SOUTH FLORIDA TRANSIT ORIENTED DEVELOPMENT

Evaluation of Water and Wastewater Infrastructure in Potential Tri-Rail Coastal Link Station Areas

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Executive Summary

The planned Tri-Rail Coastal Link (TRCL) service on the Florida East Coast (FEC) railway is a Southeast Florida initiative that will significantly improve regional access and mobility with 28 potential stations serviced by commuter rail. Each station provides an opportunity for strategic investment in Transit-Oriented Development that will generate extensive benefits including economic development, job creation, affordable and workforce housing, community enhancement, and opportunities to incorporate clean fuel infrastructure. The South Florida Regional Transportation Authority (SFRTA) and the Florida Department of Transportation (FDOT) along with partners at the Southeast Florida Transportation Council (SEFTC), the South Florida and Treasure Coast Regional Planning Councils and the transportation planning organizations of Miami-Dade, Broward and Palm Beach are working towards realizing the potential of this project.

Station areas targeted for TOD are intended to support increased development density within a one-half mile radius around the proposed station site. The potential train station area typologies considered by this study are City Centers (12,500 units), Town Centers (5,000 - 8,000 units) and Neighborhood Zones (4,000 units) as previously identified in SFRTA's report "Tri-Rail Coastal Link Station Area Opportunities" (2013). Three station areas already reflect the characteristics of a City Center typology but could be developed beyond the current conditions. These City Centers are downtown West Palm Beach, Broward Boulevard in Fort Lauderdale and Government Center in downtown Miami.

A review of the water and wastewater infrastructure around the proposed rail stations indicates that most stations areas have sufficient capacity for water and wastewater infrastructure to meet the increased demand for TOD, though improvements will still be required in many cases to meet the desired targets. The data for the analysis in this study was garnered from water use permits, FDEP permits, data from the South Florida Water Management District, utility websites, and a review of the Geographic Information Systems (GIS) mapping from the utilities and other sources. Frederick Bloetscher, Ph.D., P.E., was the lead on the study, and is a recognized expert in the field of water and wastewater utilities. Among his areas of expertise are the evaluation of utility systems.

The 28 proposed station sites exhibit some need for additional infrastructure. The extent of this need fluctuates based on the classification of the station area. Several sites will need water supply, water treatment capacity or wastewater treatment capacity. The total cost for upgrades to water and infrastructure to meet targets for TOD around the proposed stations is just over $200 million based on the proposed station area type.

Contents

Evaluation of Water and Wastewater Infrastructure in the Tri-Rail Coastal Link Corridor

The purpose of Task 4 of the South Florida Transit-Oriented Development project for the South Florida Regional Planning Council is to evaluate water and sewer utility infrastructure in the Tri-Rail Coastal Link (TRCL) rail corridor using the Florida East Coast railroad tracks (in conjunction with FEC freight and Brightline/Virgin America passenger service). Transit-Oriented Development (TOD) zones are areas located within a one-half mile radius around the proposed station site. The project proposes 28 sites for train stations varying from large urban centers to smaller ones. The types of potential train station area (Station) enhancements considered as a part of this study are City Centers (12,500 units), Town Centers (5,000-8,000 units) and Neighborhood Zones (4,000 units). Three City Center stations already exist but could be developed beyond the current conditions (Downtown West Palm Beach, Broward Blvd in Fort Lauderdale and Government Center in downtown Miami). The remainder are proposed stations. The goal of this portion of the project was to review the utilities around each of the 28 stations to determine the potential for development and the limitations each site might face if it were to move forward.

To conduct the assessment, the methodology included developing data from a series of public sources, including:

- Raw water supplies - data was generated from permit data from the South Florida Water Management District permit files and the most recent draft of the Lower East Coast Water Supply Plan
- Water treatment plant capacity – data was generated from the most recent draft of the Lower East Coast Water Supply Plan and Florida Department of Health files for each plant
- Average daily water demands - the most recent draft of the Lower East Coast Water Supply Plan and Florida Department of Health monthly operating reports (now with the Florida Department of Environmental Protection)
- Wastewater capacity – note several of these stations are connected to regional utilities – data gathered from utility websites, and monthly operating reports filed with the Florida Department of Environmental Protection
- Wastewater demands - note that capacity in regional stations are harder to analyze, especially if a regional plant serves more than one of the potential Station enhancement sites). Data was gathered from monthly operating reports filed with the Florida Department of Environmental Protection or directly from the utility.
- Geographical Information System (GIS) files from each of the utilities

For each of these station areas, the utilities were asked to provide geographic information system (GIS) data for their water and sewer piping to allow evaluation of the ability to provide service based on pipe size and looping. Each station area was analyzed based on the assumption that a City Center site would be constructed or that the smaller station size (either a Town Center or Neighborhood Center station) would be constructed to determine the magnitude of needed improvements.

For water treatment plant capacity, the current demand plus the new TOD demands were combined. If this value exceeded 90 percent of the plant capacity, added capacity was assumed to be necessary based on water resources best practices. This amount came at a cost of $8 million per million gallons per day (MGD) or $8 per gallon. Likewise, for raw water supply, the existing demand plus the added projected

demand were multiplied by 1.04 to account for lost water during the treatment process at an estimated cost of $7 million per MGD or $7 per gallon. The same analysis for wastewater treatment was performed with an estimated projected cost of $7 million per MGD or $7 per gallon.

Underground water and sewer piping needs were determined with assumptions as follows:

- If the water distribution piping was 12 inches or less, and/or not looped, new piping was suggested
- Based on the distance to the water plant or large piping, a looped pipe length was created
- The estimated cost per foot was $275 for water distribution piping
- Likewise, for sewer pipes, it was assumed a large force main and lift station was needed
- If these were not present, lift stations and force mains were estimated at $250/ft

For each of the Stations, the same analysis was made and a table was created based on the City Center station, plus either a Town Center or Neighborhood Center station based on prior corridor analysis of the proposed station size.

- The results were then peer reviewed by two utility managers familiar with the systems. Two utility group phone calls that added additional utility staff were held in May 2019. Each County was represented, and the reviewers had direct knowledge of 8 of the systems involved, which encompassed nearly all the Stations (for example, West Palm Beach serves 3 Stations with water and 6 with sewer. Fort Lauderdale is similar). Finally, tables were created by Station to develop the following:
- Current development limitations (units)
- Restrictions to current development
- Needs and costs for future development, noting the costs are magnitude of scale, not detailed costs estimates, based on two scenarios of TOD development
- County level needs

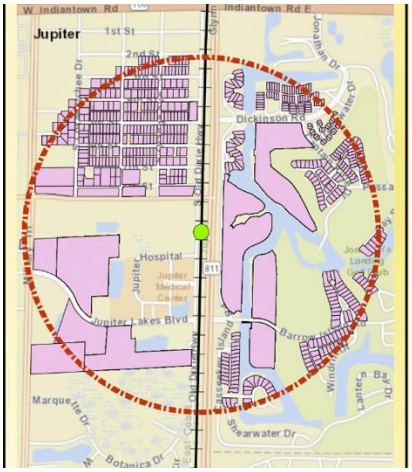
Tables and graphs outlining the overall costs, costs by station and county were also developed for the region.

Station 1. Toney Penna – Jupiter

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
JUPITER	24.41	Floridan	26	16.13	11*	6.5	Reuse	1,474	11,026

***means plant is shared with other communities**

Water Treatment Plant, Pumps and Capacity



The Town of Jupiter (Town) operates a 26 MGD water treatment plant that gets its water supply from the Floridan aquifer. It is one of the first reverse osmosis treatment plants in the state of Florida. The average daily flows are 16.1 MGD. Raw water supplies are 24.41 MGD according to South Florida Water Management District (SFWMD) water use permit allocation records. Disinfection of the water is via chloramination. The Town has a 20-year permit and demand does not warrant seeking additional water supply, however, if needed, additional Floridan allocations would be requested from the SFWMD. A treatment issue of note is that chloride levels in the wells have increased over time which requires higher power demands, higher pressure pumps and potentially different membranes. Water supply and treatment capacity are both adequate to meet current demand projections. The Town's high service pumps are rated for over 30 MGD. Pipelines to the TOD area include a 16-inch pipeline on A1A that is looped with several 12-inch mains. Distribution capacity appears to be adequate.

Wastewater Treatment Plant, Disposal Method and Capacity

Gravity sewer lines are available throughout the Town, however, there are no major gravity sewer pipelines or force mains in the TOD zone around the proposed train station. Minor 8-inch gravity lines exist, but pumping stations and force mains are undersized. A new lift station and large force main is likely required to accommodate the growth related to the proposed train station. Major vertical growth may require added sewer line capacity and lift stations and lift station pump upgrades may be required. The addition of several thousand units due to the train station suggests that added force main piping would be useful to get wastewater to the treatment facility.

The Loxahatchee River District treats the wastewater for Jupiter and Tequesta. Their primary disposal method is reclaimed wastewater for irrigation. Acres of storage ponds are located on their site. The current plant capacity is 11 MGD with average daily flows of 6.5 MGD. There is sufficient capacity in this plant to serve a TOD zone in this location, regardless of the type.

Additional Demand

Additional demands for a TOD zone depend on what type of train station area is planned and the development anticipated as a result. The largest station areas are city center (City Center) that includes 12,500 units (column 3 of Table 1). Based on such a station, the demands for TOD Station 1 site include

3.31 MGD of water supply and treatment, and 2.21 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater appear adequate as well but sewer line upgrades may be needed under this scenario for any additional TOD enhancements.

This station site is anticipated to be a Town Center station which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 1.51 MGD of water supply and treatment, and 1.01 MGD of wastewater treatment (column 2 of Table 1). Again, adequate treatment capacity exists in both systems and raw water supplies and disposal capacity for wastewater appear adequate as well. As previously discussed, sewer lines may be needed under this scenario.

The current utility infrastructure with respect to water and wastewater capacity does not limit the proposed station (column 2), however the underground sewer piping may need upgrades.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 1 outlines the current capacity, the anticipated needs for a City and Town Center station, and the units that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping are estimated. Based on the analysis of GIS pipelines for the area, treatment capacity upgrades are not required. Only sewer upgrades are needed.

Table 1 Summary of Needs for TOD development for Station 1 Site

Sta. No	1	
Station Location	TONEY PENNA	
City	JUPITER	JUPITER
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	no	no
Raw W (MDG)	24.41	24.41
Raw source	Floridan	Floridan
WTP Cap (MGD)	26	26
WTP Demand (MGD)	16.13	16.13
WWTP cap (MGD)	11	11
WWTP Demand (MGD)	6.5	6.5
Disposal method	Reuse	Reuse
# of Existing Residential Units within Half-Mile of Station (2018)	1474	1474
Max Density Scenario within Half-Mile of Station	5026	11026
Add Water Demand	1.5078	3.3078
Add WW Demand	1.0052	2.2052
Available Capacity Water	9.87	9.87
Available Capacity Raw Water	8.28	8.28
Available Capacity Wastewater	4.5	4.5
% capacity Water treatment	68%	75%
% capacity Water Supply	75%	83%
% capacity needed Wastewater treatment	68%	79%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	0	0
Force Main LF	2500	2500
Sewer lift station	1	1
gravity sewer revisions	0	0
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ -	$ -
Force Main Cost	$ 500,000	$ 500,000
Sewer lift station	$ 500,000	$ 500,000
Gravity Cost	$ -	$ -
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 1,250,000	$ 1,250,000
Total cost millions	$ 1.25	$ 1.25

Station 2. Palm Beach Gardens – PGA Blvd

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
PALM BEACH GARDENS	26.92	Biscayne	30.5	18.02	12*	8	Reuse/Inj Well	1,660	10,840

***part of regional system**

Water Treatment Plant, Pumps and Capacity

Seacoast Utility Authority (Seacoast Utilities) operates the 30.5 MGD Hood Road water treatment plant that can provide water supply capacities of 26 MGD from the Surficial aquifer and treat it with nanofiltration membranes; 3.5 MGD from brackish upper Floridan aquifer wells treated using reverse osmosis; and 1 MGD of pre-treated local Surficial aquifer blend water. The average daily flows are 18.02 MGD with raw water supplies of up to 26.92 MGD from the Surficial aquifer according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. Seacoast Utilities has a 20-year permit and is not currently looking for new supplies.

High service pumps are rated over 30 MGD. A 12-inch pipeline serves the area with a series of smaller pipelines serving local streets. Water service will need to be upgraded to supply the demand of a TOD zone.

Wastewater Treatment Plant, Disposal Method and Capacity

Gravity sewer lines are available throughout the service area. Major vertical growth may require added sewer line capacity and lift stations as only a series of 8-inch gravity lines and small lift stations are reported. As a result, new or existing lift station pump upgrades may be required. The addition of several thousand units suggested added force main piping would be useful to get wastewater to the treatment facility.

Seacoast Utilities treats the wastewater for the PGA Blvd TOD area. Their primary disposal option is reclaimed wastewater for irrigation and injection wells. Acres of storage ponds are located on their site. The current plant capacity is 12 MGD. The average daily flows are roughly 8 MGD. There is sufficient capacity in this plant to serve a TOD zone.

Additional Demand

Note it is unlikely that both sites 2 and 3, which would be served by this treatment plant, would both be pursued. If they were, the combined additions would cause the treatment capacity to exceed 80% on both systems, creating a need to pursue capacity additions at that time based on capacity best practices (see highlight in column 3 of Table 2).

Additional demands for a TOD zone depend on what type of train station area is planned and the development anticipated as a result. The largest stations are the City Center type that include 12,500 units

(column 3). Based on such a station, the demands for the TOD Station 1 site include 3.25 MGD of water supply and treatment, and 2.17 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater appear adequate as well. Sewer lines may be needed under this scenario.

However, this station site is anticipated to be a Town Center type which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 1.45 MGD of water supply and treatment, and 0.97 MGD of wastewater treatment (column 2). Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater appear adequate as well. Sewer line upgrades may be needed under this scenario.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 2 outlines the current capacity, the anticipated needs for a City and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping are estimated. Based on the analysis of GIS pipelines for the area, upgrades to the treatment capacity are not required, therefore no costs are identified. Only sewer upgrades are needed.

Table 2 Summary of Needs for TOD development

Sta. No	2	
Station Location	PGA BLVD	
City	PALM BEACH GARDENS	PALM BEACH GARDENS
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	no	yes
Raw W (MDG)	26.92	26.92
Raw source	Surficial	Surficial
WTP Cap (MGD)	30.5	30.5
WTP Demand (MGD)	18.02	18.02
WWTP cap (MGD)	12	12
WWTP Demand (MGD)	8	8
Disposal method	Reuse/Inj Well	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	1660	1660
Max Density Scenario within Half-Mile of Station	4840	10840
Add Water Demand	1.452	3.252
Add WW Demand	0.968	2.168
Available Capacity Water	12.48	12.48
Available Capacity Raw Water	8.9	8.9
Available Capacity Wastewater	4	4
% capacity Water treatment	64%	70%
% capacity Water Supply	75%	82%
% capacity needed Wastewater treatment	75%	85%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.57
16+ WM - LF	10000	10000
Force Main LF	0	0
Sewer lift station	2	2
gravity sewer revisions	0	0
Lift station upgrades	0	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ 4,544,000
16+ WM Cost	$ 2,750,000	$ 2,750,000
Force Main Cost	$ -	$ -
Sewer lift station	$ 1,000,000	$ 1,000,000
Gravity Cost	$ -	$ -
Lift station upgrades	$ -	$ 250,000
Total cost	$ 3,750,000	$ 8,544,000
Total cost millions	$ 3.75	$ 8.54

Station 3 Lake Park

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
LAKE PARK	26.92	Biscayne	30.5	18.02	12*	8	Reuse/Inj Well	1,066	11,434

***part of regional system**

Water Treatment Plant, Pumps and Capacity

Lake Park is a small community primarily consisting of single-family residential housing. Water and sewer are served by Seacoast Utilities. Seacoast Utilities operates a 30.5 MGD water treatment plant that can provide up to 26 MGD of Surficial aquifer source water treated by nanofiltration; 3.5 MGD of brackish upper Floridan aquifer water treated by reverse osmosis; and 1 MGD of pretreated local surficial aquifer blend water. Raw water supplies from the Surficial aquifer are allocated at 26.92 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. Seacoast Utilities has a 20-year permit and is not currently looking for new supplies.

Pipelines to the TOD area include only a 12-inch main along the railroad. This is insufficient to provide the needed service to the high-density construction envisioned for the station site. Looping is required, preferably with at least a 16 and preferably 24-inch line. The area is primarily low density residential so limited growth is likely.

Wastewater Treatment Plant, Disposal Method and Capacity

Gravity sewer lines are available throughout the service area. Only a series of 8-inch gravity lines and small lift stations are reported in the vicinity of the railroad. New and existing lift station pump upgrades will be required. The addition of several thousand units suggests that added force main piping would improve the hydraulic movement of the wastewater to the treatment facility.

Seacoast Utilities treats the wastewater for the PGA Blvd TOD area. Their primary disposal option is reclaimed wastewater for irrigation and injection wells. Acres of storage ponds are located on their site. The current plant capacity is 12 MGD. The average daily flows are roughly 8 MGD. There is sufficient capacity in this plant to serve a TOD zone.

Additional Demand

Additional demands for a TOD zone depend on what type of train station area is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 of Table 3). Based on a station of this size, the demands for the TOD Station 3 site include 3.43 MGD of water supply and treatment, and 2.29 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists in both systems, but this is the larger demand of stations 2 and 3. This TOD zone would push the wastewater plant past 80% capacity and trigger upgrades (see yellow in column 3). Sewer

lines will be needed under this scenario. The existing water mains are not sufficient for extensive development and would need upgrading.

However, this station site is anticipated to be a neighborhood center (Neighborhood Center) which is a smaller station that is more in keeping with what the area can support. If an assumed 4,000 units are anticipated, the demands for this site include 0.88 MGD of water supply and treatment, and 0.59 MGD of wastewater treatment (column 2). Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater appear adequate as well. Water and sewer lines may be needed under this scenario. The existing water mains are not sufficient for extensive development.

The current utility infrastructure with respect to water and wastewater capacity does not limit the proposed station.

Needed Improvements and Potential Cost

Depending on the type of station pursued, Table 3 outlines the current capacity, the anticipated needs for a City and Neighborhood Center station that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping is estimated. Based on the analysis of GIS pipelines for the area, the costs for upgrades to treatment capacity are not required. Water piping is needed to support the proposed growth. Sewer pipe upgrades are needed for the higher intensity City Center station concept.

