring during the summer months. The rainfall that does not evaporate nor run off primarily recharges the surficial aquifer, which varies from several inches to several feet below ground elevation. Although the City is not located in a primary recharge area, small portions of the recharge water also percolate to the Floridan aquifer (see **Conservation and Aquifer Recharge Element**).

Natural drainage systems are generally comprised of a series of depressions and channels within a drainage basin which allow water from storm events or rainfall to flow into a receiving body such as a river, lake or bay. The drainage basin is defined by topography and is the area into which runoff is directed toward a common major drainage feature.

The City of Temple Terrace lies within the Hillsborough River drainage basin and the majority of the City's stormwater discharges into the river, which ultimately enters Tampa Bay (**Figure 1**). Very little direct discharge occurs, however, with the majority of runoff first undergoing filtration processes in one of the City's twenty-two (22) drainage sub-basins (**Figure 2**). Larger sub-basins within the service area include the Palm River/Tampa Bypass Canal and the Cow House Creek basins. The City's drainage system serves about 4,440 acres of land within the City limits as well as additional areas in Hillsborough

County and the City of Tampa. (see **Intergovernmental Coordination Element**). The City's drainage areas are mapped in detail on a series of 1":200' base maps on file at the Departments of Public Works and Engineering. **9J-5.011(1)(e)2.**

Occasionally during severe storm conditions or as a result of land alteration activities, water from storm events cannot completely drain from a site and will pond temporarily until the excess percolates through the soil to the water table and/or evaporation takes place. This type of periodic natural flooding, which is important to the viability of certain transitional plant and animal communities, is generally not viewed as a problem until development begins to occur in and around flood-prone areas.

Often, man-made facilities such as swales, ditches, canals and storm sewers are constructed for development purposes in an attempt to alter natural drainage flows and to accommodate increasing runoff from large areas of impervious surface; e.g., parking lots, roads and buildings. Stormwater treatment is generally accomplished through retention or detention with filtration structures. Retention requires the diversion of the required volume of runoff to an impoundment area with no subsequent direct discharge to surface waters. Pollutant removal by settling and percolation of the stormwater through the soil is almost total. Detention facilities are typically within the line of flow of the drainage system. Stormwater from a site passes through the detention facility and is filtered prior to discharge to remove pollutants.

The Tampa Bay Area 208 Study for Area-Wide Water Quality targets much of north central Hillsborough County as a potential serious water quality problem area (TBRPC, 1978). In an attempt to reduce the rate of wetlands loss, Federal, State and local regulations now require pre-development drainage systems analysis particularly in relation to water quality. The City has also adopted policies limiting development along the river and taken measures to protect surface water from degradation by point and non-point sources of pollution (see Conservation Element). This has resulted in stabilization of many sensitive environmental areas. **9J-5.011(1)(f)2.**

CONTEXT FOR SERVICE PROVISION

All new drainage facilities must be designed in accordance with the Florida Department of Environmental Protection's (FDEP) Stormwater Rule (Chapter 62-25, FAC) which requires treatment of the first one-half inch of runoff for sites less than 100 acres in size, or the runoff from one inch of rainfall for sites of 100 acres or more. Treatment is generally accomplished through retention or detention with filtration. The Rule's objective is to achieve 80 to 95 percent removal of stormwater pollutants before discharge to receiving waters. As a refinement of FDEP's Rule, the City has adopted a policy of requiring a

minimum of 95 percent removal of stormwater pollutants before discharge to the Hillsborough River and at least 80 percent removal of pollutants before discharge into other water bodies. **9J-5.011(1)(f)2**

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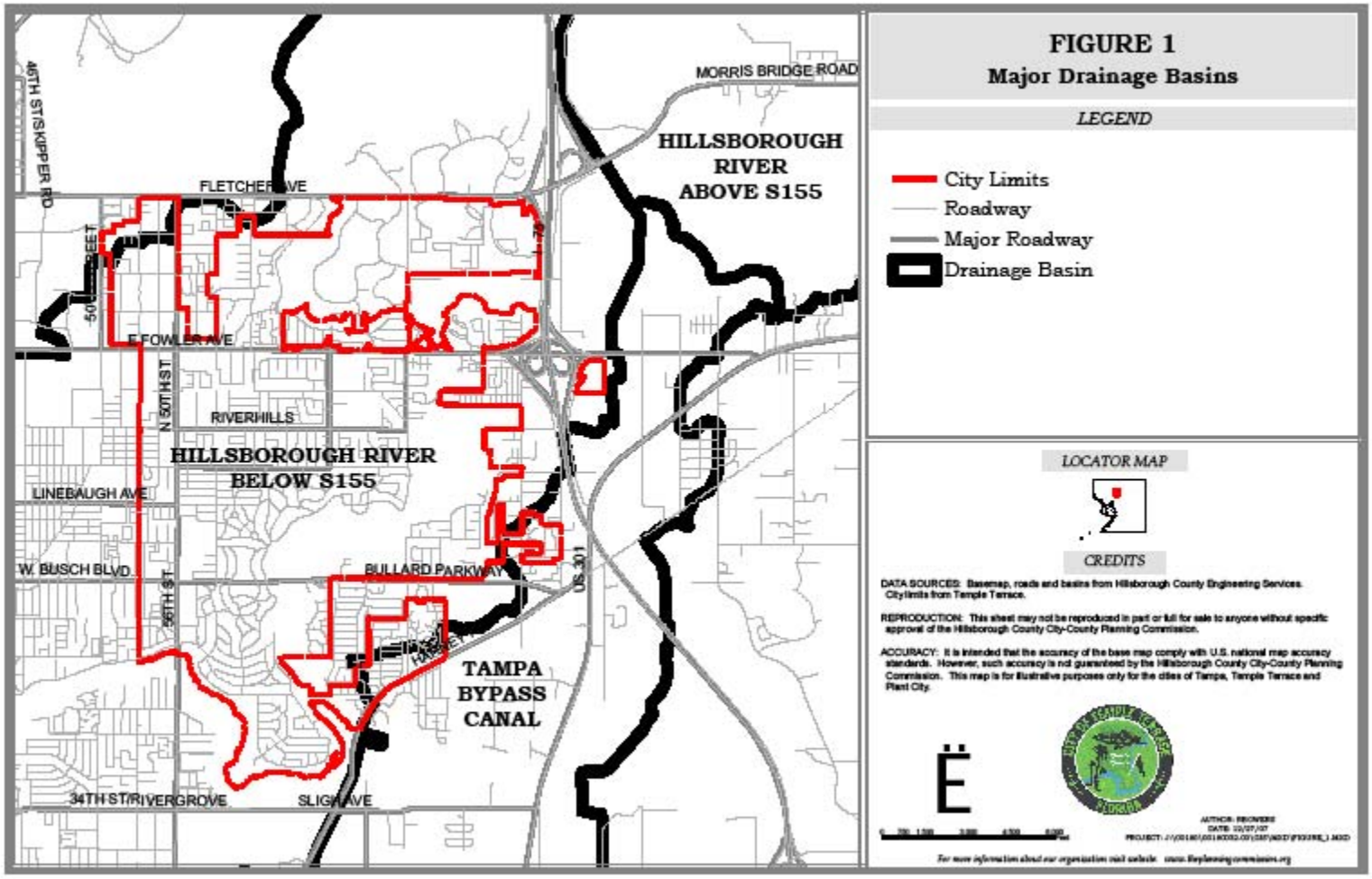
FIGURE 1
Major Drainage Basins
LEGEND
City Limits
Roadway
Major Roadway
Drainage Basin
LOCATOR MAP
CREDITS
DATA SOURCES: Basemap, roads and basins from Hillsborough County Engineering Services. City limits from Temple Terrace.
REPRODUCTION: This sheet may not be reproduced in part or full for sale to anyone without specific approval of the Hillsborough County City-County Planning Commission.
ACCURACY: It is intended that the accuracy of the base map comply with U.S. national map accuracy standards. However, such accuracy is not guaranteed by the Hillsborough County City-County Planning Commission. This map is for illustrative purposes only for the cities of Tampa, Temple Terrace and Plant City.
MORRIS BRIDGE ROAD
HILLSBOROUGH RIVER ABOVE S155
HILLSBOROUGH RIVER BELOW S155
TAMPA BYPASS CANAL
FLETCHER AVE
E FOWLER AVE
RIVERHILLS
LINEBAUGH AVE
W. BUSCH BLVD
BULLARD PARKWAY
34TH ST/RIVERGROVE
SLIGH AVE
N 50TH ST
56TH ST
US 301
I-75
46TH ST/SKIPPER RD

