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PUD Application

Nove of Margate

7870 Margate Boulevard City of Margate

October 18, 2023

1. DEVELOPER INFORMATION AND SITE LOCATION

A. Name, address and telephone number of the applicant.

Fimiani Development Corporation
5301 N. Federal Highway, Suite 350
Boca Raton, FL 33487
Contact: Michael Fimiani
Telephone: 561-395-8882

B. Name, address and telephone number of the Engineer.

Schnars Engineering Corporation
Jeff Schnars
Professional Engineer, State of Florida
License No: 46697
947 Clint Moore Rd.
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C. Name, address and telephone number of the architect:

AB Design Group
James Cantwell
Licensed Architect, State of Florida
AR No: 12079
1441 N. Ronald Regan Blvd.
Longwood, FL 32570
Telephone: 407-774-6078

D. Name, address and telephone number of the landscape architect:

Peterson Design Professionals
Joe Peterson
Registered Landscape Architect, State of Florida
License No: LA0001355
151 SW 7th Ter.
Boca Raton, FL 33486
Telephone: 561-702-0136

E. Name, address and telephone number of the attorney:

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14 SE 4th St. Suite 36
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F. Name, address and telephone number of the traffic engineer:

Joaquin Vargas, P.E.
Senior Transportation Engineer
TrafTech Engineering, Inc.
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8400 N. University Dr. Suite 309
Tamarac, FL 33321
Telephone: 954-582-0988

2. EXISTING SITE CONDITIONS & LOCATION

The Property is a defunct golf course located on the south side of Margate Boulevard west of NW 76th Avenue and consists of +/- 21.3 net acres and +/- 21.96 gross acres. Access into the property will be located along Margate Blvd. The topography is typical of a Florida golf course with former tee and green areas being elevated above fairways and rough. There is approximately 1.8 acres of canal type surface water within the property boundaries. An existing “drainage flowage easement” extends from Margate Boulevard south and east through the property to the southeast corner and meanders in and out of the existing water bodies. According to the National Resources Conservation Service Soil map, the property has been mapped as Immokalee fine sand and Immokalee limestone substratum – Urban land complex. Based upon borings, the underlying subsurface consists predominately of fine to medium-grained quartz sand from the ground surface to approximately 10 feet below ground surface. There are two small buildings on the site and a parking lot with access to Margate Boulevard to support the former golf course use.

There are currently 113 trees and palms on site; 81 of these are 'Cabbage Palms' (Sabal palmetto). Because the golf course is no longer in operation, these trees and palms are no longer receiving any maintenance that they have had in the past. Due to this, all of them are either in fair to poor condition.

3. DEVELOPER INFORMATION

Fimiani Development Corporation
5301 N. Federal Highway, Suite 350
Boca Raton, FL 33487
Contact: Michael Fimiani
Telephone: 561-395-8882

4. LAND USE & DEVELOPMENT PLAN

The Applicant is the owner of approximately 21.96 gross acres (21.3 net acres) of land located on the south side of Margate Boulevard west of NW 76th Avenue in the City of Margate (“Property”). The Property was formerly in use as a 9-hole golf course and clubhouse known as Margate Executive Golf Course. The project consists of two parcels totaling +/- 21.96 gross acres and is generally located on the south side of Margate Boulevard between NW 76th Avenue and NW 79th Avenue (“Property”) within the City of Margate (“City”). Previously developed as a 9-hole golf course which is now closed, the Property is identified by folio numbers 484135050030 (“Parcel 1”) & 484135080010 (“Parcel 2”). Parcel 1 is 21.33 gross acres in size and is designated as Commercial Recreation within an Irregular 7.6 Residential Dashed Line Area on the City’s Future Land Use Map and contains a zoning designation

of S-1 (Recreational). Parcel 2 is 0.63 gross acres in size and is designated as R(7) within an Irregular 7.6 Residential Dashed Line Area on the City's Future Land Use Map and contains a zoning designation of R-3A (Multiple-Dwelling Residential District).

The gross acreage of the overall Irregular 7.6 Residential dashed line area is 104.3 acres. Based on the maximum allowable density of 7.6 dwelling unit/acres, 792 dwelling units are permitted to be developed in the dashed line area. City staff confirmed that there are 742 dwelling units constructed in the dashed line area, leaving 50 remaining units that could be constructed on the Property. The Applicant is proposing to develop 132 residential units ("Project") on the Property. This requires an amendment to the land use plan designation on the Property to add an additional 82 dwelling units to the overall dashed line area.

With the development of the Project, the Applicant is dedicating 1.21 net acres of land along Margate Blvd. to be dedicated as public open space. This area of land will be dedicated for public use and will increase the City's total acreage of open space area towards meeting the City's Open Space Level of Service Standards of 3 acres per 1,000 residents. The City's current Community Parks Inventory tables indicate that there are 197.74 acres of open space existing in the City that can be used to meet the adopted level of service. The addition of this park area will increase the City's open space area to 198.95 net acres.

5. RESIDENTIAL PLAN & PROGRAM

The Applicant is proposing to develop 132 residential townhome units ("Project") on the Property. This equates to a density of 6.6 du/acre for the 20.24-acres of area containing a residential future land use designation. With an estimated 2.5 persons per household, the 132 townhome units will generate an estimated population of 330 people.

6. COMMERCIAL USES & SERVICE AREAS

There are no commercial uses included with this Project. As such, there are no service areas included with this request. Trash will be placed outside of each unit as curb-side pick-up.

7. CIRCULATION, STREETS & PARKING

As shown in the proposed site plan, access to the Property will be located along Margate Blvd. The entrance will be gated with a guest entrance and a resident's entrance. Guests will have a callbox to call the resident to allow access. A turnaround driveway will also be provided prior to reaching the gate to allow vehicles to turnaround and exit the Property. Access to the homes sites and private amenity areas will be via a private 40' road tract which includes a 20' paved vehicular road with 2' valley gutters on each side and a 5 foot pedestrian sidewalk.

The parking for the Project is as follows:

Use	Number of Required Spaces	Number of Provided Spaces
132 Multi-family Units (3 bedrooms)	1 Space per Bedroom = 396 Spaces	396 Spaces 1 Garage & 2 Driveway Spaces per Unit
Guest Parking	15% = 60 Spaces	62 Spaces (Including 2 HC)
Parking for Public Park	None	3 Spaces Provided
Total	456 Spaces	Residential: 458 Spaces Public Park: 3 spaces

8. OPEN SPACE PLAN

With the development of the Project, the Applicant is dedicating 1.21 net acres of land along Margate Blvd. to be dedicated as public open space. This area of land will be dedicated for public use and will increase the City's total acreage of open space area towards meeting the City's Open Space Level of Service Standards of 3 acres per 1,000 residents. The proposed 1.21 acres is over and above the 0.61 acres generated by the project for open space. The additional 0.6 acres of public park space will help to mitigate the loss of open space by creating a public park that is over 1 acre in the western portion of the City, where there is only one park located west of Rock Island Road. The public park will provide passive walking paths with benches and picnic tables and 3 parking spaces for public parking. This will add an open space area that the neighborhood can use, whereas the prior golf course on the property went out of business and is not accessible by the public.

In addition to the public park, the Project will include 2 private recreational areas; with the first being located in the western portion of the Property that will include a clubhouse, pool and pickle ball courts and a second recreational area located in the southeastern portion of the Property that includes a tot-lot. Please refer to the proposed site plan for more details.

9. MUNICIPAL & PUBIC SERVICES

Municipal and public services including fire and police services will be available to the Project. A knox box system will be placed on the gate allowing access to the Property for emergency services. Additionally, a second gated fire emergency access road will be provided from Margate Blvd., near the western property line. The gate will also contain a knox box to allow fire department access and the fire lane will be stabilized and sodded to support emergency vehicles.

10. WATER, SEWER & UTILIY SERVICES

A. Potable Water Analysis

1. Provide the potable water level of service per the adopted and certified local land use plan, including the adoption date of the 10 Year Water Supply Facilities Plan.

The potable water level of service per the adopted comprehensive plan is 335 gallons per day (gpd). The City adopted the 10-Year Water Supply Facilities Work Plan in March 2015.

2. Identify the potable water facility serving the service area in which the amendment is located including the current plant capacity, current and committed demand on the plant and planned plant capacity expansions, including year and funding sources. Identify the wellfield serving the area in which the amendment is located including the South Florida Water Management District (SFWMD) permitted withdrawal, including the expiration date of the SFWMD permit.

The City's potable water system consists of raw water supply, water treatment and distribution.

Plant Capacity:

The City's water treatment plant has a total permitted maximum day operating capacity of 13.5 mgd. The total permitted maximum day flow for 2018 is 6.766 MGD. The system includes two (2) above ground storage tanks with a combined capacity of 3.9 mgd and a remote storage facility with a capacity of 2 mgd. No plant improvements are proposed at this time.

Wells:

The City has 12 raw water wells on and around the property where the water treatment plant is located. The City draws its water from the Biscayne Aquifer. The City's Consumptive Use Permit ("CUP") was issued on April 13, 2005 for 20-year duration and will expire April 13, 2025. (Permit No. 06-00121-W). The CUP authorizes an annual allocation of 9.3 million gallons per day (mgd) and stipulates a reduced annual allocation of 8.51 mgd, effective April 13, 2010.

Distribution System:

The City maintains a water distribution system consisting of approximately 225 miles of distribution mains and a remote 2-million gallon water storage tank. There is an existing 12" water main along Margate Boulevard that fronts the property.

3. Identify the net impact on potable water demand, based on adopted level of service, resulting from the proposed amendment. Provide calculations, including anticipated demand per square foot or dwelling unit.

<i>Existing Use</i>		
<i>Development Intensity</i>	<i>Generation Rate</i>	<i>Demand</i>
<i>Golf Course</i>	<i>Golf Course 10 gpd / person x 150 people / day</i>	<i>.0015 MGD</i>
<i>Proposed Use:</i>		
<i>Development Intensity</i>	<i>Generation Rate*</i>	<i>Demand</i>
<i>132 dwelling units</i>	<i>335 gpd/ERC</i>	<i>0.0442 MGD</i>
	<i>Net Change: + 0.0427 MGD</i>	

4. Proposed Water Distribution System

Two connections will be made to the existing 12" water main along Margate Boulevard. New 6" and 8" water mains will be extended throughout the project to provide potable water and fire protection.

B. Sanitary Sewer Analysis

1. Provide the sanitary sewer level of service per the adopted and certified local land use plan.

The adopted level of service standard for sanitary sewer service as identified in Policy 2.2.2 of the adopted Comprehensive Plan is 335 gallons per day (gpd) per equivalent residential connection (ERC).

2. Identify the sanitary sewer facility serving the area in which the amendment is located including the current plant capacity, current and committed demand on the plant and planned plant capacity expansions, including year and funding sources.

The Subject Property is within the service area of the City of Margate Wastewater Treatment Plant which consists of these major operating components:

1. A wastewater treatment plant, which provides secondary treatment.
2. A deep well injection effluent disposal system.
3. A series of gravity collection mains which serve specific geographical neighborhoods and which discharge into the wet wells of one or more sewage pumping stations strategically located in each area.
4. An integrated system of pumping stations that pump raw sewage into force mains and interceptors leading to the wastewater treatment plant.

There is an existing 12" gravity sewer main located in the Margate Boulevard right of way. This gravity sewer flows to lift station #24. A gravity sewer system will be constructed on the Subject Property that will flow to an onsite private lift station. A force main from the private lift station will connect to a gravity sewer manhole on Margate Boulevard.

The City's Comprehensive Plan indicates that the City's Wastewater Treatment Plant has adequate capacity for buildout of the City. The current statistics for the plant are provided below.

Design Capacity: 12.1 MGD
Permitted Operating Capacity 10.01 MGD
Current Demand: 6.519 MGD

There are no planned expansions for the treatment plant at this time.

3. Identify the net impact on sanitary sewer demand, based on the adopted level of service, resulting from the proposed amendment. Provide calculations, including anticipated demand per square foot or dwelling unit.

<i>Existing Use</i>		
<i>Development Intensity</i>	<i>Generation Rate</i>	<i>Demand</i>
<i>Golf Course</i>	<i>Golf Course 10 gpd / person x 150 people / day</i>	<i>.0015 MGD</i>
<i>Proposed Use:</i>		
<i>Development Intensity</i>	<i>Generation Rate*</i>	<i>Demand</i>
<i>132 dwelling units</i>	<i>335 gpd/ERC</i>	<i>0.0442 MGD</i>
	<i>Net Change: + 0.0427 MGD</i>	

4. Proposed Water Distribution System

Two connections will be made to the existing 12" water main along Margate Boulevard. New 6" and 8" water mains will be extended throughout the project to provide potable water and fire protection.

C. Solid Waste Analysis

1. Provide the solid waste level of service per the adopted and certified local land use plan.

According to Policy 4.1.4 of City's Comprehensive Plan, the adopted level of service for solid waste for residential dwelling units is 8.9 pounds per dwelling unit per day.

2. Identify the solid waste facility serving the service area in which the amendment is located including the landfill/plant capacity, current and committed demand on the landfill/plant capacity and planned landfill/plant capacity.

The Property is served by the Wheelabrator South Broward Waste to Energy Facility located at 4400 S. State Rd. 7, Fort Lauderdale, FL 33314. Per the Solid Waste Element of the Broward County Comprehensive Plan, the facility has a gross electrical generating capacity of approximately 66 megawatts. In anticipation of future disposal needs, Broward County has received certification for ultimate generating capacities of 96.1 megawatts. As such, the facility has the capacity to service the project.

3. Identify the net impact on solid waste demand, based on the adopted level of service, resulting from the proposed amendment. Provide calculations, including anticipated demand per square foot or dwelling unit.

Existing Use		
Development Intensity	Generation Rate	Demand
Golf Course (commercial rate is applied)	2 lbs./day	2 lbs./day
Proposed Use		
Development Intensity	Generation Rate*	Demand
132 dwelling units	8.9 lbs./unit/day	1,174 lbs./day
NET CHANGE: +1,172 lbs./day		

D. Other Utilities

Proposed electric and communication lines will be installed underground within a 10' utility easement adjacent to the project's private road tract.

11. SCHOOLS & EDUCATIONAL FACILITIES

A SCAD report has been provided by the Broward County School confirming capacity in the public schools for this project. The report has been included with this submittal.

12. DRAINAGE & WATERWAYS

A. Drainage Analysis

1. Provide the drainage level of service per the adopted and certified local land use plan.

The adopted level of service standards for drainage facilities as contained in Policy 3.2.1 of the City's Comprehensive Plan are provided below.

Road protection. Residential streets not greater than fifty feet to have crown elevations no lower than the elevation for the respective area depicted on the ten year "Flood Criteria Map." Rights-of-way greater than fifty feet to have an ultimate edge of pavement no lower than the elevation for the respective area depicted on the ten-year "Flood Criteria Map."

Buildings. To have the lowest floor elevation no lower than the elevation for the respective area depicted on the "100-Year Flood Elevation Map."

Off-site discharge. Not to exceed the predevelopment discharge rate.

Storm sewers. Design frequency minimum to be three-year rainfall intensity off the State DOT

Zone 10 Rainfall curves.

Floodplain routing. Calculated flood elevations based on the ten year and one-hundred-year return frequency rainfall of three-day duration shall not exceed the corresponding elevations of the ten year "Flood Criteria Map" and the "100 Year Flood Elevation Map."

Antecedent water level. The higher elevation of either the control elevation or the elevation depicted on the map "Average Wet Season Water Levels."

On-site storage. Additional surface storage will be provided so there will be no loss of stormwater storage within the property.

Best management practices (BMP). Prior to discharge to surface or ground water, BMPs will be used to reduce pollutant discharge.

The drainage system that is ultimately built on the Subject Property will meet the City, Broward County, and South Florida Water Management District drainage requirements.

2. Identify the drainage district and drainage systems serving the amendment area.

The Subject Property is within the C-14 basin. The requirements of the City of Margate, South Florida Water Management District ("SFWMD") and the Broward County Development Management and Environmental Review Section will be applied to the ultimate drainage system for the Subject Property.

A canal flows thru the site that more or less follows an existing flowage easement. The existing drainage flow and easement will be relocated and maintained as part of the proposed design. Parts of the existing canal are located on the property line and service the adjacent properties. The storm water from the adjacent townhomes and condominium properties flow into the on-site canals. This historical flow will be maintained as part of the proposed design.

3. Identify any planned drainage improvements, including year, funding sources and other relevant information.

Currently, there are no planned drainage improvements set forth by the City.

4. Indicate if a Surface Water Management Plan has been approved by, or an application submitted to, the SFWMD and/or any independent drainage district, for the amendment site. Identify the permit number(s), or application number(s) if the project is pending, for the amendment site. If an amendment site is not required to obtain a SFWMD permit, provide documentation of same.

No formal application has been made to the local drainage districts; but, preliminary surface water management calculations and a plan were reviewed by Broward County Environmental Engineering and Permitting Division. Attached is an email confirming they are in agreement with the concept presented (Exhibit A). The onsite drainage system will be designed to meet all applicable levels of service standards.

5. **If the area in which the amendment is located does not meet the adopted level of service and there are no improvements planned (by the unit of local government or drainage authority) to address the deficiencies, provide an engineering analysis which demonstrates how the site will be drained and the impact on the surrounding properties. The information should include the wet season water level for the amendment site, design storm elevation, natural and proposed land elevation, one hundred year flood elevation, acreage of proposed water management retention area, elevations for buildings, roads and years, storage and runoff calculations for the design storm and estimated time for flood waters to recede to natural land elevation.**

The existing surface water management system for the Subject Property consists of series of water features constructed to provide drainage for the golf course and surrounding communities. The proposed design will consist of a combination of the existing canals and proposed lakes to provide on-site storage to meet the minimum flood designs. A crowned roadway with valley gutter curb on both sides of the street is proposed. The community will have positive drainage through inlets and pipes discharging into the lake and canal. An existing culvert under Margate Boulevard will be maintained and extended to connect to the proposed lake pending the final site plan design. Existing drainage from the adjacent residential communities will be maintained and allowed to continue to flow through the property. Proper easements will be provided.

Water quality treatment and water storage will be provided in the proposed lakes as required by the permitting agencies. The developed area storm water management system will provide for attenuation of runoff from storm events including protection of interior roadways, buildings, and the adjacent areas.

6. Drainage Report

Project Introduction/Location

The proposed project is a redevelopment of the existing and inactive Margate Executive Golf Course into a new 132-unit residential town home community. The site is comprised of two parcels totaling 21.30 acres of land that are located on the north side of Atlantic Blvd., west of Rock Island Road and south of Margate Blvd. in the City of Margate. The entire golf course site is anticipated to be demolished to accommodate the new residential community.

Existing Conditions

This surface water management responsibility for the property lies within the governmental jurisdictional agencies of South Florida Water Management District (SFWMD), Broward County, and the City of Margate. The subject property is an inactive golf course facility and, according to our research, there are no available SFWMD permits for the properties. It appears some surrounding lands drain through the properties including the existing Oriole Homes Golf and Tennis Club (SFWMD Permit No. 06-00144-S) north of Margate Blvd. The site has a public and City of Margate 30' drainage flowage easement. The flow must be maintained, and new flowage easements will be granted to each of the adjacent property owners. The subject properties flow south unrestricted to the SFWMD C-14 canal via the City of Margate drainage system. To establish the existing permitting criteria, a pre-development analysis of the water quality and quantity will be performed. The site will be cleared and graded to accommodate the new community. Any loss of the golf course site storage, soil storage, and an increase in the impervious area above the original conditions will require supplemental detention and have been designed into the proposed plan.