Table 3 Summary of Needs for TOD development for Station 3 Site

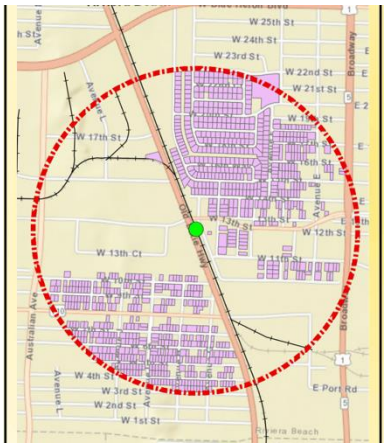
Sta. No	3	
Station Location	PARK AVE	
City	LAKE PARK	LAKE PARK
Station Goal	Neigh Center	City Center
Potential Units For Planning Purposes	4000	12500
Restrictions for WTP, WWTP or Raw water capacity	no	yes
Raw W (MDG)	26.92	26.92
Raw source	Surficial	Surficial
WTP Cap (MGD)	30.5	30.5
WTP Demand (MGD)	18.02	18.02
WWTP cap (MGD)	12	12
WWTP Demand (MGD)	8	8
Disposal method	Reuse/Inj Well	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	1066	1066
Max Density Scenario within Half-Mile of Station	2934	11434
Add Water Demand	0.8802	3.4302
Add WW Demand	0.5868	2.2868
Available Capacity Water	12.48	12.48
Available Capacity Raw Water	8.9	8.9
Available Capacity Wastewater	4	4
% capacity Water treatment	62%	70%
% capacity Water Supply	73%	83%
% capacity needed Wastewater treatment	72%	86%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.69
16+ WM - LF	10000	10000
Force Main LF	0	5000
Sewer lift station	1	2
gravity sewer revisions	0	0
Lift station upgrades	0	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ 5,494,400
16+ WM Cost	$ 2,750,000	$ 2,750,000
Force Main Cost	$ -	$ 1,000,000
Sewer lift station	$ 500,000	$ 1,000,000
Gravity Cost	$ -	$ -
Lift station upgrades	$ -	$ 250,000
Total cost	$ 3,250,000	$ 10,494,400
Total cost millions	$ 3.25	$ 10.49

Station 4. Riviera Beach

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
RIVIERA BEACH	9.08	Biscayne	17.5	7.81	70*	41.45	Reuse/ Inj Well	1,168	11,332

***part of regional system**

Water Treatment Plant, Pumps and Capacity



Riviera Beach (City) is a large community looking for redevelopment. The community is a mix of multi-family housing. Water and sewer services are served by Riviera Beach Utilities. The City operates a 17.5 MGD water treatment plant that gets its water supply from the Surficial aquifer. Treatment is via lime softening. The average daily flows are 7.81 MGD. Raw water supplies are 9.08 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit but will likely need more water if redevelopment occurs.

Pipelines to the TOD area do not exceed 12 inches. This is insufficient for fire flows and demands for 10,000 units. Distribution capacity does not appear to be adequate. This station site is unlikely to be feasible.

Wastewater Treatment Plant, Disposal Method and Capacity

Gravity sewer lines are available throughout the service area. The City has some older infrastructure and the force mains and lift stations would need to be looked at. The addition of several thousand units suggested added force main piping would be useful to get wastewater to the regionally owned East Central Regional Water Reclamation Facility (ECRWRF or ECR for short) which is managed by the City of West Palm Beach. The force mains do not exceed 12 inches in the TOD zone, which is insufficient to provide the needed service.

The City of West Palm Beach manages the wastewater treatment for Riviera Beach through interlocal agreement. Their primary disposal option is by deep injection well, with 20 MGD piped to the FPL West County Energy Center, a small amount used for reclaimed irrigation and up to 10 MGD permitted for disposal on WPB's wellfield for recharge. The current plant capacity is 70 MGD and Riviera Beach's allocation is currently 8 MGD. The average daily flows are roughly 41 MGD. There is sufficient capacity in this plant to serve a TOD zone, although depending on growth, the City may need to increase its allocation from the ECR.

Additional Demand

Additional demands for a TOD zone depend on what type of train station area is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 of Table 4). Based on such a station, the demands for the TOD Station 4 site include 3.40 MGD of water supply and treatment, and 2.27 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists in both systems, but additional water supplies would need to be secured, either

by the City or through one of their interconnects with neighboring utilities (which may have to be upgraded—see yellow highlights on Table 4). Added water supplies are needed before a station could be constructed at this location (or a purchase from another user with adequate supplies). This TOD zone would push the wastewater plant past 80% capacity and trigger upgrades (see yellow in column 3). Sewer lines will be needed under this scenario. The existing water mains are 12 inches and smaller, which is unlikely to be sufficient for the extensive development envisioned by the station.

However, this station site is anticipated to be a Neighborhood Center which is a smaller station that is more in keeping with what the area can support from a utility perspective. If an assumed 4,000 units are anticipated, the demands for this site include 0.5 MGD of water supply and treatment, and 0.33 MGD of wastewater treatment (column 2). Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater appear adequate as well. Water and sewer lines may be needed under this scenario. The existing water mains are not sufficient for extensive development.

The current utility infrastructure with respect to water and wastewater capacity does not limit the proposed station.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 3 outlines the current capacity, the anticipated needs for a city and neighborhood center station that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping are estimated. Based on the analysis of GIS pipelines for the area, treatment capacity upgrades are not required so there are no costs associated with this line item. Additional water distribution piping is needed for greater density of development. Sewer pipe upgrades are needed for the higher intensity City Center station concept.

Table 4 Summary of Needs for TOD development

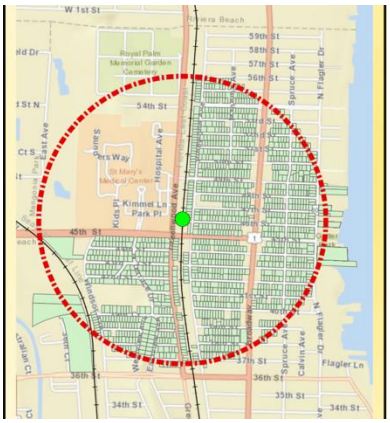
Sta. No	4	
Station Location	13TH ST	
City	RIVIERA BEACH	RIVIERA BEACH
Station Goal	Neigh Center	City Center
Potential Units For Planning Purposes	4000	12500
Restrictions for WTP, WWTP or Raw water capacity	yes	yes
Raw W (MDG)	9.08	9.08
Raw source	Surficial	Surficial
WTP Cap (MGD)	17.5	17.5
WTP Demand (MGD)	7.81	7.81
WWTP cap (MGD)	70	70
WWTP Demand (MGD)	41.45	41.45
Disposal method	Reuse/Inj Well	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	1168	1168
Max Density Scenario within Half-Mile of Station	2832	11332
Add Water Demand	0.8496	3.3996
Add WW Demand	0.5664	2.2664
Available Capacity Water	9.69	9.69
Available Capacity Raw Water	1.27	1.27
Available Capacity Wastewater	28.55	28.55
% capacity Water treatment	49%	64%
% capacity Water Supply	99%	128%
% capacity needed Wastewater treatment	60%	62%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.83	3.49
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	10000	20000
Force Main LF	5000	10000
Sewer lift station	2	4
gravity sewer revisions	0	0
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ 5,003,904	$ 20,915,904
Capacity Sewer	$ -	$ -
16+ WM Cost	$ 2,750,000	$ 5,500,000
Force Main Cost	$ 1,000,000	$ 2,000,000
Sewer lift station	$ 1,000,000	$ 2,000,000
Gravity Cost	$ -	$ -
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 10,003,904	$ 30,665,904
Total cost millions	$ 10.00	$ 30.67

Station 5. West Palm Beach – 45th St

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
WEST PALM BEACH	41.2	Biscayne	47	29.49	70*	41.45	Reuse/Inj Well	2,178	10,322

***part of regional system**

Water Treatment Plant, Pumps and Capacity



The City of West Palm Beach (City) operates south Florida's only surface water treatment plant. The plant capacity is 47 MGD and provides conventional treatment, along with a variety of treatment enhancement methods used to address surface water issues like algae and solids. The average daily flows are 29.5 MGD. Raw water supplies are 41.2 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

High service pumps are rated over 60 MGD. A 20-inch pipeline on 45th Street serves the area and is looped back downtown. A series of 4-, 6-, and 8-inch lines serve smaller streets. A TOD zone would likely require added pipelines. Some of the pipes in the system are old, since the utility was originally part of Henry Flagler's system and the original plant built in 1901, with subsequent upgrades through the years.

Wastewater Treatment Plant, Disposal Method and Capacity

Gravity sewer lines are available throughout the service area. The City has some older infrastructure and the force mains and lift stations may need to be further evaluated based on condition, not just capacity. The sewer lines in the area are primarily 8-inch gravity lines that would need upgrades for a TOD zone, along with new pumping stations. The closest lift station is a neighborhood station on 43rd. The addition of several thousand units suggested added force main piping would be useful to get wastewater to the regionally owned East Central Regional Wastewater Treatment Reclamation Facility (ECR) which is managed and operated by the City.

The primary disposal option for the wastewater effluent is by deep injection well, with 20 MGD piped to the FPL West County Energy Center, a small amount used for reclaimed wastewater irrigation and up to 10 MGD permitted for disposal on WPB's wellfield for recharge. The current plant capacity is 70 MGD. The average daily flows are roughly 41 MGD. There is sufficient capacity in this plant to serve a TOD zone.

Additional Demand

Additional demands for a TOD zone depend on what type of train station area is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 5). Based on such a station, the demands for the TOD Station 5 site include 3.10 MGD of water supply and treatment, and 2.06 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater

appear adequate as well. Sewer lines are needed under this scenario. The existing water mains are not sufficient for extensive development.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 1.30 MGD of water supply and treatment, and 0.86 MGD of wastewater treatment (column 3). Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater appear adequate as well. Water and sewer lines may be needed under this scenario.

The current utility infrastructure with respect to water and wastewater capacity does not limit the proposed station (column 2).

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 5 outlines the current capacity, the anticipated needs for a city and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping is estimated. Based on the analysis of GIS pipelines for the area, the costs for upgrades to treatment capacity are not required. Only sewer upgrades are needed and as noted above, water and sewer lines may be needed under certain scenarios.

Table 5 Summary of Needs for TOD development for Station 5 Site

Sta. No	5	
Station Location	45TH ST	
City	WEST PALM BEACH	WEST PALM BEACH
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	no	no
Raw W (MDG)	41.2	41.2
Raw source	Surface Water	Surface Water
WTP Cap (MGD)	47	47
WTP Demand (MGD)	29.49	29.49
WWTP cap (MGD)	70	70
WWTP Demand (MGD)	41.45	41.45
Disposal method	Reuse/Inj Well	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	2178	2178
Max Density Scenario within Half-Mile of Station	4322	10322
Add Water Demand	1.2966	3.0966
Add WW Demand	0.8644	2.0644
Available Capacity Water	17.51	17.51
Available Capacity Raw Water	11.71	11.71
Available Capacity Wastewater	28.55	28.55
% capacity Water treatment	66%	69%
% capacity Water Supply	78%	82%
% capacity needed Wastewater treatment	60%	62%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	0	8000
Force Main LF	2500	5000
Sewer lift station	4	4
gravity sewer revisions	0	0
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ -	$ 2,200,000
Force Main Cost	$ 500,000	$ 1,000,000
Sewer lift station	$ 2,000,000	$ 2,000,000
Gravity Cost	$ -	$ -
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 2,750,000	$ 5,450,000
Total cost millions	$ 2.75	$ 5.45

Station 6. West Palm Beach – Evernia St

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
WEST PALM BEACH	41.2	Biscayne	47	29.49	70*	41.45	Reuse/Inj Well	5,111	7,389

***part of regional system**

Water Treatment Plant, Pumps and Capacity

The City of West Palm Beach (City) operates south Florida's only surface water treatment plant. The plant capacity is 47 MGD and provides conventional treatment along with a variety of treatment enhancement methods used to address surface water issues like algae and solids. The average daily flows are 29.5 MGD. Raw water supplies are 41.2 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

High service pumps are rated over 60 MGD. This TOD zone is downtown West Palm Beach. There are currently multiple large diameter pipelines serving the downtown areas. The TOD zone is less than ½ mile from the water plant. Distribution capacity appears to be adequate.

Wastewater Treatment Plant, Disposal Method and Capacity

Gravity sewer lines are available throughout the service area. The City has some older infrastructure and the force mains and lift stations would need to be looked at. There are multiple large force mains and lift stations to get wastewater to the regionally owned East Central Regional Wastewater Treatment Reclamation Facility (ECR) which is managed and operated by the City. Note that extensive high-density development is already occurring in the TRCL corridor and infrastructure has been provided for this purpose.

The primary disposal option for the wastewater effluent is by deep injection well, with 20 MGD piped to the FPL West County Energy Center, a small amount used for reclaimed wastewater for irrigation and up to 10 MGD permitted for disposal on WPB's wellfield for recharge. The current plant capacity is 70 MGD. The average daily flows are roughly 41 MGD. There is sufficient capacity in this plant to serve a TOD zone.

Additional Demand

Additional demands for a TOD zone at this site include 2.22 MGD of water supply and treatment, and 1.48 MGD of wastewater treatment. Treatment capacity and water supply is available for this demand. The increased demand is small compared to the existing system so piping should not pose a problem.

Needed Improvements and Potential Cost

No major improvements are needed for this site that is currently served with a train station (see Table 6).

Table 6 - Summary of Infrastructure for Station 6 site

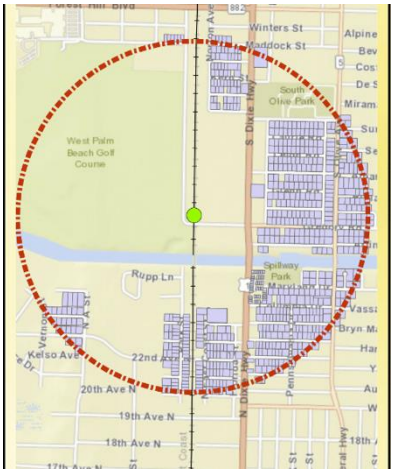
Sta. No	6
Station Location	EVERNIA ST/DOWNTOWN
City	WEST PALM BEACH
Station Goal	CC
Potential Units For Planning Purposes	12500
Restrictions for WTP, WWTP or Raw water capacity	no
Raw W (MDG)	41.2
Raw source	Surface Water
WTP Cap (MGD)	47
WTP Demand (MGD)	29.49
WWTP cap (MGD)	70
WWTP Demand (MGD)	41.45
Disposal method	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	5111
Max Density Scenario within Half-Mile of Station	7389
Add Water Demand	2.2167
Add WW Demand	1.4778
Available Capacity Water	17.51
Available Capacity Raw Water	11.71
Available Capacity Wastewater	28.55
% capacity Water treatment	67%
% capacity Water Supply	80%
% capacity needed Wastewater treatment	61%
Capacity needed water MGD	0.00
Water supply Capacity needed MGD	0.00
Wastewater treatment plant Capacity needed MGD	0.00
16+ WM - LF	0
Force Main LF	0
Sewer lift station	0
gravity sewer revisions	0
Lift station upgrades	0
Capacity water (per MGD)	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000
16" or more water main - $/LF	$ 275
Force Main $/LF	$ 200
Sewer lift station cost	$ 500,000
Gravity Sewer Installtion /LF	$ 250
Lift station upgrades cost	$ 250,000
Capacity water	$ -
Water supply	$ -
Capacity Sewer	$ -
16+ WM Cost	$ -
Force Main Cost	$ -
Sewer lift station	$ -
Gravity Cost	$ -
Lift station upgrades	$ -
Total cost	$ -
Total cost millions	$ -

Station 7. West Palm Beach – Gregory Rd.

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
WEST PALM BEACH	41.2	Biscayne	47	29.49	70*	41.45	Reuse/Inj Well	852	11,648

***part of regional system**

Water Treatment Plant, Pumps and Capacity



This area has limited potential to grow and as a result the facilities to supply it are limited. The City of West Palm Beach (City) operates south Florida's only surface water treatment plant. The plant capacity is 47 MGD and provides conventional treatment along with a variety of treatment enhancement methods are used to address surface water issues like algae and solids. The average daily flows are 29.5 MGD. Raw water supplies are 41.2 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

High service pumps are rated over 60 MGD. There is a 16-inch water main along the railroad corridor. Looping is not near the area; some added piping to loop is needed. The rest of the water mains are 8 inches and less. Upgrades are required.

Wastewater Treatment Plant, Disposal Method and Capacity

Gravity sewer lines are available throughout the service area. The City has some older infrastructure that would need to be looked at. There are a few small gravity lines in the area but they cannot support a TOD zone. This is not a preferable location for a station. Wastewater is treated at the regionally owned East Central Regional Water Reclamation Facility (ECRWRF or ECR for short) which is managed by the City of West Palm Beach. The primary disposal option for the wastewater effluent is by deep injection well, with 20 MGD piped to the FPL West County Energy Center, a small amount is used for reclaimed irrigation and up to 10 MGD is permitted for disposal on WPB's wellfield for recharge. The current plant capacity is 70 MGD. The average daily flows are roughly 41 MGD. There is sufficient capacity in this plant to serve a TOD zone.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 of Table 7). Based on such a station, the demands for the TOD Station 7 site include 3.49 MGD of water supply and treatment, and 2.33 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists in both systems, but this is the larger demand of stations 2 and 3. This TOD zone would push the wastewater plant past 80% capacity and trigger upgrades (see yellow in column 3). Sewer lines will be needed under this scenario. The existing water and sewer mains are not sufficient for

extensive development. This site is not designed for much development unless the golf course is redeveloped.

However, this station site is anticipated to be a neighborhood center which is a smaller station that is more in keeping with what the area can support. If an assumed 4,000 units are anticipated, the demands for this site include 0.94 MGD of water supply and treatment, and 0.63 MGD of wastewater treatment (column 2). Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater appear adequate as well. Water and sewer lines may be needed under this scenario. The existing water mains are not sufficient for extensive development. Still the site is not geared toward much development.

The current utility infrastructure with respect to water and wastewater capacity does not limit the proposed station but the piping system is a severe restriction.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 7 outlines the current capacity, the anticipated needs for a city and neighborhood center station that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping is estimated. Based on the analysis of GIS pipelines for the area, the costs for upgrades to treatment capacity are not required. Water and sewer pipe upgrades are needed for either station concept.

Table 7 Summary of Needs for TOD development for Station 7 site

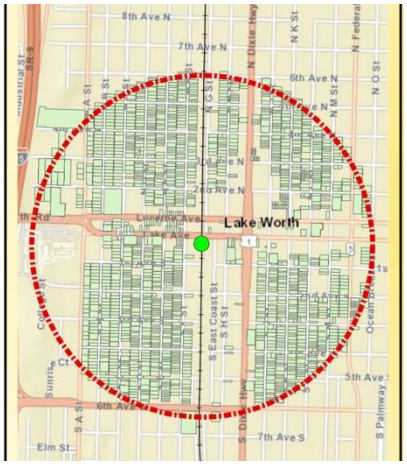
Sta. No	7	
Station Location	GREGORY RD	
City	WEST PALM BEACH	WEST PALM BEACH
Station Goal	Neigh Center	City Center
Potential Units For Planning Purposes	4000	12500
Restrictions for WTP, WWTP or Raw water capacity	no	no
Raw W (MDG)	41.2	41.2
Raw source	Surface Water	Surface Water
WTP Cap (MGD)	47	47
WTP Demand (MGD)	29.49	29.49
WWTP cap (MGD)	70	70
WWTP Demand (MGD)	41.45	41.45
Disposal method	Reuse/Inj Well	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	852	852
Max Density Scenario within Half-Mile of Station	3148	11648
Add Water Demand	0.9444	3.4944
Add WW Demand	0.6296	2.3296
Available Capacity Water	17.51	17.51
Available Capacity Raw Water	11.71	11.71
Available Capacity Wastewater	28.55	28.55
% capacity Water treatment	65%	70%
% capacity Water Supply	77%	83%
% capacity needed Wastewater treatment	60%	63%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	0	0
Force Main LF	8000	8000
Sewer lift station	2	2
gravity sewer revisions	10000	10000
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ -	$ -
Force Main Cost	$ 3,600,000	$ 3,600,000
Sewer lift station	$ 1,000,000	$ 1,000,000
Gravity Cost	$ 2,500,000	$ 2,500,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 7,350,000	$ 7,350,000
Total cost millions	$ 7.35	$ 7.35

Station 8. Lake Worth

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
LAKE WORTH	11.25	Biscayne	17.4	5.31	70*	41.45	Reuse/Inj Well	3,695	8,805

***part of regional system**

Water Treatment Plant, Pumps and Capacity



The City of Lake Worth operates a reverse osmosis and lime softening plant on the same site. The plant capacity is 17.4 MGD. The average daily flows are 5.3 MGD. Raw water supplies are 11.25 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

There is a 12-inch water main in the area. This is insufficient to serve a TOD zone. However, the area is near the water plant so upgrades to high service pumping and a looped system of larger lines might be sufficient to provide service, but the costs are significant. A neighborhood station seems more appropriate here.