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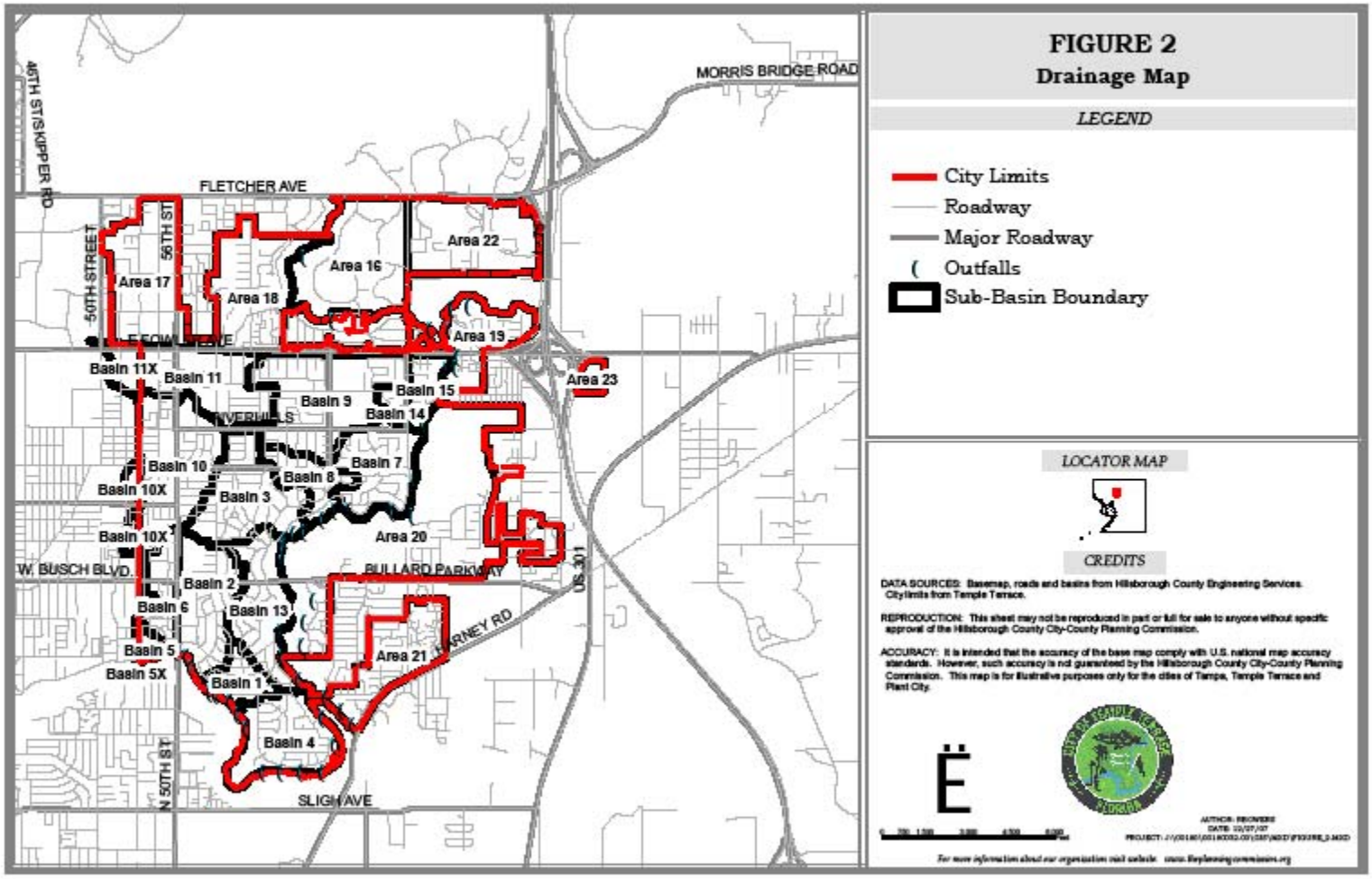
FIGURE 2
Drainage Map
LEGEND
City Limits
Roadway
Major Roadway
Outfalls
Sub-Basin Boundary
LOCATOR MAP
CREDITS
DATA SOURCES: Basemap, roads and basins from Hillsborough County Engineering Services. City limits from Temple Terrace.
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MORRIS BRIDGE ROAD
45TH ST/SKIPPER RD
FLETCHER AVE
50TH STREET
56TH ST
Area 17
Area 18
Area 16
Area 22
Area 19
Area 23
Basin 11X
Basin 11
Basin 9
Basin 15
Basin 14
Basin 10
Basin 10X
Basin 8
Basin 7
Basin 3
Area 20
W. BUSCH BLVD.
BULLARD PARKWAY
US 301
Basin 2
Basin 6
Basin 13
Basin 5
Basin 5X
Area 21
Basin 1
Basin 4
N 50TH ST
SLIGH AVE

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The FDEP's Stormwater Rule is implemented by the Southwest Florida Water Management District (SWFWMD) through a permitting process. The SWFWMD permitting requirements exempt facilities serving individual single-family, duplex, triplex and quadriplex sites; dwelling unit sites less than ten acres in size with less than two acres impervious area and which have complied with local stormwater management regulations or discharge to a permitted regional facility; and agricultural or silvacultural lands with approved management plans.

The City of Temple Terrace has extended the minimum requirements of SWFWMD's permitting guidelines to most new sub-threshold developments within the City. The City's Land Development Code requires additional stormwater management review during the subdivision, site plan approval (which exempts only single-family construction on individual lots) and building permit review processes. The City also participates in the Federal flood insurance program (FEMA) and coordinates development permits with the Hillsborough County Environmental Protection Commission (EPC) by requiring development setbacks, drainage swales, retention/detention ponds, piped systems and other methods of stormwater flow attenuation and treatment as necessary to maintain acceptable levels of water quality. As a matter of policy, City approval of a development request is not granted until all other required Federal, State and local permits are obtained by the applicant.

EXISTING CONDITIONS

The Hillsborough River, the County's largest river in terms of both flow and basin area, discharges an average of 400 million gallons of water per day into Tampa Bay. Its drainage area includes 650 square miles, some of it in Polk and Pasco Counties (Water Resources Atlas, 1984). Northeast Hillsborough County and Temple Terrace are profoundly influenced by the drainage patterns of the Hillsborough River and its tributaries, which include Blackwater, Trout, Cypress, Clay and Cow House Creeks. This system includes numerous areas of forested wetland and an extensive annual floodplain due to the flat terrain. The portion of the river basin lying in and north of Temple Terrace is one of the most ecologically significant areas in the region (HCCPC, 1974). Preservation of these wetlands affords many public benefits including natural flood control and surface water quality improvement.

The Palm River and the Six-Mile Creek, which were channelized in the Tampa Bypass Canal project in the early 1970s, formerly drained much of the northeast part of Tampa and Temple Terrace. The primary functions of these natural rivers, namely conveyance of surface waters from the drainage basin's lands, are now performed by the Bypass Canal system. Because stream-flow volume is controlled by the Canal's extensive lock system, drainage and flooding problems in this area have been minimized.