Stormwater Treatment

In accordance with SFWMD criteria, detention for water quality purposes shall be provided in the amount of 2.5 inches times the percentage of imperviousness or the first inch of runoff, whichever is greater. The water quality volume will be detained in the proposed on-site lakes and will be greater than pre-development volume. The site is located within an impaired water body discharge area and will require an additional 50% water quality detention volume and a pre-post nutrient analysis, see attached map. According to the attached BMP analysis, the pre-development nutrient loadings exceed the post development nutrient loadings and will not require additional pre-treatment.

Stormwater Attenuation

The surface water management system will consist of a series of catch basins and pipe which will direct runoff to the proposed on-site lakes that will be designed to protect the proposed finished floor elevation above the calculated 100 year-3 day zero discharge storm elevation, the elevation specified by FEMA (Zone AE) + 1 foot, the Broward County Future Conditions 100 year flood elevation, or 18 inches above the average adjacent road crown, whichever is higher. According to the SFWMD C-14 East basin criteria, off-site discharge will be limited to 69.2 CSM at the 25 year – 3 day storm event. However, since the site is currently flowing unrestricted, off-site discharge will be limited to the pre-development stages in the SFWMD C-14 canal via the existing City of Margate drainage system. The crown of the on-site roadway will be designed above the Broward County 10 year flood map elevation and the calculated 10 year - 1 day storm event elevation.

Drainage Summary

Federal Emergency Management Agency (FEMA) Flood Zones:

According to the FEMA FIRM Community Panel Number 12011C0355H dated August 18, 2014, as published by the Federal Emergency Management Agency (FEMA), the site contains the following flood designations: Zone AE, base flood elevations of 10.0' and 11.0' NAVD and Zone X.

The proposed calculated stages below are consistent with the pre-development criteria.

The surface water management calculations are based upon the impervious areas shown on the plan. No additional impervious area will be allowed unless supported by revised calculations.

13. CONFORMITY WITH THE CITY AND COUNTY COMPREHENSIVE PLANS**City of Margate Land Use Plan**

Per Policy 1.1.2(a) of the City's Future Land Use Element, the proposed residential dwelling units are consistent with the permitted uses listed within the residential land use category. Additionally, the Proposed Amendment is consistent with the following policies of the City's Comprehensive Plan:

Policy 1.2.2-The compatibility of existing and future land uses and the established character or predominantly developed areas shall be a primary consideration in the review and approval of amendments to the Future Land Use Plan in order to prevent incompatible uses. It is recognized that approved redevelopment plans aimed at eliminating or reducing blighted and deteriorating areas may appropriately promote the introduction of land use patterns in variance with existing land use patterns.

The Applicant's redevelopment plan will provide a quality residential development that fits within the character of the adjacent properties and the surrounding area. The proposed land use designation of R(7) is compatible with the land use and density of the surrounding properties within the Dashed Line Area; being bounded by R(7) & R(17) to the east, R(4) to the west, and R(17) to the south. The property

to the north is not located within the Dashed Line Area and contains land use designations of R(16) and R(20). The proposed Project consisting of 132 townhome units with a density of 6.6 du/acre is compatible with the character of the adjacent single-family and multi-family residential use.

Furthermore, the Applicant has designed the Project to provide buffers between the adjacent properties with a lake provided along the western property line and landscaping and fencing provided along the perimeter of the Property.

Objective 4.2-Provide recreation and open spaces that meet the needs of residents and that are compatible with the character of the City.

This amendment provides a 1.21 net acre park located along Margate Blvd. This space will be dedicated to the public as park and open space use. The addition of this park will provide a public park within the western portion of the City, where there is only one park located west of Rock Island Road.

Policy 4.2.2-Level of service standards for parks shall be established to ensure adequate facilities exist to provide Margate's present and future population with a diversified and balanced parks and recreation system, as provided in the Recreation and Open Space element.

As stated previously in the Parks & Open Space section of this amendment, the City will be deficient in meeting the required level of service standards for parks and open space in the long-range planning horizon. This amendment will add an additional 1.21 net acres to the City's Community Parks Inventory, increasing the total parks and open space acreage to 198.95, decreasing the deficiency in meeting the level of service standards for parks and open space in the long range planning horizon.

Policy 5.1.1-Prior to approving increases in density or intensity of land uses, including amendments to the Future Land Use Map and Zoning maps, approvals of plats, and issuance of development orders, there shall be a finding that existing public facilities and services are available to serve the needs of the proposed development.

The level of service and capacity analyses provided herein demonstrate that there are sufficient public facilities to service the Project.

Policy 5.1.2-New development shall provide water storage capacity equal to that which existed under pre-development conditions consistent with the water management regulations and plans of the SFWMD, Broward County and independent drainage districts.

Additional surface water area is being provided with the proposed project to ensure that post development storm stages do not exceed pre-development storm stages. As stated above, a preliminary review of the plans and surface water management calculations was conducted by Broward County Surface Water Management Licensing.

Objective 5.3-Discourage urban sprawl by directing new development into areas where necessary regional and community facilities and services exist.

This project will redevelop a defunct golf course into a residential townhome development consisting of 132 units. As a redevelopment project, the Property already has existing connections for water and wastewater that the Project will tie into. Additionally, the Property has connections to existing roadway

system that has the capacity to hold the traffic generated by the Project. This is fundamentally an urban infill project, as opposed to urban sprawl.

Policy 5.4.2-The City shall utilize the highway capacity methodology endorsed by the Metropolitan Planning Organization and approved by the Broward County Commissioners to determine the capacities and levels of service on the regional roadway network.

The traffic analysis conducted for this amendment utilizes the highway capacity methodology endorsed by the Metropolitan Organization to determine the capacities and levels of service on the regional roadway network. The analysis demonstrates that the Project will have less than a 3% significant impact threshold on any roadway segment located within the study area and will not increase the traffic demand on the surrounding roadways.

Broward County Land Use Plan

Per Section Two of the Broward County Land Use Plan, the proposed residential dwelling units are consistent with the permitted uses listed within the residential land use category. Additionally, the Proposed Amendment is consistent with the following policies of the County Land Use Plan:

Policy 2.10.2-The compatibility of existing and future land uses shall be a primary consideration in the review and approval of amendments to the Broward County and local land use plans. It is recognized that approved redevelopment plans aimed at eliminating or reducing blighted and deteriorating areas may appropriately promote the introduction of land use patterns in variance from existing land use patterns.

The Project will remove an abandoned golf course from the area and redevelop the Property with a use that is compatible with the surrounding neighborhood. The proposed land use designation of R(7) is compatible with the land use and density of the surrounding properties within the Dashed Line Area; being bounded by R(7) & R(17) to the east, R(4) to the west, and R(17) to the south. The property to the north is not located within the Dashed Line Area and contains land use designations of R(16) and R(20). The proposed Project consisting of 132 townhome units with a density of 6.6 du/acre is compatible with the character of the adjacent single-family and multi-family residential use.

Policy 2.10.3-In order to prevent future incompatible land uses, the established character of predominately developed areas shall be a primary consideration when amendments to the Broward County Land Use Plan are proposed.

As stated previously, this Project will redevelop an abandoned golf course with a low-density residential development that is compatible with the density and residential uses of the surrounding area. The proposed R(7) land use designation is less dense the adjacent R(16), R(17) and R(20) developments and is also harmonious with the adjacent developments containing an R(7) and R(4) land use designation.

Policy 2.13.1-No unit of local government may grant an application for a building permit for the construction of a principal building on a parcel of land unless a plat including the parcel or parcels of land has been approved by the Broward County Commission and recorded in the official records of Broward County subsequent to June 4, 1953.

The Property was platted in 1972 as the Oriole Golf & Tennis Club Section Two plat.

Policy 2.14.2-To maintain those level of service standards identified within the Broward County Comprehensive Plan and local comprehensive plans, Broward County shall, prior to final action on amendments to the Broward County Land Use Plan, determine whether adequate public facilities and services will be available when needed to serve the proposed development.

The level of service analyses provided throughout this application confirm there is adequate capacity for all public facilities to service the Project.

Policy 2.11.2-In considering amendments to the Broward County Land Use Plan, analysis regarding the availability of potable water supply shall include a determination of whether such supply will be available as per the applicable adopted 10-Year Water Supply Facilities Work Plan and Capital Improvements Element.

The level of service analysis and responses to the Potable Water section in this application include information from the City's 10 Year Water Supply Facilities Work Plan and Capital Improvements Element. The information provided demonstrates that there is sufficient capacity to service the Project for potable water.

Policy 2.11.4-The availability of sanitary sewer service, or plans to extend or provide such service within a financially feasible capital plan, adopted by a local government, shall be a primary consideration when amendments to the Broward County Land Use Plan for increased densities and intensities are proposed.

The level of service analysis and responses to the wastewater section of this application demonstrate there is sufficient capacity to service the Project for wastewater. Additionally, a hydraulic evaluation has been conducted to confirm there is sufficient capacity to serve the Project. The report from this evaluation will be provided upon receipt from the engineering firm as Exhibit B.

14. ECONOMIC IMPACT

The proposed development will revitalize an underutilized property with a new residential community which will increase the City's tax base and tax revenues. An economic impact study conducted by Econsult Solutions, Inc. (Exhibit A) demonstrates that the proposed new development will generate property tax revenues between \$592,717 to \$825,033. This is an increase of \$591,561 to \$823,878 beyond what the property is currently generating in property taxes (\$1,155). In addition, the Proposed Amendment will provide employment opportunities during construction and long-term tax revenues for the City.

15. TRAFFIC IMPACT ANALYSIS

A traffic study has been included with this submittal that demonstrates that the proposed development is projected to generate approximately 921 daily trips, approximately 64 AM peak hour trips and approximately 77 trips during the typical afternoon peak period. Furthermore, The project driveway is projected to operate at level of service “A” as proposed. The table below demonstrates the trip generate summary for the Project.

TABLE 1 Trip Generation Summary Nove of Margate								
Land Use	Size	Daily Trips	AM Peak Hour			PM Peak Hour		
			Total Trips	Inbound	Outbound	Total Trips	Inbound	Outbound
Residential Low-Rise (LUC 220)	132 units	921	64	15	49	77	49	28
Net External Trips	132 units	921	64	15	49	77	49	28

ITE Land Use Code 220 - Multifamily (Low-Rise)

Daily Trips: $T = 6.41(X) + 75.31$, X = number of units

AM Peak: $T = 0.31(X) + 22.85$ (24% inbound and 76% outbound), X = number of units

PM Peak: $T = 0.43(X) + 20.55$ (63% inbound and 37% outbound), X = number of units

ITE Land Use Code 221 - Multifamily (Mid-Rise)

Daily Trips: $T = 4.77(X) - 46.46$, X = number of units

AM Peak: $T = 0.44(X) - 11.61$ (23% inbound and 77% outbound), X = number of units

PM Peak: $T = 0.39(X) - 0.34$ (61% inbound and 39% outbound), X = number of units

16. DEDICATION OF LAND

With the development of the Project, the Applicant is setting aside 1.21 net acres of land along Margate Blvd. to be dedicated solely for use as public open space. This area of land will be dedicated for public use and will increase the City’s total acreage of open space area towards meeting the City’s Open Space Level of Service Standards of 3 acres per 1,000 residents. The City’s current Community Parks Inventory tables indicate that there are 197.74 acres of open space existing in the City that can be used to meet the adopted level of service. The addition of this park area will increase the City’s open space area to 198.95 net acres. Applicant will maintain ownership of the park parcel and will be responsible for maintenance of it, but it will be publicly accessible and reserved for open space purposes.

17. EXISTING ZONING WITHIN ONE MILE

A map showing the existing zoning within one mile has been provided as Exhibit D.

18. PUD STANDARDS

The PUD standards are as follows:

LOT DEVELOPMENT REGULATIONS

BUILDING HEIGHT:	2 STORIES / 35' MAX.
LOT WIDTH:	22 FT MIN.
BUILDING SETBACKS:	
FRONT WITH FRONT LOAD GARAGE:	25' MIN.
SIDE (INTERIOR):	0' MIN.
SIDE (END UNIT):	7.5' MIN.
SIDE (STREET):	15' MIN.
REAR:	15' MIN.
PATIO SETBACKS:	
SIDE:	2' MIN.
REAR:	2' MIN.
FENCE SETBACKS:	
SIDE:	0' MIN.
REAR:	0' MIN.

NOTE

1. TOWNHOME LOTS WILL NOT INCLUDE ACCESSORY STRUCTURES, SHEDS, PERGOLAS, POOLS, SPAS, SCREEN ENCLOSURES, EXPANDED PATIOS, OR GENERATORS.

SITE COVERAGES

NET SITE AREA :	21.30 AC.	100%
RESIDENTIAL LOT AREA :	7.38 AC.	34.6%
BLDG. FOOTPRINTS :	3.68 AC.	
DRIVEWAYS :	1.18 AC.	
SIDEWALKS / PATIOS :	0.30 AC.	
PERVIOUS :	2.22 AC.	
PRIVATE ROAD TRACT :	3.44 AC.	16.2%
PAVEMENT :	2.28 AC.	
DRIVEWAYS :	0.30 AC.	
SIDEWALKS :	0.36 AC.	
PERVIOUS :	0.50 AC.	
LAKE #1 SURFACE :	2.78 AC.	13.1%
CANAL SURFACE :	1.01 AC.	4.7%
PRIVATE RECREATION AREA 1:	0.57 AC.	2.7%
CLUBHOUSE :	0.07 AC.	
POOL DECK :	0.08 AC.	
SIDEWALK :	0.02 AC.	
PICKLEBALL COURTS :	0.10 AC.	
PERVIOUS :	0.30 AC.	
PRIVATE RECREATION AREA 2:	0.35 AC.	1.6%
SIDEWALK :	0.01 AC.	
PERVIOUS :	0.34 AC.	
PUBLIC PARK AREA :	1.21 AC.	5.7%
PAVEMENT :	0.07 AC.	
SIDEWALK :	0.06 AC.	
PERVIOUS :	1.08 AC.	
OTHER OPEN SPACE :	4.56 AC.	21.4%
IMPERVIOUS :	0.62 AC.	
PERVIOUS :	3.94 AC.	
TOTAL PERVIOUS :	8.39 AC.	39.4%
TOTAL IMPERVIOUS :	12.91 AC.	60.6%

PROVIDED OPEN SPACE

	PROVIDED	ALLOWED	NOTES
LAKE #1 (SURFACE) :	2.78 AC.	1.39 AC.	50% (MAX. PER CODE)
OTHER OPEN SPACE :	3.26 AC.	3.26 AC.	100%
PUBLIC PARK :	1.21 AC.	0.91 AC.	75% (MAX. PER CODE)
PRIVATE RECREATION AREA 1:	0.57 AC.	0.43 AC.	75% (MAX. PER CODE)
PRIVATE RECREATION AREA 2:	0.35 AC.	0.26 AC.	75% (MAX. PER CODE)
FIRE ACCESS (WITHIN 25' SETBACK) :	0.36 AC.	0.18 AC.	50% (MAX. PER CODE)
LOT AREA (USEABLE) :	1.19 AC.	1.07 AC.	5% (MAX. PER NET SITE)
TOTAL PROVIDED OPEN SPACE :		7.50 AC.	35%
TOTAL REQUIRED OPEN SPACE :		7.46 AC.	35%

MINIMUM SITE REQUIREMENTS

	REQUIRED	PROVIDED
MAXIMUM BLDG. HEIGHT:	N/A	31 FT 4 IN (2 STORY)
MINIMUM PERIPHERAL SETBACK:	25 FT	25 FT
MINIMUM BUILDING SEPERATION:	N/A	15 FT
MINIMUM FRONT BLDG. SETBACK:	N/A	25 FT (FROM ROAD TRACT)
MINIMUM REAR BLDG. SETBACK:	N/A	40 FT (FROM PROPERTY LINE)

PARKING REQUIREMENTS

	REQUIRED	PROVIDED
132 MULTI-FAMILY D.U.	396 SPACES	396 SPACES
(3 BEDROOM TOWNHOMES)	1 SPACE PER BEDROOM	1 GARAGE & 2 DRIVEWAY SPACES PER UNIT
15% SUPPLEMENTAL GUEST PARKING	60 SPACES (396 x 15%)	62 SPACES
TOTAL	456 SPACES	458 SPACES

RECREATION AREA ADA PARKING REQUIREMENTS

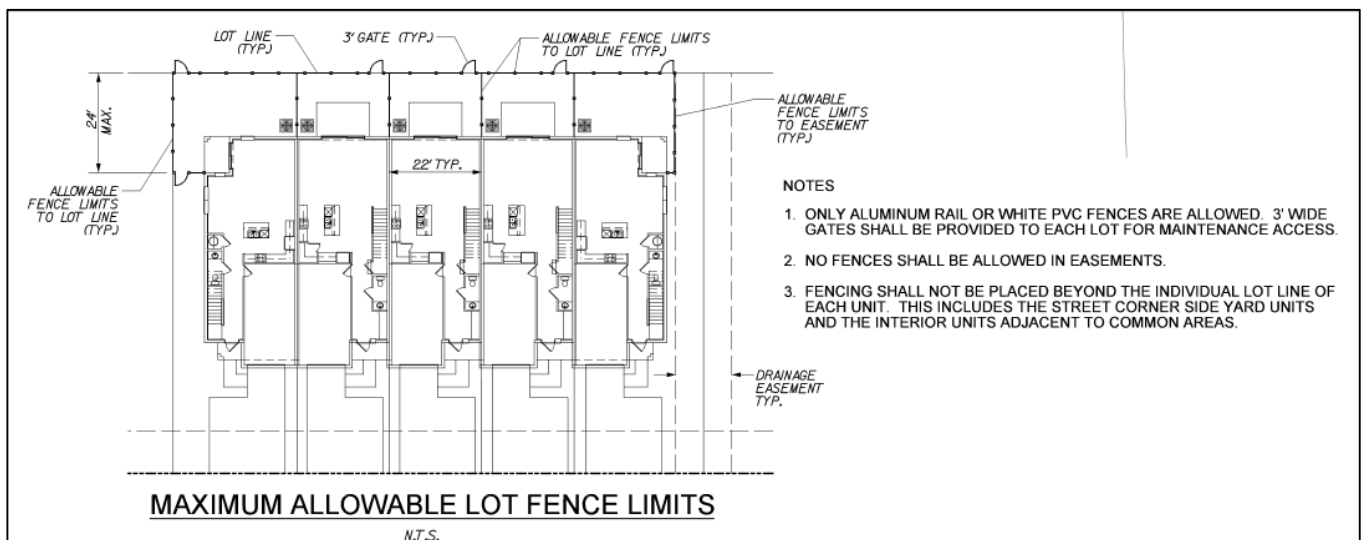
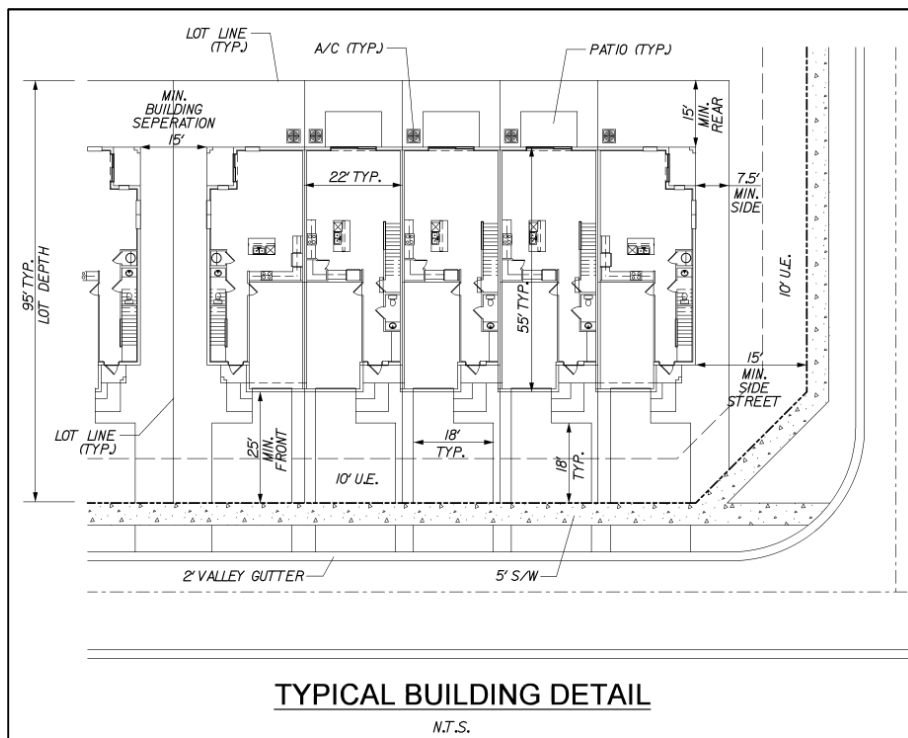
	REQUIRED	PROVIDED
ADA PARKING SPACES	1 SPACE	2 SPACES