Wastewater Treatment Plant, Disposal Method and Capacity

There are two large gravity lines that serve the TOD area, along with smaller gravity lines. These would need to evaluated further, especially since gravity lines may have crown corrosion.

The primary disposal option for the wastewater effluent is by deep injection well, with 20 MGD piped to the FPL West County Energy Center, a small amount used for reclaimed irrigation and up to 10 MGD permitted for disposal on WPB's wellfield for recharge. The current plant capacity is 70 MGD. The average daily flows are roughly 41 MGD. There is sufficient capacity in this plant to serve a TOD zone.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 of Table 8). Based on such a station, the demands for the TOD Station 8 site include 2.64 MGD of water supply and treatment, and 1.76 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists in both systems but the pipelines are not sufficient. There two large gravity lines that serve the TOD area, would need to be increased to meet the City Center station. These would need to evaluated further, especially since gravity lines may have crown corrosion. The water mains would need to be upgrades and looped.

However, this station site is anticipated to be a neighborhood center which is a smaller station that is more in keeping with what the area can support. If an assumed 4,000 units are anticipated, the demands for this site include 0.84 MGD of water supply and treatment, and 0.56 MGD of wastewater treatment (column 2). Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity

for wastewater appear adequate. Water and sewer lines are still needed under this scenario, but fewer. The existing water mains are not sufficient for extensive development. Still the site is not geared toward much development.

The current utility infrastructure with respect to water and wastewater capacity does not limit the proposed station but the piping system is a severe restriction.

Needed Improvements and Potential Cost

The existing water and sewer mains are not sufficient for extensive development. Depending on the type of station pursued, Table 8 outlines the current capacity, the anticipated needs for a City and Neighborhood Center Station that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping is estimated. Based on the analysis of GIS pipelines for the area, the costs for upgrades to treatment capacity are not required. Water and sewer pipe upgrades are needed for either station concept.

Table 8 Summary of Needs for TOD development for Station 8 site

Sta. No	8	
Station Location	LAKE AVE	
City	LAKE WORTH	LAKE WORTH
Station Goal	TC	CC
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	no	no
Raw W (MDG)	11.2	11.2
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	17.4	17.4
WTP Demand (MGD)	5.31	5.31
WWTP cap (MGD)	70	70
WWTP Demand (MGD)	41.45	41.45
Disposal method	Reuse/Inj Well	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	3695	3695
Max Density Scenario within Half-Mile of Station	2805	8805
Add Water Demand	0.8415	2.6415
Add WW Demand	0.561	1.761
Available Capacity Water	12.09	12.09
Available Capacity Raw Water	5.89	5.89
Available Capacity Wastewater	28.55	28.55
% capacity Water treatment	35%	46%
% capacity Water Supply	57%	74%
% capacity needed Wastewater treatment	60%	62%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	8000	10000
Force Main LF	0	0
Sewer lift station	1	1
gravity sewer revisions	2000	20000
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ 2,200,000	$ 2,750,000
Force Main Cost	$ 400,000	$ 4,000,000
Sewer lift station	$ 500,000	$ 500,000
Gravity Cost	$ 500,000	$ 5,000,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 3,850,000	$ 12,500,000
Total cost millions	$ 3.85	$ 12.50

Station 9. Boynton Beach

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
Boynton Beach	20.86	Biscayne	34	13.51	24*	9.5	Reuse/Inj Well	2,944	9,556

***part of regional system**

The City of Boynton Beach (City) was not cooperative or forthcoming with any data on their utility system, despite many items being available by public record. They are actively attempting to build a downtown, but are not coordinating with the rail lines.

Water Treatment Plant, Pumps and Capacity

The City of Boynton Beach operates a nanofiltration water treatment plant located in the western part of the City. Near the downtown area, it also operates a lime softening plant with Miex treatment enhancements. The plant capacity is 34 MGD. The average daily flows are 13.51 MGD. Raw water supplies are 20.86 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

A 16-inch water main is looped along US1. The lime softening water plant is under ½ mile away. Smaller lines emanate from this loop however, distribution capacity appears adequate.

Wastewater Treatment Plant, Disposal Method and Capacity

The South Central Regional Wastewater Treatment and Disposal Board's South Central Regional Wastewater Treatment Plant treats wastewater for both Boynton Beach and Delray Beach. The primary disposal option for the wastewater effluent is reclaimed wastewater for irrigation, deep injection wells, and ocean outfall for wet weather flows. Although the outfall has been effectively abandoned the majority of the time, the outfall is still used occasionally. The current plant capacity is 24 MGD but a capital improvement project will expand the capacity to 30 MGD by 2024. The average daily flows are roughly 9.5 MGD from Boynton Beach and 6.7 from Delray Beach. There is sufficient capacity in this plant to serve one TOD zone but likely not two without the planned expansion. If two TOD zones were planned, the expansion should be in place by the time the TOD zones were active.

There are 2 small lift stations in the TOD corridor. Most of the area is served by small 8-inch gravity lines. It is anticipated that force main and lift station upgrades are needed to serve a TOD population. A new, large force main was installed on Woolbright Road in the past two years to carry water to the SCRWWTP.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 9). Based on this type of station, the demands for the TOD Station 9 site include 2.87 MGD of

water supply and treatment, and 1.91 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater appear adequate as well. Sewer lines are needed under this scenario. The existing water mains are not sufficient for extensive development.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 1.07 MGD of water supply and treatment, and 0.71 MGD of wastewater treatment (column 3). Adequate treatment capacity exists in both systems. Raw water supplies and disposal capacity for wastewater appear adequate as well. Water and sewer lines may be needed under this scenario.

The current utility infrastructure with respect to water and wastewater capacity does not limit the proposed station (column 2). However, the current proposed location is concerning because of the current plans by the City of Boynton Beach and how the two would blend together. There would have to be a strong collective effort with the city in order to make this station work.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 9 outlines the current capacity, the anticipated needs for a city and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping is estimated. Based on the analysis of GIS pipelines for the area, the costs for upgrades to treatment capacity are not required assuming the plant capital projects and expansion project underway is completed. Only minor sewer upgrades are needed.

Table 9 Summary of Needs for TOD development for Station 9 Site

Sta. No	9	
Station Location	BOYNTON BEACH BLVD	
City	Bontyon Beach	Bontyon Beach
Station Goal	TC	CC
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	no	no
Raw W (MDG)	20.86	20.86
Raw source	Surficial	Surficial
WTP Cap (MGD)	34	34
WTP Demand (MGD)	13.51	13.51
WWTP cap (MGD)	24	24
WWTP Demand (MGD)	9.5	9.5
Disposal method	Reuse/Inj Well	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	2944	2944
Max Density Scenario within Half-Mile of Station	3556	9556
Add Water Demand	0.1836	1.9836
Add WW Demand	0.1224	1.3224
Available Capacity Water	20.49	20.49
Available Capacity Raw Water	7.35	7.35
Available Capacity Wastewater	14.5	14.5
% capacity Water treatment	40%	46%
% capacity Water Supply	66%	74%
% capacity needed Wastewater treatment	40%	45%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	0	0
Force Main LF	0	0
Sewer lift station	1	1
gravity sewer revisions	500	500
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ -	$ -
Force Main Cost	$ 100,000	$ 100,000
Sewer lift station	$ 500,000	$ 500,000
Gravity Cost	$ 125,000	$ 125,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 975,000	$ 975,000
Total cost millions	$ 0.98	$ 0.98

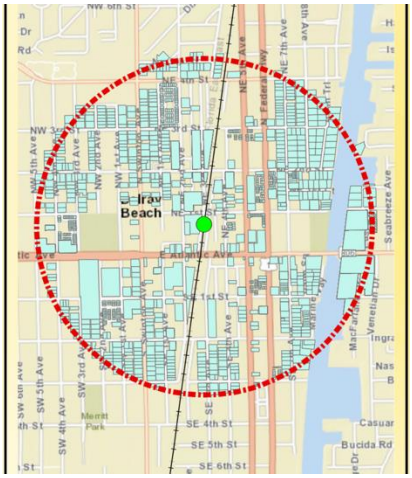
Station 10. Delray Beach

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
DELRAY BEACH	19.1	Biscayne	24	16.15	24*	6.7	Reuse/Inj Well	2,740	9,760

***part of regional system**

The City of Delray Beach did not provide data on their utility system due to turnover on staff.

Water Treatment Plant, Pumps and Capacity



The City of Delray Beach (City) operates a 26 MGD lime softening plant. The average daily flows are 16.15 MGD. Permitted raw water supplies are 19.1 MGD according to SFWMD water use permit allocation records, but they also have a 1 MGD aquifer storage and recovery (ASR) well not in current use, completed in the upper Floridan aquifer, which may be converted to a production well. Disinfection of the water is via chloramination. The utility has a 20-year permit.

A 16-inch water main is looped to the TOD area. Smaller lines emanate from this loop. Distribution capacity appears to be lacking for fire flow demands and may need upgrading for a TOD project.

Wastewater Treatment Plant, Disposal Method and Capacity

The South Central Regional Wastewater Treatment and Disposal Board's South Central Regional Wastewater Treatment Plant treats wastewater for both Boynton Beach and Delray Beach. The primary disposal option for the wastewater effluent is reclaimed wastewater for irrigation and a deep injection well. The ocean outfall has been effectively abandoned most of the time, but is still used occasionally for wet weather flows. The current plant capacity is 24 MGD but including in an ongoing capital project is expansion of the plant to 30 MGD by 2024. The average daily flows are roughly 9.5 MGD from Boynton Beach and 6.7 from Delray Beach. There is sufficient capacity in this plant to serve one TOD zone but would not be expected to support two TOD zones without the completion of the expansion project underway.

Data on the sewer system is not currently available.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 4). Based on such a station, the demands for the TOD Station 3 site include 2.11 MGD of water supply and treatment, and 1.40 MGD of wastewater treatment for a City Center station. Raw water supplies and disposal capacity for wastewater appear adequate due to the expansion underway. Sewer lines may be needed under this scenario and should be further evaluated if a TOD zone is planned, noting

the data was not provided by the City. The existing water mains are undersized for extensive development and would need upgrading.

However, this station site is anticipated to be a Town Center which is a smaller station that is more in keeping with what the area can support. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 1.13 MGD of water supply and treatment, and 0.75 MGD of wastewater treatment (column 2). Adequate treatment capacity exists in both systems. Raw water supplies need to be evaluated for peak demands and disposal capacity for wastewater appear adequate as well. Water and sewer lines may be needed under this scenario.

The current utility infrastructure with respect to the water capacity may not limit the proposed station to 1207 units before expansion is needed, and the City is considering additional water supply options now.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 10 outlines the current capacity, the anticipated needs for a City Center and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping are estimated.

Table 10 Summary of Needs for TOD development for Station 10 Site

Sta. No	10	
Station Location	ATLANTIC AVE	
City	DELRAY BEACH	DELRAY BEACH
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	yes	yes
Raw W (MDG)	19.1	19.1
Raw source	Surficial	Surficial
WTP Cap (MGD)	24	24
WTP Demand (MGD)	16.15	16.15
WWTP cap (MGD)	24	24
WWTP Demand (MGD)	6.7	6.7
Disposal method	Reuse/Inj Well	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	2740	2740
Max Density Scenario within Half-Mile of Station	3760	9760
Add Water Demand	1.128	2.928
Add WW Demand	0.752	1.952
Available Capacity Water	7.85	7.85
Available Capacity Raw Water	2.95	2.95
Available Capacity Wastewater	17.3	17.3
% capacity Water treatment	72%	79%
% capacity Water Supply	94%	104%
% capacity needed Wastewater treatment	31%	36%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.78	2.65
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF		
Force Main LF		
Sewer lift station		
gravity sewer revisions		
Lift station upgrades		
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ 4,674,720	$ 15,906,720
Capacity Sewer	$ -	$ -
16+ WM Cost	$ -	$ -
Force Main Cost	$ -	$ -
Sewer lift station	$ -	$ -
Gravity Cost	$ -	$ -
Lift station upgrades	$ -	$ -
Total cost	$ 4,674,720	$ 15,906,720
Total cost millions	$ 4.67	$ 15.91

Station 11. Boca Raton

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
BOCA RATON	51.54	Biscayne	70	35.02	17	14	Reuse/Inj Well	3,401	9,099

Water Treatment Plant, Pumps and Capacity

The City of Boca Raton (City) operates a 70 MGD water plant. Nanofiltration and lime softening plants exist on the same site. The average daily flows are 35 MGD. Raw water supplies are 51.54 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

A 24-inch water main is looped to the potential TOD areas along the TRCL corridor in multiple locations. The water plant is under 1 mile away. Smaller lines emanate from this loop. Distribution capacity appears to be adequate for fire flow demands. The City staff suggested the 20th St. Corridor might be a better site for the station than downtown. Both are adequately served.

Wastewater Treatment Plant, Disposal Method and Capacity

The City of Boca Raton owns and operates a 17.5 MGD wastewater treatment plant. The primary disposal option for the wastewater effluent is reclaimed wastewater for irrigation and the ocean outfall as a backup for wet season discharges. The average daily flows are 13.5 MGD. There is sufficient capacity in this plant to serve one TOD zone.

A 24-inch force main goes from the TOD corridor to the plant. The force main has sufficient capacity to carry added sewage. Local improvements and lift stations may be needed.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 9). Based on such a station, the demands for the TOD Station 2 site include 2.73 MGD of water supply and treatment, and 1.82 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists in both water treatment and raw waters systems. Wastewater capacity appears inadequate to meet the 80% threshold if these units are added (see highlight). Limited sewer lines are needed under this scenario. The existing water mains are not sufficient for extensive development.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include

0.93 MGD of water supply and treatment, and 0.62 MGD of wastewater treatment (column 3). Adequate treatment capacity exists in the water system, but the sewer system still fails to meet the 80% capacity marker. Raw water supplies are adequate.

The current utility infrastructure with respect to water and wastewater capacity does not limit the proposed station (column 2).

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 11 outlines the current capacity, the anticipated needs for a city and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping are estimated. Based on the analysis of GIS pipelines for the area, the costs for upgrades to wastewater treatment capacity are required. Only minor sewer upgrades are needed.

Table 11 Summary of Needs for TOD development for Station 11 Site

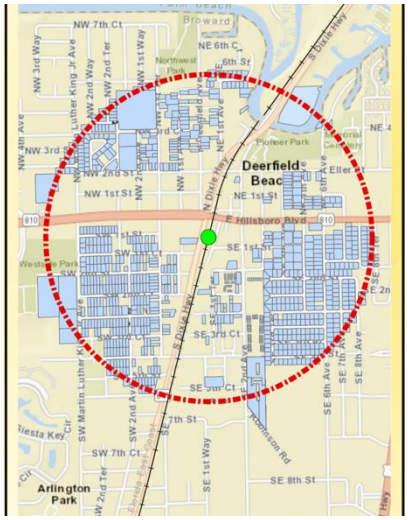
Sta. No	11	
Station Location	NE 2ND ST	
City	BOCA RATON	BOCA RATON
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	yes	yes
Raw W (MDG)	51.54	51.54
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	70	70
WTP Demand (MGD)	35.02	35.02
WWTP cap (MGD)	17	17
WWTP Demand (MGD)	14	14
Disposal method	Reuse/Inj Well	Reuse/Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	3401	3401
Max Density Scenario within Half-Mile of Station	3099	9099
Add Water Demand	0.9297	2.7297
Add WW Demand	0.6198	1.8198
Available Capacity Water	34.98	34.98
Available Capacity Raw Water	16.52	16.52
Available Capacity Wastewater	3	3
% capacity Water treatment	51%	54%
% capacity Water Supply	73%	76%
% capacity needed Wastewater treatment	86%	93%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	1.02	2.22
16+ WM - LF	0	0
Force Main LF	1000	1000
Sewer lift station	2	2
gravity sewer revisions	0	0
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ 8,158,400	$ 17,758,400
16+ WM Cost	$ -	$ -
Force Main Cost	$ 200,000	$ 200,000
Sewer lift station	$ 1,000,000	$ 1,000,000
Gravity Cost	$ -	$ -
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 9,608,400	$ 19,208,400
Total cost millions	$ 9.61	$ 19.21

Station 12. Deerfield Beach

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
DEERFIELD BEACH	14.74	Biscayne	34.8	10.42	7*	6.5	Outfall/Reuse	2,011	10,489

***part of regional system**

Water Treatment Plant, Pumps and Capacity



The City of Deerfield Beach (City) operates a 34.8 MGD water plant. Nanofiltration and lime softening plants exist on the same site. The average daily flows are 10.42 MGD. A portion of the City is served by Broward County. Raw water supplies are 14.74 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

A 24-inch water main is looped to the potential TOD areas along the TRCL corridor in multiple locations. The water plant is under 1 mile away. Smaller lines emanate from this loop. Distribution capacity appears to be lacking for fire flow demands in the proposed TOD area without booster pumps.

Wastewater Treatment Plant, Disposal Method and Capacity

The City of Delray Beach does not own a wastewater treatment plant. Broward County treats their wastewater at the North District Wastewater Treatment Plant on Copans Road. The primary disposal option for the wastewater effluent is reclaimed wastewater for irrigation and injection wells. An outfall is still in use at this facility. The outfall is supposed to be discontinued by 2025.

The City has reserved 7 MGD of capacity in this plant. The current flows are 6.5 MGD. An apparent 24-inch force main goes from the TOD corridor to the plant. The force main appears to have capacity to carry added sewage. Local improvement and lift stations are needed.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 12). Based on such a station, the demands for the TOD Station 2 site include 3.15 MGD of water supply and treatment, and 2.10 MGD of wastewater treatment for a City Center station. Adequate water treatment capacity exists. Raw water supplies appear inadequate for a City Center station (see highlight in Table 12). The allocation of wastewater from the North District Wastewater treatment plant is an issue – the proposed TOD use appears to exceed their allocation at present (see Table 12). Limited sewer lines are needed under this scenario. The existing water mains may not be locally sufficient for extensive development.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 1.35 MGD of water supply and treatment, and 0.90 MGD of wastewater treatment (column 3). Adequate treatment capacity exists in the water system, but the allocation of wastewater from the North District Wastewater treatment plant is an issue. Raw water supplies are adequate.

The current utility infrastructure with respect to wastewater capacity limits the proposed town center station (column 2).

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 12 outlines the current capacity, the anticipated needs for a city and Town Center station and the units that can be supported by the current treatment and raw water supply infrastructure. In addition, costs for raw water, wastewater treatment, piping and pumping are estimated. Based on the analysis of GIS pipelines for the area, the costs estimated for upgrades to wastewater treatment capacity are required.