Overall, the City's existing drainage system operates at an acceptable level. The existing outfalls discharge water generally meeting Class II Standards or better; most meet Class I Standards. These outfalls are also of adequate capacity to discharge high intensity storms without being surcharged and with no detrimental scouring to the Hillsborough River channel. Additionally, the storm sewers' tributary to the outfalls operates at a level such that minor seasonal flooding occurs in an isolated area in the City (Figure 3). The City has improved some of the stormwater systems that contributed to minor seasonal flooding in the past, such as, S Glen Arven Avenue, N Riverhills Drive at Druid Hills Road, Overlook Drive at Blane Drive, N Riverhills Drive at Whiteway Drive, Glen Burnie and Glen Arven, 52nd Street and the Family Recreation Complex.

The majority of Temple Terrace's drainage subsystems are contained within the City's municipal boundaries, primarily due to the presence of the Hillsborough River and Fowler Avenue as major geographic barriers. Sub-basins 5, 10, and 11 are shared with the City of Tampa. In these sub-basins shared with the City of Tampa, any new facilities or correction of existing deficiencies will be coordinated with Tampa. As the City continues to annex, it will also continue to inherit the drainage systems and system deficiencies which exist in the unincorporated area of Hillsborough County.

Relationship to Existing Land Uses

The areas served by drainage basins 1, 3, 4, 5, 7, 8, 9, 13, 14, 15 and Area 18 (**Figure 2**) are primarily developed with single-family detached or multi-family housing. **9J-5.011(1)(e)2** Little change in the drainage patterns of those areas is likely during the planning period. Suburban scale residential developments in the City generally rely on non-structural techniques such as retention areas and swales which use the infiltration and runoff filtering characteristics of natural drainage features. The sub-basins serving the City's downtown and the urbanizing fringes north of Fowler and between the Hillsborough River and the Tampa By-Pass Canal are currently undergoing, or are planned for, significant residential or commercial development during the planning timeframe (see **Future Land Use Element**). Structural solutions to drainage issues are more common in these areas due to the high percentage of impervious surfaces.

Enforcement of current Federal, State and local regulations will ensure that post-development runoff in these areas will not exceed pre-development runoff conditions. In the case of Temple Terrace's downtown, where up to 80 percent of some sites are impervious, existing deficiencies in the drainage subsystem will be addressed as development and redevelopment occurs through the City's site plan approval process and State and local permitting requirements.

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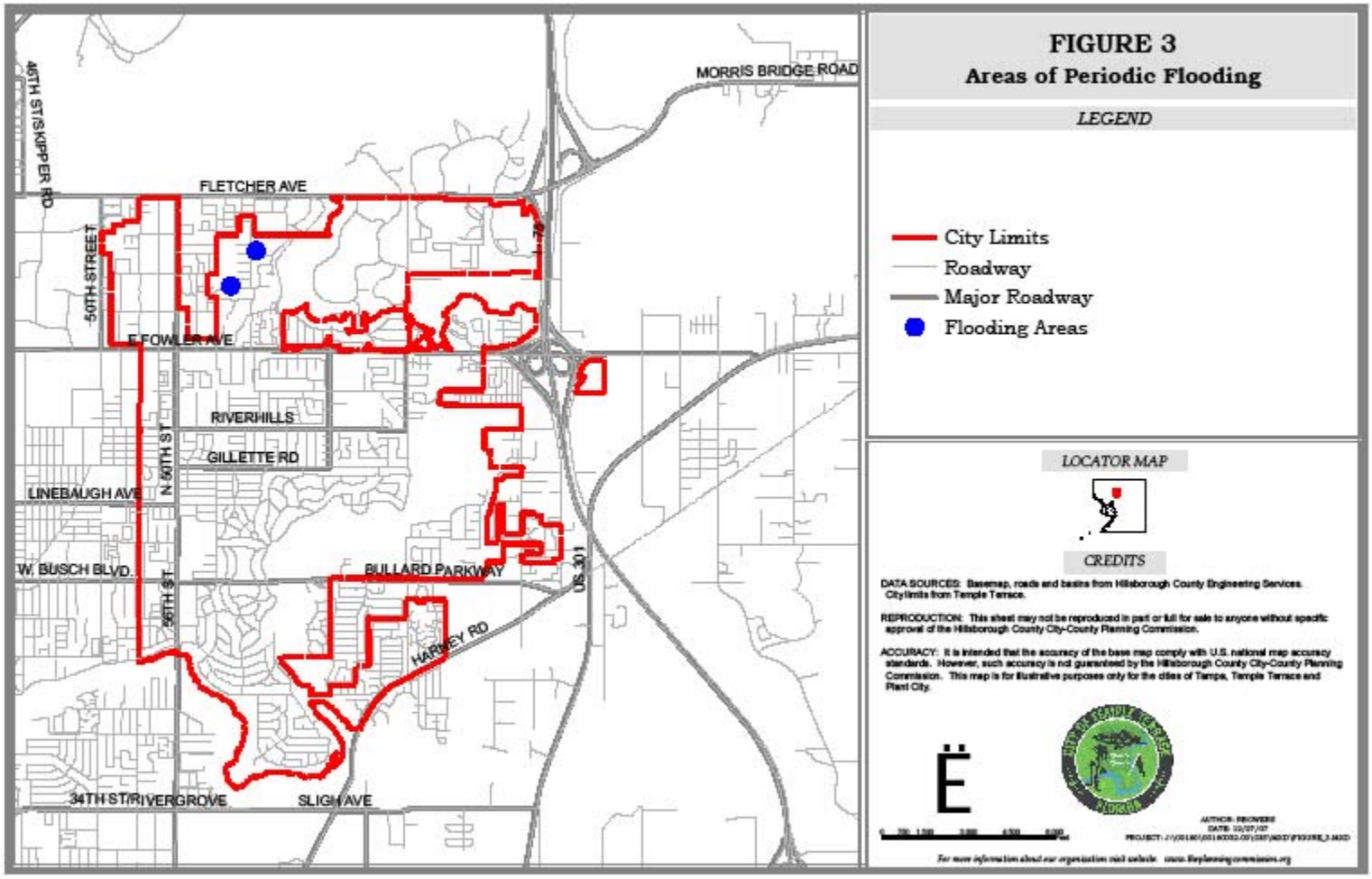
FIGURE 3
Areas of Periodic Flooding
LEGEND
City Limits
Roadway
Major Roadway
Flooding Areas
LOCATOR MAP
CREDITS
DATA SOURCES: Basemap, roads and basins from Hillsborough County Engineering Services. Citylimits from Temple Terrace.
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GILLETTE RD
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LINEBAUGH AVE
W. BUSCH BLVD.
56TH ST
BULLARD PARKWAY
US 301
HARNEY RD
34TH ST/RIVERGROVE
SLIGH AVE

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Drainage System Description

Existing facility conditions are inventoried in **Table 1 through Table 3**. Overall, the City's existing drainage infrastructure operates at an acceptable level.