PUBLIC PARK PARKING

PROVIDED 2 REGULAR PARKING SPACES & 1 ADA SPACE

GENERAL NOTES

1. ALL INTERNAL STREETS SHALL BE PRIVATE & MAINTAINED BY H.O.A.
2. ALL PROPOSED ELECTRIC AND COMMUNICATION LINES SHALL BE PLACED UNDERGROUND.
3. OPEN SPACE, LAKE & 20' LAKE MAINTENANCE EASEMENT SHALL BE MAINTAINED BY H.O.A.
4. LAKE IS TO BE USED AS IRRIGATION SOURCE.
5. GARBAGE COLLECTION WILL BE CURBSIDE PICKUP.



Landscape Standards

The landscape standards, as shown on the plans, reflect an increase in the plant quantities and sizes above and beyond the required minimum standards. The locations as specified in sheets LP-02 through LP-12 show enhanced buffers, roadways, vehicular parking areas, common areas, and residential buildings.

The plantings and irrigation systems will be maintained in a healthy and orderly manner, by the established HOA and in compliance with the City's requirements. These assurances are shown in the maintenance notes and specifications in the construction documents.

The buffers around the property show enhanced plantings with roughly twice as many trees required. Palm clusters have been added for variety with large shrub massings. The buffers around the property

show enhanced plantings with more than 50% over the number of trees required.

Townhome unit standards

End unit townhomes are 1,682 sf and the interior unit townhomes are 1,727 sf of air-conditioned space. The townhome driveways will be concrete pavers. Optional fences within the townhome lots shall be white aluminum or white PVC a maximum of six (6) feet high. The maximum size of the patios are limited to those shown on the approved site plan. The end units have a covered patio that measures 6' x 8' 8" and the interior units shall have a patio that is a maximum of 102 square feet.

Canal Standards & Docks

All lakes and canals will be constructed with a 4:1 (H:V) maximum slope from the top to two (2) foot below the design water level and stabilized with sod above the water. No docks will be permitted.

Street Standards

The typical street within the community is 2 lanes with 20' of asphalt vehicular road, 2' concrete valley gutters on each side of the road, and a 5' wide 4" thick concrete sidewalk on one side of the road. Concrete pavers are allowed in place of the asphalt roadway surface. The edge of road radii at intersections shall be 30 feet. On-street parking is allowed in designated parking spaces which are a minimum of 9' x 18' for 90-degree spaces and 9' x 22' for parallel spaces. The cul-de-sacs shall have a minimum 100-foot diameter including the 2' valley gutter.

19. PROPOSED ORDER OF DEVELOPMENT

There is no phasing proposed with this development. All of the units will be developed in one stage. However, the project will be constructed in accordance with Section 19.11 of the City Code, with the rate of construction of the common open space and public and recreation facilities at the same rate as the construction of the dwelling units.

20. PLANNING & ZONING BOARD REQUIREMENTS

The plans will meet all requirements provided by the Planning & Zoning Board.

21. GENERAL LOCATION MAP

A general location map is provided as Exhibit E.

22. BOUNDARY MAP

A boundary map with a legal description is provided on the survey that was included with the submittal.

23. GENERAL CONCEPT PLAN

The general concept plan is shown in the proposed site plan. Please refer to Sheets SP-00 thru SP-06.

24. MASTERPLAN

The masterplan has been provided with this submittal. Please refer to Sheet SP-01.

25. ENGINEERING PLAN

The civil and engineering plans have been provided with this submittal. Please refer to Sheets C-00 thru C-11). The drainage calculations have been provided with the submittal as Exhibit F.

26. STREETS & LIGHTING PLANS

The plan for streets and circulation and lighting plans have been provided with this submittal. Please refer to Sheets C-5 thru C-7 & PHO-01 thru PH-08.

27. LANDSCAPING PLAN

The landscaping plans have been provided with this submittal. Please refer to Sheets LP-01 thru LP-15.

28. RESIDENTIAL UNIT PLANS

The building floor plans and elevations have been provided with this submittal. Please refer to Sheets A-1 thru A-7.

29. SITE PLAN

The site plan has been provided with this submittal. Please refer to Sheets SP-00 thru SP-06.

30. STAGING PLAN

There is no phasing proposed with this project, as such a staging plan is not applicable.

31. ZONING MODIFICATIONS

This request does not include any zoning modifications. The Project will meet all Code requirements.

Exhibit A
Broward County
Drainage Email

Amanda Martinez

From: Perez Abeniacar, Tomas <TPEREZABENIACAR@broward.org>
Sent: Thursday, September 29, 2022 2:24 PM
To: Jeff Schnars; mike@fimiani.com
Cc: Narvaez, Johana; Adorisio, Carlos
Subject: RE: Margate Executive Golf Course property

Jeff,

Yes, I agree with the items described below based on the meeting on 8/24.

Thank you,



TOMAS PEREZ ABENIACAR, STAFF ENGINEER

Resilient Environment Department

ENVIRONMENTAL PERMITTING DIVISION

Surface Water Management Licensing

1 North University Drive, Mailbox 201, Plantation, FL 33324-2038

Office: (954) 519-1243

[Broward.org/Environment](https://www.broward.org/Environment) | [ePermits](#)

We value your feedback as a customer. You can comment on the quality of service you received by [completing our survey](#). Thank you!

From: Jeff Schnars <jeff@schnars.com>
Sent: Thursday, September 29, 2022 1:55 PM
To: Perez Abeniacar, Tomas <TPEREZABENIACAR@broward.org>; mike@fimiani.com
Cc: Narvaez, Johana <JNARVAEZ@broward.org>; Adorisio, Carlos <CADORISIO@broward.org>
Subject: RE: Margate Executive Golf Course property

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Tomas / Johana,
Can you please provide confirmation that we are in agreement.
Thank you.
Jeff

Jeffrey T. Schnars, P.E.
President
jeff@schnars.com



947 Clint Moore Road
Boca Raton, Florida 33487
Office: 561-241-6455
Fax: 561-241-5182
Toll Free: 888-285-3886
www.schnars.com

From: Jeff Schnars

Sent: Wednesday, September 07, 2022 8:47 AM

To: 'Perez Abeniagar, Tomas' <TPEREZABENIACAR@broward.org>; mike@fimiani.com

Cc: Narvaez, Johana <JNARVAEZ@broward.org>; Adorisio, Carlos <CADORISIO@broward.org>

Subject: RE: Margate Executive Golf Course property

Hi Tomas,

Please accept this email as a follow up to our conference call with everyone on this email.

First of all I wanted to thank everyone for their time with this pre-application request. It was helpful to confirm our direction so that we may proceed confidently with respect to drainage with the site plan process through the City of Margate. On our call, it was confirmed that we can proceed with the pre versus post surface water management analysis for the proposed project and the calculations and plan as submitted (concept plan is attached again for ease of reference) are acceptable in principle.

In summary,

1. The post development zero discharge storm stages will be lower than the pre development stages.
2. The post development water quality stage will be lower than the predevelopment stage.
3. The project will continue to accept drainage from adjacent properties to pass through the project.
4. New drainage / flowage easements will be granted to accommodate the pass thru drainage.
5. There is no control structure for the existing property. A control structure and 25 year berm will not be required for the new project.
6. The north south lake will be expanded to meet the dimensional criteria (minimum 100 foot average width).
7. The existing canals along the north and east side of the southeast portion of the property will generally remain at their existing width but the subject property side will be regraded to achieve a 4:1 minimum slope in a 20' LME.
8. We are having the surveyor check the existing lake water levels again to confirm design water level of 5.0 ft NAVD is appropriate.
9. We will use P = 18" for 100 year – 3 day event.

Please confirm you agree with the above.

Thank you.

Jeff

Jeffrey T. Schnars, P.E.

President

jeff@schnars.com



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From: Perez Abeniagar, Tomas <TPEREZABENIACAR@broward.org>

Sent: Friday, August 05, 2022 11:18 AM

To: Jeff Schnars <jeff@schnars.com>; mike@fimiani.com

Cc: Narvaez, Johana <JNARVAEZ@broward.org>; Adorisio, Carlos <CADORISIO@broward.org>

Subject: RE: Margate Executive Golf Course property

Good morning Jeff,

Our first available dates for pre-application meetings are 08/24 or 08/25 at 10 am. Let me know if these work for you.

Thank you,



TOMAS PEREZ ABENIACAR, STAFF ENGINEER

Resilient Environment Department

ENVIRONMENTAL PERMITTING DIVISION

Surface Water Management Licensing

1 North University Drive, Mailbox 201, Plantation, FL 33324-2038

Office: (954) 519-1243

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We value your feedback as a customer. You can comment on the quality of service you received by [completing our survey](#). Thank you!

From: Jeff Schnars <jeff@schnars.com>

Sent: Thursday, August 4, 2022 2:33 PM

To: Perez Abeniagar, Tomas <TPEREZABENIACAR@broward.org>; mike@fimiani.com

Cc: Narvaez, Johana <JNARVAEZ@broward.org>; Adorisio, Carlos <CADORISIO@broward.org>

Subject: RE: Margate Executive Golf Course property

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Hi Tomas,

See below in CAPS for a response to comments. Let's set up a conference call to discuss. Let me know when you are available.

Thanks.

Jeff

Jeffrey T. Schnars, P.E.

President

jeff@schnars.com

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From: Perez Abeniagar, Tomas <TPEREZABENIACAR@broward.org>
Sent: Wednesday, August 03, 2022 4:29 PM
To: Jeff Schnars <jeff@schnars.com>; mike@fimiani.com
Cc: Narvaez, Johana <JNARVAEZ@broward.org>; Adorisio, Carlos <CADORISIO@broward.org>
Subject: FW: Margate Executive Golf Course property

Mr. Schnars,

I have reviewed the attached documents for the project located at 7870 MARGATE BLVD MARGATE FL 33063 (https://bcpa.net/RecInfo.asp?URL_Folio=484135050030). It seems like there are a couple of Pre89 licenses (attached) which this project would modify. However, I couldn't find any ERPs or any conditions to these licenses yet. JOHANA HAD PREVIOUSLY SENT THOSE 2 EXHIBITS. LET ME KNOW IF YOU FIND ANYTHING ELSE.

Additionally, It seems like you would need to check in with Wetlands (lsunderland@broward.org) and EAR (EAR@broward.org) since plans propose to enlarge the lake areas and the golf course appears to have some Arsenic contamination. WE WILL DO THAT. THANK YOU.

Comments regarding the plans and calculations:

- The calcs used the water table at 5' NAVD. In our maps future WT is 4.5' NAVD but current WT is 5.5' NAVD. We use the highest of the two since we want projects to be resilient both now and in the future. AS WE DISCUSSED ON THE PHONE, ATTACHED IS A SURVEY FROM THAT SHOWS AN EXISTING WATER LEVEL OF 4.85 FT NAVD AS MEASURED IN AUGUST 2018.
- The calcs used 17" for the 100y 72h rainfall. We have 18" in our GIS. WE WILL CHANGE THIS TO 18".
- The calcs analyzed all pre vs post zero discharge. However, the site is connected to the canal. Please include Pre and Post discharge rates and detail of the control structure(s)/if any to the canal. THE POINT OF ENSURING THE POST ELEVATIONS ARE LOWER THAN THE PRE ELEVATIONS IS TO AVOID A 25 YEAR BERM AND CONTROL STRUCTURE. SURROUNDING PROPERTIES DRAIN THROUGH THE SUBJECT SITE, SO IT WOULD BE BEST IF THOSE CAN CONTINUE TO FLOW UNIMPEDED THROUGH THE PROPOSED PROJECT.
- There are areas where the lake width is lower than the minimum 100 ft. ACKNOWLEDGED. NONE OF THE EXISTING WATER BODIES WITHIN THE SITE MEET THE 100 WIDE CRITERIA AND WE ARE IMPROVING ON WHAT IS THERE. WE HAVE COME UP WITH AN ALTERNATE PLAN WHERE THE MAIN NORTH SOUTH LAKE MEETS THE DIMENSIONAL CRITERIA OF 100 FEET WIDE BUT THE CANALS ALONG THE NORTH AND EAST PROPERTY LINE OF THE SOUTH PORTION OF THE SITE WILL REMAIN LESS THAN 100 FEET WIDE. SEE ATTACHED. THE PRE AND POST DEVELOPMENT CALCS INCLUDE ALL WATER BODIES WITHIN THE PROEPRTY LIMITS. THIS NEW PLAN HAS AT LEAST AS MUCH LAKE AS THE PREVIOUS PLAN SO THE CALCULATIONS WOULD NOT BE SIGNIFICANTLY ALTERED FOR THE PURPOSE OF THIS DISCUSSION.

Let me know if you have any questions.

Regards,



TOMAS PEREZ ABENIACAR, STAFF ENGINEER

Resilient Environment Department

ENVIRONMENTAL PERMITTING DIVISION

Surface Water Management Licensing

1 North University Drive, Mailbox 201, Plantation, FL 33324-2038

Office: (954) 519-1243

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We value your feedback as a customer. You can comment on the quality of service you received by [completing our survey](#). Thank you!

From: Jeff Schnars <jeff@schnars.com>

Sent: Tuesday, July 19, 2022 2:45 PM

To: Narvaez, Johana <JNARVAEZ@broward.org>; Adoriso, Carlos <CADORISIO@broward.org>

Cc: 'mike@fimiani.com' <mike@fimiani.com>

Subject: RE: Margate Executive Golf Course property

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Johana,

As a follow up to our previous conversations and emails regarding the subject property, we would appreciate if you would do a review of the calcs and drainage exhibit to make sure we are headed down the right path. We are proposing to widen the canals that run through the site to provide additional water management area to compensate for the proposed development. Lake / canal dimensions are shown on the exhibit. The attached calcs demonstrate that the post development elevations (water quality and storm stages) are below the pre-development. There is no control structure on the property as adjacent properties flow through the site.

We are happy to attend a meeting to review together.

Thank you and call me with any questions or let me know if you need anything else.

Jeff

Jeffrey T. Schnars, P.E.

President

jeff@schnars.com

SCHNARS
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947 Clint Moore Road

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Fax: 561-241-5182

Toll Free: 888-285-3886

www.schnars.com

From: Narvaez, Johana <JNARVAEZ@broward.org>
Sent: Wednesday, February 09, 2022 10:44 AM
To: Jeff Schnars <jeff@schnars.com>; Adoriso, Carlos <CADORISIO@broward.org>
Cc: 'mike@fimiani.com' <mike@fimiani.com>
Subject: RE: Margate Executive Golf Course property

See Broward County Licenses attached.

Please do not hesitate to contact me if you have any questions.

Sincerely,



JOHANA NARVAEZ, M.S.E.E., ENVIRONMENTAL PROGRAM MANAGER
Resilient Environment Department
ENVIRONMENTAL PERMITTING DIVISION
Surface Water Management Licensing
1 North University Drive, Mailbox 201, Plantation, FL 33324-2038
Office: (954) 519- 0318 Fax: (954) 519- 1412
jnarvaez@broward.org

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We value your feedback as a customer. You can comment on the quality of service you received by [completing our survey](#). Thank you!

From: Jeff Schnars <jeff@schnars.com>
Sent: Thursday, February 3, 2022 4:27 PM
To: Adoriso, Carlos <CADORISIO@broward.org>
Cc: Narvaez, Johana <JNARVAEZ@broward.org>; 'mike@fimiani.com' <mike@fimiani.com>
Subject: RE: Margate Executive Golf Course property

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Carlos,
As requested below, please let me know when you are available to discuss.
Thank you.
Jeff

Jeffrey T. Schnars, P.E.
President
jeff@schnars.com

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www.schnars.com

From: Jeff Schnars
Sent: Thursday, January 27, 2022 1:39 PM
To: Adorasio, Carlos <cadorasio@broward.org>
Cc: JOHANA NARVAEZ (<jnarvaez@broward.org> <jnarvaez@broward.org>
Subject: Margate Executive Golf Course property

Hi Carlos / Johana:

We are looking into the subject property and I would like to speak to you regarding the drainage. Attached is a drainage atlas map I just got from the City and some information that was generated a few years ago before we got involved (a letter written by Jose in 2018, a proposed site plan by a prospective purchaser at the time, and a location map).

Let me know when you are available to discuss.

Thanks.

Jeff

Jeffrey T. Schnars, P.E.

President

jeff@schnars.com

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Exhibit B

Hydraulic Flow Report



MEMORANDUM

CHA, INC.
4700 Riverside Drive, Suite 110
Coral Springs, Florida 33067
Registry No. 28386

Project:	Springdale Townhomes Hydraulic Evaluation		
Date:	February 8, 2023	Client:	City of Margate
Prepared By:	Ahmet Tahaoglu	EEL Proj. No.:	268-005.00
		Revision No.:	1
Reference:	Water and Wastewater Flow Projections		

A. INTRODUCTION

In 2022, Eckler Engineering, Inc. (presently CHA, Inc.) completed two master plans for the City of Margate (City): the Water Distribution Model Update and the Force Main System Model. The purpose of both the water and wastewater master plans was to carry out a comprehensive study of present and future demands with a plan for necessary improvements for meeting these demands.