Table 12 Summary of Needs for TOD development for Station 12 Site

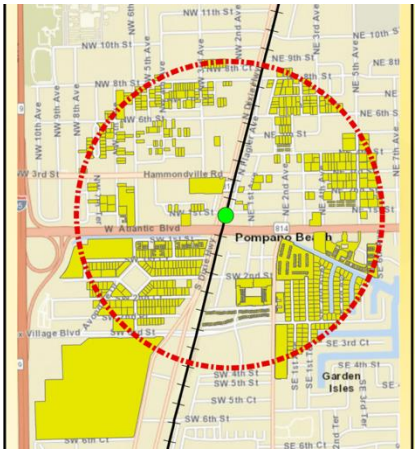
Sta. No	12	
Station Location	HILLSBORO BLVD	
City	DEERFIELD BEACH	DEERFIELD BEACH
Station Goal	Town Cneter	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	s	yes
Raw W (MDG)	14.74	14.74
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	34.8	34.8
WTP Demand (MGD)	10.42	10.42
WWTP cap (MGD)	7	7
WWTP Demand (MGD)	6.5	6.5
Disposal method	Outfall/Reuse	Outfall/Reuse
# of Existing Residential Units within Half-Mile of Station (2018)	2011	2011
Max Density Scenario within Half-Mile of Station	4489	10489
Add Water Demand	1.35	3.15
Add WW Demand	0.90	2.10
Available Capacity Water	24.38	24.38
Available Capacity Raw Water	4.32	4.32
Available Capacity Wastewater	0.5	0.5
% capacity Water treatment	34%	39%
% capacity Water Supply	83%	96%
% capacity needed Wastewater treatment	106%	123%
Capacity needed water MGD	0.00	#VALUE!
Water supply Capacity needed MGD	0.00	0.84
Wastewater treatment plant Capacity needed MGD	1.80	3.00
16+ WM - LF	5000	5000
Force Main LF	5000	5000
Sewer lift station	2	2
gravity sewer revisions	10000	10000
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	#VALUE!
Water supply	$ -	$ 5,060,208
Capacity Sewer	$ 14,382,400	$ 23,982,400
16+ WM Cost	$ 1,375,000	$ 1,375,000
Force Main Cost	$ 3,000,000	$ 3,000,000
Sewer lift station	$ 1,000,000	$ 1,000,000
Gravity Cost	$ 2,500,000	$ 2,500,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 22,507,400	#VALUE!
Total cost millions	$ 22.51	#VALUE!

Station 13. Pompano Beach

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
POMPANO BEACH	17.75	Biscayne	50	14.56	15.71*	16.1	Outfall/Reuse	3,682	8,818

***part of regional system**

Water Treatment Plant, Pumps and Capacity



The City of Pompano Beach (City) operates a 50 MGD water plant. Nanofiltration and lime softening plants exist on the same site. The average daily flow is 14.56 MGD. Raw water supplies are 17.75 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

A 30-inch water main is piped to the potential TOD areas along Atlantic Ave. However, a loop in the TOD zone is not present. A 12- or 16-inch loop from MLK Blvd to Atlantic Blvd is required to provide service. Smaller lines emanate from this loop.

Wastewater Treatment Plant, Disposal Method and Capacity

The City of Pompano Beach does not own a wastewater treatment plant, although they do own a plant to treat effluent from Broward County's (County) plant for reuse purposes. The County treats their wastewater at the North District Wastewater Treatment Plant on Copans Road. The primary disposal option for the wastewater effluent is reclaimed wastewater for irrigation and deep injection wells. An outfall is still in use at this facility. The outfall is supposed to be discontinued by 2025, except for wet weather flows as allowed.

The City has reserved 15.7 MGD of capacity in this plant. The current flows exceed 16 MGD. A 12-inch force main goes from the TOD corridor to the west. The force main likely has insufficient capacity to carry added sewage. Local improvement and lift stations may be needed.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 13). Based on such a station, the demands for the TOD Station 2 site include 2.65 MGD of water supply and treatment, and 1.76 MGD of wastewater treatment for a City Center station. Adequate water treatment capacity exists. Raw water supplies appear inadequate for a City Center station. The allocation of wastewater from the North District Wastewater treatment plant is an issue – their use appears to exceed their allocation at present (see highlighted Table 13). Limited sewer lines are needed under this scenario. The existing water mains may not be locally sufficient for extensive development.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 0.85 MGD of water supply and treatment, and 0.56 MGD of wastewater treatment (column 3). Adequate treatment capacity exists in the water system, but the allocation of wastewater from the North District Wastewater treatment plant is an issue – their use appears to exceed their allocation. Raw water supplies are insufficient.

The current utility infrastructure with respect to wastewater capacity limits the proposed TOD stations.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 13 outlines the current capacity, the anticipated needs for a city and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. In addition, costs for raw water, wastewater treatment, piping and pumping are estimated. Based on the analysis of GIS pipelines for the area, the costs for upgrades to wastewater treatment capacity are required. Water and sewer piping and pumping may need upgrading to support any level of TOD development as stated above and should be further evaluated.

Table 13 Summary of Needs for TOD development for Station 13 Site

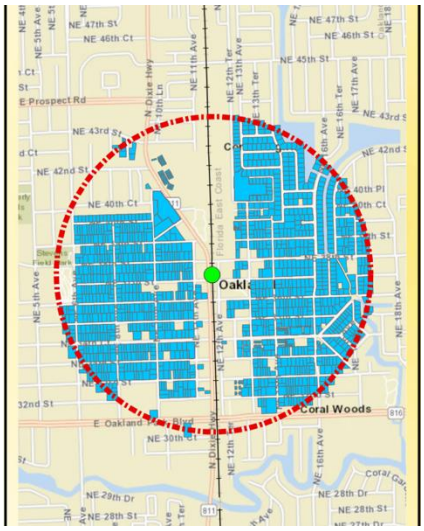
Sta. No	13	
Station Location	ATLANTIC BLVD	
City	POMPANO BEACH	POMPANO BEACH
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	yes	yes
Raw W (MDG)	17.75	17.75
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	50	50
WTP Demand (MGD)	14.56	14.56
WWTP cap (MGD)	15.71	15.71
WWTP Demand (MGD)	16.1	16.1
Disposal method	Outfall/Reuse	Outfall/Reuse
# of Existing Residential Units within Half-Mile of Station (2018)	3682	3682
Max Density Scenario within Half-Mile of Station	2818	8818
Add Water Demand	0.85	2.65
Add WW Demand	0.56	1.76
Available Capacity Water	35.44	35.44
Available Capacity Raw Water	3.19	3.19
Available Capacity Wastewater	-0.39	-0.39
% capacity Water treatment	31%	34%
% capacity Water Supply	90%	101%
% capacity needed Wastewater treatment	106%	114%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.05	1.92
Wastewater treatment plant Capacity needed MGD	4.10	5.30
16+ WM - LF	3000	3000
Force Main LF	500	500
Sewer lift station	2	2
gravity sewer revisions	5000	5000
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ 279,696	$ 11,511,696
Capacity Sewer	$ 32,764,800	$ 42,364,800
16+ WM Cost	$ 825,000	$ 825,000
Force Main Cost	$ 1,100,000	$ 1,100,000
Sewer lift station	$ 1,000,000	$ 1,000,000
Gravity Cost	$ 1,250,000	$ 1,250,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 37,469,496	$ 58,301,496
Total cost millions	$ 37.47	$ 58.30

Station 14. Oakland Park

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
OAKLAND PARK	61.19	Biscayne	82	40.89	55.7*	37.5	Inj Well	2,272	10,228

***part of regional system**

Water Treatment Plant, Pumps and Capacity



The City of Oakland Park purchases potable water from the City of Fort Lauderdale. The City of Fort Lauderdale operates two water plants. The Peele Dixie plant is the original water plant. The lime softening component has been abandoned and a new upper Floridan reverse osmosis treatment plant was constructed on the same site. The wells are at the Fort Lauderdale Country Club one mile west. The Five Ash plant is located off Prospect Road and I-95. This larger plant uses lime softening for treatment. The average daily flows are 40.89 MGD. The total capacity of the plants is 82 MGD. Raw water supplies are 61.19 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

A 30-inch water main is piped to the potential TOD areas. The pipe is looped toward the beach and back downtown between plants. Smaller lines emanate from this loop. Local upgrades will be required. This station needs collaboration with the City of Fort Lauderdale.

Wastewater Treatment Plant, Disposal Method and Capacity

The City of Oakland does not own a wastewater treatment plant. Instead, the City of Fort Lauderdale treats their wastewater at the Lohmeyer facility at Port Everglades. The primary disposal option for the wastewater effluent is injection wells. Capacity of the plant is 55.7 MGD. Demands are 37.5 MGD. The City of Fort Lauderdale has a consent order to spend over a billion dollars to address sewer piping deficiencies in their system. This may cause an issue with any increased conveyance of wastewater to the City of Fort Lauderdale.

The City of Oakland Park has reserve capacity in this plant. A 12-inch force main goes from the TOD corridor to the south. The force main likely has insufficient capacity to carry added sewage. Efforts should be coordinated with the Cities of Wilton Manors and Fort Lauderdale to address conveyance of increased wastewater flow. Local improvements and lift stations may be needed.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 14). Based on such a station, the demands for the TOD Station 2 site include 3.07 MGD of water supply and treatment, and 2.08 MGD of wastewater treatment for a City Center station. Adequate water

treatment, raw water and wastewater treatment are in place, although the City of Fort Lauderdale in concerned about raw water capacity after 2028. Limited sewer lines are needed under this scenario. The existing water mains may not be locally sufficient for extensive development.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 1.27 MGD of water supply and treatment, and 0.85 MGD of wastewater treatment (column 3). Capacity appears adequate for the proposed Town Center station. Localized improvement may be needed.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 14 outlines the current capacity, the anticipated needs for a city and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. Only localized improvements are needed for this station except for added force main capacity to the City of Fort Lauderdale as noted.

Table 14 Summary of Needs for TOD development for Station 14 Site

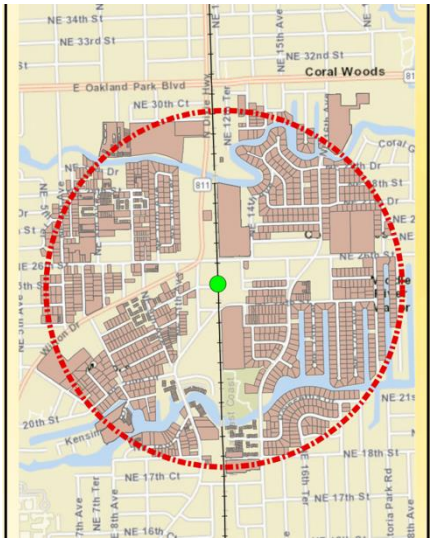
Sta. No	14	
Station Location	38TH ST	
City	OAKLAND PARK	OAKLAND PARK
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	no	no
Raw W (MDG)	61.19	61.19
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	82	82
WTP Demand (MGD)	40.89	40.89
WWTP cap (MGD)	55.7	55.7
WWTP Demand (MGD)	37.5	37.5
Disposal method	Inj Well	Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	2272	2272
Max Density Scenario within Half-Mile of Station	4228	10228
Add Water Demand	1.2684	3.0684
Add WW Demand	0.8456	2.0456
Available Capacity Water	41.11	41.11
Available Capacity Raw Water	20.3	20.3
Available Capacity Wastewater	18.2	18.2
% capacity Water treatment	51%	54%
% capacity Water Supply	72%	75%
% capacity needed Wastewater treatment	69%	71%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	2000	2000
Force Main LF	2500	2500
Sewer lift station	2	2
gravity sewer revisions	2500	2500
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ 550,000	$ 550,000
Force Main Cost	$ 1,000,000	$ 1,000,000
Sewer lift station	$ 1,000,000	$ 1,000,000
Gravity Cost	$ 625,000	$ 625,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 3,425,000	$ 3,425,000
Total cost millions	$ 3.43	$ 3.43

Station 15. Wilton Manors

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station	Additional Water Demand	Additional Wastewater Demand
WILTON MANORS	61.19	Biscayne	82	40.89	55.7*	37.5	Inj Well	3,978	8,522	1.36	0.91

***part of regional system**

Water Treatment Plant, Pumps and Capacity



The City of Wilton Manors purchases potable water from the City of Fort Lauderdale. The City of Fort Lauderdale operates 2 water plant. The Peele Dixie plant is the original water plant. The lime softening component has been abandoned and a new Floridan reverse osmosis treatment plant was constructed on the same site. The wells are at the Fort Lauderdale Country Club 1 mile west. The Five Ash plant is located off Prospect Rd and I95. This is the larger plant; it uses lime softening for treatment. The average daily flows are 40.89 MGD. The capacity of the plants is 82 MGD. Raw water supplies are 61.19 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

A 30-inch water main is piped to the downtown TOD area. The pipe is looped toward the beach and back downtown between plants. Smaller lines emanate from this loop. Local upgrades will be required.

Wastewater Treatment Plant, Disposal Method and Capacity

The City of Wilton Manors does not own a wastewater treatment plant. Instead, the City of Fort Lauderdale treats their wastewater at the Lohmeyer facility at Port Everglades. The primary disposal option for the wastewater effluent is injection wells. Capacity of the plant is 55.7 MGD. Demands are 37.5 MGD. The City of Fort Lauderdale has a consent order to spend over a billion dollars to address sewer piping deficiencies in their system. This may be an issue with conveyance to the City of Fort Lauderdale.

The City of Wilton Manors has reserved capacity in this plant. A 12-inch force main goes from the TOD corridor to the south. The force main likely has insufficient capacity to carry added sewage. Efforts should be coordinated with the City of Oakland Park. Local improvements and lift stations may be needed.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 15). Based on such a station, the demands for the TOD Station 2 site include 2.56 MGD of water supply and treatment, and 1.70 MGD of wastewater treatment for a City Center station. Adequate water treatment, raw water and wastewater treatment capacity exists although the City of Fort Lauderdale has

concerns about raw water supplies after 2028. Limited sewer lines are needed under this scenario. The existing water mains may not be locally sufficient for extensive development.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 0.76 MGD of water supply and treatment, and 0.50 MGD of wastewater treatment (column 3). Capacity appears adequate. Localized improvement may be needed.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 15 outlines the current capacity, the anticipated needs for a City Center and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. Only localized improvements are needed for this station except for added force main to the City of Fort Lauderdale as noted.

Table 15 Summary of Needs for TOD development for Station 15 Site

Sta. No	15	
Station Location	26TH ST	
City	WILTON MANORS	WILTON MANORS
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	no	no
Raw W (MDG)	61.19	61.19
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	82	82
WTP Demand (MGD)	40.89	40.89
WWTP cap (MGD)	55.7	55.7
WWTP Demand (MGD)	37.5	37.5
Disposal method	Inj Well	Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	3978	3978
Max Density Scenario within Half-Mile of Station	2522	8522
Add Water Demand	0.7566	2.5566
Add WW Demand	0.5044	1.7044
Available Capacity Water	41.11	41.11
Available Capacity Raw Water	20.3	20.3
Available Capacity Wastewater	18.2	18.2
% capacity Water treatment	51%	53%
% capacity Water Supply	71%	74%
% capacity needed Wastewater treatment	68%	70%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	2000	2000
Force Main LF	2500	2500
Sewer lift station	2	2
gravity sewer revisions	1000	1000
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ 550,000	$ 550,000
Force Main Cost	$ 700,000	$ 700,000
Sewer lift station	$ 1,000,000	$ 1,000,000
Gravity Cost	$ 250,000	$ 250,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 2,750,000	$ 2,750,000
Total cost millions	$ 2.75	$ 2.75

Station 16. Fort Lauderdale

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
FT. LAUDERDALE	61.19	Biscayne/Floridan	82	40.89	55.7*	37.5	Inj Well	6,136	6,364

Water Treatment Plant, Pumps and Capacity

The City of Fort Lauderdale operates two water plants. The Peele Dixie plant is the original water plant. The lime softening component has been abandoned and a new Floridan reverse osmosis treatment plant was constructed on the same site. The wells are at the Fort Lauderdale Country Club 1 mile west. The Five Ash plant is located off Prospect Rd and I95. This is the larger pant is uses lime softening for treatment. The average daily flows are 40.89 MGD. The capacity of the plants is 82 MGD. Raw water supplies are 61.19 MGD according to SFWMD water use permit allocation records. Disinfection of the water is via chloramination. The utility has a 20-year permit.

A 30-inch water main is piped to the potential TOD areas. The pipe is looped toward the beach and back downtown. Between plants. Smaller lines emanate from this loop. Local upgrades will be required.

Wastewater Treatment Plant, Disposal Method and Capacity

The City of Fort Lauderdale treats their wastewater at the Lohmeyer facility at Port Everglades. The primary disposal option for the wastewater effluent is injection wells. Capacity of the plant is 55.7 MGD. Demands are 37.5 MGD. The City of Fort Lauderdale has a consent order to spend over a billion dollars to address sewer piping deficiencies in their system. This may be an issue with conveyance to the City of Fort Lauderdale.

Aside from issues associated with pipe condition, the force main that goes from the TOD corridor to the plant likely has sufficient capacity to carry added sewage for the City since demands are so small.

Additional Demand

Additional demands for a TOD zone at this site include 1.91 MGD of water supply and treatment, and 1.27 MGD of wastewater treatment. Treatment capacity and water supply is available for this demand although posts 2028 the raw water may be of issue.

Needed Improvements and Potential Cost

No major improvements are needed for this site that is currently served with a train station (see Table 16).

Table 16 - Summary of Infrastructure for Station 16 site

Sta. No	16
Station Location	BROWARD BLVD
City	FT. LAUDERDALE
Station Goal	CC
Potential Units For Planning Purposes	12500
Restrictions for WTP, WWTP or Raw water capacity	no
Raw W (MDG)	61.19
Raw source	Biscayne/ Floridan
WTP Cap (MGD)	82
WTP Demand (MGD)	40.89
WWTP cap (MGD)	55.7
WWTP Demand (MGD)	37.5
Disposal method	Inj Well
# of Existing Residential Units within Half-Mile of Station (2018)	6136
Max Density Scenario within Half-Mile of Station	6364
Add Water Demand	1.9092
Add WW Demand	1.2728
Available Capacity Water	41.11
Available Capacity Raw Water	20.3
Available Capacity Wastewater	18.2
% capacity Water treatment	52%
% capacity Water Supply	73%
% capacity needed Wastewater treatment	70%
Capacity needed water MGD	0.00
Water supply Capacity needed MGD	0.00
Wastewater treatment plant Capacity needed MGD	0.00
16+ WM - LF	0
Force Main LF	0
Sewer lift station	0
gravity sewer revisions	0
Lift station upgrades	0
Capacity water (per MGD)	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000
16" or more water main - $/LF	$ 275
Force Main $/LF	$ 200
Sewer lift station cost	$ 500,000
Gravity Sewer Installtion /LF	$ 250
Lift station upgrades cost	$ 250,000
Capacity water	$ -
Water supply	$ -
Capacity Sewer	$ -
16+ WM Cost	$ -
Force Main Cost	$ -
Sewer lift station	$ -
Gravity Cost	$ -
Lift station upgrades	$ -
Total cost	$ -
Total cost millions	$ -

Station 17. Ft. Lauderdale-Hollywood International Airport

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
n/a	39.38	Biscayne/Floridan	46	23.22	48.75	41.5	Inj Well		

Water Treatment Plant, Pumps and Capacity

This site is served by Broward County 3A service area. Water is purchased from Hollywood and redistributed via large user agreement. The County has adequate capacity to serve the airport. The area has no potential to be a TOD zone and as a result no improvements are required.

Wastewater Treatment Plant, Disposal Method and Capacity

This site is served by Broward County 3A service area. Wastewater service, like water supplies, is purchased from Hollywood via a large user agreement that has been in place since 1974. The City has adequate capacity to serve the airport. The City of Hollywood currently uses an ocean outfall for wastewater disposal and two deep injection wells. The outfall needs to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goals but this is not achievable. Although added deep wells are in place, there is no other solution that has been currently identified.

The area has no potential to be a TOD zone and as a result no improvements are required.

Additional Demand

None.