Table 1: MAJOR TEMPLE TERRACE DRAINAGE FACILITIES: SEWER LINES

Basin Name	Area (Acres)	Length (Linear Feet)
Basin 1	70	3,582
Basin 2	197	19,009
Basin 3	228	13,664
Basin 4	199	12,687
Basin 5	19	1,535
Basin 5X	5	-
Basin 6	89	15,459
Basin 6X	0	-
Basin 7	181	13,377
Basin 8	89	6,215
Basin 9	317	21,156
Basin 10	276	27,743
Basin 10X	27	31
Basin 11	208	23,761
Basin 11X	40	1,144
Basin 13	192	7,395
Basin 14	32	2,084
Basin 15	62	1,701
Area 16	314	32,287
Area 17	279	7,624
Area 18	261	19,021
Area 19	181	14,506
Area 20	740	9,776
Area 21	198	11,028
Area 22	260	8,596
Area 23	20	-
TOTAL	**4,484**	**273,381**

Source: Temple Terrace, Dept. of Public Works, 2007, GIS

Table 2: MAJOR TEMPLE TERRACE DRAINAGE FACILITIES: SEWER STRUCTURES

Basin Name	Number of Structures
Basin 1	35
Basin 2	210
Basin 3	124
Basin 4	89

Basin 5	24
Basin 5X	-
Basin 6	150
Basin 6X	-
Basin 7	102
Basin 8	54
Basin 9	165
Basin 10	309
Basin 10X	1
Basin 11	299
Basin 11X	7
Basin 13	78
Basin 14	20
Basin 15	36
Area 16	338
Area 17	68
Area 18	102
Area 19	170
Area 20	109
Area 21	108
Area 22	106
Area 23	-
TOTAL	**2,704**

Source: Temple Terrace, Dept. of Public Works, 2007, GIS

Table 3: MAJOR TEMPLE TERRACE DRAINAGE FACILITIES: RETENTION/DETENTION PONDS

LOCATION	WET/DRY/LS	AREA (SQUARE FEET)
RAINTREE TERRACE	D	31,005
RAINTREE TERRACE	2 – W	100,900
THERESA ARBOR	D	62,500
RUSTIC VILLAGE	D	25,760
113TH & GILLETTE	W	154,126
WHITEWAY & RIVERHILLS	W	22,162
RAILROAD R.O.W.	D	12,750
FAMILY RECREATION POND	D	17,380
GILLETTE & WHITEWAY	W	48,000
62ND STREET	D	20,520
RICHLYNE & WHITEWAY	W – LS	48,880
HIBISCUS (A – PIT)	W – LS	44,800
MISSION HILLS	W	139,587
BEVERLY DRIVE	D	8,772
GENTILLY OAKS	D	22,651
RIVER FOREST RESERVE #1 AND #2	D	13,900
114TH STREET	D	6,438
SUNNYSIDE & BULLARD	W	15,000

LOCATION	WET/DRY/LS	AREA (SQUARE FEET)
SPRINGDALE & RIVERHILLS	D	3,680
301 SPORTS COMPLEX	D	2,675
78TH STREET	W – LS	86,848
WATER PLANT	W	11,645
PUBLIC WORKS	D	31,221
RIVERHILLS (WEST OF 56TH STREET)	D	2,550
BLUFFS (AT MONET)	D	10,000
JENNIFER (EAST – PRIVATE)	D	10,625
JENNIFER (WEST – PRIVATE)	D	8,320
ALANBROOK (DEAD-END)	D	16,775
LIBRARY	D	4,125
PRIMROSE	D	14,400
RIDGEDALE	2-D	19,125
RECREATION CENTER	3-D	35,920
CHICAGO	W	
127TH AVENUE	LS	N/A
	TOTAL	**1,053,040**
12 – WET	**25 – DRY**	**4 – LIFT STATIONS**

Source: Temple Terrace, Dept. of Public Works, 2007

Much of the City of Temple Terrace is contiguous to the Hillsborough River and surface runoff from Drainage Basins Nos. 1, 2, 3, 4, 5, 6, 7, 8, 13, 14 and 15 and Areas 16, 18, 19, 20 and 21 (**Figure 2**) discharges to the river after going through detention ponds and/or drainage swales specifically designed to reduce pollutant loads. Drainage Basins No. 9, 10 and 11 are natural depressions from which there is no gravity outlet; they rely on natural percolation within detention ponds to remove runoff water.

Where natural percolation is not sufficient to remove stormwater over a reasonable period of time, pumps are used to move the water to another drainage basin. A permanent pump for this purpose is installed in the ponds on Richlyne south of Whiteway (Basin 10) and on the north side of Whiteway at Richlyne. In addition, an outfall control structure was installed in the pond at Gillette and Whiteway. Temporary pumping is needed at times to alleviate flooding issues throughout the City.

The City of Temple Terrace is located in an area where sinkholes are fairly common and special drainage conditions relate to the large sinkhole which is located within the City (see **Conservation and Aquifer Recharge Element**). The limestone formations which underlie the area are riddled with cavities which are prone to collapse. Runoff naturally flows into these depressions and further dissolves the underlying rock. Eventually, the collected stormwater from these sinks reaches the surficial aquifer and mixes with the groundwater.

Because of potential groundwater contamination, stormwater discharge into sinkholes must be carefully controlled.

Sinkholes are frequently located in conjunction with well-drained soils, which are, ironically, otherwise well-suited for development. Generally such areas are unsuitable for development and should be reserved for stormwater retention if aquifer pollution is unlikely. The City has a large sinkhole located at its north end. The sinkhole, located on public property at the City recreation complex, is periodically cleaned and monitored for pollutant loads.

In some cases, a facility or a portion of it is the responsibility of another party. For example, the City's major arterials are maintained by the State or Hillsborough County and contain drainage facilities which are critical to the City's drainage system. In other cases, privately-owned drainage facilities are a portion of a larger sub-basin system and must be maintained by parties other than the City of Temple Terrace. **Table 4** identifies the number of drainage structures in the City which have been privately installed.

Table 4: PRIVATELY INSTALLED TEMPLE TERRACE DRAINAGE STRUCTURES

Basin Name	Number of Structures
Basin 1	3
Basin 2	54
Basin 4	1
Basin 6	76
Basin 9	13
Basin 10	67
Basin 11	136
Basin 13	21
Area 16	215
Area 17	20
Area 18	22
Area 19	24
Area 20	29
Area 21	29
Area 22	44
TOTAL	**754**

Source: Temple Terrace, Dept. of Public Works, 2007, GIS

Level of Service (LOS) Standards

Identifying an appropriate LOS for drainage in a developed community such as Temple Terrace requires careful consideration of the community's expectations for this type of public infrastructure. To identify a LOS which addresses the community's drainage concerns, the Department of Public Works and

Engineering reviews citizen complaints relating to drainage. A review of drainage-related complaints shows that temporary flooding occurs infrequently.

Although LOS could be set on the basis of water quality and/or volume discharged to receiving waters, thereby addressing the community's concerns regarding environmental quality, a measure which focuses primarily on the incidence and severity of flooding was identified as the most responsive LOS the City could implement in its future planning and permitting activities. The "development standards" section of this sub-element describes the design storm LOS established by the City which is based on the Southwest Florida Water Management District's standards. With this in mind, the City has identified the following general criteria for use in drainage system analysis:

Acceptable LOS
This LOS allows some minor flooding of yard and street areas that occurs for limited lengths of time and that poses no threat to buildings and other structures. Overland flow of off-site stormwaters, surcharging of the stormwater collection system, and ponding of confined waters will occur in limited areas. In other instances, all stormwater will be captured by the collection system and street storage conditions will be absent.

The impacts of this LOS are primarily nuisance flooding problems related to temporary impassability of streets and minor yard flooding by brief periods of stormwater inundation. Flooding of major roadways is limited to the outer lanes and does not prevent travel. Minor roadways may flood but not sufficiently to make travel impossible or to flood vehicles using the roadways or that are parked in driveway and yard areas. Yard flooding will generally be limited to less than half of the front yard setback area. The hydraulic grade line is near the inlet throat and stormwater may pond for up to 20 minutes at the inlet. Environmental impacts resulting from rapid flushing of stormwater to receiving water bodies pose no threat to the public health, safety, and welfare or to the ability of natural systems to return to normal following the storm event.

Unacceptable LOS
This LOS includes flooding of yard and street areas as well as some structural flooding. Overland flow of off-site stormwater, surcharging of the stormwater collection system, and ponding of confined waters combine to create significant flooding hazards on the street system. The impacts of this LOS relate to both road impassibility and the potential for damage to structures by periods of stormwater inundation.