A hydraulic model was prepared for the master plans using the software InfoWater by Innovyze® based on the GIS database obtained from the City. This hydraulic model allowed for simulation of the water and force mains under average and peak flows to account for future developments and population growth projections so that necessary improvements such as main sizing could be adequately addressed.

This memorandum focuses on the area that is the Springdale Townhomes and how its development impacts the water distribution and force main system demands for the City. CHA will utilize the models developed under the master plan projects to evaluate the impact that this development has on the nearby hydraulic systems.

B. DATA GATHERING

Schnars Engineering Corporations (SEC) provided preliminary engineering plans (see Attachment 1) which shows the proposed site plan and proposed water and force mains. The number of townhome units and the sewer demand estimates per unit were provided by SEC through email. This estimate was used to calculate a water demand, with the help of Broward County's Equivalent Residential Unit (ERU) Factors (Attachment 2) and the City of Margate Water and Wastewater Master Plans.

Figure 1 shows an illustration from Google Earth of the current golf course space in which the townhomes are proposed to be constructed on. This course space is just south of the Oriole Golf

Club and is surrounded by residential communities to the east, west and south. The course spans from Margate Boulevard to the north and West Atlantic Boulevard to the south.

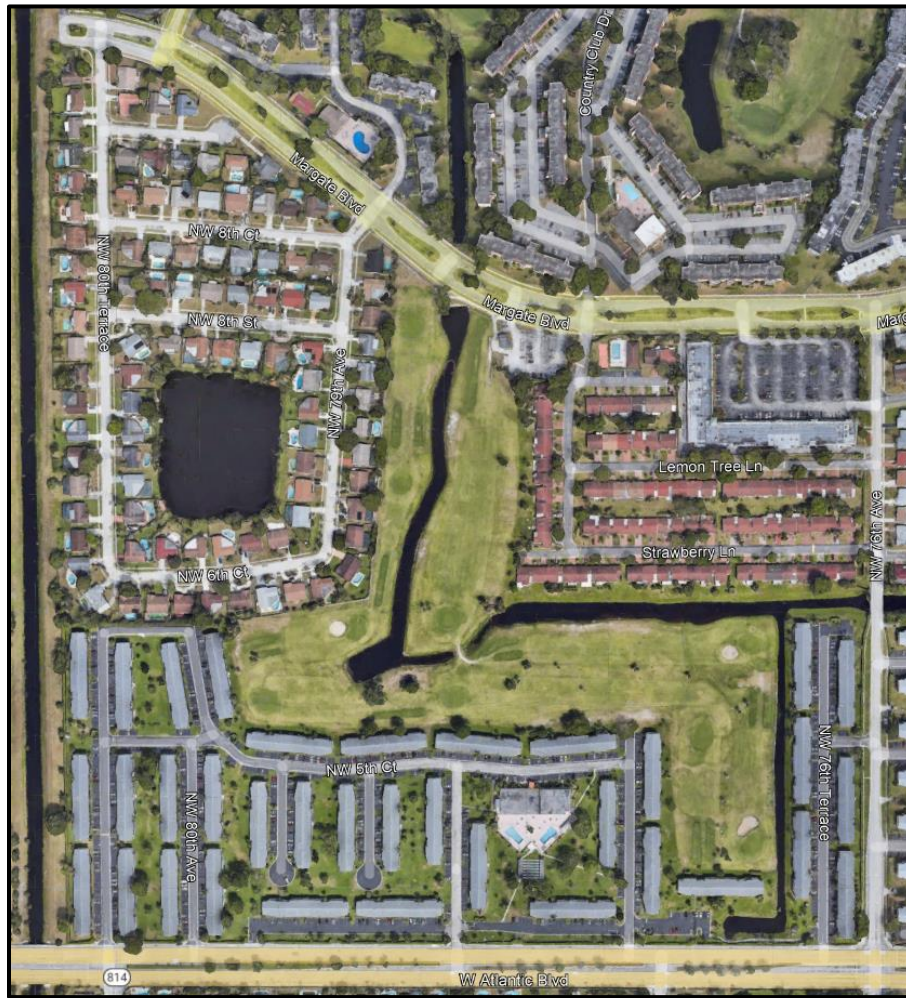


Figure 1 – Golf Course Development Area

The development encompasses a gross site area of about 21 acres and is proposed to have 137 townhome units.

C. DESIGN PARAMETERS

To complete the hydraulic capacity analysis, several design parameters were provided by SEC. They are discussed as follows:

- Water and wastewater demands were projected using the County's ERU factor of 2.88 per building unit and per capita water and wastewater demand of 106.9 gpcd, which is the four-year average (2018-2021) from City's Wastewater Master Plan. Note that this wastewater production value is also applied to the water design, as it was the higher historical average.



- ▶ The worst-case scenario demand for water was based off the Max Day Demand (MDD) ratio of 1.37, per the City's Water Master Plan. In addition, a fire flow (FF) demand of 1,000 gpm for a flow event duration of 2 hours was provided by SEC.
- ▶ The worst-case scenario demand for wastewater involved using a peaking factor of 4.0, provided by SEC.
- ▶ CHA has not confirmed the accuracy of all design parameters provided and is relying on the estimates done by SEC. CHA has not reviewed any of the existing underground utility infrastructure within the development area. It is assumed that all existing flows and utilities within development footprint have been confirmed.
- ▶ Single fire hydrant service mains were assumed in the water model for simplicity. It is the responsibility of the developer's engineers to design on-site fire service flow distribution per all applicable codes and regulations.

Table 1 below shows all the mentioned design parameters.

Table 1
Design Parameters

Townhome Units	137
ERU Factor	2.88
Per Capita Water and Wastewater Demand	106.9 gpcd
MDD Ratio	1.37
Fire Flow Demand	1,000 gpm
Peak Hour Factor	4.0

D. WATER AND WASTEWATER FLOWS

Table 2 presents the demand calculations based on the data provided by SEC. This information will be used to model the existing City water and sewer infrastructure to determine if improvements are required prior to development.

Table 2
Proposed Water and Wastewater Demands

	ADD		MDD		MDD + FF	Peaking Factor	PHF	
	GPD	GPM	GPD	GPM	GPM		GPD	GPM
Water	42,189	30	57,621	41	1,041	4.0	168,757	120
Waste-water	42,189	30	N/A			4.0	168,757	120



For both water and wastewater flows, the average daily demand (ADD) can be calculated utilizing the townhome units, ERU factor and per capita demand since all three are constants, as shown below:

$$\text{Per capita demand} \times \text{ERU factor} = \text{Demand (gdp)/unit}$$

$$106.9 \text{ gpcd} \times 2.88 = 308 \text{ gpd/unit}$$

$$\text{Demand (gdp)/unit} \times \text{townhome units} = \text{ADD (gdp)}$$

$$308 \text{ gpd/unit} \times 137 \text{ units} = 42,189 \text{ gpd or } 30 \text{ gpm}$$

To calculate peak demands, the water model is concerned with the max day demand (MDD) plus the fire flow. To produce the future MDD, a ratio of the ADD and MDD for a specific year is calculated. Using the Water Master Plan, this ratio was calculated between the years of 2018 and 2020 and resulted in a 1.37 ratio factor. The calculation to achieve the MDD is as shown:

$$\text{Max Day ratio} \times \text{ADD (gpd)} = \text{MDD (gpd)}$$

$$1.37 \times 42,178 \text{ gpd} = 57,621 \text{ gpd or } 41 \text{ gpm}$$

Being that the FF used is 1,000 gpm, per the National Fire Protection Association (NFPA) code 18.4.5.1, adding it to the MDD makes the worst-case demand for water to be 1,041 gpm.

Lastly, the peak hourly flow (PHF) is the worst-case wastewater production and is based off the 4.0 peaking factor provided by SEC, as shown below:

$$\text{Peaking factor} \times \text{ADD (gpd)} = \text{PHF (gpd)}$$

$$4.0 \times 42,178 \text{ gpd} = 168,757 \text{ gpd or } 120 \text{ gpm}$$

E. MODEL SETUP

As mentioned in Section A, Eckler Engineering completed the Water Distribution and Force Main System Model and Master Plan project which modeled the City's water and sewer network using Innovyze's InfoWater software. The entire network was simulated under various current scenarios with fire flow events to evaluate the impact to the distribution infrastructure. This same model will be used to evaluate this proposed redevelopment within the City. Model runs were conducted based on the Broward County guidelines for potable water and wastewater level of service standards as presented in Table 3 below.



Table 3
Broward County Level of Service Standards

Facility	Level of Service Standard
Potable Water Distribution System	The most stringent of: (1) Peak Hour at 45 psi residual pressure, or (2) Maximum Day Plus Fire Flow at 25 psi residual pressure
Wastewater Collection System	Peak Hour

Scenarios were run for each model based on the above criteria using the demands that were included in the provided models. Thus, the demand conditions below are based on the existing WTP output plus the output required by Springdale Townhomes.

Potable Water:

1. Maximum Day Demand + Fire Flow: The system was modeled under the current maximum day demand condition of approximately 5,390 gpm (7.76 MGD) with a fire flow of 1,000 gpm.
2. Peak Hour Demand: The system was modeled under the current peak hour demand condition of approximately 15,740 gpm (22.67 MGD) which includes the proposed developments' peak demand.

Wastewater:

3. Peak Hour Demand: The system was modeled under the current peak hour wastewater generation condition of approximately 26,950 gpm (38.81 MGD) which includes the proposed developments' peak generation.

The scenarios above were evaluated based on residual pressure during fire flow events and peak hour conditions. Broward County's service standard requires that residual pressure be at least 25 psi during fire flow events under maximum day demand or 45 psi during peak hour demand conditions.

For maximum day runs, an extended period simulation was set up based on a diurnal provided by SEC. The average day demand diurnal is shown in Figure 2, while a peaking factor of 1.37 was applied to generate the maximum day demand diurnal shown in Figure 3.

The peak hour runs for both potable water and wastewater were conducted using steady state with a peaking factor of 4.0 applied to the base demand.

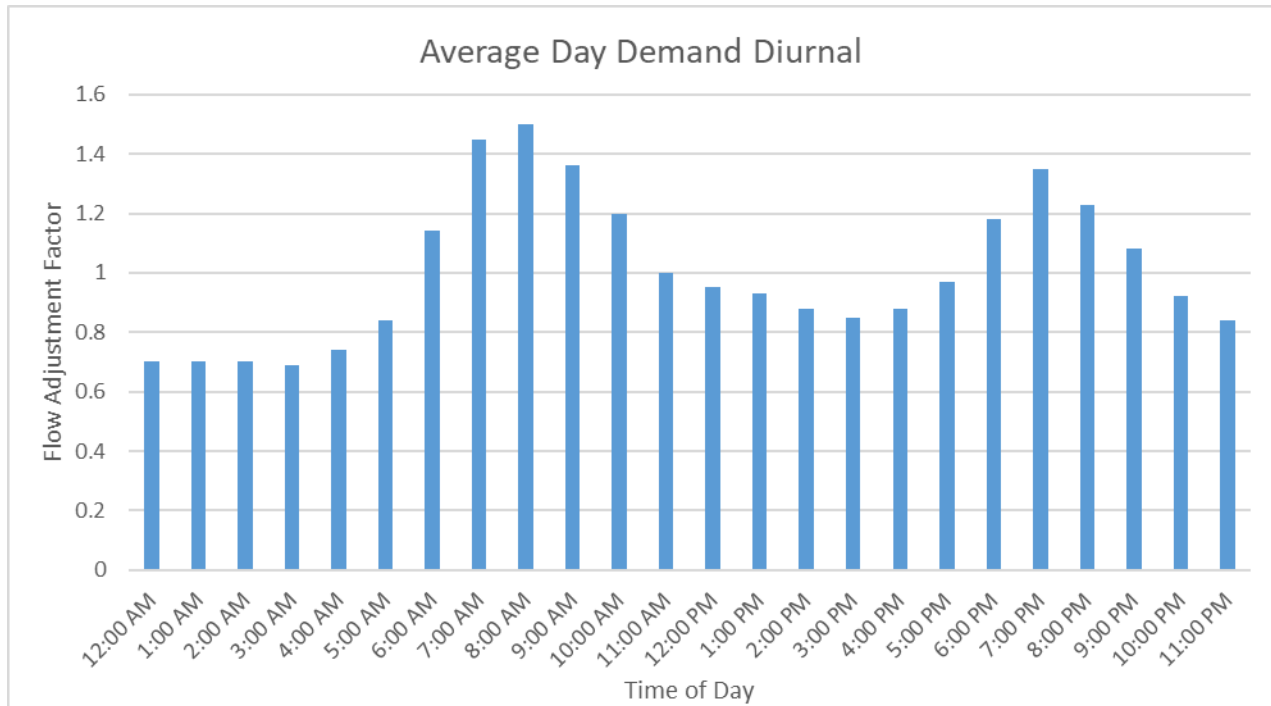


Figure 2 – Average Day Demand Diurnal

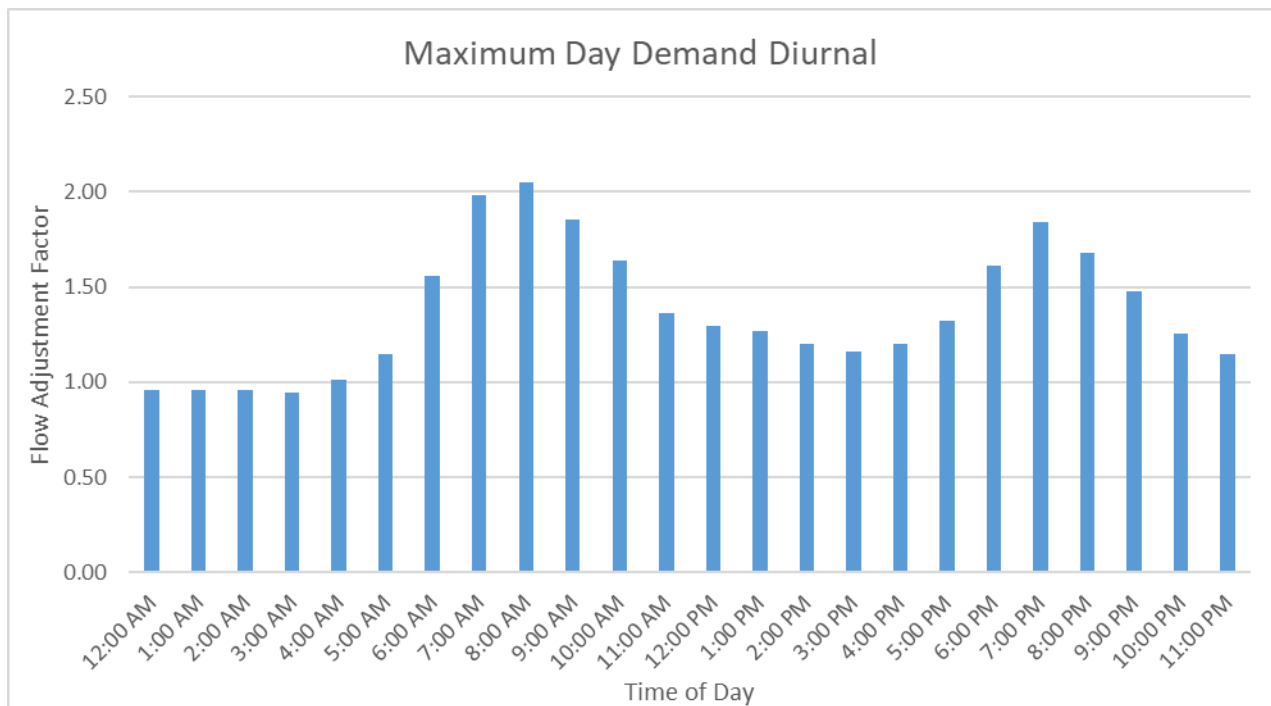


Figure 3 – Maximum Day Demand Diurnal



F. POTABLE WATER MODEL ANALYSIS

The pipe diameter used was acquired from the SEC preliminary engineering plans in Attachment 1 and consisted of an 8-inch water main that connects to the existing system at two points along Margate Blvd. Elevations were not in the provided model, so these were added to the existing nodes as well as the nodes for the proposed development using elevation contours from the USGS database. As mentioned in Section E, the potable water model was run for both maximum day demand with a fire flow of 1,000 gpm and for peak hour demand. The results of these runs are summarized in Table 4.

Table 4
Results of the Potable Water Model Analysis

Scenario	Velocity (ft/s)	Residual Pressure (psi)
MDD+FF*	6.40	48
PHF	0.08	70

**MDD+FF results taken at 8:00 AM which is the highest flow time in the MDD diurnal*

The results indicate that the addition of the Springdale Townhomes developments will not adversely affect the existing potable water system with the provided model and demands under the stated assumptions. In both max day with fire flow and the peak hour runs, pressures remained well above the required residual pressures based on Broward County guidelines. Pipe velocities at and downstream of the developments also remain within an adequate range between 2.5-7.0 ft/s. The results of the MDD run are presented visually in Figure 4 and Figure 5 and peak hour in Figure 6 and Figure 7.