Needed Improvements and Potential Cost

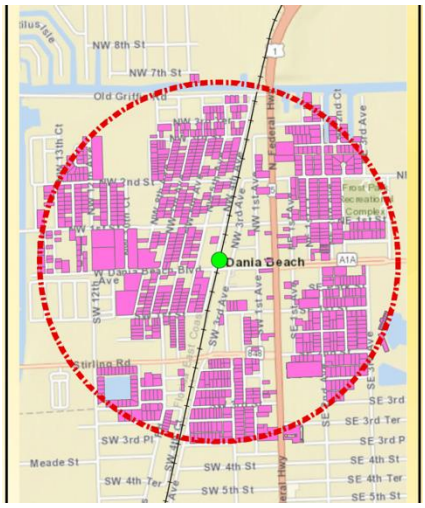
None.

Station 18. Dania Beach

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
DANIA BEACH	2.58	Biscayne	5.04	2.18	3.9*	2.9	Outfall	2,332	10,168

***part of regional system**

Water Treatment Plant, Pumps and Capacity



The City of Dania Beach (City) operates a 5.04 MGD water treatment plant. 3.04 MGD of this capacity is lime softening. The remaining 2 MGD is nanofiltration. Disinfection is via chloramination. Raw water comes from the Biscayne aquifer. Capacity is limited to 2.58 MGD, with an application for 2.88 MGD. The City is in the process of developing additional supplies. Water treatment is adequate to supply the needed water. Water supplies are not adequate at this time.

High service pumps are rated over 12 MGD. A new 20-inch pipeline, with a 16/12-inch connection to downtown, and new 12-inch looped pipelines were constructed in anticipation of 4000 added residential units in 2008, along with a new storage tank, so piping capacity appears adequate for anticipated growth to 4000 units. Distribution capacity appears to be adequate.

Wastewater Treatment Plant, Disposal Method and Capacity

Gravity sewer lines are available throughout the City except Melaleuca Gardens (which is not a potential site for the TOD), and 8-inch pipelines exist throughout the City. Major vertical growth may require added sewer line capacity and lift stations. Lift station pump upgrades will be required. However, the nature of the community may limit growth. The contract with the City of Hollywood includes 4.15 MGD of capacity. Flows are less than this today. Collaboration is needed with Hollywood on the wastewater capacity.

The City of Hollywood treats the wastewater. The City of Hollywood currently uses an ocean outfall for wastewater disposal and two deep injection wells. The outfall needs to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goals but this is not currently achievable. Although added deep wells are in place, there is no other solution that has been currently identified.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 of Table 18). Based on such a station, the demands for the TOD Station 18 site include 3.05 MGD of water supply and treatment, and 2.03 MGD of wastewater treatment for a City Center station. Inadequate raw water, treated water and wastewater capacity exist for a City Center station (see highlight). Note the City of Dania Beach is a large user for the Hollywood plant. The southern Regional Wastewater Treatment

Plant in Hollywood is currently operating at over 80% capacity, so any station will be an issue from any large user.

However, this station site is anticipated to be a Town Center which is a smaller station that is more in keeping with what the area can support. If an assumed 5,000 to 8,000 (assume 6,500 for planning) units are anticipated, the demands for this site include 1.25 MGD of water supply and treatment, and 0.83 MGD of wastewater treatment (column 2). Inadequate raw water and wastewater capacity exist for a Town Center station.

This station should probably be a neighborhood station, not a Town Center station, but raw water supply remains an issue. The current utility infrastructure with respect to raw water and wastewater capacity is insufficient for the proposed station, but the piping system poses no restriction.

Needed Improvements and Potential Cost

The existing water and sewer mains are sufficient for extensive development. Depending on the type of station area pursued, Table 18 outlines the current capacity, the anticipated needs for a City Center and Town Center station, neither of which can be supported at present. The costs for piping and pumping is estimated. Based on the analysis of GIS pipelines for the area, the costs for upgrades to water treatment capacity are not required, but raw water and wastewater are issues.

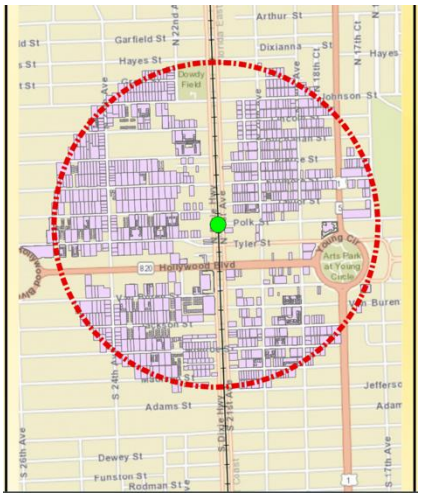
Table 18 Summary of Needs for TOD development for Dania Beach Station 18

Sta. No	18	
Station Location	DANIA BEACH	
City	DANIA BEACH	DANIA BEACH
Station Goal	Town Cneter	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity		2.58
Raw W (MDG)	2.58	2.58
Raw source	Biscayne	
WTP Cap (MGD)	5.04	5.04
WTP Demand (MGD)	2.18	2.18
WWTP cap (MGD)	4.15	4.15
WWTP Demand (MGD)	2.9	2.9
Disposal method	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	2,332	2,332
Max Density Scenario within Half-Mile of Station	4,168	10,168
Add Water Demand	1.25	3.05
Add WW Demand	0.83	2.03
Available Capacity Water	2.86	2.86
Available Capacity Raw Water	0.4	0.4
Available Capacity Wastewater	1.25	1.25
% capacity Water treatment	68%	104%
% capacity Water Supply	138%	211%
% capacity needed Wastewater treatment	90%	119%
Capacity needed water MGD	0.00	1.00
Water supply Capacity needed MGD	1.25	3.12
Wastewater treatment plant Capacity needed MGD	0.41	1.61
16+ WM - LF		
Force Main LF	5000	5001
Sewer lift station	1	1
gravity sewer revisions	0	0
Lift station upgrades		
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 7,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 6,000,000
16" or more water main - $/LF	$ 275	$ 8,000,000
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ 8,321,735
Water supply	$ 7,473,696	$ 7,000,000
Capacity Sewer	$ 3,308,800	$ 18,705,696
16+ WM Cost	$ -	$ -
Force Main Cost	$ 1,000,000	$ 1,000,200
Sewer lift station	$ 500,000	$ 500,000
Gravity Cost	$ -	$ -
Lift station upgrades	$ -	$ -
Total cost	$ 12,282,496	$ 35,527,631
Total cost millions	$ 12.28	$ 35.53

Station 19. Hollywood

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
HOLLYWOOD	39.38	Biscayne/Floridan	46	23.22	48.75	41.5	Outfall	5,648	6,852

Water Treatment Plant, Pumps and Capacity



The City of Hollywood (City's) operates a 46 MGD water treatment plant. The plant includes a lime softening (Spiractor) component, a nanofiltraiton component (14 MGD) and a Floridan reverse osmosis component on the same site. Disinfection is via chloramination. Raw water comes from the Biscayne aquifer and the Floridan aquifer. Raw water supplies are 39.38 MGD according to SFWMD water use permit allocation records. Water treatment is adequate to supply the needed water. The utility has a 20-year permit.

A 30-inch water main is piped to the potential TOD areas. The pipe is looped toward the beach and back downtown. Smaller lines emanate from this loop. Local upgrades will be required and many 2-inch galvanized pipes remain from the 1960s.

Wastewater Treatment Plant, Disposal Method and Capacity

The City of Hollywood treats the wastewater. The City of Hollywood currently uses an ocean outfall for wastewater disposal and two deep injection wells. The outfall needs to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goals but this is not achievable. Although added deep wells are in place, there is no other solution that has been currently identified.

Gravity sewer lines are not available in many areas east of Interstate I-95 which has hampered the City's ability to grow vertically beyond the downtown area. A major effort within the last 5 years to serve areas between US 1 and Dixie Highway has improved this situation but issues remain. Major vertical growth may require added sewer line capacity and lift stations. Lift station pump upgrades will be required.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 of Table 19). Based on such a station, the demands for the TOD Station 19 site include 2.07 MGD of water supply and treatment, and 1.37 MGD of wastewater treatment for a City Center station. Inadequate wastewater capacity exists for a City Center station (see highlight). Note the plant is over 80% at present so any station will be an issue from any large user.

However, this station site is anticipated to be a Town Center which is a smaller station that is more in keeping with what the area can support. If an assumed 5,000 to 8,000 (assume 6,500 for planning) units are anticipated, the demands for this site include 0.26 MGD of water supply and treatment, and 0.17 MGD of wastewater treatment (column 2). Inadequate wastewater capacity exists for a Town Center station.

Needed Improvements and Potential Cost

Table 19 outlines the current capacity, the anticipated needs for a City Center and Town Center station, neither of which can be supported at present based on wastewater capacity. In addition, sewer lines need to be extended. The costs for piping and pumping are estimated based on the analysis of GIS pipelines for the area.

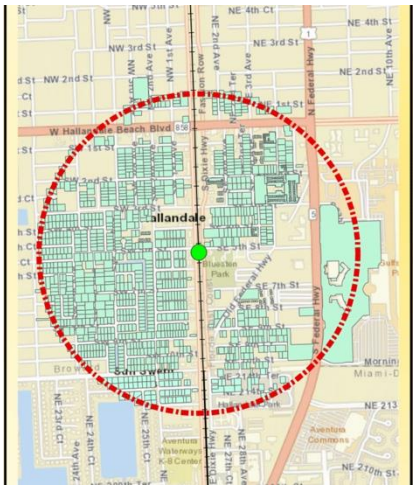
Table 19 Summary of Needs for TOD development for Station 19

Sta. No	19	
Station Location	HOLLYWOOD BLVD	
City	HOLLYWOOD	HOLLYWOOD
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	yes	yes
Raw W (MDG)	39.38	39.38
Raw source	Biscayne/ Floridan	Biscayne/ Floridan
WTP Cap (MGD)	46	46
WTP Demand (MGD)	23.22	23.22
WWTP cap (MGD)	48.75	48.75
WWTP Demand (MGD)	41.5	41.5
Disposal method	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	5648	5648
Max Density Scenario within Half-Mile of Station	852	6852
Add Water Demand	0.2556	2.0556
Add WW Demand	0.1704	1.3704
Available Capacity Water	22.78	22.78
Available Capacity Raw Water	16.16	16.16
Available Capacity Wastewater	7.25	7.25
% capacity Water treatment	51%	55%
% capacity Water Supply	62%	67%
% capacity needed Wastewater treatment	85%	88%
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	2.67	3.87
16+ WM - LF	0	0
Force Main LF	0	0
Sewer lift station	1	1
gravity sewer revisions	5000	5000
Lift station upgrades	0	0
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ 21,363,200	$ 30,963,200
16+ WM Cost	$ -	$ -
Force Main Cost	$ 1,000,000	$ 1,000,000
Sewer lift station	$ 500,000	$ 500,000
Gravity Cost	$ 1,250,000	$ 1,250,000
Lift station upgrades	$ -	$ -
Total cost	$ 24,113,200	$ 33,713,200
Total cost millions	$ 24.11	$ 33.71

Station 20. Hallandale Beach

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
HALLANDALE BEACH	6.5	Biscayne	10	6.07	9.2	9.2	Outfall	2,613	9,887

Water Treatment Plant, Pumps and Capacity



The City of Hallandale Beach (City) operates a 10 MGD water plant. Nanofiltration and lime softening plants exist on the same site. The average daily flows are 6.07 MGD. Disinfection of the water is via chloramination. Raw water supplies are 6.5 MGD according to SFWMD water use permit allocation records. Water supplies are limited but the City has plans to move to Floridan wells in the future to provide more supply. The utility has a 20-year permit.

The entire City is only 4 square miles with an elevated tank on the beach. Watermain infrastructure needs to be modeled. Much of the current beach development is high rise, so looping is present in the system. Raw water remains an ongoing issue, but the City executed an agreement to tie into the C51 reservoir project for added water supply. This remains a critical issue.

Wastewater Treatment Plant, Disposal Method and Capacity

Throughout the City, 8-inch and larger gravity sewer lines are available. Most were installed in the 1960s. Major vertical growth may require added sewer line capacity and lift stations. Lift station pump upgrades will be required. However, the nature of the community may limit growth. The contract with the City of Hollywood includes 9 MGD of capacity. The City is at this point today, but is performing ongoing work to reduce extensive infiltration. Collaboration is needed with Hollywood on the wastewater capacity.

The City of Hollywood treats the wastewater. The City of Hollywood currently uses an ocean outfall for wastewater disposal and two deep injection wells. The outfall needs to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goals but this is not achievable. Although added deep wells are in place, there is no other solution that has been currently identified.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 of Table 20). Based on such a station, the demands for the TOD Station 20 site include 2.97 MGD of water supply and treatment, and 1.98 MGD of wastewater treatment for a City Center station. Inadequate raw water, water treatment and wastewater capacity exists for a City Center station at the Southern

Regional Wastewater Treatment Plant in Hollywood (see highlight). Note the plant is over 80% at present so any station will be an issue from any large user. Force main improvements are needed.

However, this station site is anticipated to be a Town Center which is a smaller station that is more in keeping with what the area can support. If an assumed 5,000 to 8,000 (assume 6,500 for planning) units are anticipated, the demands for this site include 1.17 MGD of water supply and treatment, and 0.78 MGD of wastewater treatment (column 2). Inadequate raw water and wastewater capacity exists for a Town Center station at the Southern Regional Wastewater Treatment Plant in Hollywood. Force main analysis should be undertaken. The City is in the midst of a major infiltration removal project.

Needed Improvements and Potential Cost

Table 20 outlines the current capacity, the anticipated needs for a city and Town Center station, neither of which can be supported at present based on wastewater capacity. In addition, sewer lines need to be extended. The costs for piping and pumping is estimated based on the analysis of GIS pipelines for the area.

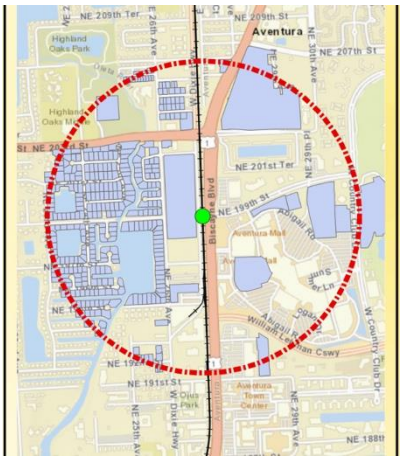
Table 20 Summary of Needs for TOD development for Station 20

Sta. No	20	
Station Location	SE 4TH ST	
City	HALLANDALE BEACH	HALLANDALE BEACH
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	yes	yes
Raw W (MDG)	6.5	6.5
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	10	10
WTP Demand (MGD)	6.07	6.07
WWTP cap (MGD)	9.2	9.2
WWTP Demand (MGD)	9.2	9.2
Disposal method	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	2613	2613
Max Density Scenario within Half-Mile of Station	3887	9887
Add Water Demand	1.1661	2.9661
Add WW Demand	0.7774	1.9774
Available Capacity Water	3.93	3.93
Available Capacity Raw Water	0.43	0.43
Available Capacity Wastewater	0	0
% capacity Water treatment	72%	90%
% capacity Water Supply	116%	145%
% capacity needed Wastewater treatment	108%	121%
Capacity needed water MGD	0.00	1.04
Water supply Capacity needed MGD	1.68	3.55
Wastewater treatment plant Capacity needed MGD	2.62	3.82
16+ WM - LF	0	0
Force Main LF	0	0
Sewer lift station	0	1
gravity sewer revisions	2500	10000
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ 7,252,700
Water supply	$ 10,053,264	$ 21,285,264
Capacity Sewer	$ 20,939,200	$ 30,539,200
16+ WM Cost	$ -	$ -
Force Main Cost	$ 500,000	$ 2,000,000
Sewer lift station	$ -	$ 500,000
Gravity Cost	$ 625,000	$ 2,500,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 32,367,464	$ 64,327,164
Total cost millions	$ 32.37	$ 64.33

Station 21. Aventura

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
AVENTURA	386.07	Biscayne	464	338.12	376	195.8	Outfall	1,281	11,219

Water Treatment Plant, Pumps and Capacity



The City of North Miami Beach (City) provides water service to this site. The City of North Miami Beach operates a 32 MGD water plant. Reverse osmosis and lime softening plants exist on the same site. The average daily flows are 20.33 MGD. Disinfection of the water is via chloramination. Raw water supplies are 38.38 MGD according to SFWMD water use permit allocation records. Water supplies are limited but the City has plans to move to Floridan wells in the future to create more demand. The utility has a 20-year permit. The City has adequate water supply.

A 24-inch water main is looped to the potential TOD area with 12-inch lines along the TRCL corridor. Smaller lines emanate from this loop. Distribution capacity appears adequate fire flow demands.

Wastewater Treatment Plant, Disposal Method and Capacity

Miami-Dade County, through the Miami-Dade County Water and Sewer Department provides sewer service to this site. The County operates three wastewater treatment plants – North, Central and South Districts. The South District plant uses deep injection wells for disposal. The North and Central District plants send treated wastewater to the ocean and injection wells. The outfalls need to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goals but this is not achievable. As a result, although added deep wells are in place, but no other solution. The capacity of these three plants is 376 MGD. Current flows are 195 MGD. Significant effort has occurred over the last twenty years to rehabilitate the piping and conveyance system.

The site is served by local gravity lines lift station and large force main that goes to the North District plant. The force main size was 54 and 72 inches along US 1. Local upgrades may be needed for this site west of US 1, but adequate capacity exists for pressurized systems.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 21). Based on such a station, the demands for the TOD Station 21 site include 3.37 MGD of water supply and treatment, and 2.24 MGD of wastewater treatment for a City Center station. Adequate water treatment and wastewater treatment capacity exists although raw water is a concern (the volume exceeds the 90% capacity although the system size is huge). Note this is a consistent issue in Miami-Dade

County's stations, yet over 30 MGD of raw water is available creating somewhat of a distorted conclusion. Limited sewer lines are needed under this scenario. The existing water mains are sufficient for this proposed development.

This station site is anticipated to be a neighborhood center which is a smaller station, but the City and transportation officials are looking at the City Center option. If an assumed 4,000 units are anticipated, the demands for this site include 0.82 MGD of water supply and treatment, and 0.54 MGD of wastewater treatment (column 3). Capacity appears adequate except raw water as noted above. Localized improvement may be needed.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 21 outlines the current capacity, the anticipated needs for a city and neighborhood center station and the units that can be supported by the current treatment and water supply infrastructure. Only raw water (system-wide) and localized improvements are needed for this station.

Table 21 Summary of Infrastructure Needs for TOD development for Station 21 Site

Sta. No	21	
Station Location	192ND ST	
City	AVENTURA	AVENTURA
Station Goal	Neigh Center	City Center
Potential Units For Planning Purposes	4000	12500
Restrictions for WTP, WWTP or Raw water capacity	no	no
Raw W (MDG)	386.07	386.07
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	464	464
WTP Demand (MGD)	338.12	338.12
WWTP cap (MGD)	376	376
WWTP Demand (MGD)	195.8	195.8
Disposal method	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	1281	1281
Max Density Scenario within Half-Mile of Station	2719	11219
Add Water Demand	0.8157	3.3657
Add WW Demand	0.5438	2.2438
Available Capacity Water	125.88	125.88
Available Capacity Raw Water	47.95	47.95
Available Capacity Wastewater	180.2	180.2
% capacity Water treatment	0.73	0.74
% capacity Water Supply	0.91	0.92
% capacity needed Wastewater treatment	0.52	0.53
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	0	0
Force Main LF	1000	2500
Sewer lift station	1	1
gravity sewer revisions	0	0
Lift station upgrades	0	0
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ -	$ -
Force Main Cost	$ 200,000	$ 500,000
Sewer lift station	$ 500,000	$ 500,000
Gravity Cost	$ -	$ -
Lift station upgrades	$ -	$ -
Total cost	$ 700,000	$ 1,000,000
Total cost millions	$ 0.70	$ 1.00

Station 22. North Miami Beach

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
NORTH MIAMI BEACH	38.38	Biscayne/ Floridan	32	20.55	376	195.8	Outfall	1,492	11,008

Water Treatment Plant, Pumps and Capacity

The City of North Miami Beach (City) operates a 32 MGD water plant. Reverse osmosis, nanofiltration and lime softening plants exist on the same site. The average daily flows are 20.33 MGD. Disinfection of the water is via chloramination. Raw water supplies are 38.38 MGD according to SFWMD water use permit allocation records. Water supplies are not limited and the City has already pursued the Florida wells to provide greater supply. The utility has a 20-year permit. The City has adequate water supply.