Flooding of major roadways precludes the use of outer traffic lanes and travel in inner lanes is difficult. Minor roadways may flood sufficiently to make travel impossible and to flood vehicles using the roadways or that are parked in

driveway and yard areas. Yard flooding can be total and may extend into the structure. The hydraulic grade line is well above the inlet throat for extended periods of time. Environmental impacts resulting from rapid flushing of stormwater to receiving water bodies may pose a threat to the public health, safety, and welfare or to the ability of natural systems to return to normal following the storm event.

Development Standards

New developments are regulated to ensure that post development runoff does not exceed pre-development discharge volumes and rates. The Land Development Code has established a design LOS which requires on-site detention/retention basins and other structural solutions as are determined to be necessary to achieve this objective. **9J-5.011(1)(e)5.**

The City has adopted the stormwater quantity and quality design standards included in the Southwest Florida Water Management District's, Environmental Resource Permit, Basis of Review document.
(see: http://www.swfwmd.state.fl.us/rules/files/40d_basis_of_review.pdf).

These design standards are based on Chapters 40D-4, 40D-40 and 40D-400 F.A.C. In short, for on-site dry detention, the first one-half inch of rainfall is required to be held for treatment; for wet detention, the first one-inch. Absent a known problem within a drainage area, detention and retention basins with an overflow outlet are required to be designed for a 25-year, 24-hour rainfall with a peak discharge rate not exceeding that of the pre-development 25-year rainfall. Retention basins without an overflow outlet are required to be designed for a 100-year, 24-hour rainfall. The design of drainage subsystems for streets and roads relies on a 10-year recurrence interval design storm event. **9J-5.011(1)(f)1.b., 9J-5.011(1)(f)1.c.**

These design standards are generally considered to be the most cost-effective standards under which the benefits derived are at least equal to the cost of the storm drainage system necessary to convey the runoff. These design standards, when combined with an ongoing maintenance program, will assure continuing acceptable conditions in the City's drainage subsystems. It should be kept in mind, however, that design standards generally apply only to new development and cannot address the effects of inadequately designed existing systems or development constraints in areas that naturally flood. **9J-5.011(1)(f)2.**

EXISTING AND FUTURE NEEDS

Today, few drainage problems exist. Those that exist can usually be traced to pre-1980's developments which were built prior to enactment of the current regulatory framework. The advancing age of many City facilities also makes it critical that steps are taken to rehabilitate and maintain functioning systems.

In some cases, existing drainage outfalls contribute to the degradation of certain receiving waters. Steps to improve water quality, such as drainage facility retrofitting, have occurred to ensure continued acceptable levels of water quality and to limit contamination of sinkholes, such as the installation of five (5) CDS (Continuous Deflection Separation) units.

Recently completed stormwater system improvements include:

- 52nd Street – A storm inlet, drainage structures and culvert were installed and connected to an existing system to reduce standing water at a common low area with no outfall.

- Glen Burnie and Glen Arven area – A drainage collection system was constructed to intercept runoff that flows across the golf course and impact the drainage on Riverhills Drive.

- Family Recreation Complex – An inlet and pipe were installed to intercept runoff during heavy storm events to prevent flooding adjacent buildings.

- Installation of five (5) CDS Units – One on Chicago Avenue at the Broadway outfall, two on Riverhills Drive and two on Glen Arven Avenue.

Known stormwater system improvements need to be made including:

- Raintree Subdivision Improvements – During major storm events, two streets in the subdivision experience flooding because of an inadequate outfall pipe. The Capital Improvement Project is to replace a 15-inch culvert with a 36-inch culvert and improve the downstream outfall system. The project requires an easement.

The Land Development Code requires that new stormwater systems be designed within the parameters of the sub-basin's discharge capacity and that improvements to existing systems be made with sub-basin characteristics in mind. In some cases, development of new systems or redesign of existing ones will help alleviate drainage problems in other portions of the sub-basin and result in an overall improvement in the LOS.

FUNDING ALTERNATIVES

The City currently funds drainage improvements from either general operating revenues or gas tax dollars (in the case of roadway improvements). **Figure 4** shows "Drainage Improvement Projects Thru 2013". Most City-funded improvements are directed toward correcting existing deficient conditions since

new development provides adequate on-site drainage as a condition of development approval. Additional funds could be made available through the Community Development Block Grant Program (CDBG), special district assessments, impact fees or Southwest Florida Water Management District.

The City has identified funding sources for all improvements based on its current revenue structure. The Capital Improvements Program will be reassessed annually and additional funding sources may be sought to support a more ambitious improvement program if warranted in the future.

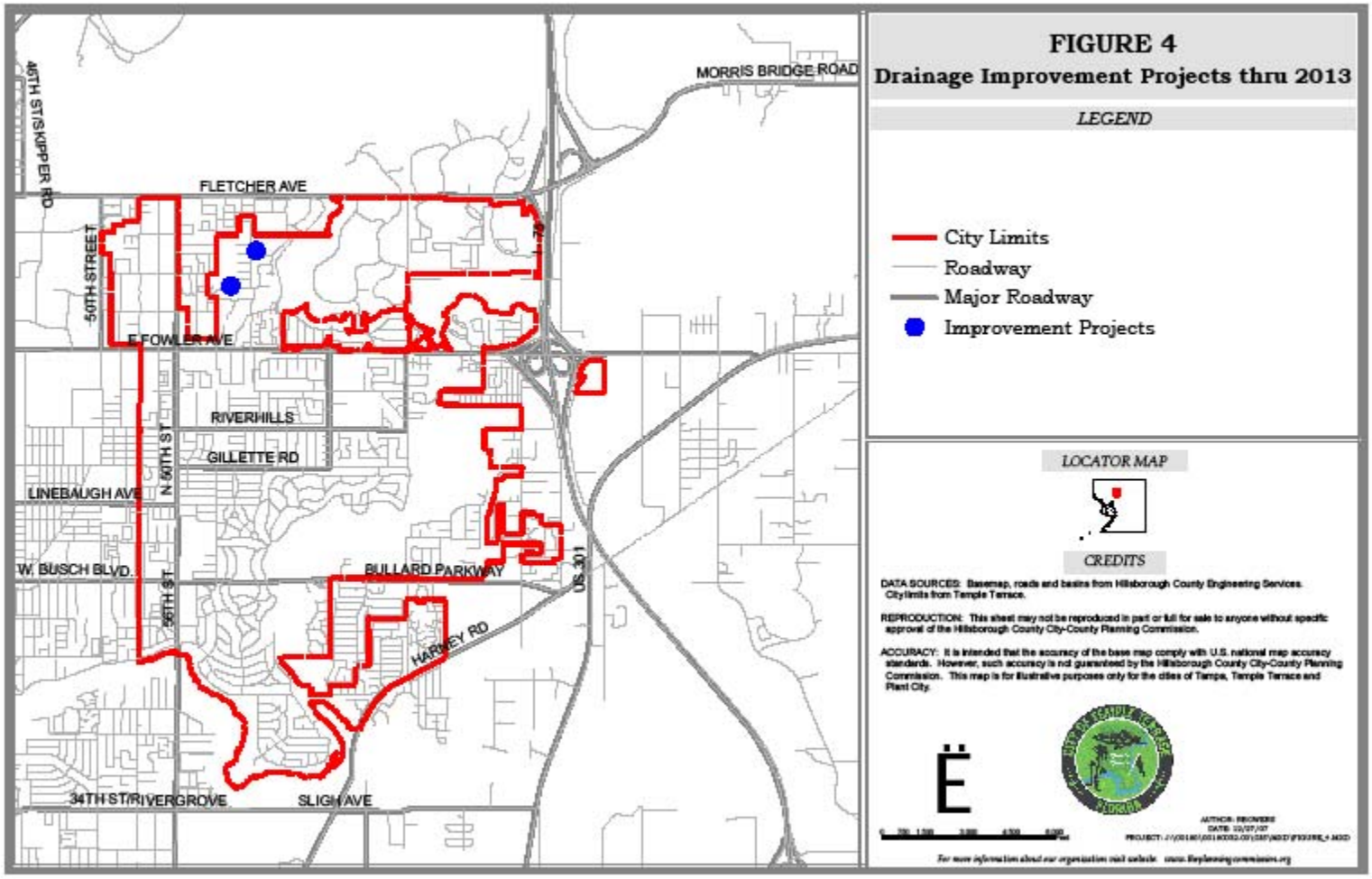
FIGURE 4
Drainage Improvement Projects thru 2013
LEGEND
City Limits
Roadway
Major Roadway
Improvement Projects
LOCATOR MAP
CREDITS
DATA SOURCES: Basemap, roads and basins from Hillsborough County Engineering Services. Citylimits from Temple Terrace.
REPRODUCTION: This sheet may not be reproduced in part or full for sale to anyone without specific approval of the Hillsborough County City-County Planning Commission.
ACCURACY: It is intended that the accuracy of the base map comply with U.S. national map accuracy standards. However, such accuracy is not guaranteed by the Hillsborough County City-County Planning Commission. This map is for illustrative purposes only for the cities of Tampa, Temple Terrace and Plant City.
MORRIS BRIDGE ROAD
46TH ST/SKIPPER RD
FLETCHER AVE
50TH STREET
I-75
E FOWLER AVE
RIVERHILLS
GILLETTE RD
N 60TH ST
LINEBAUGH AVE
W. BUSCH BLVD.
56TH ST
BULLARD PARKWAY
US 301
HARNEY RD
34TH ST/RIVERGROVE
SLIGH AVE