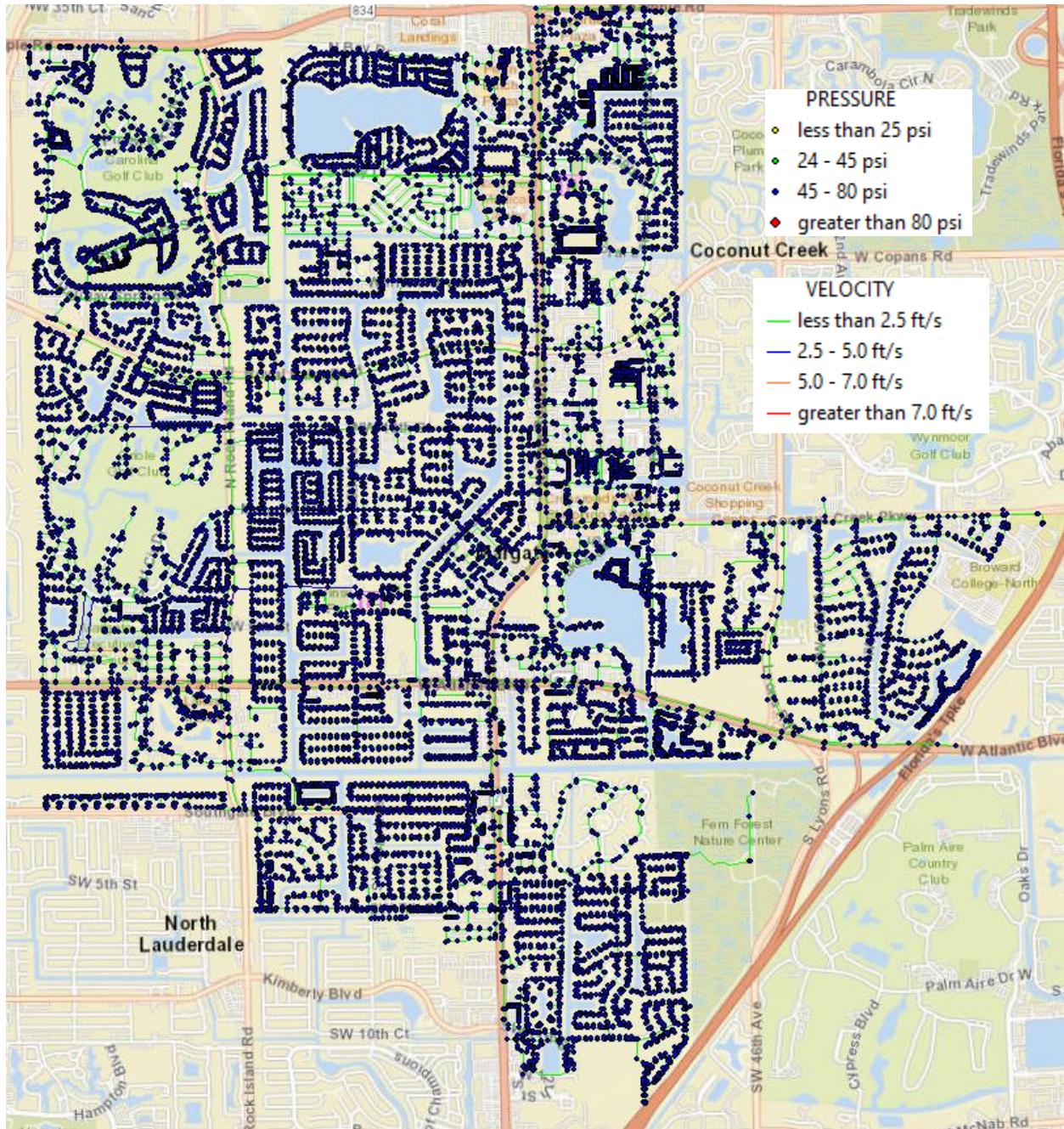


Figure 4 – Potable Water MDD+FF System Results



Figure 5 – Potable Water MDD+FF Springdale Townhomes Results

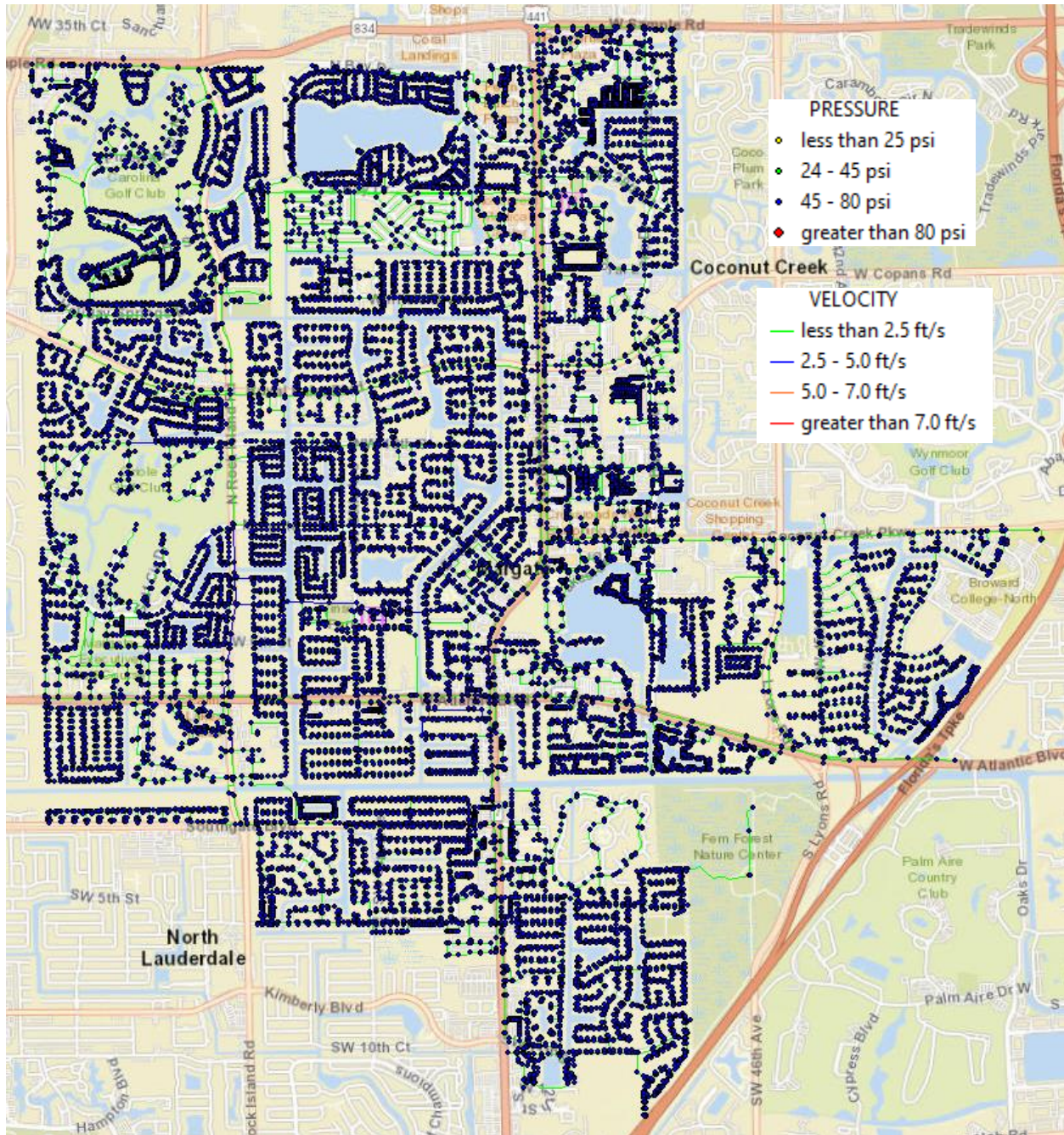


Figure 6 – Potable Water PHF System Results

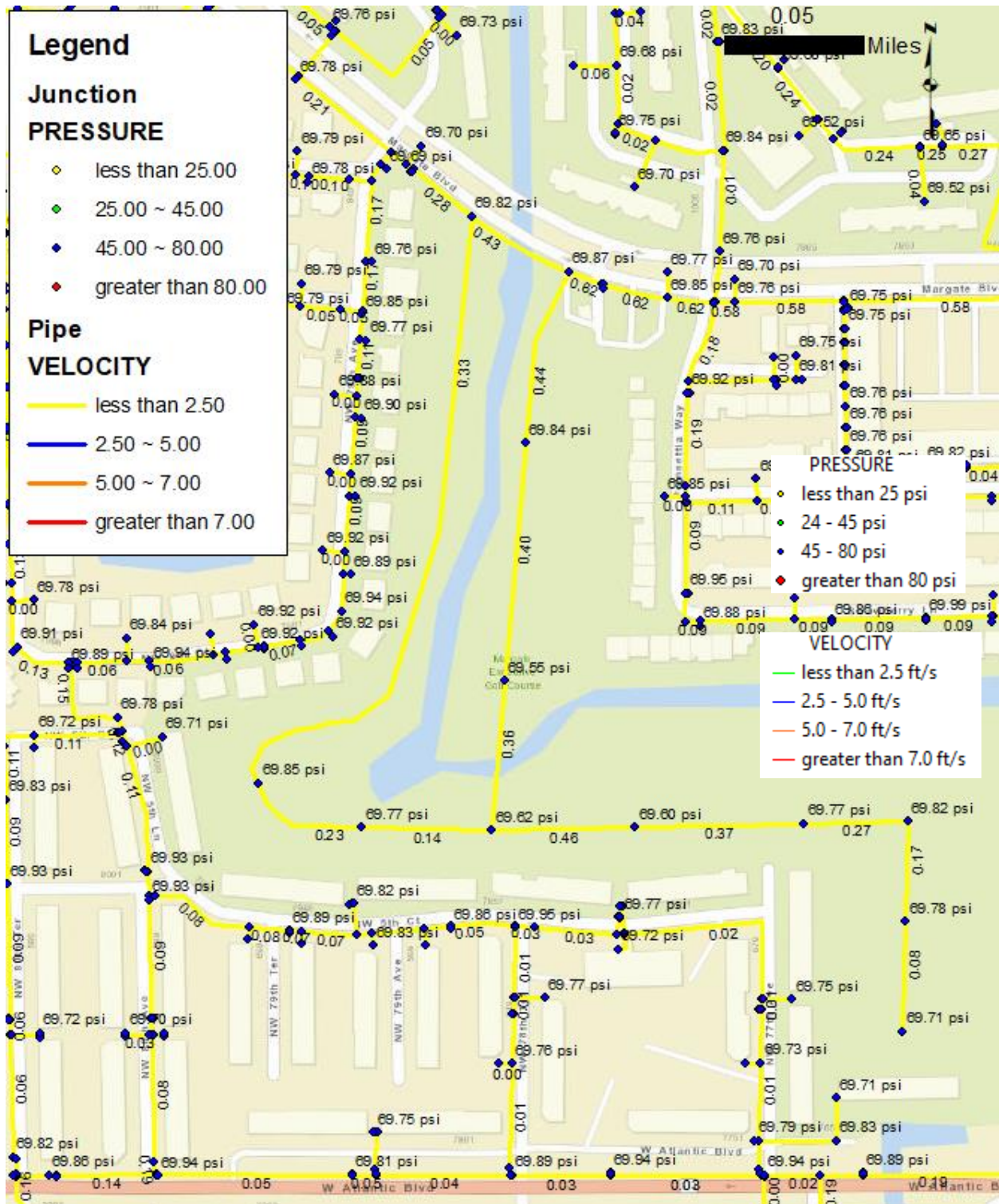


Figure 7 – Potable Water PHF Springdale Townhomes Results



G. WASTEWATER MODEL ANALYSIS

The provided wastewater model did not include gravity mains and utilized forced flow analysis, so this same method was used in the analysis of the proposed developments. This limits the wastewater model analysis to specifically the flow through the proposed 4-inch force main found in the preliminary engineering plans and cannot make an accurate analysis on the gravity mains, downstream piping, or lift station capabilities without pumps included in the entirety of the system. The lift station immediately downstream from the proposed development, Lift Station 24, can accommodate the flow from the proposed developments based on analyses done prior to the modeling based on emails between Broward County and SEC. Prior to the analysis, elevations were added to existing and proposed development nodes for a more accurate analysis as the provided model did not include elevations initially. A minor update was also included on the demands to convert them all to negative values to simulate wastewater generation so that flow travels from the nodes to the treatment plant as it should.

As mentioned in Section E the wastewater model was run at peak hour conditions with the results summarized in Table 5 below.

Table 5
Results of the Wastewater Model Analysis

Force Main	PHF Velocity (ft/s)
Proposed Development	3.06
Downstream of LS 24	2.12
At WWTP	5.40

The results indicate that the addition of the proposed developments will not adversely affect the existing wastewater collection system with the provided model under the stated assumptions. Pressures at the proposed development lift station to Lift Station 24, immediately downstream of the development are adequate while the velocities in the proposed 4-inch force main and the force main coming out of Lift Station 24 are within an acceptable range as well. Under the assumption that the demand values in the provided model were already the peak hour values, the velocities in the force main downstream of the proposed development to the treatment plant remain within acceptable limits. The results of the peak hour wastewater run are presented visually in Figure 8 and Figure 9.

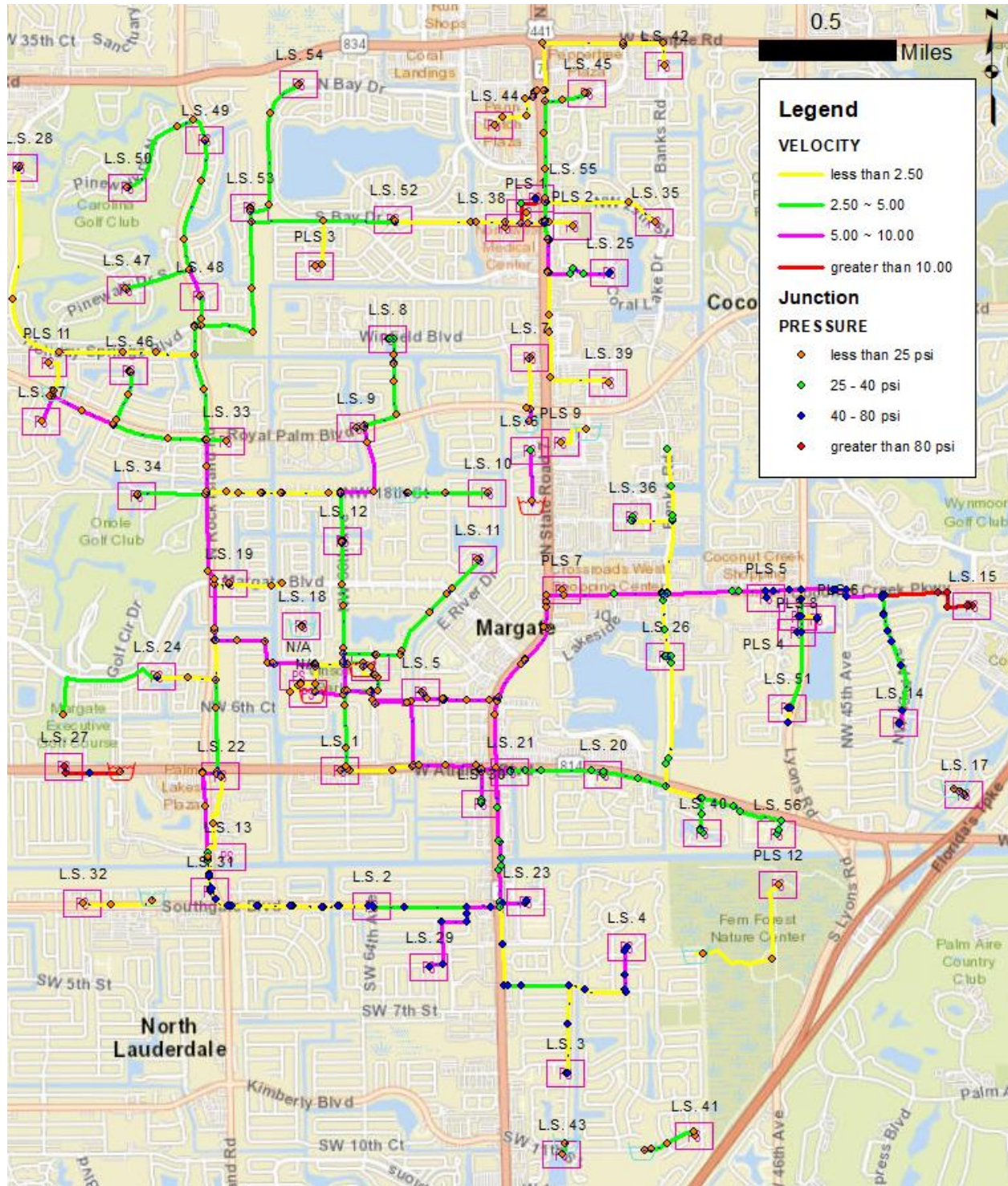


Figure 8 – Wastewater PHF System Results

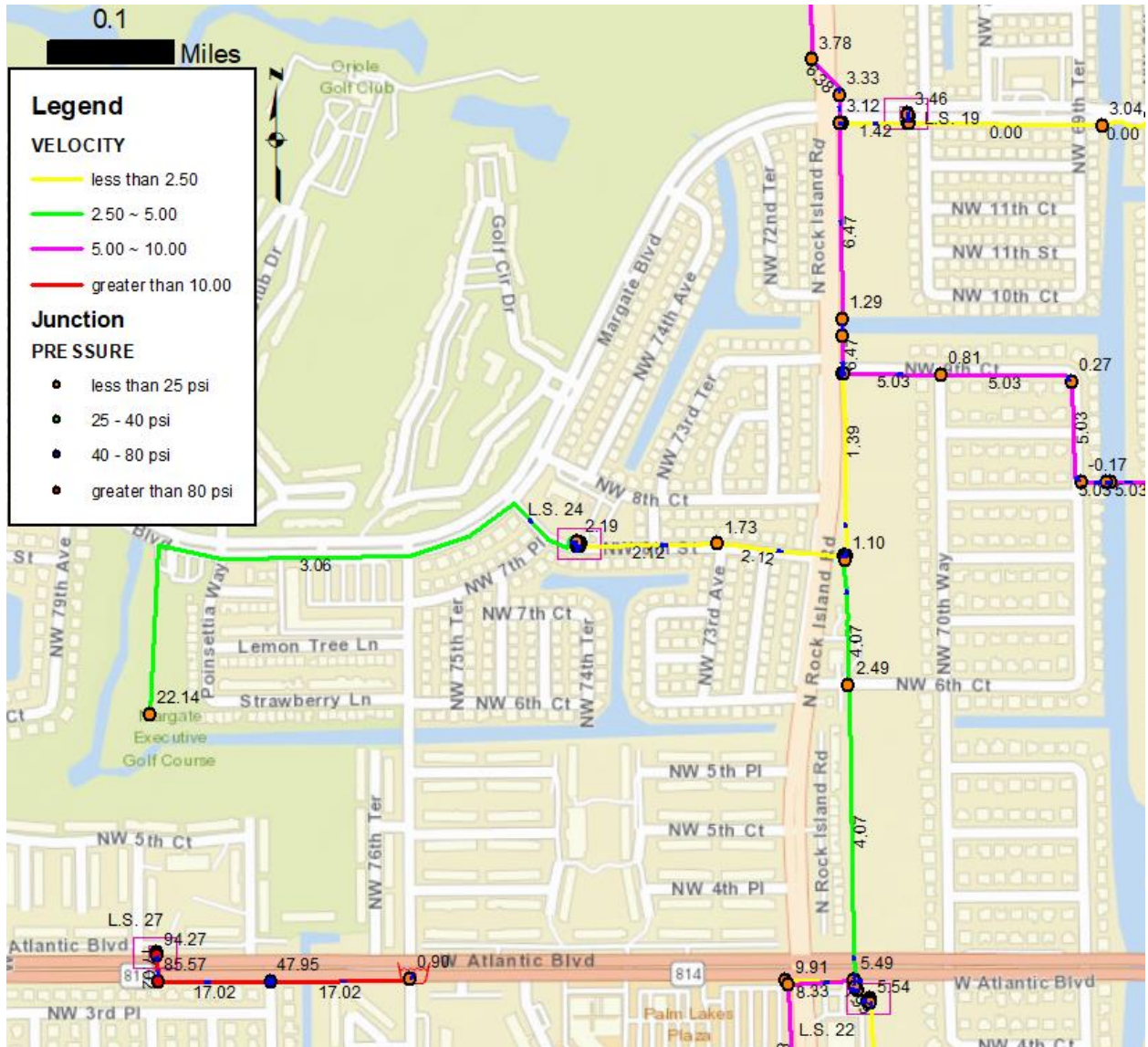


Figure 9 –Wastewater PHF Springdale Townhomes Results



H. CONCLUSION AND RECOMMENDATIONS

Potable Water

Conclusions:

- The proposed 8-inch diameter water main is adequate for the Springdale Townhomes development regarding velocities during both maximum day demand with fire flow and peak hour runs.
- The residual pressures at the development are approximately 20 psi above the required levels in both maximum day with fire flow and peak hours runs.
- The proposed developments should not adversely affect the existing potable water system based on the provided information under the assumptions stated previously.