A 24-inch water main is looped to the potential TOD area with 12-inch lines along the TRCL corridor. Smaller lines emanate from this loop. Distribution capacity appears adequate fire flow demands.

Wastewater Treatment Plant, Disposal Method and Capacity

Wastewater collection is provided by the City and Miami-Dade County. Treatment capacity is via the County. The Miami-Dade County Water and Sewer Department provides sewer service to this site. The County operates three wastewater treatment plants – North, Central and South Districts. The North District plant serves this site. The North and Central District plants send treated wastewater to the ocean and injection wells. The outfalls need to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goals but this is not achievable. Although added deep wells are in place, there is no other solution that has been currently identified. The capacity of these three plants is 376 MGD. Current flows are 195 MGD. Significant effort has occurred over the last twenty years to rehabilitate the piping and conveyance system. Large collector force mains are available on US 1. There is localized gravity sewer in the vicinity of the site at 164th St.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Centers that include 12,500 units (column 3). Based on such a station, the demands for the TOD Station 22 site include 3.30 MGD of water supply and treatment, and 2.20 MGD of wastewater treatment for a City Center station. Adequate treatment capacity exists for raw water and water treatment. Localized sewers and pumping capacity will be needed but large capacity force mains are present.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 1.50 MGD of water supply and treatment, and 1.00 MGD of wastewater treatment (column 2). Adequate treatment capacity exists for raw water and water treatment. However, the same issues apply with regard to the sewers as above but to a lesser extent. The reserved capacity in a wastewater plant is included in the cost because the plants do not provide service at this time.

The current utility infrastructure with respect to water supply, capacity and piping does not limit the proposed station. However, some local upgrades to sewer will be required.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 22 outlines the current capacity, the anticipated needs for a City and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. In addition, costs for piping and pumping is estimated. Based on the analysis of GIS pipelines for the area, the costs for upgrades to treatment capacity are not required. Only sewer upgrades are needed.

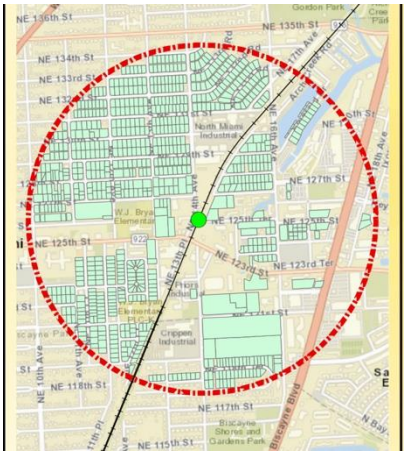
Table 22 Summary of Infrastructure Needs for TOD development for Station 22 Site

Sta. No	22	
Station Location	163RD ST	
City	NORTH MIAMI BEACH	NORTH MIAMI BEACH
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	no	no
Raw W (MDG)	38.38	38.38
Raw source	Biscayne/ Floridan	Biscayne/ Floridan
WTP Cap (MGD)	32	32
WTP Demand (MGD)	20.55	20.55
WWTP cap (MGD)	376	376
WWTP Demand (MGD)	195.8	195.8
Disposal method	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	1492	1492
Max Density Scenario within Half-Mile of Station	5008	11008
Add Water Demand	1.5024	3.3024
Add WW Demand	1.0016	2.2016
Available Capacity Water	11.45	11.45
Available Capacity Raw Water	17.83	17.83
Available Capacity Wastewater	180.2	180.2
% capacity Water treatment	0.69	0.75
% capacity Water Supply	0.60	0.65
% capacity needed Wastewater treatment	0.52	0.53
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	0	
Force Main LF	1500	2500
Sewer lift station	4	4
gravity sewer revisions	0	5000
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ -	$ -
Force Main Cost	$ 300,000	$ 1,500,000
Sewer lift station	$ 2,000,000	$ 2,000,000
Gravity Cost	$ -	$ 1,250,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 2,550,000	$ 5,000,000
Total cost millions	$ 2.55	$ 5.00

Station 23. North Miami

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
NORTH MIAMI	17.27	Biscayne	16	7.82	376	195.8	Outfall	3,048	9,452

Water Treatment Plant, Pumps and Capacity



The City of North Miami (City) operates a 16 MGD lime softening water plant. The average daily flows are 7.82 MGD. Disinfection of the water is via chloramination. Raw water supplies are 17.27 MGD according to SFWMD water use permit allocation records. Water supplies are limited but the City has plans to move to upper Floridan wells in the future to create more demand. The utility has a 20-year permit.

A 12-inch water main is looped to the potential TOD areas along the TRCL corridor in multiple locations. Local 2-, 4-, 6- and 8-inch lines are located throughout. This does not appear adequate for a TOD development. Distribution capacity appears to be lacking for fire flow demands. Miami Dade County has some very strong raw water supply concerns, and these locations, although workable, will require a strong collective effort from county and cities to work. We would recommend the smaller stations.

Wastewater Treatment Plant, Disposal Method and Capacity

Wastewater collection is provided by the City and Miami-Dade County. Treatment capacity is via the County. The Miami-Dade County Water and Sewer Department provides sewer service to this site. The County operates three wastewater treatment plants – North, Central and South Districts. The South District plant uses deep injection wells for disposal. The North and Central District plants send treated wastewater to the ocean and injection wells. The outfalls need to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goals but this is not achievable. As a result, although added deep wells are in place, but no other solution. The capacity of these three plants is 376 MGD. Current flows are 195 MGD. Significant effort has occurred over the last twenty years to rehabilitate the piping and conveyance system. Force mains are available on US 1.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 23). Based on such a station, the demands for the TOD Station 23 site include 2.84 MGD of water supply and treatment, and 1.89 MGD of wastewater treatment for a City Center station. Adequate water treatment and wastewater treatment capacity exists although raw water is a concern (the volume exceeds the 90% capacity although the system size is huge). Note this is a consistent issue in Miami-Dade County's stations, yet over 30 MGD of raw water is available creating somewhat of a distorted conclusion.

The existing water mains may not be locally sufficient for extensive development. Limited sewer lines are needed under this scenario.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 0.29 MGD of water supply and treatment, and 0.19 MGD of wastewater treatment (column 2). Adequate treatment capacity exists in both systems. Capacity appears adequate except raw water as noted above. Localized improvements and sanitary sewers may be needed.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 23 outlines the current capacity, the anticipated needs for a City and Neighborhood Center station and the units that can be supported by the current treatment and water supply infrastructure. A water main loop and local sewers are needed for this system.

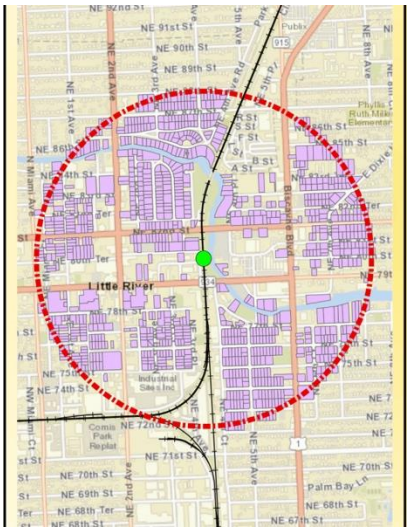
Table 23 Summary of Needs for TOD development for Station 23 Site

Sta. No	23	
Station Location	125TH ST	
City	NORTH MIAMI	NORTH MIAMI
Station Goal	Neigh Center	City Center
Potential Units For Planning Purposes	4000	12500
Restrictions for WTP, WWTP or Raw water capacity	no	bno
Raw W (MDG)	17.27	17.27
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	16	16
WTP Demand (MGD)	7.82	7.82
WWTP cap (MGD)	376	376
WWTP Demand (MGD)	195.8	195.8
Disposal method	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	3048	3048
Max Density Scenario within Half-Mile of Station	952	9452
Add Water Demand	0.2856	2.8356
Add WW Demand	0.1904	1.8904
Available Capacity Water	8.18	8.18
Available Capacity Raw Water	9.45	9.45
Available Capacity Wastewater	180.2	180.2
% capacity Water treatment	0.51	0.67
% capacity Water Supply	0.49	0.64
% capacity needed Wastewater treatment	0.52	0.53
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	5000	10000
Force Main LF	1500	2500
Sewer lift station	4	4
gravity sewer revisions	0	5000
Lift station upgrades	1	1
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ 1,375,000	$ 2,750,000
Force Main Cost	$ 300,000	$ 1,500,000
Sewer lift station	$ 2,000,000	$ 2,000,000
Gravity Cost	$ -	$ 1,250,000
Lift station upgrades	$ 250,000	$ 250,000
Total cost	$ 3,925,000	$ 7,750,000
Total cost millions	$ 3.93	$ 7.75

Station 24. Miami – 79th St

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
MIAMI	386.07	Biscayne	464	338.12	376	195.8	Outfall	3,514	8,986

Water Treatment Plant, Pumps and Capacity



Miami-Dade County (County), through the Miami-Dade County Water and Sewer Department (MDWASD) provides water service to this site. Miami-Dade County's sole source for drinking water is ground water from wells. The wells feed the Hialeah and John E. Preston, and Alexander Orr regional water treatment plants and the South Dade Water Supply System, which is comprised of five smaller water treatment plants that serve residents south of SW 264th Street in the unincorporated areas of the County. Total capacity for the plants is 464 MGD. The County has a permit to withdraw 386.07 MGD from its wellfields. Demands are 338 MGD.

A regional 54-inch main plus a 20-inch water mains are looped to the area. Local upgrades may not be required.

Wastewater Treatment Plant, Disposal Method and Capacity

Miami-Dade County, through the Miami-Dade County Water and Sewer Department provides water service to this site. The County operates three wastewater treatment plants – North, Central and South Districts. The South District plant uses deep injection wells for disposal. The North and Central District plants send treated wastewater to the ocean and injection wells. The outfalls need to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goal but this is not achievable. As a result, although added deep wells are in place, there are no other solutions in place at this time. The capacity of these three plants is 376 MGD. Current flows are 195 MGD. Significant effort has occurred over the last twenty years to rehabilitate the piping and conveyance system.

The site is served by 8-, 10- and 12-inch local gravity lines, lift stations and a 48/60-inch force main that goes to the North District plant. Local upgrades may not be needed for this site.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Centers that include 12,500 units (column 3 in Table 24). Based on such a station, the demands for the TOD Station 24 site include 2.70 MGD of water supply and treatment, and 1.80 MGD of wastewater treatment for a City Center station. Adequate water treatment and wastewater treatment capacity exists although raw water is a concern (the volume exceeds the 90% capacity although the system size is huge). Note that this is a consistent

issue in Miami-Dade County's stations, yet over 30 MGD of raw water is available creating somewhat of a distorted conclusion. The existing water mains may not be locally sufficient for extensive development.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 0.90 MGD of water supply and treatment, and 0.60 MGD of wastewater treatment (column 2). Adequate treatment capacity exists in both systems. Capacity appears adequate except raw water as noted above. Localized improvements may be needed.

Needed Improvements and Potential Cost

Depending on the type of station pursued area, Table 24 outlines the current capacity, the anticipated needs for a City and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. Only raw water (system-wide) and localized improvements are needed for this station.

Summary of Infrastructure Needs for TOD development for Station 24 Site

Sta. No	24	
Station Location	79TH ST	
City	MIAMI	MIAMI
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	yes	yes
Raw W (MDG)	386.07	386.07
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	464	464
WTP Demand (MGD)	338.12	338.12
WWTP cap (MGD)	376	376
WWTP Demand (MGD)	195.8	195.8
Disposal method	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	3514	3514
Max Density Scenario within Half-Mile of Station	2986	8986
Add Water Demand	0.8958	2.6958
Add WW Demand	0.5972	1.7972
Available Capacity Water	125.88	125.88
Available Capacity Raw Water	47.95	47.95
Available Capacity Wastewater	180.2	180.2
% capacity Water treatment	0.73	0.73
% capacity Water Supply	0.91	0.92
% capacity needed Wastewater treatment	0.52	0.53
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	0	0
Force Main LF	1000	1000
Sewer lift station	1	1
gravity sewer revisions	0	0
Lift station upgrades	0	0
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ -	$ -
Force Main Cost	$ 200,000	$ 200,000
Sewer lift station	$ 500,000	$ 500,000
Gravity Cost	$ -	$ -
Lift station upgrades	$ -	$ -
Total cost	$ 700,000	$ 700,000
Total cost millions	$ 0.70	$ 0.70

Station 25. Miami – 55th St

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
MIAMI	386.07	Biscayne	464	338.12	376	195.8	Outfall	2,429	10,071

Water Treatment Plant, Pumps and Capacity

Miami-Dade County (County), through the Miami-Dade County Water and Sewer Department (MDWASD) provides water service to this site. Miami-Dade County's sole source for drinking water is ground water from wells. The wells feed the Hialeah and John E. Preston, and Alexander Orr regional water treatment plants and the South Dade Water Supply System, which is comprised of five smaller water treatment plants that serve residents south of SW 264th Street in the unincorporated areas of the County. Total capacity for the plants is 464 MGD. The County has a permit to withdraw 386.07 MGD from its wellfields. Demands are 338 MGD.

A 16-inch water main is piped to the area. Local upgrades may not be required but the 16-inch line needs to be looped north and south to provide needed fire flows.

Wastewater Treatment Plant, Disposal Method and Capacity

Miami-Dade County, through the Miami-Dade County Water and Sewer Department provides water service to this site. The County operates three wastewater treatment plants – North, Central and South Districts. The South District plant uses deep injection wells for disposal. The North and Central District plants send treated wastewater to the ocean and injection wells. The outfalls need to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goal but this is not achievable. As a result, although added deep wells are in place, there are no other solutions in place at this time. The capacity of these three plants is 376 MGD. Current flows are 195 MGD. Significant effort has occurred over the last twenty years to rehabilitate the piping and conveyance system.

The site is served by local gravity lines, lift stations and 48/60-inch force main that goes to the North District plant. Local upgrades may not be needed for this site.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 25). Based on such a station, the demands for the TOD Station 25 site include 3.02 MGD of water supply and treatment, and 2.01 MGD of wastewater treatment for a City Center station. Adequate water treatment and wastewater treatment capacity exists although raw water is a concern (the volume exceeds the 90% capacity although the system size is huge). Note this is a consistent issue in Miami-Dade

County's stations, yet over 30 MGD of raw water is available creating somewhat of a distorted conclusion. The existing water mains may not be locally sufficient for extensive development.

However, this station site is anticipated to be a Town Center which is a smaller station. If an assumed 5,000 to 8,000 units (using 6,500 units for an average) are anticipated, the demands for this site include 1.22 MGD of water supply and treatment, and 0.81 MGD of wastewater treatment (column 2). Adequate treatment capacity exists in both systems. Capacity appears adequate except raw water as noted above. Localized improvements may be needed.

Needed Improvements and Potential Cost

Depending on the type of station area pursued, Table 25 outlines the current capacity, the anticipated needs for a city and Town Center station and the units that can be supported by the current treatment and water supply infrastructure. Only raw water (system-wide) and localized improvements are needed for this station.

Summary of Infrastructure Needs for TOD development for Station 25 Site

Sta. No	25	
Station Location	55TH ST	
City	MIAMI	MIAMI
Station Goal	Town Center	City Center
Potential Units For Planning Purposes	6500	12500
Restrictions for WTP, WWTP or Raw water capacity	yes	yes
Raw W (MDG)	386.07	386.07
Raw source	Biscayne	Biscayne
WTP Cap (MGD)	464	464
WTP Demand (MGD)	338.12	338.12
WWTP cap (MGD)	376	376
WWTP Demand (MGD)	195.8	195.8
Disposal method	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	2429	2429
Max Density Scenario within Half-Mile of Station	4071	10071
Add Water Demand	1.2213	3.0213
Add WW Demand	0.8142	2.0142
Available Capacity Water	125.88	125.88
Available Capacity Raw Water	47.95	47.95
Available Capacity Wastewater	180.2	180.2
% capacity Water treatment	0.73	0.74
% capacity Water Supply	0.91	0.92
% capacity needed Wastewater treatment	0.52	0.53
Capacity needed water MGD	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00
16+ WM - LF	10000	10000
Force Main LF	0	0
Sewer lift station	0	0
gravity sewer revisions	0	0
Lift station upgrades	0	0
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275
Force Main $/LF	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000
Capacity water	$ -	$ -
Water supply	$ -	$ -
Capacity Sewer	$ -	$ -
16+ WM Cost	$ 2,750,000	$ 2,750,000
Force Main Cost	$ -	$ -
Sewer lift station	$ -	$ -
Gravity Cost	$ -	$ -
Lift station upgrades	$ -	$ -
Total cost	$ 2,750,000	$ 2,750,000
Total cost millions	$ 2.75	$ 2.75

Station 26. Miami – 36th St

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
MIAMI	386.07	Biscayne	464	338.12	376	195.8	Outfall	2,336	10,164

Water Treatment Plant, Pumps and Capacity

Miami-Dade County (County), through the Miami-Dade County Water and Sewer Department (MDWASD) provides water service to this site. Miami-Dade County's sole source for drinking water is ground water from wells. The wells feed the Hialeah and John E. Preston, and Alexander Orr regional water treatment plants and the South Dade Water Supply System, which is comprised of five smaller water treatment plants that serve residents south of SW 264th Street in the unincorporated areas of the County. Total capacity for the plants is 464 MGD. The County has a permit to withdraw 386.07 MGD from its wellfields. Demands are 338 MGD.

A 16-inch water main is piped to the area. Local upgrades may not be required but the 16-inch line needs to be looped north and south to provide needed fire flows.

Wastewater Treatment Plant, Disposal Method and Capacity

Miami-Dade County, through the Miami-Dade County Water and Sewer Department provides water service to this site. The County operates three wastewater treatment plants – North, Central and South Districts. The South District plant uses deep injection wells for disposal. The North and Central District plants send treated wastewater to the ocean and injection wells. The outfalls need to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goal but this is not achievable. As a result, although added deep wells are in place, there are no other solutions in place at this time. The capacity of these three plants is 376 MGD. Current flows are 195 MGD. Significant effort has occurred over the last twenty years to rehabilitate the piping and conveyance system.

The site is served by local 8- and 12-inch gravity lines, and a lift station and 48-inch force main that goes to the Central District plant on Virginia Key. Local upgrades may not be needed for this site.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 26). Based on such a station, the demands for the TOD Station 25 site include 3.02 MGD of water supply and treatment, and 2.01 MGD of wastewater treatment for a City Center station. Adequate water treatment and wastewater treatment capacity exists although raw water is a concern (the volume

exceeds the 90% capacity although the system size is huge). Note this is a consistent issue in Miami-Dade County's stations, yet over 30 MGD of raw water is available creating somewhat of a distorted conclusion. The existing piping system may need localized improvements, but the loops and large force mains are present to support this type of development.