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STRATEGIES FOR IMPLEMENTATION

Design standards as set forth in this sub-element will be enforced for all new development. The Capital Improvements Program will be implemented as funds become available and reviewed annually so that new priorities may be assigned as necessary.

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GOALS, OBJECTIVES, AND POLICIES

POTABLE WATER AND SANITARY SEWER

GOAL 1: To efficiently deliver excellent public facilities and services for potable water and sanitary sewer that support development and redevelopment in the City, provide for the health, safety and welfare of its citizens, and ensure protection and preservation of the environment. **9J-5.011(2)(a)**

Objective 1.1: To achieve and maintain potable water and sanitary sewer facilities that meet or exceed adopted levels of service for current development and for future development. **9J-5.011(2)(b)1 and 2.**

Establish Levels of Service

Policy 1.1.1:

Attain or exceed the following Levels of Service standards for the City's potable water facilities, based upon professional engineering design standards:

- maximum facility flow design standards of 340 gallons per equivalent connection per day at a minimum pressure of 20 PSI residual, during hourly peak flow, throughout the system;
- a ratio of peak-day capacity to average-day capacity of 1.72; and
- a storage capacity of finished water, in combination with standby pumping facilities, to provide 0.5 maximum daily demand for water supply. **9J-5.011(2)(c)2.d**

Policy 1.1.2:

Attain or exceed the following Levels of Service standards for the City's sanitary sewer facilities, based upon professional engineering design standards:

- maximum facility flow design standards of 190 gallons per equivalent connection per day for wastewater collection; and
- a ratio of peak-day capacity to average-day capacity of 1.93.

Establish Priorities

Policy 1.1.3:

Prioritize infrastructure programming based on existing facility deficiencies first, replacement and retrofitting of facilities second, and future facility needs third. **9J-5.011(2)(c)1.**

Policy 1.1.4:
Provide urban service levels in the City's service area that are consistent with the service levels provided to City residents and that will promote the health, safety, and welfare of all residents.

Facility Planning
Policy 1.1.5:
Maintain a concurrency management process to ensure adequate system capacity before permits are issued, and to update facility demand and capacity information as development orders and permits are issued.

Policy 1.1.6:
Prepare an annual Level of Service report to assess the extent of current and projected capacities and/or deficiencies within the potable water and wastewater systems for a period of twenty years. **9J-5.011(2)(c)2.**

Policy 1.1.7:
Update the City's master plans for potable water and sanitary sewer as needed to provide for a minimum of five years of future growth, or longer as necessary to eliminate deficiencies and to comply with State law and City ordinance.

Policy 1.1.8:
Begin negotiations with Tampa Bay Water to design and build an interconnect for potable water supply as a backup water source when projected demand is within five years of exceeding capacity.

Policy 1.1.9:
Prepare an annual Capital Improvements Program to address all existing deficiencies and future needs of potable water and wastewater systems on a comprehensive basis.

Policy 1.1.10:
Implement projects in accordance with the Capital Improvements Program.

Policy 1.1.11:
Locate public facilities and utilities to:
(a) maximize the efficiency of services provided;
(b) minimize their cost; and
(c) minimize their impacts upon the natural environment.

Policy 1.1.12:
Ensure that suitable lands and/or easements are available for the provision of necessary potable water and wastewater facilities.

Facility Construction & Maintenance

Policy 1.1.13:

Adhere to established Technical Standards for water and sewer construction in Temple Terrace and its service area.

Policy 1.1.14:

Cooperate with the City of Tampa in the development of innovative, cost-effective potable water and wastewater treatment techniques, facility designs, and reclaimed water reuse programs which will allow for maximum flexibility in the design and construction of City systems.

Policy 1.1.15:

Continue inspection, maintenance, renovation, and replacement programs which will ensure the continued acceptable operation of all existing potable water and wastewater facilities.

Policy 1.1.16:

Continue the program of improving water pressure and fire protection in problem areas by replacing undersized piping, providing loops to the distribution system, and adding fire hydrants.

Policy 1.1.17:

Adequate sanitary sewer, solid waste, stormwater drainage and potable water facilities shall be in place and available to serve new development no later than the issuance of a certificate of occupancy, consistent with Chapter 163.3180. F.S. Park and recreational facilities shall be in place and available to serve new development no later than one year after the issuance of a certificate of occupancy by the City of Temple Terrace. Transportation facilities needed to serve new development shall be in place or under actual construction within three years after a building permit is approved that results in traffic generation, unless otherwise exempt under Chapter 163.3180. F.S.

Policy 1.1.18:

Temple Terrace shall continue to perform a coordinated review process for new development among its departments, including the City's Water Department and such other water suppliers the City may contract with in the future, to ensure that an adequate water supply is maintained and available in the City of Temple Terrace. *(The coordination mechanisms for public facilities with other jurisdictional entities and agencies are noted in* ***Table 1 of the Intergovernmental Coordination Element (ICE)****.)*

Policy: 1.1.19:

Prior to approval of a building permit or its comparable equivalent, the City will consult with the City Water Department and such other water suppliers the City may contract with in the future to determine whether adequate water supplies to serve the subject development will be available no later than the anticipated date of the issuance of a certificate of occupancy or its functional equivalent, as required by Section 163.3180(2)(a), Florida Statutes.

Objective 1.2: To manage growth so as to utilize existing potable water and sanitary sewer facilities efficiently. **9J-5.011(2)(b)3.**

Policy 1.2.1:

Require all new development and substantial redevelopment to be served by the City's centralized potable water distribution and wastewater collection systems.

Policy 1.2.2:

Provide incentives for developing land in a way that maximizes the use of existing facilities with available capacity to serve development or minimizes the need for new infrastructure.

Policy 1.2.3:

Continue the program of marking the location of all water service and sewer house laterals as they are constructed.

Objective 1.3: To conserve water resources so as to limit use of primary water sources, to delay cost of connecting with Tampa Bay Water, to reduce volume of sanitary sewer treated, and to lower unit costs of delivering potable water and sanitary sewer. **9J-5.011(2)(b)4.**

Policy 1.3.1:

Encourage xeriscape yards and appropriate combination of cisterns, grey water systems, green roofs and xeriscape yards on all new and redeveloped City properties.

Policy 1.3.2:

Encourage xeriscape yards on all new and redeveloped nonresidential and multifamily properties.