Recommendations:

- While the design provided is adequate under all scenarios, it is recommended to provide looping at the dead-end if possible, to provide better fire flow throughout the developments.

Wastewater

Conclusions:

- The proposed 4-inch diameter force main is adequate for the Springdale Townhomes development regarding velocities during peak hour generation.
- The proposed developments should not adversely affect the rest of the wastewater collection system based on the provided information under the assumptions stated previously.
- Based on previous emails between Broward County and SEC, Lift Station 24, the lift station immediately downstream of the development, has adequate capacity for the addition of the proposed development.

Recommendations:

- It is recommended that a final design confirmation of the pumps at the proposed lift station be conducted by the engineer of record to ensure adequate pumping capacity for the flow and head conditions prior to construction.
- Engineer of record should request a capacity certification letter from the City to confirm that there will be sufficient capacity at the wastewater plant.

ATTACHMENT 1

PRELIMINARY ENGINEERING PLANS

PRELIMINARY ENGINEERING PLAN
FOR

LEGAL DESCRIPTION

PARCEL 3, "ORIOLE GOLF AND TENNIS CLUB SECTION TWO", ACCORDING TO THE PLAT THEREOF AS RECORDED IN PLAT BOOK 78, PAGE 21, OF THE PUBLIC RECORDS OF BROWARD COUNTY, FLORIDA.

TOGETHER WITH:

A PORTION OF PARCEL 4 OF SAID PLAT, "ORIOLE GOLF AND TENNIS CLUB SECTION TWO", ACCORDING TO THE PLAT THEREOF, AS RECORDED IN PLAT BOOK 78, PAGE 21, OF THE PUBLIC RECORDS OF BROWARD COUNTY, FLORIDA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 35, TOWNSHIP 48 SOUTH, RANGE 41 EAST; THENCE SOUTH 00° 03' 23" WEST, 292.60 FEET ALONG THE WEST BOUNDARY OF SAID SECTION TO THE POINT OF INTERSECTION WITH THE SOUTH RIGHT-OF-WAY LINE OF MARGATE BLVD. ACCORDING TO SAID PLAT; THENCE ALONG SAID SOUTH RIGHT-OF-WAY LINE OF MARGATE BLVD. THE FOLLOWING FOUR (4) COURSES: SOUTH 89° 56' 37" EAST, 15.94 FEET; THENCE ALONG THE ARC OF A TANGENT CURVE, BEING CONCAVE TO THE SOUTHWEST, HAVING A RADIUS OF 664.05 FEET, A DELTA OF 39° 51' 40", AN ARC DISTANCE OF 461.98 FEET; THENCE TANGENT TO SAID CURVE SOUTH 50° 04' 57" EAST, 725.16 FEET; THENCE ALONG THE ARC OF A TANGENT CURVE, CONCAVE TO THE NORTHEAST, HAVING A RADIUS OF 776.33 FEET, A DELTA OF 22° 15' 10", AN ARC DISTANCE OF 301.52 FEET TO THE NORTHEAST CORNER OF SAID PARCEL 3 AND THE POINT OF BEGINNING; THENCE CONTINUE ALONG SAID CURVE, HAVING A RADIUS OF 776.33 FEET, A DELTA OF 11° 58' 05", AN ARC DISTANCE OF 162.16 FEET (THE PRECEDING COURSE BEING COINCIDENT WITH THE SAID SOUTH RIGHT-OF-WAY LINE OF MARGATE BLVD.); THENCE SOUTH 20° 36' 41" WEST, 134.67 FEET; THENCE NORTH 88° 35' 00" WEST, 115.00 FEET TO A POINT OF THE EAST LINE OF SAID PARCEL 3, THENCE NORTH 01° 25' 00" EAST ALONG THE EAST LINE OF SAID PARCEL 3, A DISTANCE OF 156.02 FEET TO THE POINT OF BEGINNING.

SAID LANDS SITUATE IN THE CITY OF MARGATE, BROWARD COUNTY, FLORIDA AND CONSISTS OF 21.302 ACRES MORE OR LESS.

DEVELOPMENT TEAM

DEVELOPER: Fimiani Development Corporation
5301 North Federal Highway, Suite 350
Boca Raton, Florida 33487
Phone: 561-395-8882

**LAND USE ATTORNEY/
LAND PLANNER:** Dunay, Miskel and Backman, LLP
14 SE 4th Street, Suite 36
Boca Raton, Florida 33432
Phone: 561-405-3300

**ENGINEER/
PLANNER:** Schnars Engineering Corporation
947 Clint Moore Road
Boca Raton, Florida 33487
Phone: 561-241-6455

ARCHITECT: A B Design Group
1441 N. Ronald Reagan Boulevard
Longwood, Florida 32750
Phone: 407-774-6078

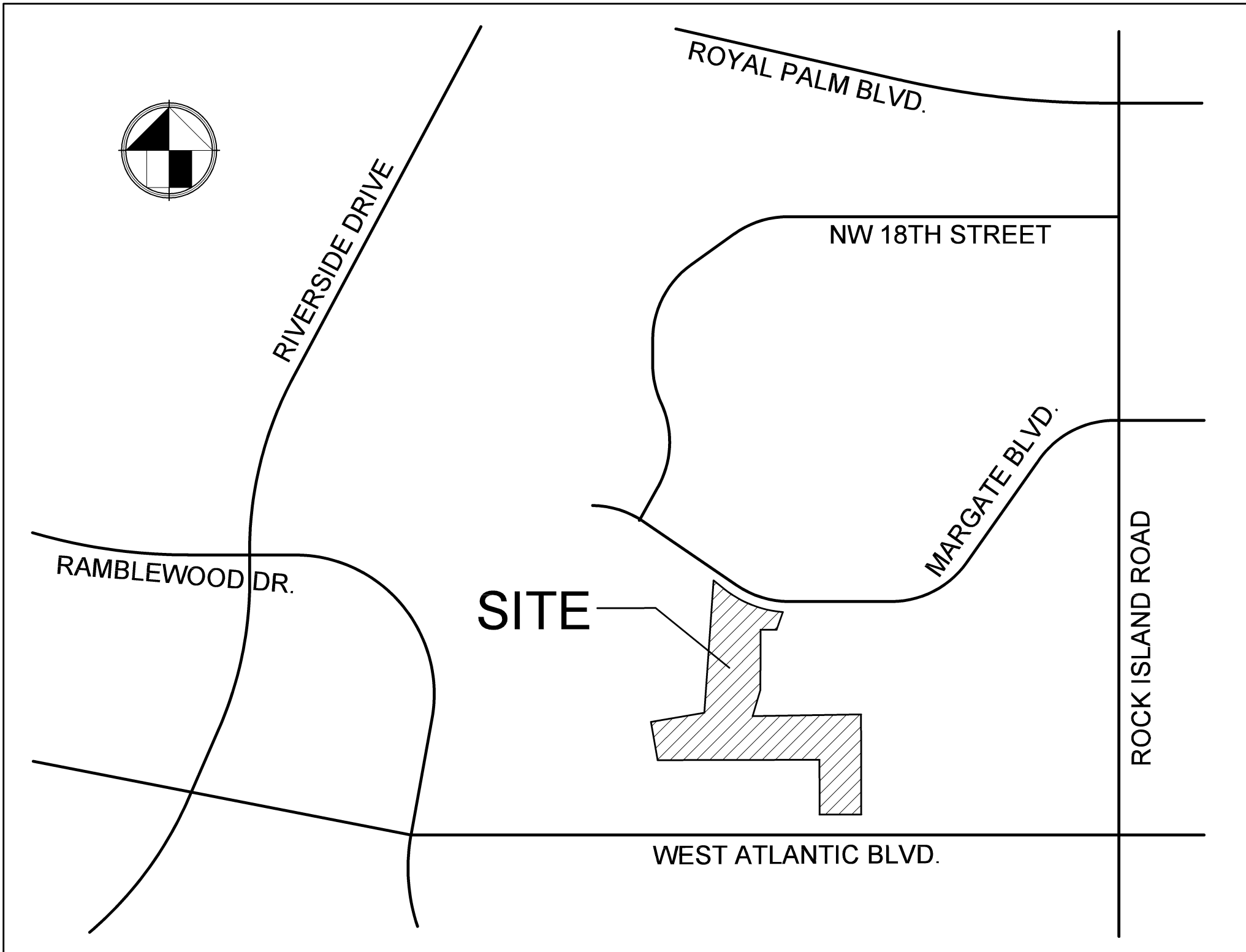
LANDSCAPE ARCHITECT: Peterson Design Professionals
151 Southwest 7th Terrace
Boca Raton, Florida 33486
Phone: 561-702-0136

PHOTOMETRIC ENGINEER: Lightworks, Inc.
7447 NW 48th Street, Suite B
Miami, Florida 33166
Phone: 561-641-5570

OWNER:

Margate Executive Golf Course, LLC
5301 North Federal Highway, Suite 350
Boca Raton, Florida 33487

Springdale Townhomes
Margate, Florida



LOCATION MAP
S 35, T 48S, R 41E
NOT TO SCALE

INDEX OF SHEETS

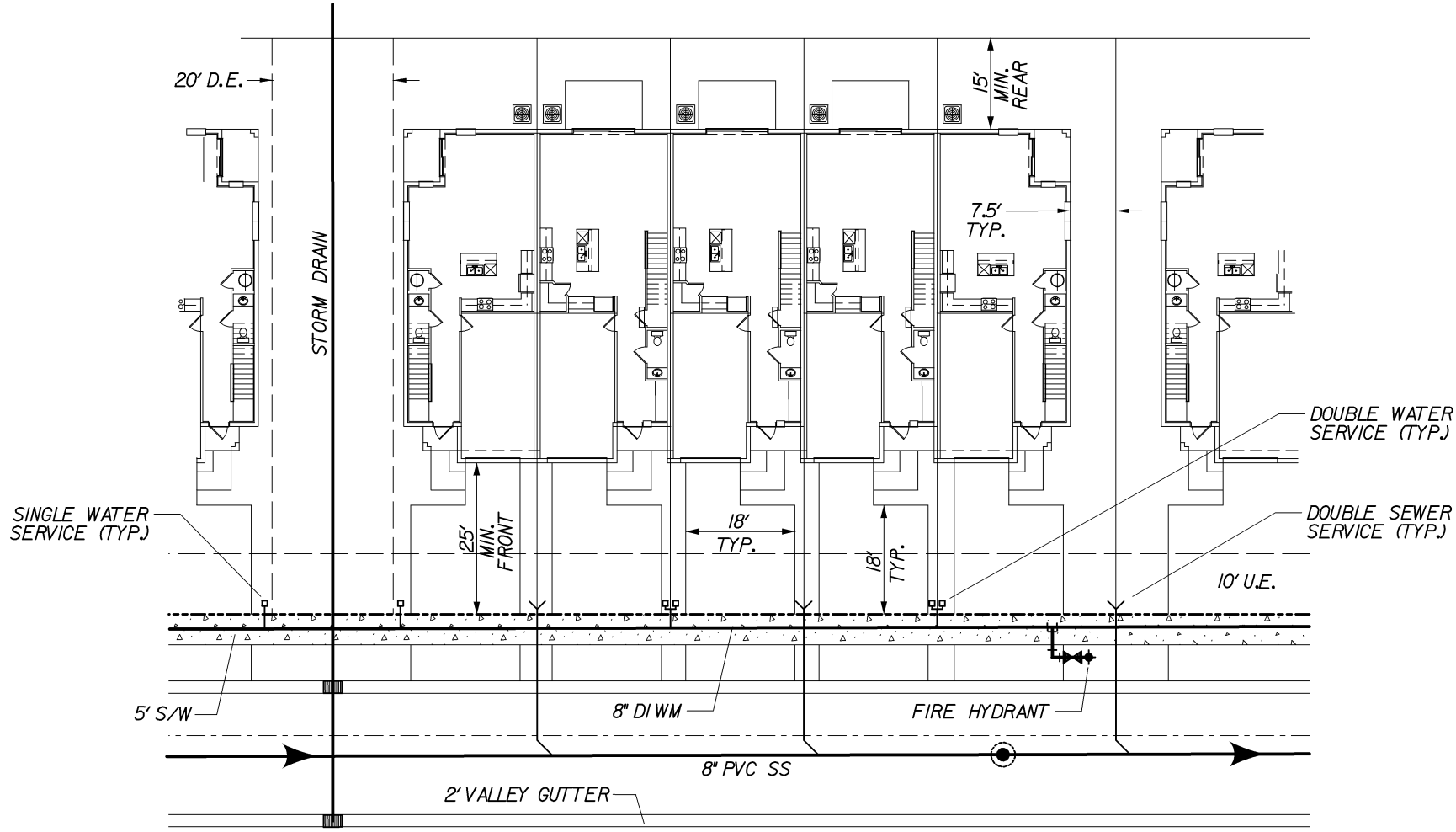
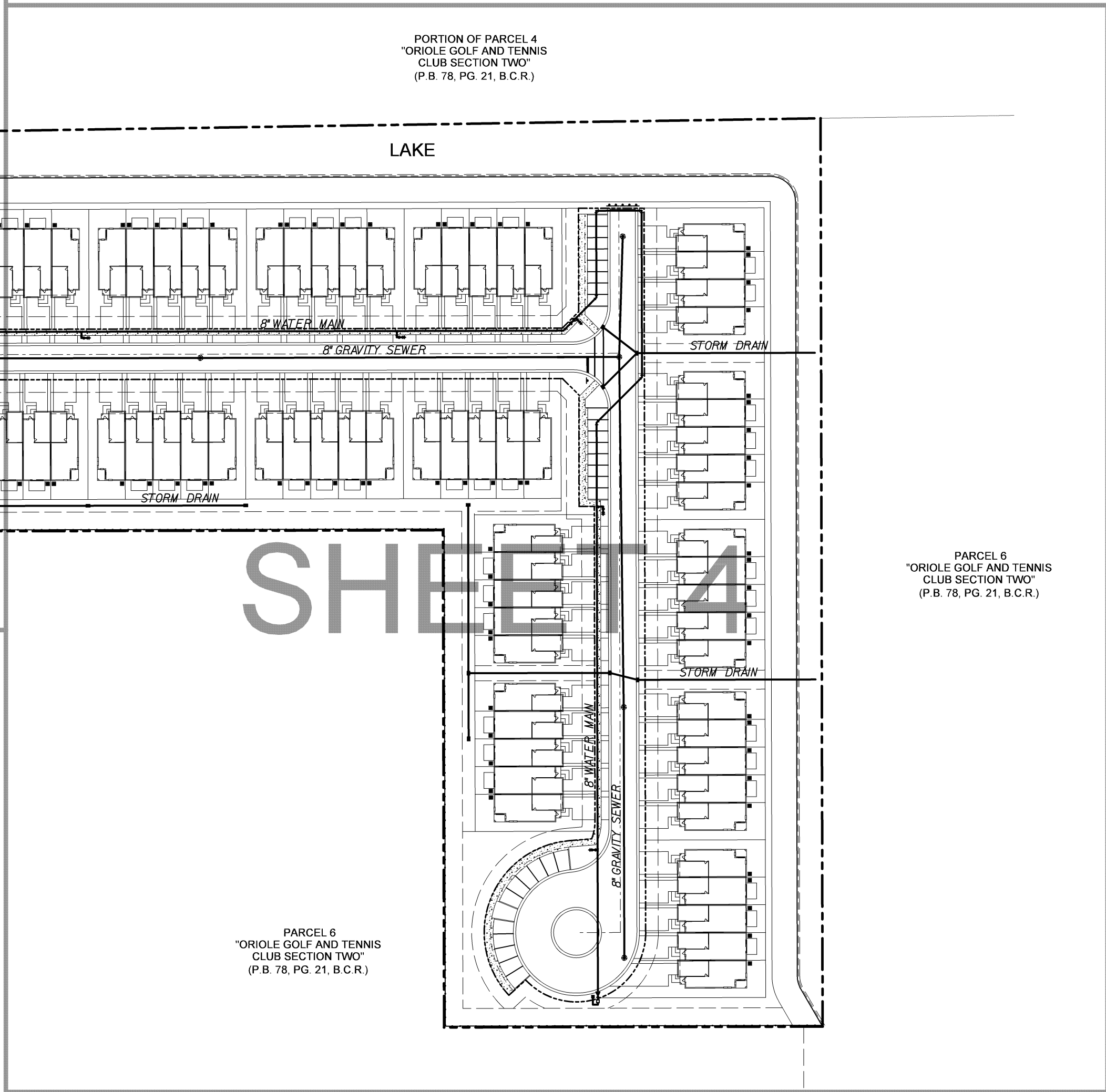
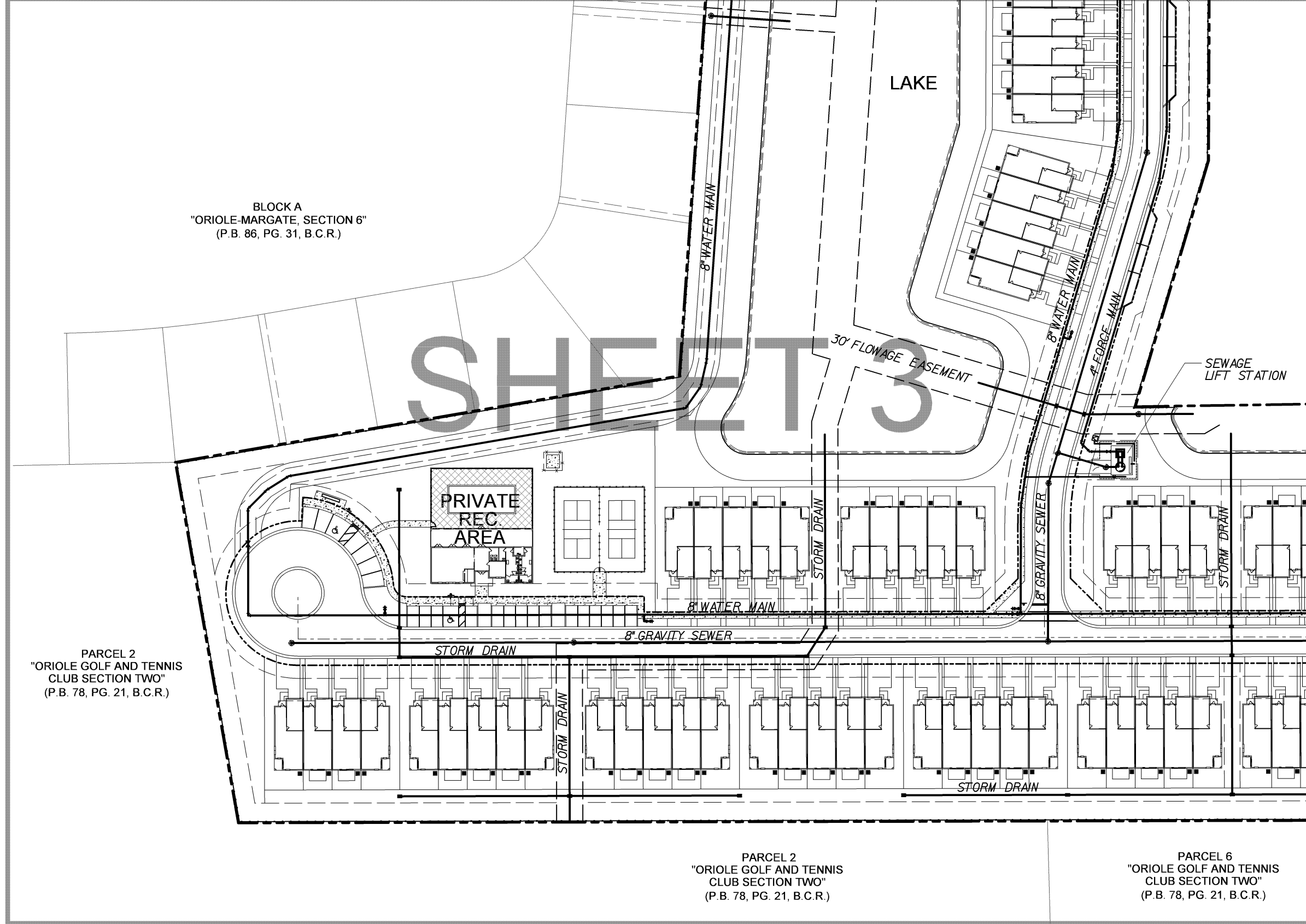
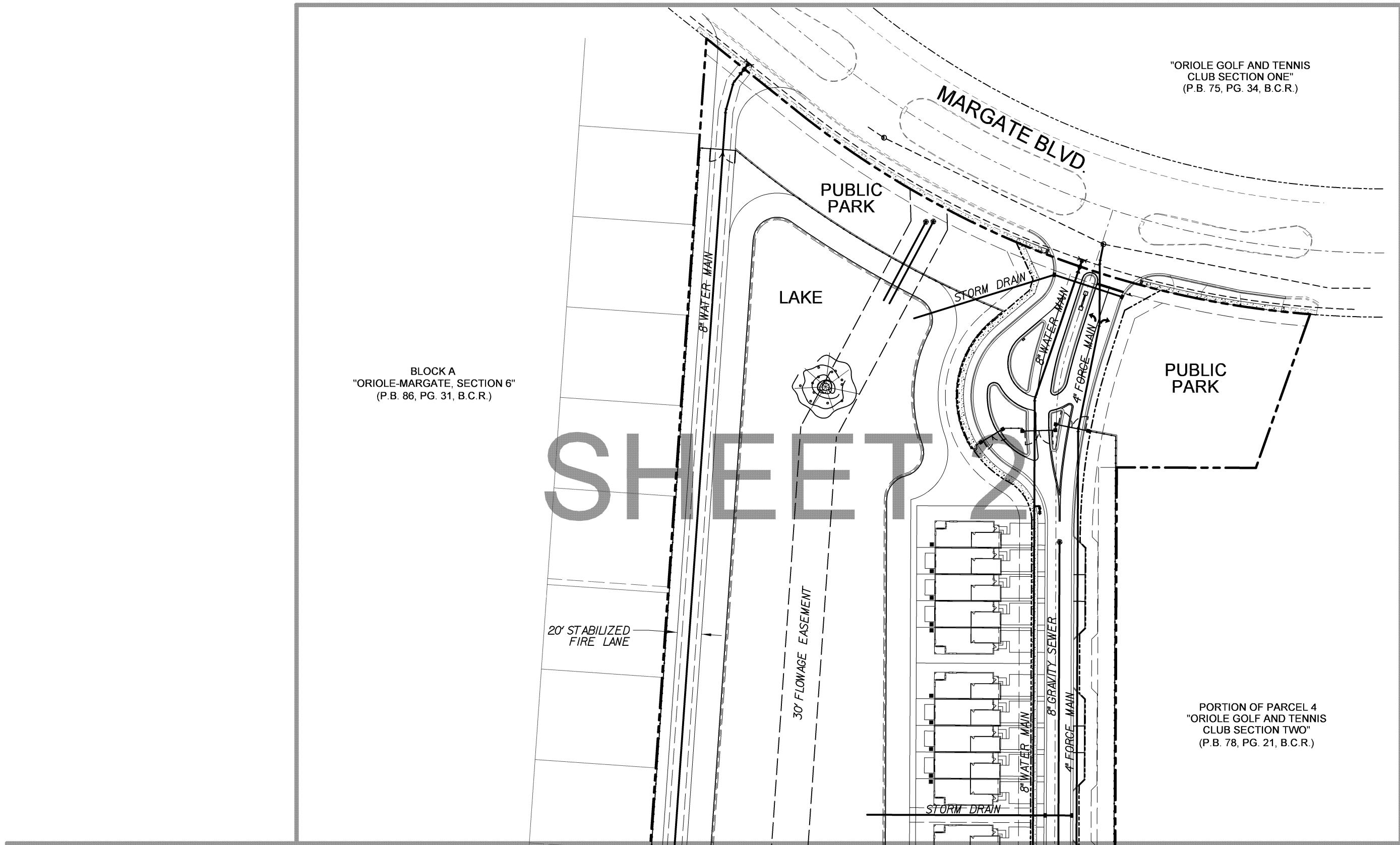
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MASTER PRELIMINARY ENGINEERING PLAN	1
PRELIMINARY ENGINEERING PLAN	2 - 4
CONSTRUCTION DETAILS	5