Needed Improvements and Potential Cost

Table 26 outlines the current capacity, the anticipated needs for a City Center station and the units that can be supported by the current treatment and water supply infrastructure. Only raw water (system-wide) and localized improvements are needed for this station.

Table 26 - Summary of Infrastructure for Station 26 site

Sta. No	26
Station Location	36TH ST
City	MIAMI
Station Goal	City Center
Potential Units For Planning Purposes	12500
Restrictions for WTP, WWTP or Raw water capacity	yes
Raw W (MDG)	386.07
Raw source	Biscayne
WTP Cap (MGD)	464
WTP Demand (MGD)	338.12
WWTP cap (MGD)	376
WWTP Demand (MGD)	195.8
Disposal method	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	2336
Max Density Scenario within Half-Mile of Station	10164
Add Water Demand	3.0492
Add WW Demand	2.0328
Available Capacity Water	125.88
Available Capacity Raw Water	47.95
Available Capacity Wastewater	180.2
% capacity Water treatment	0.74
% capacity Water Supply	0.92
% capacity needed Wastewater treatment	0.53
Capacity needed water MGD	0.00
Water supply Capacity needed MGD	0.00
Wastewater treatment plant Capacity needed MGD	0.00
16+ WM - LF	10000
Force Main LF	0
Sewer lift station	0
gravity sewer revisions	0
Lift station upgrades	0
Capacity water (per MGD)	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000
16" or more water main - $/LF	$ 275
Force Main $/LF	$ 200
Sewer lift station cost	$ 500,000
Gravity Sewer Installtion /LF	$ 250
Lift station upgrades cost	$ 250,000
Capacity water	$ -
Water supply	$ -
Capacity Sewer	$ -
16+ WM Cost	$ 2,750,000
Force Main Cost	$ -
Sewer lift station	$ -
Gravity Cost	$ -
Lift station upgrades	$ -
Total cost	$ 2,750,000
Total cost millions	$ 2.75

Station 27. Miami – 11th St

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
MIAMI	386.07	Biscayne	464	338.12	376	195.8	Outfall	3,299	9,201

Water Treatment Plant, Pumps and Capacity

Miami-Dade County (County), through the Miami-Dade County Water and Sewer Department (MDWASD) provides water service to this site. Miami-Dade County's sole source for drinking water is ground water from wells. The wells feed the Hialeah and John E. Preston, and Alexander Orr regional water treatment plants and the South Dade Water Supply System, which is comprised of five smaller water treatment plants that serve residents south of SW 264th Street in the unincorporated areas of the County. Total capacity for the plants is 464 MGD. The County has a permit to withdraw 386.07 MGD from its wellfields. Demands are 338 MGD.

A 30-inch water main is piped to the downtown, but going north is mostly local service. A larger line would need to be constructed. Local upgrades may be required.

Wastewater Treatment Plant, Disposal Method and Capacity

Miami-Dade County, through the Miami-Dade County Water and Sewer Department provides water service to this site. The County operates three wastewater treatment plants – North, Central and South Districts. The South District plant uses deep injection wells for disposal. The North and Central District plants send treated wastewater to the ocean and injection wells. The outfalls need to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goals but this is not achievable. As a result, although added deep wells are in place, there are no other solutions in place at this time. The capacity of these three plants is 376 MGD. Current flows are 195 MGD. Significant effort has occurred over the last twenty years to rehabilitate the piping and conveyance system.

The site is served by local 8- and 12-inch gravity lines, and a lift station and 48-inch force main that goes to the Central District plant on Virginia Key. Local upgrades would be needed for this site.

Additional Demand

Additional demands for a TOD zone depend on the type of train station area that is planned and the development anticipated as a result. The largest stations are City Center that include 12,500 units (column 3 in Table 27). Based on such a station, the demands for the TOD Station 25 site include 2.76 MGD of water supply and treatment, and 1.84 MGD of wastewater treatment for a City Center station. Adequate water treatment and wastewater treatment capacity exists although raw water is a concern (the volume exceeds the 90% capacity although the system size is huge). Note this is a consistent issue in Miami-Dade

County's stations, yet over 30 MGD of raw water is available creating somewhat of a distorted conclusion. The existing piping system may need localized improvements, but the loops and large force mains are present to support this type of development.

Needed Improvements and Potential Cost

Table 27 outlines the current capacity, the anticipated needs for a City Center station and the units that can be supported by the current treatment and water supply infrastructure. Only raw water (system-wide) and localized improvements are needed for this station.

Table 27 - Summary of Infrastructure for Station 27 site

Sta. No	27
Station Location	11TH ST
City	MIAMI
Station Goal	City Center
Potential Units For Planning Purposes	12500
Restrictions for WTP, WWTP or Raw water capacity	yes
Raw W (MDG)	386.07
Raw source	Biscayne
WTP Cap (MGD)	464
WTP Demand (MGD)	338.12
WWTP cap (MGD)	376
WWTP Demand (MGD)	195.8
Disposal method	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	3299
Max Density Scenario within Half-Mile of Station	9201
Add Water Demand	2.7603
Add WW Demand	1.8402
Available Capacity Water	125.88
Available Capacity Raw Water	47.95
Available Capacity Wastewater	180.2
% capacity Water treatment	0.73
% capacity Water Supply	0.92
% capacity needed Wastewater treatment	0.53
Capacity needed water MGD	0.00
Water supply Capacity needed MGD	0.00
Wastewater treatment plant Capacity needed MGD	0.00
16+ WM - LF	5000
Force Main LF	2000
Sewer lift station	2
gravity sewer revisions	5000
Lift station upgrades	1
Capacity water (per MGD)	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000
16" or more water main - $/LF	$ 275
Force Main $/LF	$ 200
Sewer lift station cost	$ 500,000
Gravity Sewer Installtion /LF	$ 250
Lift station upgrades cost	$ 250,000
Capacity water	$ -
Water supply	$ -
Capacity Sewer	$ -
16+ WM Cost	$ 1,375,000
Force Main Cost	$ 1,400,000
Sewer lift station	$ 1,000,000
Gravity Cost	$ 1,250,000
Lift station upgrades	$ 250,000
Total cost	$ 5,275,000
Total cost millions	$ 5.28

Station 28. Miami – Government Center

City	Raw Water (MDG)	Raw Water source	Water Treatment Plant Cap (MGD)	Water Treatment Plant Demand (MGD)	Wastewater Treatment Plant Capacity (MGD)	Wastewater Treatment Plant Demand (MGD)	Disposal method	# of Existing Residential Units within Half-Mile of Station (2018)	Max Density Scenario within Half-Mile of Station
MIAMI	386.07	Biscayne	464	338.12	376	195.8	Outfall	4,902	7,598

Water Treatment Plant, Pumps and Capacity

Miami-Dade County (County), through the Miami-Dade County Water and Sewer Department (MDWASD) provides water service to this site. Miami-Dade County's sole source for drinking water is ground water from wells. The wells feed the Hialeah and John E. Preston, and Alexander Orr regional water treatment plants and the South Dade Water Supply System, which is comprised of five smaller water treatment plants that serve residents south of SW 264th Street in the unincorporated areas of the County. Total capacity for the plants is 464 MGD. The County has a permit to withdraw 386.07 MGD from its wellfields. Demands are 338 MGD.

A 30-inch water main is piped to the downtown, with a looped 16-inch around downtown. Local upgrades may be required.

Wastewater Treatment Plant, Disposal Method and Capacity

Miami-Dade County, through the Miami-Dade County Water and Sewer Department provides water service to this site. The County operates three wastewater treatment plants – North, Central and South Districts. The South District plant uses deep injection wells for disposal. The North and Central District plants send treated wastewater to the ocean and injection wells. The outfalls need to be discontinued by 2025 and a solution has yet to be found. FDEP and the SFWMD desire to have a 60% reuse goal but this is not achievable. As a result, although added deep wells are in place, there are no other solutions at this time. The capacity of these three plants is 376 MGD. Current flows are 195 MGD. Significant effort has occurred over the last twenty years to rehabilitate the piping and conveyance system.

The site is served by several large gravity lines (24-inch) and a lift station and 72-inch force main that goes to the Central District plant on Virginia Key.

Additional Demand

Additional demands for a TOD zone at this site include 2.28 MGD of water supply and treatment and 1.52 MGD of wastewater treatment. Treatment capacity and water supply is available for this demand. The increased demand is small compared to the existing system so piping should not pose a problem.

Needed Improvements and Potential Cost

No major improvements are needed for this site that is currently served with a train station (see Table 28).

Table 28 - Summary of Infrastructure for Station 28 site

Sta. No	28
Station Location	GOVERNMENT CENTER
City	MIAMI
Station Goal	City Center
Potential Units For Planning Purposes	12500
Restrictions for WTP, WWTP or Raw water capacity	yes
Raw W (MDG)	386.07
Raw source	Biscayne
WTP Cap (MGD)	464
WTP Demand (MGD)	338.12
WWTP cap (MGD)	376
WWTP Demand (MGD)	195.8
Disposal method	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	4902
Max Density Scenario within Half-Mile of Station	7598
Add Water Demand	2.2794
Add WW Demand	1.5196
Available Capacity Water	125.88
Available Capacity Raw Water	47.95
Available Capacity Wastewater	180.2
% capacity Water treatment	0.73
% capacity Water Supply	0.92
% capacity needed Wastewater treatment	0.52
Capacity needed water MGD	0.00
Water supply Capacity needed MGD	0.00
Wastewater treatment plant Capacity needed MGD	0.00
16+ WM - LF	1500
Force Main LF	0
Sewer lift station	0
gravity sewer revisions	0
Lift station upgrades	0
Capacity water (per MGD)	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000
16" or more water main - $/LF	$ 275
Force Main $/LF	$ 200
Sewer lift station cost	$ 500,000
Gravity Sewer Installtion /LF	$ 250
Lift station upgrades cost	$ 250,000
Capacity water	$ -
Water supply	$ -
Capacity Sewer	$ -
16+ WM Cost	$ 412,500
Force Main Cost	$ -
Sewer lift station	$ -
Gravity Cost	$ -
Lift station upgrades	$ -
Total cost	$ 412,500
Total cost millions	$ 0.41

Conclusions Regarding Utility Infrastructure in South Florida TOD zones

The purpose of this project was to evaluate water and sewer utility infrastructure in the TRCL rail corridor. The project proposes 28 sites for transit-oriented development zones with three potential train station types – City Centers (12,500 units), Town Centers (5,000-8,000 units and Neighborhood Zones (4,000 units).

Depending on the type of station area, the sites had varying needs. Most stations require piping infrastructure to some degree. Several sites will need water supply, water treatment capacity or wastewater treatment capacity. Note that water systems were deemed to need expansion if the station brought total use above 90% of capacity. Wastewater was 80% of capacity based on FDEP guidelines and industry best practices.

The total cost for upgrades to the proposed station area water and wastewater infrastructure is just over $200 million based on the proposed station type, as shown on Table 29. The highlighted areas are those where capacity issues arise with TOD development. There are four stations that may have particular challenges with water and wastewater infrastructure to support TOD targets: Riviera Beach, Pompano Beach, Dania Beach and Hallandale Beach. The latter have to do with water supply. All four involve wastewater treatment plant capacity issues. Note that for all stations served by Miami-Dade County, adequate water treatment and wastewater treatment capacity exists although raw water is a concern (the volume exceeds the 90% capacity although the system size is huge). Hence while the 90% threshold is exceeded in Miami-Dade County, this does not prevent any particular station from being developed.

Table 30 shows the cost for each site based on the proposed station location (also illustrated in Figure 1). Figure 2 shows the Cost by County. The regional system in Miami-Dade County resolves many issues that are present in Broward County. Miami-Dade has a large, well developed, large capacity system that is fully interconnected between sites. The southeast region of Broward County is particularly challenged due to saltwater intrusion that limits water supply and the outfall issues with Hollywood's wastewater plant. However, the penny sales tax for transportation may be a source of funds to address some of these needs.

Table 31 outlines the current potential for development. While many of the sites have the water supply, water treatment capacity and wastewater capacity to serve the area, piping and other limitation may prove to be a challenge. Those with current challenges are noted. The Miami-Dade numbers are huge because there is a lot of capacity in the system, but raw water and the sewer disposal options are likely large expenditures planned by the utility agencies.

Table 29 Summary of Needs at All Stations

Sta. No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Station Location	TONEY PENNA	PGA BLVD	PARK AVE	13TH ST	45TH ST	EVERNIA ST/DOWNTOWN	GREGORY RD	LAKE AVE	BOYNTON BEACH BLVD	ATLANTIC AVE	NE 2ND ST	HILLSBORO BLVD	ATLANTIC BLVD	38TH ST	26TH ST	BROWARD BLVD	FLL INTERNATIONAL AIRPORT	DANIA BEACH	HOLLYWOOD BLVD	SE 4TH ST	192ND ST	163RD ST	125TH ST	79TH ST	55TH ST	36TH ST	11TH ST	GOVERNMENT CENTER
City	JUPITER	PALM BEACH GARDENS	LAKE PARK	RIVIERA BEACH	WEST PALM BEACH	WEST PALM BEACH	WEST PALM BEACH	LAKE WORTH	Bontyon Beach	DELRAY BEACH	BOCA RATON	DEERFIELD BEACH	POMPANO BEACH	OAKLAND PARK	WILTON MANORS	FT. LAUDERDALE	Broward Co/Hollywood	DANIA BEACH	HOLLYWOOD	HALLANDALE BEACH	AVENTURA	NORTH MIAMI BEACH	NORTH MIAMI	MIAMI	MIAMI	MIAMI	MIAMI	MIAMI
Station Goal	TC	TC	NC	NC	TC	CC	NC	TC	TC	TC	TC	TC	TC	TC	TC	CC	P&R	TC	TC	TC	NC	TC	NC	TC	TC	CC	CC	CC
Potential Units For Planning Purposes	6500	6500	4000	4000	6500	12500	4000	6500	6500	6500	6500	6500	6500	6500	6500	12500	0	6500	6500	6500	4000	6500	4000	6500	6500	12500	12500	12500
Restrictions for WTP, WWTP or Raw water capacity				yes									yes					yes		yes								
Raw W (MDG)	24.41	26.92	26.92	9.08	41.2	41.2	41.2	41.2	20.86	19.1	51.54	14.74	17.75	61.19	61.19	61.19	61.19	2.58	39.38	6.5	386.07	38.38	17.27	386.07	386.07	386.07	386.07	386.07
Raw source	Floridan	Surficial Aq	Surficial Aq	Surficial Aq	Surface Water	Surface Water	Surface Water	Surficial Aq	Surficial Aq	Surficial Aq	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne/ Floridan	Biscayne/ Floridan	Biscayne	Biscayne/ Floridan	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne
WTP Cap (MGD)	26	30.5	30.5	17.5	47	47	47	17.4	34	24	70	34.8	50	82	82	82	46	5.04	46	10	464	32	16	464	464	464	464	464
WTP Demand (MGD)	16.13	18.02	18.02	7.81	29.49	29.49	29.49	5.31	13.51	16.15	35.02	10.42	14.56	40.89	40.89	40.89	23.22	2.18	23.22	6.07	338.12	20.55	7.82	338.12	338.12	338.12	338.12	338.12
WWTP cap (MGD)	11	12	12	70	70	70	70	70	24	24	17	7	15.71	55.7	55.7	55.7	3.5	4.15	48.75	9.2	376	376	376	376	376	376	376	376
WWTP Demand (MGD)	6.5	8	8	41.45	41.45	41.45	41.45	41.45	9.5	6.7	14	6.5	16.1	37.5	37.5	37.5	2.5	2.9	41.5	9.2	195.8	195.8	195.8	195.8	195.8	195.8	195.8	195.8
Disposal method	Reuse	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Outfall/Reuse	Outfall/Reuse	Inj Well	Inj Well	Inj Well	Inj Well	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	1474	1660	1066	1168	2178	5111	852	3695	2944	2740	3401	2011	3682	2272	3978	6136		2332	5648	2613	1281	1492	3048	3514	2429	2336	3299	4902
Max Density Scenario within Half-Mile of Station	-1474	-1660	-1066	#VALUE!	-2178	-5111	-852	-3695	-2944	-2740	-3401	-2011	#VALUE!	-2272	-3978	-6136	0	#VALUE!	-5648	#VALUE!	-1281	-1492	-3048	-3514	-2429	-2336	-3299	-4902
Add Water Demand	-0.4422	-0.498	-0.3198	#VALUE!	-0.6534	-1.5333	-0.2556	-1.1085	-0.8832	-0.822	-1.0203	-0.6033	#VALUE!	-0.6816	-1.1934	-1.8408	0	#VALUE!	-1.6944	#VALUE!	-0.3843	-0.4476	-0.9144	-1.0542	-0.7287	-0.7008	-0.9897	-1.4706
Add WW Demand	-0.2948	-0.332	-0.2132	#VALUE!	-0.4356	-1.0222	-0.1704	-0.739	-0.5888	-0.548	-0.6802	-0.4022	#VALUE!	-0.4544	-0.7956	-1.2272	0	#VALUE!	-1.1296	#VALUE!	-0.2562	-0.2984	-0.6096	-0.7028	-0.4858	-0.4672	-0.6598	-0.9804
Available Capacity Water	9.87	12.48	12.48	9.69	17.51	17.51	17.51	12.09	20.49	7.85	34.98	24.38	35.44	41.11	41.11	41.11	22.78	2.86	22.78	3.93	125.88	11.45	8.18	125.88	125.88	125.88	125.88	125.88
Available Capacity Raw Water	8.28	8.9	8.9	1.27	11.71	11.71	11.71	35.89	7.35	2.95	16.52	4.32	3.19	20.3	20.3	20.3	37.97	0.4	16.16	0.43	47.95	17.83	9.45	47.95	47.95	47.95	47.95	47.95
Available Capacity Wastewater	4.5	4	4	28.55	28.55	28.55	28.55	28.55	14.5	17.3	3	0.5	-0.39	18.2	18.2	18.2	1	1.25	7.25	0	180.2	180.2	180.2	180.2	180.2	180.2	180.2	180.2
% capacity Water treatment	0.60	0.57	0.58	#VALUE!	0.61	0.59	0.62	0.24	0.37	0.64	0.49	0.28	#VALUE!	0.49	0.48	0.48	0.50	#VALUE!	0.47	#VALUE!	0.73	0.63	0.43	0.73	0.73	0.73	0.73	0.73
% capacity Water Supply	0.67	0.68	0.68	#VALUE!	0.73	0.71	0.74	0.11	0.63	0.83	0.69	0.69	#VALUE!	0.68	0.67	0.66	0.39	#VALUE!	0.57	#VALUE!	0.91	0.54	0.42	0.91	0.91	0.91	0.91	0.91
% capacity needed Wastewater treatment	0.56	0.64	0.65	#VALUE!	0.59	0.58	0.59	0.58	0.37	0.26	0.78	0.87	#VALUE!	0.67	0.66	0.65	0.71	#VALUE!	0.83	#VALUE!	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Capacity needed water MGD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water supply Capacity needed MGD	0.00	0.00	0.00	#VALUE!	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#VALUE!	0.00	#VALUE!	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wastewater treatment plant Capacity needed MGD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.28	0.50	#VALUE!	0.00	0.00	0.00	0.00	#VALUE!	1.37	#VALUE!	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16+ WM - LF	0	0	0	20000	8000	0	0	8000	0	0	0	5000	3000	2000	2000	0	0	0	0	0	0	0	5000	0	10000	10000	5000	1500
Force Main LF	2500	0	0	10000	5000	0	8000	0	0	0	1000	5000	500	2500	2500	0	0	5000	0	0	1000	1500	1500	1000	0	0	2000	0
Sewer lift station	1	0	0	4	4	0	2	1	1	0	2	2	2	2	2	0	0	1	1	0	1	4	4	1	0	0	2	0
gravity sewer revisions	0	0	0	0	0	0	10000	20000	500	0	0	10000	5000	2500	1000	0	0	0	5000	0	0	0	0	0	0	0	5000	0
Lift station upgrades	1	0	0	1	1	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	1	0
Capacity water (per MGD)	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000	$ 7,000,000
Raw Water (per MGD)	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000
Capacity Sewer (per MGD)	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000	$ 8,000,000
16" or more water main - $/LF	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275	$ 275
Force Main $/LF	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200
Sewer lift station cost	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000
Gravity Sewer Installtion /LF	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250
Lift station upgrades cost	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000
Capacity water	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water supply	$ -	$ -	$ -	#VALUE!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#VALUE!	$ -	#VALUE!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capacity Sewer	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	###########	$ 3,982,400	#VALUE!	$ -	$ -	$ -	$ -	#VALUE!	$10,963,200	#VALUE!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
16+ WM /LF	$ -	$ -	$ -	$ 5,500,000	$ 2,200,000	$ -	$ -	$ 2,200,000	$ -	$ -	$ -	$ 1,375,000	$ 825,000	$ 550,000	$ 550,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,375,000	$ -	$ 2,750,000	$ 2,750,000	$ 1,375,000	$ 412,500
Force Main/ LF	$ 500,000	$ -	$ -	$ 2,000,000	$ 1,000,000	$ -	$ 3,600,000	$ 4,000,000	$ 100,000	$ -	$ 200,000	$ 3,000,000	$ 1,100,000	$ 1,000,000	$ 700,000	$ -	$ -	$ 1,000,000	$ 1,000,000	$ -	$ 200,000	$ 300,000	$ 300,000	$ 200,000	$ -	$ -	$ 1,400,000	$ -
Sewer lift station	$ 500,000	$ -	$ -	$ 2,000,000	$ 2,000,000	$ -	$ 1,000,000	$ 500,000	$ 500,000	$ -	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ -	$ -	$ 500,000	$ 500,000	$ -	$ 500,000	$ 2,000,000	$ 2,000,000	$ 500,000	$ -	$ -	$ 1,000,000	$ -
Gravity Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,500,000	$ 5,000,000	125,000	$ -	$ -	$ 2,500,000	$ 1,250,000	$ 625,000	$ 250,000	$ -	$ -	$ -	$ 1,250,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,250,000	$ -
Lift station upgrades	$ 250,000	$ -	$ -	$ 250,000	$ 250,000	$ -	$ 250,000	$ 250,000	$ 250,000	$ -	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 250,000	$ 250,000	$ -	$ -	$ -	$ 250,000	$ -
Total cost	$ 1,250,000	$ -	$ -	#VALUE!	$ 5,450,000	$ -	$ 7,350,000	###########	$ 975,000	$ -	$ (791,600)	$12,107,400	#VALUE!	$ 3,425,000	$ 2,750,000	$ -	$ -	#VALUE!	$13,713,200	#VALUE!	$ 700,000	$ 2,550,000	$ 3,925,000	$ 700,000	$ 2,750,000	$ 2,750,000	$ 5,275,000	$ 412,500
Total cost millions	$ 1.25	$ -	$ -	#VALUE!	$ 5.45	$ -	$ 7.35	$ 11.95	$ 0.98	$ -	$ (0.79)	$ 12.11	#VALUE!	$ 3.43	$ 2.75	$ -	$ -	#VALUE!	$ 13.71	#VALUE!	$ 0.70	$ 2.55	$ 3.93	$ 0.70	$ 2.75	$ 2.75	$ 5.28	$ 0.41
																												#VALUE!