Policy 1.3.3:
Encourage appropriate combination of cisterns, grey water systems and green roofs, when feasible, on all new and redeveloped nonresidential and multifamily properties.

Policy 1.3.4:
Encourage through a favorable structure for water and sewer rates and other incentives, the use of cisterns, grey water systems, green roofs and xeriscape yards on all properties.

Policy 1.3.5:
Require developments to participate in recovered water reuse programs when such programs are established in the service area.

Policy 1.3.6:
Assess and redesign the water utility rate structure at least every five years to optimize water conservation while maintaining overall revenues.
[SWFWMD has a water rate simulation model freely available for local water utilities: http://www.swfwmd.state.fl.us/conservation/waterrates/.)
9J-5.011(2)(c)3.

Objective 1.4: To ensure compliance with all health, safety, environmental and other regulations emanating from federal, state and local law that pertain to the provision of potable water and sanitary sewer facilities and services.

Policy 1.4.1:
Ensure compliance with SWFWMD Water Master Plan.

Policy 1.4.2:
Issue no development orders or permits until the applicant has demonstrated compliance with applicable Federal, State and local requirements for potable water treatment and distribution, and for wastewater collection and disposal.

Policy 1.4.3:
The City will coordinate with the Southwest Florida Water Management District (SWFWMD) to assure consistency between the City of Temple Terrace Comprehensive Plan and SWFWMD's Regional Water Supply Plan. The 10 Year Water Supply Facilities Work Plan shall be updated every five years and within 18 months of the update of the Southwest Florida Water Management District's Regional Water Supply Plan.

Policy 1.4.4:

In addition to the City's current 10-Year Water Supply Work Plan that covers years through the 2018 planning horizon, the City will update its potable water demand and supply analysis by December 2010 to cover the years through the 2020 planning horizon for facility plan updates. This updated analysis, consistent with the Southwest Florida Water Management District's (SWFWMD) Regional Water Supply Plan, will include additional water conservation planning initiatives and strategies to address further water conservation of the City's water supply.

The gross per capita water use values for the City have most recently ranged from approximately 110 gallons per day per person (gpd/p) to approximately 126 gpd/p, which is below the 130 gpd/p per-capita water use rate goal that has been established by SWFWMD through the January 2011 management period.

In addition to existing water conservation efforts, such as low flow water fixtures and a graduated water rate schedule, the City maintains strict watering restrictions, allowing residential irrigation two days per week during periods of high rainfall, and only one day per week during periods of reduced rainfall. One day per week watering restrictions were most recently enacted on January 9, 2007 and have remained in effect since then. The City has other water conservation measures such as Wellhead Protection and Water Conservation ordinances, news releases, and code enforcement.

Table 5 below presents the permitted withdrawal and water conservation offsets through October 28, 2018.

TABLE 5:
PERMITTED AND AUTHORIZED WATER USAGE AND PROJECTIONS
1998-2018

	Previously Permitted 1998 – 2007	**Authorized by SWFWMD 2008 - 2018**
Annual Average[1] (gallons per day)	5,098,000	5,150,000[3]
Peak Month[2] (gallons per day)	7,272,000	5,817,400[4]
Total Water Conserved Over 10 Years 2008 – 2018 ≈ 45,000,000 gallons[5]		

1. *Annual average is the total gallons in a year divided by 365 days per year*
2. *Peak month is the total gallons in the highest water-use month divided by the number of days in that month.*
3. *The 52,000 gpd increase in annual average quantity is based on projected demand through 2018.*
4. *The 1,454,600 gpd decrease in peak month is largely due to water conservation measures enforced by the City.*

5. *The City's water conservation measures and other factors have decreased the gross per capita rate from 115.8 gallons per day per person (2007) to 115.5 gallons per day per person (2018).* ***Total water conserved over the 10-year period is about 45 million gallons or (115.8 gpd/p - 115.5 gpd/p) x 41,774 persons in extra-jurisdictional service area x 365 days/year x 10 years.***

	2008	2018
Water Demand (gallons per day)	3,730,680	5,685,431
Water Supply (gallons per day)	5,150,000	5,150,000
Water Surplus or Deficit (gallons per day)	1,419,320	(535,431)

The City's permitted water withdrawal rate is adequate to meet present demand. A water supply deficit exists for 2018 based on permitted withdrawal rate and demand. The City has a site available for an interconnect with Tampa Bay Water if additional water supply is needed through 2018 to meet demand. This site is included in the City's 2005 Potable Water Master Plan.

The actual projected water demand for 2018 is 5,685,431 gallons per day based on projected extra-jurisdictional service area residential population of 41,774, water demand rate of 127 gallons per day per person, and system treatment losses as presented in the Water Use Permit application, TABLE 5. However, during pre-Water Use Permit application meetings with the SWFWMD, it was made evident that the significant increase of water use from the previous permit would be denied. Therefore, the previously permitted amount became the baseline for consideration of the new permitted amount. A minor increase of 52,000 gpd was achieved through reapportioning the pumping between existing wells, showing no additional adverse impacts to the Hillsborough River. In summary, the newly permitted quantity of 5,150,000 gpd is the previously permitted quantity of 5,098,000 gpd plus the 52,000 gpd gained through reapportionment of pumping.

SOLID WASTE

GOAL 2: To efficiently deliver an excellent solid and hazardous waste collection and disposal system that supports development and redevelopment in the City, provides for the health, safety and welfare of its citizens, and ensures protection and preservation of the environment. **9J-5.011(2)(a)**

Objective 2.1: To achieve and maintain a solid waste collection system that meets or exceeds adopted levels of service for current development and for future development. **9J-5.011(2)(b)1 and 2.**

Establish Levels of Service

Policy 2.1.1:

Attain or exceed the following Levels of Service standards for the City's solid waste collection facilities: **9J-5.011(2)(c)2.c.**

- 1,000 to 1,150 stops per crew-day for residential service;
- 484 to 550 pounds per lift and 110 to 130 lifts per day for commercial service; and
- 1,000 stops per crew-day for curbside recycling service.

Establish Priorities

Policy 2.1.2:

Prioritize infrastructure programming based on existing facility deficiencies first, replacement and retrofitting of facilities second, and future facility needs third. **9J-5.011(2)(c)1.**

Policy 2.1.3:

Provide urban service levels in the City's service area that are consistent with the service levels provided to City residents and that will promote the health, safety, and welfare of all residents. **9J-5.011(2)(c)2.**

Facility Planning

Policy 2.1.4:

Maintain a concurrency management process to ensure adequate system capacity before permits are issued, and to update facility demand and capacity information as development orders and permits are issued.

Policy 2.1.5:

Prepare an annual Level of Service report to assess the extent of current and projected capacities and/or deficiencies within the solid waste collection system and as regards the contract for disposal for a period of twenty years. **9J-5.011(2)(c)2.**

Policy 2.1.6:

Update the City's master plan for solid waste collection as needed to provide for a minimum of five years of future growth, or longer as necessary to eliminate deficiencies and to comply with State law and City ordinance.

Policy 2.1.7:

In accordance with the "Interlocal Agreement for Solid Waste Management Services Between Hillsborough County and The City of Temple Terrace,

Florida," Hillsborough County shall provide solid waste management facilities sufficient to receive, process and/or dispose of all acceptable waste.

Policy 2.1.8:
Prepare an annual Capital Improvements Program to address all existing deficiencies and future needs of the solid waste collection system on a comprehensive basis.

Policy 2.1.9:
Implement projects in accordance with the Capital Improvements Program.

Policy 2.1.10:
Locate public facilities and utilities to:
(a) maximize the efficiency of services provided;
(b) minimize their cost; and
(c) minimize their impacts upon the natural environment.

Objective 2.2: To manage growth so as to utilize existing solid waste collection services efficiently. **9J-5.011(2)(b)3.**

Policy 2.2.1:
Require all new development and substantial redevelopment to be served by the City's solid waste collection system.