SCHNARS
ENGINEERING CORPORATION

947 CLINT MOORE ROAD • BOCA RATON, FLORIDA 33487

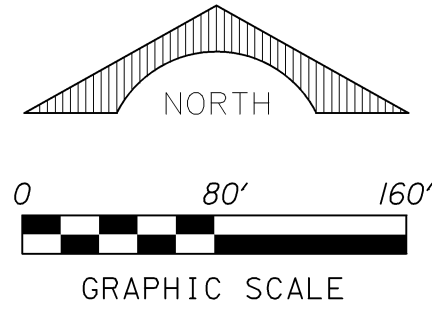
TEL: (561) 241-6455 • FAX: (561) 241-5182

CERTIFICATE OF AUTHORIZATION No. 6640



TYPICAL WATER & SEWER DETAIL
(22' WIDE TOWNHOUSE UNITS)

N.T.S.



NOTES:

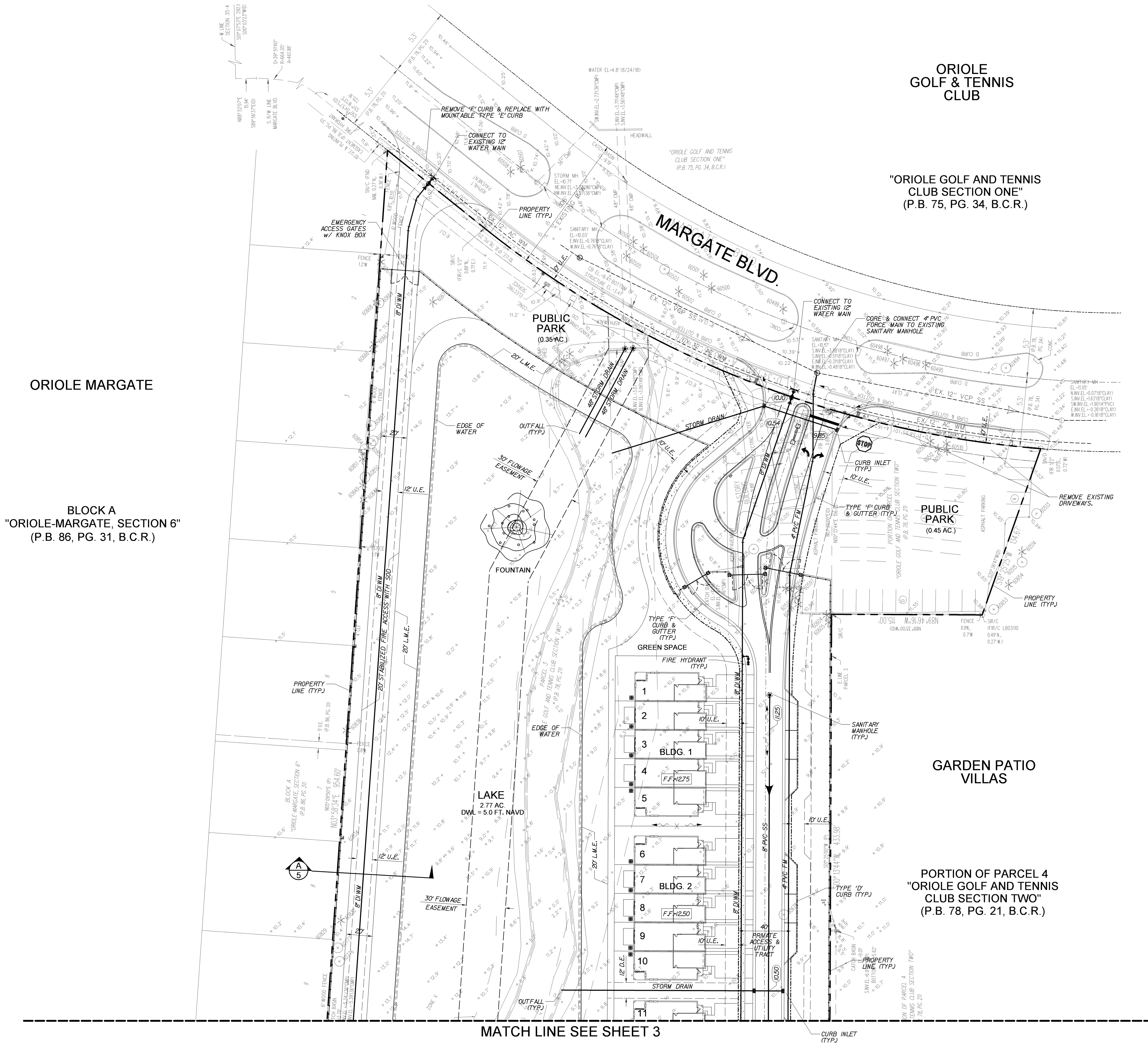
- FEMA FIRM FLOOD ZONES:
COMMUNITY PANEL NO. 12011 C 0355 H DATED 8/18/2014
FLOOD ZONES: AE (EL. 11.0 FT. NAVD), AND X
- BROWARD COUNTY 100 YEAR FLOOD ELEVATION MAP: 12.50 FT NAVD
BROWARD COUNTY 10 YEAR FLOOD ELEVATION MAP: 10.50 FT NAVD
- PROPOSED ELEVATIONS:
MINIMUM FINISHED FLOOR = 12.50 FT NAVD
MINIMUM ROAD = 10.50 FT NAVD
DESIGN WATER LEVEL: 5.00 FT NAVD
- A DRAINAGE & FLOWAGE EASEMENT SHALL BE PROVIDED TO THE CITY OF MARGATE THROUGH THE LAKE SYSTEM.
- DURING CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE FLOW FROM MARGATE BLVD. AND ADJACENT COMMUNITIES THROUGH THE PROJECT.
- ALL HANDICAP RAMPS AND DETECTABLE WARNINGS SHALL BE INSTALLED PER FDOT INDEX 522-002.
- CURB INLET GRATE ELEVATIONS REPRESENT THE EDGE OF PAVEMENT ELEVATION.
- ALL ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988).

ORIGINAL:	OCT. 2022
REVISIONS:	
1	
2	
3	
4	
5	

TASK:	MASTER PRELIMINARY ENGINEERING PLAN
PROJECT:	SPRINGDALE TOWNHOMES MARGATE FLORIDA

Jeffrey T. Schnars, P.E.
Civil Engineer
Florida Registration No. 46697
(FOR THE FIRM)

JOB NO.	17180
DRAWN	RAD
DESIGNED	JTS
CHECKED	JWM
Q.C.	JTS



ORIOLE MARGATE

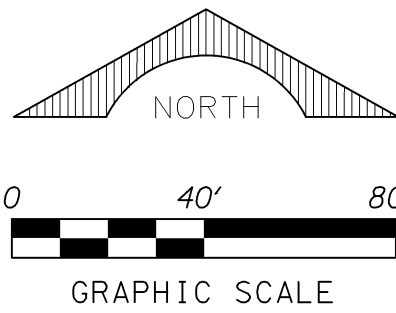
BLOCK A
"ORIOLE-MARGATE, SECTION 6"
(P.B. 86, PG. 31, B.C.R.)

ORIOLE
GOLF & TENNIS
CLUB

"ORIOLE GOLF AND TENNIS
CLUB SECTION ONE"
(P.B. 75, PG. 34, B.C.R.)

GARDEN PATIO
VILLAS

PORTION OF PARCEL 4
"ORIOLE GOLF AND TENNIS
CLUB SECTION TWO"
(P.B. 78, PG. 21, B.C.R.)



LEGEND	
R.E.	RIM ELEVATION
G.E.	GRATE ELEVATION
I.E.	INVERT ELEVATION
U.E.	UTILITY EASEMENT
	SANITARY SEWER MANHOLE
	SEWER LATERAL
	STORM CATCH BASIN
	FIRE HYDRANT, GATE VALVE & TEE ASSEMBLY
	PROPOSED GATE VALVE
	DIRECTION OF OVERLAND FLOW
	HIGH POINT
F.F. + 10.00	FINISHED FLOOR ELEVATION
	EXISTING UTILITIES
	EXISTING ELEVATION
	PROPERTY LINE
	EXISTING INFORMATION
	PROPOSED INFORMATION
	NEW CONCRETE SIDEWALK
	EXISTING CONCRETE
	PROPOSED OFFSITE ASPHALT
	PROPOSED CONCRETE PAVERS

SCHNARS
ENGINEERING CORPORATION
947 CLINT MOORE ROAD
BOCA RATON, FLORIDA 33487
TEL: (561) 241-1455
FAX: (561) 241-1512
CERTIFICATE OF AUTHORIZATION No. 6640

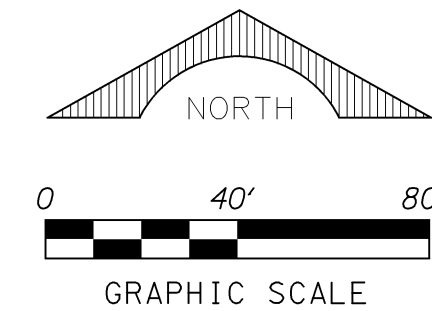
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REVISIONS:	
1	
2	
3	
4	
5	

TASK:	PRELIMINARY ENGINEERING PLAN
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PROJECT:	SPRINGDALE TOWNHOMES
STATE:	FLORIDA

Jeffrey T. Schnars, P.E.
Civil Engineer
Florida Registration No. 46697
(FOR THE FIRM)

JOB NO.	17180
DRAWN	RAD
DESIGNED	JTS
CHECKED	JWM
Q.C.	JTS



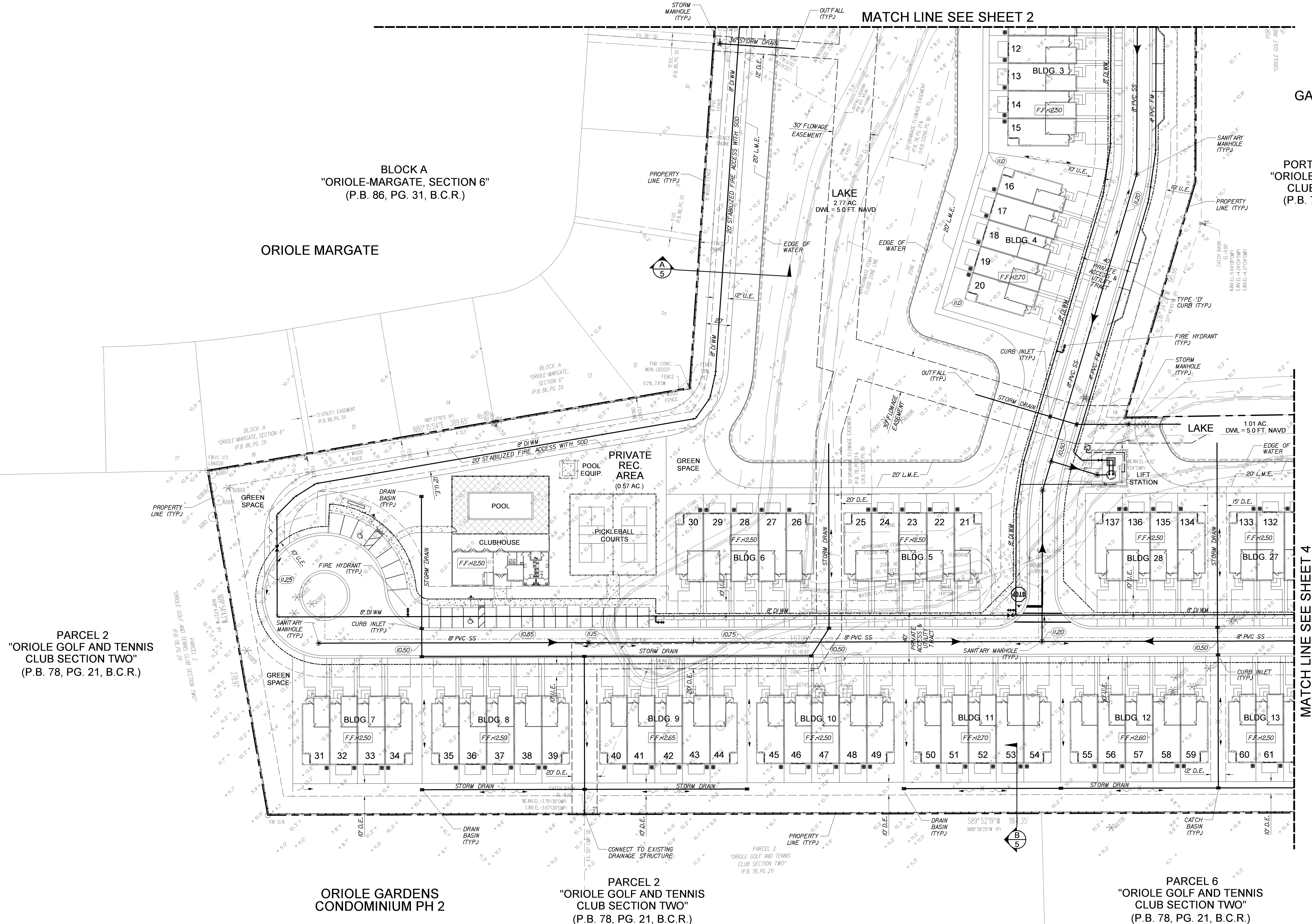
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TASK:	PRELIMINARY ENGINEERING PLAN
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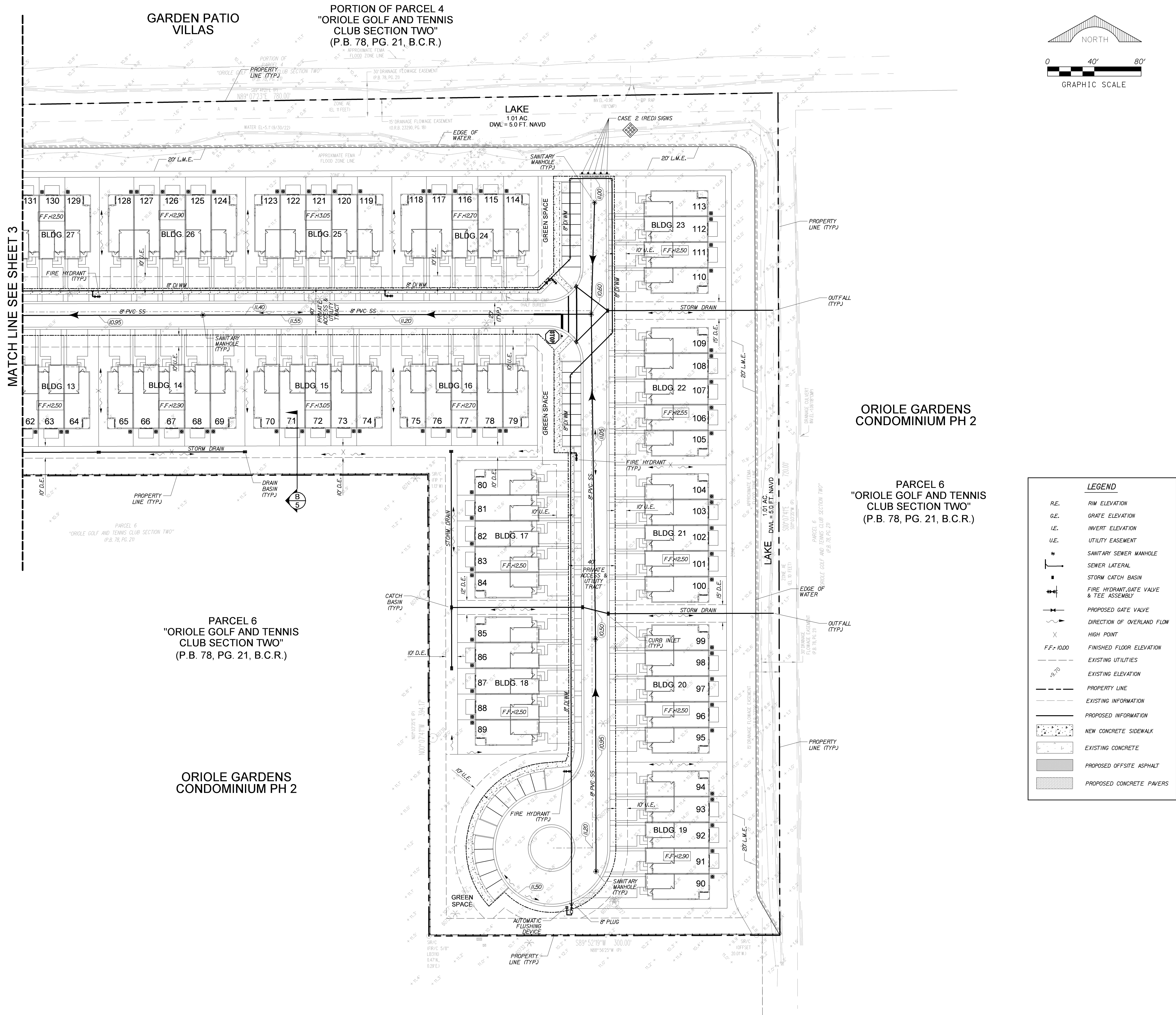
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	MARGATE	