Table 30 Costs by Proposed Station

Sta. No	Station Location	City	Station Goal	Potential Units For Planning Purposes	Capacity water	Water supply	Capacity Sewer	16+ WM /LF	Force Main/ LF	Sewer lift station	Gravity Cost	Lift station upgrades	Total cost
1	TONEY PENNA	JUPITER	Town Center	6500	$ -	$ -	$ -	$ -	$ 500,000	$ 500,000	$ -	$ 250,000	$ 1,250,000
2	PGA BLVD	PALM BEACH GARDENS	Town Center	6500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
3	PARK AVE	LAKE PARK	Neigh. Center	4000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
4	13TH ST	RIVIERA BEACH	Neigh. Center	4000	$ -	$ 5,003,904	$ -	$ 5,500,000	$ 2,000,000	$ 2,000,000	$ -	$ 250,000	$ 14,753,904
5	45TH ST	WEST PALM BEACH	Town Center	6500	$ -	$ -	$ -	$ 2,200,000	$ 1,000,000	$ 2,000,000	$ -	$ 250,000	$ 5,450,000
6	EVERNIA ST/DOWN TOWN	WEST PALM BEACH	City Center	12500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
7	GREGORY RD	WEST PALM BEACH	Neigh. Center	4000	$ -	$ -	$ -	$ -	$ 3,600,000	$ 1,000,000	$ 2,500,000	$ 250,000	$ 7,350,000
8	LAKE AVE	LAKE WORTH	Town Center	6500	$ -	$ -	$ -	$ 2,200,000	$ 4,000,000	$ 500,000	$ 5,000,000	$ 250,000	$ 11,950,000
9	BOYNTON BEACH BLVD	Bontyon Beach	Town Center	6500	$ -	$ -	$ -	$ -	$ 100,000	$ 500,000	$ 125,000	$ 250,000	$ 975,000
10	ATLANTIC AVE	DELRAY BEACH	Town Center	6500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
11	NE 2ND ST	BOCA RATON	Town Center	6500	$ -	$ -	$ 8,158,400	$ -	$ 200,000	$ 1,000,000	$ -	$ 250,000	$ 9,608,400
12	HILLSBORO BLVD	DEERFIELD BEACH	Town Center	6500	$ -	$ -	$ 14,382,400	$ 1,375,000	$ 3,000,000	$ 1,000,000	$ 2,500,000	$ 250,000	$ 22,507,400
13	ATLANTIC BLVD	POMPANO BEACH	Town Center	6500	$ -	$ -	$ 32,764,800	$ 825,000	$ 1,100,000	$ 1,000,000	$ 1,250,000	$ 250,000	$ 37,189,800
14	38TH ST	OAKLAND PARK	Town Center	6500	$ -	$ -	$ -	$ 550,000	$ 1,000,000	$ 1,000,000	$ 625,000	$ 250,000	$ 3,425,000
15	26TH ST	WILTON MANORS	Town Center	6500	$ -	$ -	$ -	$ 550,000	$ 700,000	$ 1,000,000	$ 250,000	$ 250,000	$ 2,750,000
16	BROWARD BLVD	FT. LAUDERDALE	City Center	12500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
17	FLL INTERNATIONAL AIRPORT	Broward Co/Hollywood	P&R	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
18	DANIA BEACH	DANIA BEACH	Town Center	6500	$ -	$ 7,473,696	$ 3,308,800	$ -	$ 1,000,000	$ 500,000	$ -	$ -	$ 12,282,496
19	HOLLYWOOD BLVD	HOLLYWOOD	Town Center	6500	$ -	$ -	$ 21,363,200	$ -	$ 1,000,000	$ 500,000	$ 1,250,000	$ -	$ 24,113,200
20	SE 4TH ST	HALLANDALE BEACH	Town Center	6500	$ -	$ 10,053,264	$ 20,939,200	$ -	$ -	$ -	$ -	$ -	$ 30,992,464
21	192ND ST	AVENTURA	Neigh Center	4000	$ -	$ -	$ -	$ -	$ 200,000	$ 500,000	$ -	$ -	$ 700,000
22	163RD ST	NORTH MIAMI BEACH	Town Center	6500	$ -	$ -	$ -	$ -	$ 300,000	$ 2,000,000	$ -	$ 250,000	$ 2,550,000
23	125TH ST	NORTH MIAMI	Neigh Center	4000	$ -	$ -	$ -	$ 1,375,000	$ 300,000	$ 2,000,000	$ -	$ 250,000	$ 3,925,000
24	79TH ST	MIAMI	Town Center	6500	$ -	$ -	$ -	$ -	$ 200,000	$ 500,000	$ -	$ -	$ 700,000
25	55TH ST	MIAMI	Town Center	6500	$ -	$ -	$ -	$ 2,750,000	$ -	$ -	$ -	$ -	$ 2,750,000
26	36TH ST	MIAMI	City Center	12500	$ -	$ -	$ -	$ 2,750,000	$ -	$ -	$ -	$ -	$ 2,750,000
27	11TH ST	MIAMI	City Center	12500	$ -	$ -	$ -	$ 1,375,000	$ 1,400,000	$ 1,000,000	$ 1,250,000	$ 250,000	$ 5,275,000
28	GOVERNMENT CENTER	MIAMI	City Center	12500	$ -	$ -	$ -	$ 412,500	$ -	$ -	$ -	$ -	$ 412,500

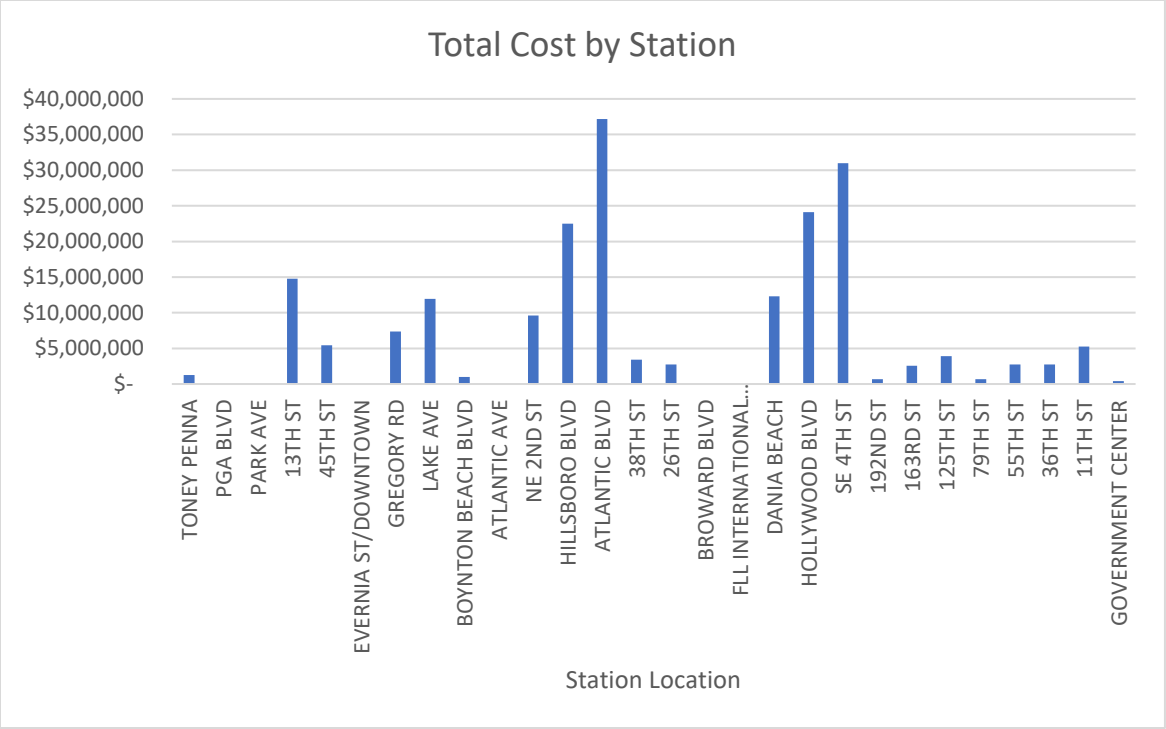


Figure 1 Cost by Station

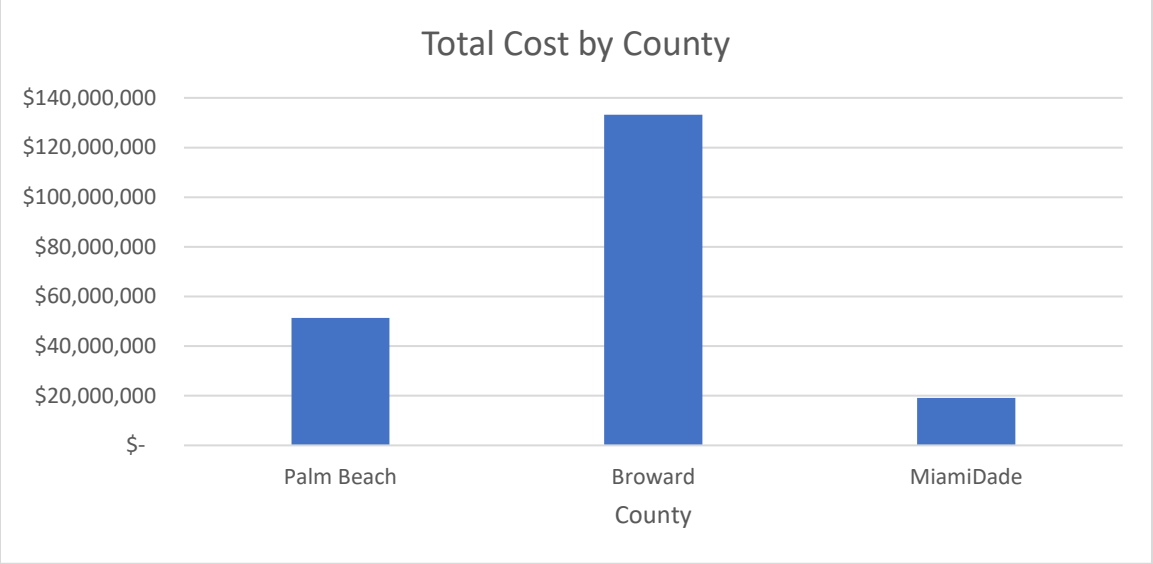


Figure 2 Cost by County

Table 31 Potential Development and Limitations

Sta. No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Station Location	TONEY PENNA	PGA BLVD	PARK AVE	13TH ST	45TH ST	EVERNIA ST/DOWNTOWN	GREGORY RD	LAKE AVE	BOYNTON BEACH BLVD	ATLANTIC AVE	NE 2ND ST	HILLSBORO BLVD	ATLANTIC BLVD	38TH ST	26TH ST	BROWARD BLVD	FLL INTERNATIONAL AIRPORT	DANIA BEACH	HOLLYWOOD BLVD	SE 4TH ST	192ND ST	163RD ST	125TH ST	79TH ST	55TH ST	36TH ST	11TH ST	GOVERNMENT CENTER
City	JUPITER	PALM BEACH GARDENS	LAKE PARK	RIVIERA BEACH	WEST PALM BEACH	WEST PALM BEACH	WEST PALM BEACH	LAKE WORTH	Bontyon Beach	DELRAY BEACH	BOCA RATON	DEERFIELD BEACH	POMPANO BEACH	OAKLAND PARK	WILTON MANORS	FT. LAUDERDALE	Broward Co/Hollywood	DANIA BEACH	HOLLYWOOD	HALLANDALE BEACH	AVENTURA	NORTH MIAMI BEACH	NORTH MIAMI	MIAMI	MIAMI	MIAMI	MIAMI	MIAMI
Station Goal	TC	TC	NC	NC	TC	CC	NC	TC	TC	TC	TC	TC	TC	TC	TC	CC	P&R	TC	TC	TC	NC	TC	NC	TC	TC	CC	CC	CC
Potential Units For Planning Purposes	6500	6500	4000	4000	6500	12500	4000	6500	6500	6500	6500	6500	6500	6500	6500	12500	0	6500	6500	6500	4000	6500	4000	6500	6500	12500	12500	12500
Restrictions for WTP, WWTP or Raw water capacity				1207					0		5200	0	0					473	0	0								
Raw W (MDG)	24.41	26.92	26.92	9.08	41.2	41.2	41.2	41.2	20.86	19.1	51.54	14.74	17.75	61.19	61.19	61.19	61.19	2.58	39.38	6.5	386.07	38.38	17.27	386.07	386.07	386.07	386.07	386.07
Raw source	Floridan	Surficial Aq	Surficial Aq	Surficial Aq	Surface Water	Surface Water	Surface Water	Surficial Aq	Surficial Aq	Surficial Aq	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne/ Floridan	Biscayne/ Floridan	Biscayne	Biscayne/ Floridan	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne	Biscayne
WTP Cap (MGD)	26	30.5	30.5	17.5	47	47	47	17.4	34	24	70	34.8	50	82	82	82	46	5.04	46	10	464	32	16	464	464	464	464	464
WTP Demand (MGD)	16.13	18.02	18.02	7.81	29.49	29.49	29.49	5.31	13.51	16.15	35.02	10.42	14.56	40.89	40.89	40.89	23.22	2.18	23.22	6.07	338.12	20.55	7.82	338.12	338.12	338.12	338.12	338.12
WWTP cap (MGD)	11	12	12	70	70	70	70	70	24	24	17	7	15.71	55.7	55.7	55.7	3.5	4.15	48.75	9.2	376	376	376	376	376	376	376	376
WWTP Demand (MGD)	6.5	8	8	41.45	41.45	41.45	41.45	41.45	9.5	6.7	14	6.5	16.1	37.5	37.5	37.5	2.5	2.9	41.5	9.2	195.8	195.8	195.8	195.8	195.8	195.8	195.8	195.8
Disposal method	Reuse	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Reuse/Inj Well	Outfall/Reuse	Outfall/Reuse	Inj Well	Inj Well	Inj Well	Inj Well	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall
# of Existing Residential Units within Half-Mile of Station (2018)	1474	1660	1066	1168	2178	5111	852	3695	2944	2740	3401	2011	3682	2272	3978	6136	0	2332	5648	2613	1281	1492	3048	3514	2429	2336	3299	4902
Potential units - water supply	26220	28183	28183	4022	37082	37082	37082	113652	23275	9342	52313	13680	10102	64283	64283	64283	0	1267	51173	1362	151842	56462	29925	151842	151842	151842	151842	151842
net to add Water supply	18246	20023	23117	-1146	28404	19471	32230	103457	13831	102	42412	5169	-80	55511	53805	45647	0	-7565	39025	-7751	146561	48470	22877	141828	142913	137006	136043	134440
Potential units - treatment	32900	41600	41600	32300	58367	58367	58367	40300	68300	26167	116600	81267	118133	137033	137033	137033	0	9533	75933	13100	419600	38167	27267	419600	419600	419600	419600	419600
net to add Water Treatment	24926	33440	36534	27132	49689	40756	53515	30105	58856	16927	106699	72756	107951	128261	126555	118397	0	701	63785	3987	414319	30175	20219	409586	410671	404764	403801	402198
Potential units - Wastwater Treatment	18000	16000	16000	114200	114200	114200	114200	114200	58000	69200	12000	2000	-1560	72800	72800	72800	0	5000	29000	0	720800	720800	720800	720800	720800	720800	720800	720800
net to add Wastwater supply	10026	7840	10934	109032	105522	96589	109348	104005	48556	59960	2099	-6511	-11742	64028	62322	54164	0	-3832	16852	-9113	715519	712808	713752	710786	711871	705964	705001	703398
Water Piping	no	no	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	0	no	no	no	no	no	no	no	no	no	no	no
Sewer piping/Pumping	no	no	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	0	no	no	no	no	no	no	no	no	no	no	no
Added units to exceed a parameter				water supply, piping				piping				WWTP	WWTP				land space	water supply, WWTP	potentially SS	Wastewater		potentially SS	potentially SS					