Policy 2.2.2:
Provide incentives for developing land in a way that maximizes the use of existing facilities with available capacity to serve development or minimizes the need for new infrastructure.

Objective 2.3: To encourage behavior so as to reduce the volume of solid waste and to lower unit costs of delivering solid waste collection services.

Policy 2.3.1:
Encourage reuse strategies, recycling, composting and trash compacting on all City properties.

Policy 2.3.2:
Encourage reuse strategies, recycling, composting and trash compacting on all new and redeveloped nonresidential and multifamily properties.

Policy 2.3.3:
Continue recycling program for newspaper, cardboard, aluminum, metal cans, plastic and glass.

Policy 2.3.4:
Encourage through a favorable structure for solid waste collection rates and other incentives, reuse strategies, composting and trash compacting on all properties.

Policy 2.3.5:
Assess and redesign the solid waste collection rate structure at least every five years to optimize solid waste reduction incentives while maintaining overall revenues.

Policy 2.3.6:
If the solid waste management facility provider(s) is, at some future date, unable to provide disposal capacity and landfill space for City waste generators, the City shall increase the rate of citywide re-use, composting and recycling, and prohibit all development until the City can provide alternative landfill service consistent with the LOS standard or contract with another landfill service provider to dispose of the waste.

Objective 2.4: To ensure compliance with all health, safety, environmental and other regulations emanating from federal, state and local law that pertain to the provision of solid waste collection facilities and services.

Policy 2.4.1:
Issue no development orders or permits until the applicant has demonstrated compliance with applicable Federal, State and local requirements for solid waste collection and disposal.

Objective 2.5: In cooperation with Hillsborough County, the City will continue to maintain a comprehensive hazardous waste and emergency response capability that facilitates source reduction and the proper transfer, storage, disposal and recycling of wastes.

Policy 2.5.1:
Participate in Hillsborough County's hazardous waste collection and disposal programs.

Policy 2.5.2:
The City shall distribute public education information on the types of hazardous materials as well as their proper use, storage and disposal.

Policy 2.5.3:
The City shall participate in the County's permanent household waste program to facilitate the safe and convenient collection and disposal of household hazardous wastes.

Policy 2.5.4:
The City recommends recycling household and commercial hazardous waste products such as oils, solvents, plastics and paints, in development reviews and through other means.

Policy 2.5.5:
The City shall continue to participate in a comprehensive chemical emergency preparedness program.

Policy 2.5.6:
The City shall prohibit, through its Land Development Code, hazardous and non-hazardous waste sites located where they pose a danger to the health, safety and welfare of residential communities and areas.

STORMWATER MANAGEMENT

GOAL 3: To efficiently deliver an excellent drainage and stormwater treatment system that supports development and redevelopment in the City, provides for the health, safety and welfare of its citizens, and ensures protection and preservation of the environment. **9J-5.011(2)(a)**

Objective 3.1: To achieve and maintain a drainage and stormwater treatment system that meets or exceeds adopted levels of service for current development and for future development. **9J-5.011(2)(b)1 and 2.**

Establish Levels of Service
Policy 3.1.1:
Attain or exceed the following Levels of Service standards for the City's drainage and stormwater treatment facilities for the storm return frequency and adequacy of available outfalls:
- No positive outfall - 100-year storm event
- Positive outfall - 25-year storm event. **9J-5.011(2)(c)2.c.**

Establish Priorities
Policy 3.1.2:
Prioritize infrastructure programming based on existing facility deficiencies first, replacement and retrofitting of facilities second, and future facility needs third. **9J-5.011(2)(c)1.**

Policy 3.1.3:
Provide urban service levels in the City that are consistent with the service levels provided to City residents and that will promote the health, safety, and welfare of all residents. **9J-5.011(2)(c)2.**

Facility Planning
Policy 3.1.4:
Maintain a concurrency management process to ensure adequate system capacity before permits are issued, and to update facility demand and capacity information as development orders and permits are issued.

Policy 3.1.5:
Prepare an annual Level of Service report to assess the extent of current deficiencies within the drainage and stormwater treatment systems.

Policy 3.1.6:
Maintain and update stormwater management facilities in the City's GIS (Geographic Information System).

Policy 3.1.7:
Prepare an annual Capital Improvements Program to address all existing deficiencies and future needs of the stormwater management system on a comprehensive basis.

Policy 3.1.8:
Implement projects in accordance with the Capital Improvements Program.

Policy 3.1.9:
Locate public facilities and utilities to:
(a) maximize the efficiency of services provided;
(b) minimize their cost; and
(c) minimize their impacts upon the natural environment.

Policy 3.1.10:
Ensure that suitable lands and/or easements are available for the provision of necessary drainage and stormwater treatment facilities.

Facility Construction & Maintenance
Policy 3.1.11:
Adhere to established Technical Standards for drainage system construction and reconstruction in Temple Terrace.

Policy 3.1.12:
Continue inspection, maintenance, renovation, and replacement programs which will ensure the continued optimal operation of all existing stormwater facilities.

Policy 3.1.13:
Continue to remove sediments from retention/detention ponds, and remove silt and vegetation from ditches and storm sewers to ensure the design capacity of existing facilities is maintained.

Objective 3.2: To manage growth so as to utilize existing stormwater facilities efficiently. **9J-5.011(2)(b)3.**

Policy 3.2.1:
Require that post-development runoff not exceed 25-year, 24-hour peak discharge of the pre-developed conditions.

Policy 3.2.2:
Provide incentives for developing land in a way that maximizes the use of existing facilities with available capacity to serve development or minimizes the need for new infrastructure.

Policy 3.2.3:
Encourage multi-use facilities in which stormwater detention/retention areas are combined with an open space/recreation Plan.

Objective 3.3: To encourage behavior so as to reduce the volume of stormwater runoff, to ensure reasonable protection from flooding, to prevent degradation of receiving water quality, and to lower the unit cost of managing and treating stormwater runoff.

Policy 3.3.1:
Continue participation in the National Flood Insurance Program.

Policy 3.3.2:
Do not allow new stormwater discharge into existing sinkholes.

Policy 3.3.3:
Encourage use of latest technologies to reduce stormwater runoff and/or improve water quality, such as, green roofs and cisterns.

Policy 3.3.4:
Require that the retention or detention facility provide treatment of the runoff from the first one inch (1") of rainfall or as an option for projects or

project subunits with drainage areas less than 100 acres, the first one-half inch (1/2") of runoff. **9J-5.011(2)(c)5.a.**

Policy 3.3.5:
Stormwater discharge facilities which directly discharge to Outstanding Florida Waters shall include an additional level of treatment equal to fifty percent (50%) of the treatment criteria specified in **Policy 3.3.4** above. **9J-5.011(2)(c)5.a.**

Objective 3.4: To ensure compliance with all health, safety, environmental and other regulations emanating from federal, state and local law that pertain to the provision of stormwater treatment facilities and services.

Policy 3.4.1:
Adopt the Southwest Florida Water Management District's (SWFWMD's) Basis of Review stormwater management systems design standards for stormwater quantity and quality as basis for City's LOS standard.

Policy 3.4.2:
Require SWFWMD's Environmental Resource Permit be attained by all land development projects in the City.

Policy 3.4.3:
Issue no development orders or permits until the applicant has demonstrated compliance with applicable Federal, State and local requirements for stormwater management and clean water regulations.

Policy 3.4.4:
Annually submit report in compliance with National Pollutant Discharge Elimination System (NPDES) permit.

Policy 3.4.5:
Beautify retention/detention facilities where improvements can be made without suffering a loss of hydraulic capacity.

SUPPORT DOCUMENT SUMMARY

SOURCE REFERENCE AND BIBLIOGRAPHY*

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* *The referenced engineering reports and studies were undertaken by the City to review future infrastructure needs within the City and its service area. These reports serve as the support documentation for this Element.*

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