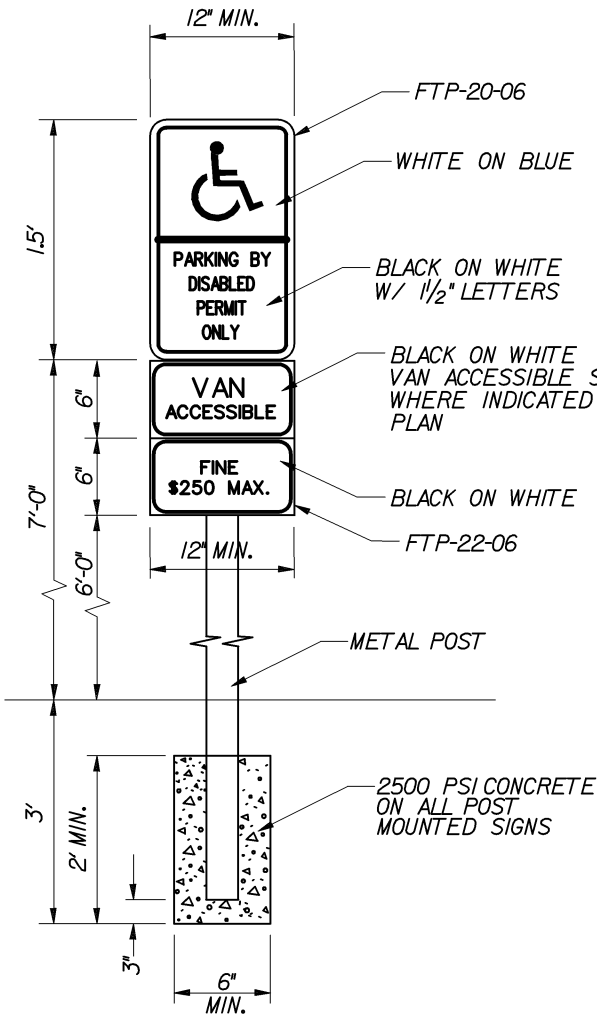
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Jeffrey T. Schnars, P.E. Civil Engineer Florida Registration No. 46697 (FOR THE FIRM)	

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CHECKED	JWM
Q.C.	JTS

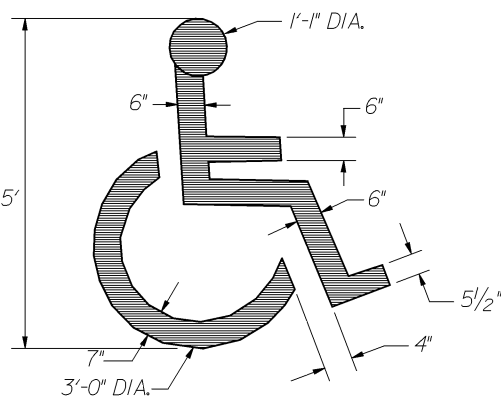


LEGEND	
R.E.	RIM ELEVATION
G.E.	GRATE ELEVATION
I.E.	INVERT ELEVATION
U.E.	UTILITY EASEMENT
—	SANITARY SEWER MANHOLE
—	SEWER LATERAL
—	STORM CATCH BASIN
—	FIRE HYDRANT, GATE VALVE & TEE ASSEMBLY
—	PROPOSED GATE VALVE
—	DIRECTION OF OVERLAND FLOW
X	HIGH POINT
FF+10.00	FINISHED FLOOR ELEVATION
---	EXISTING UTILITIES
---	EXISTING ELEVATION
---	PROPERTY LINE
---	EXISTING INFORMATION
---	PROPOSED INFORMATION
---	NEW CONCRETE SIDEWALK
---	EXISTING CONCRETE
---	PROPOSED OFFSITE ASPHALT
---	PROPOSED CONCRETE PAVERS

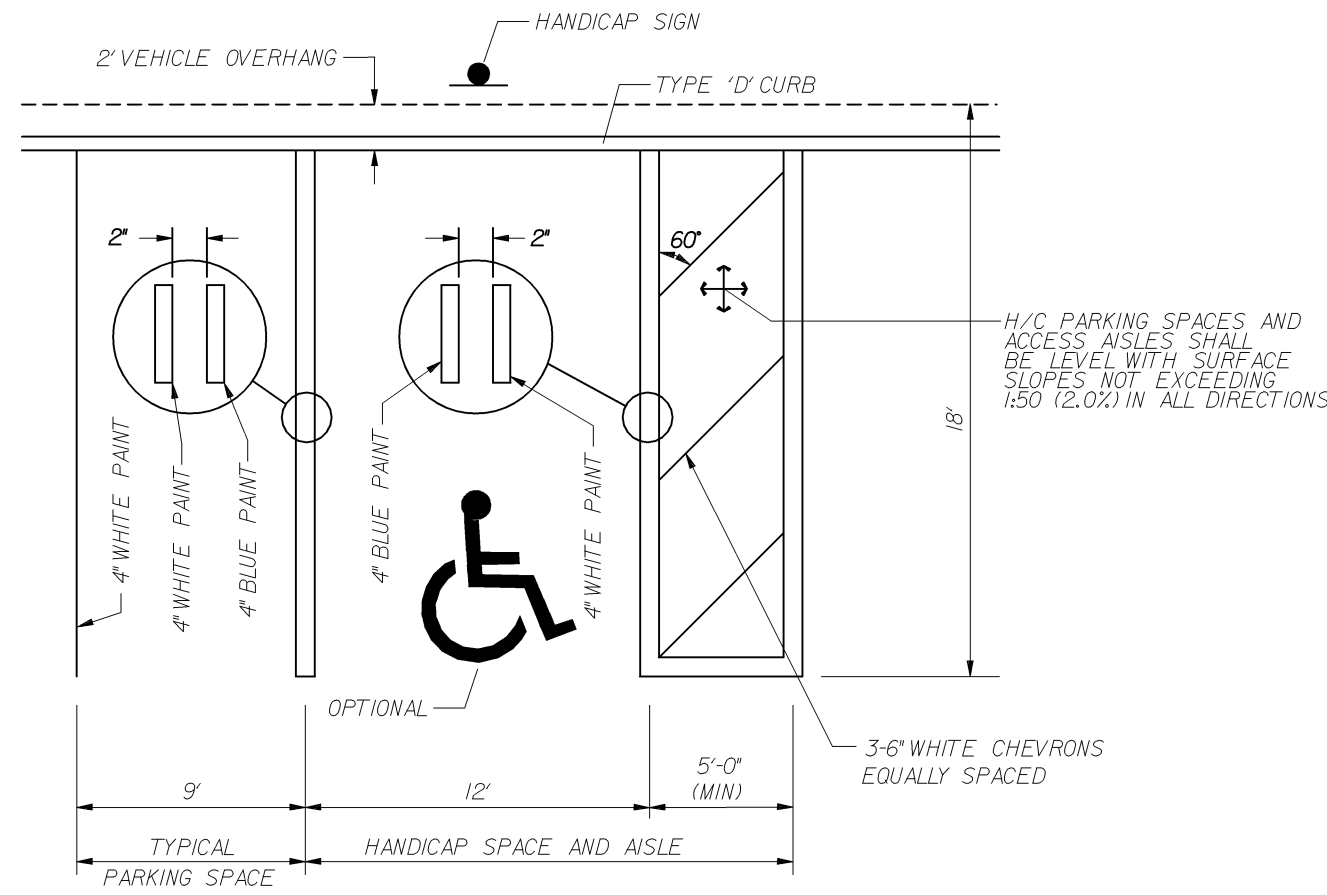




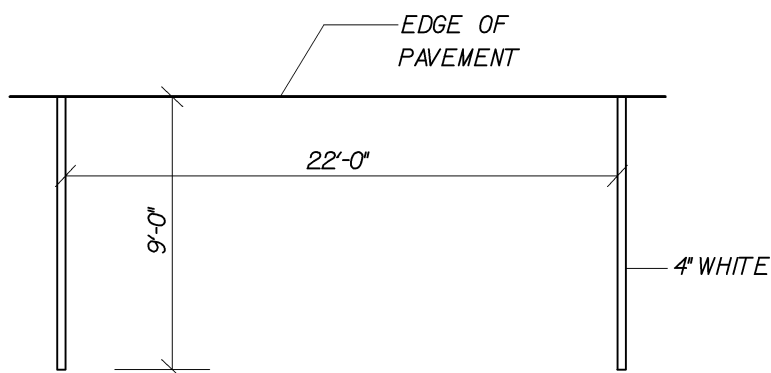
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N.T.S.



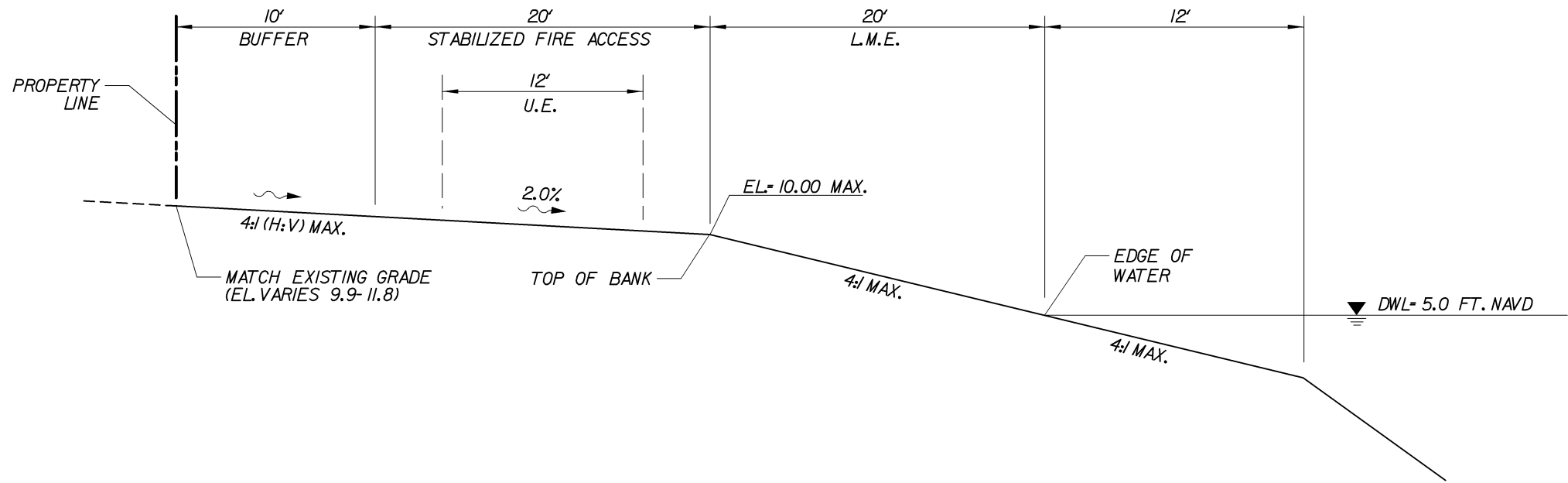
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PAINT DETAIL
N.T.S.



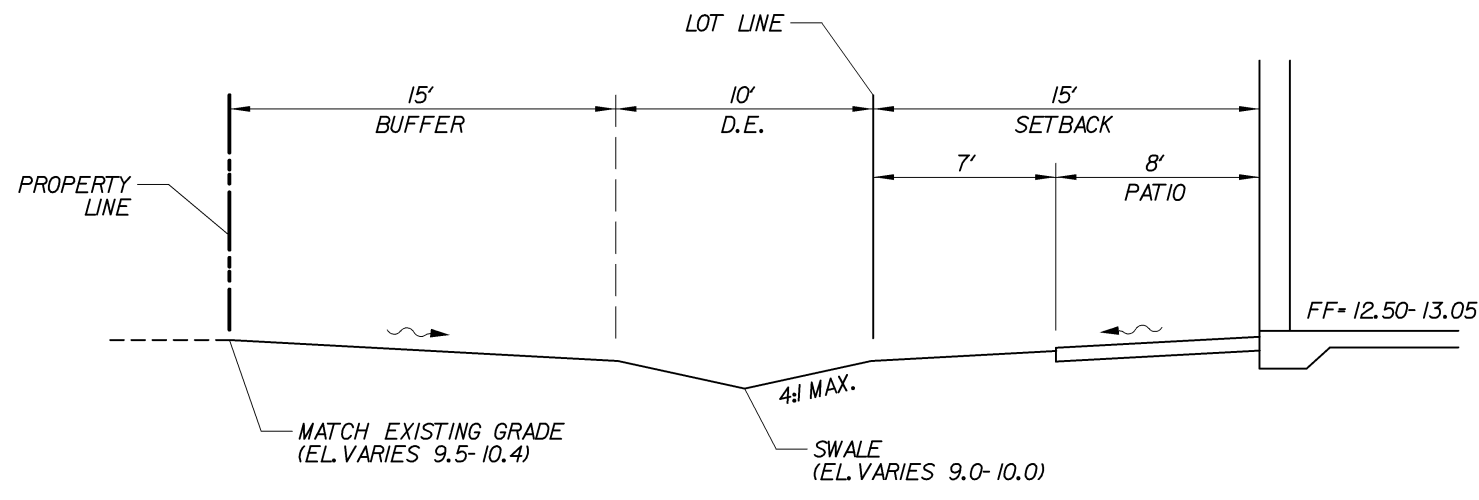
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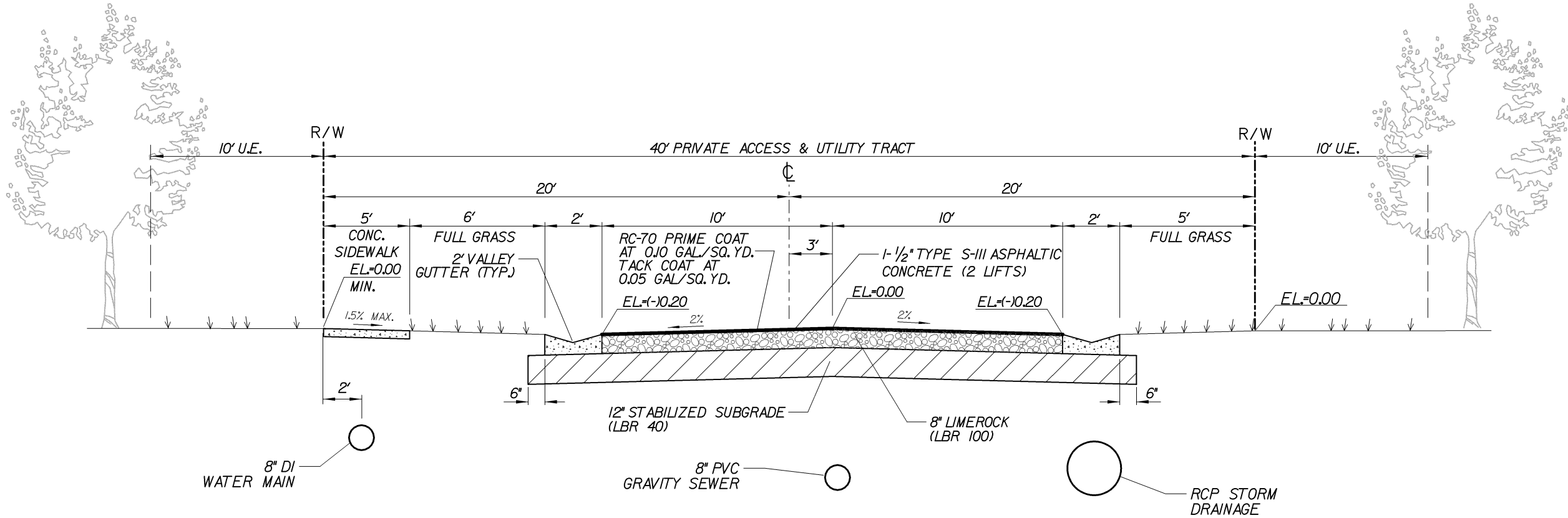
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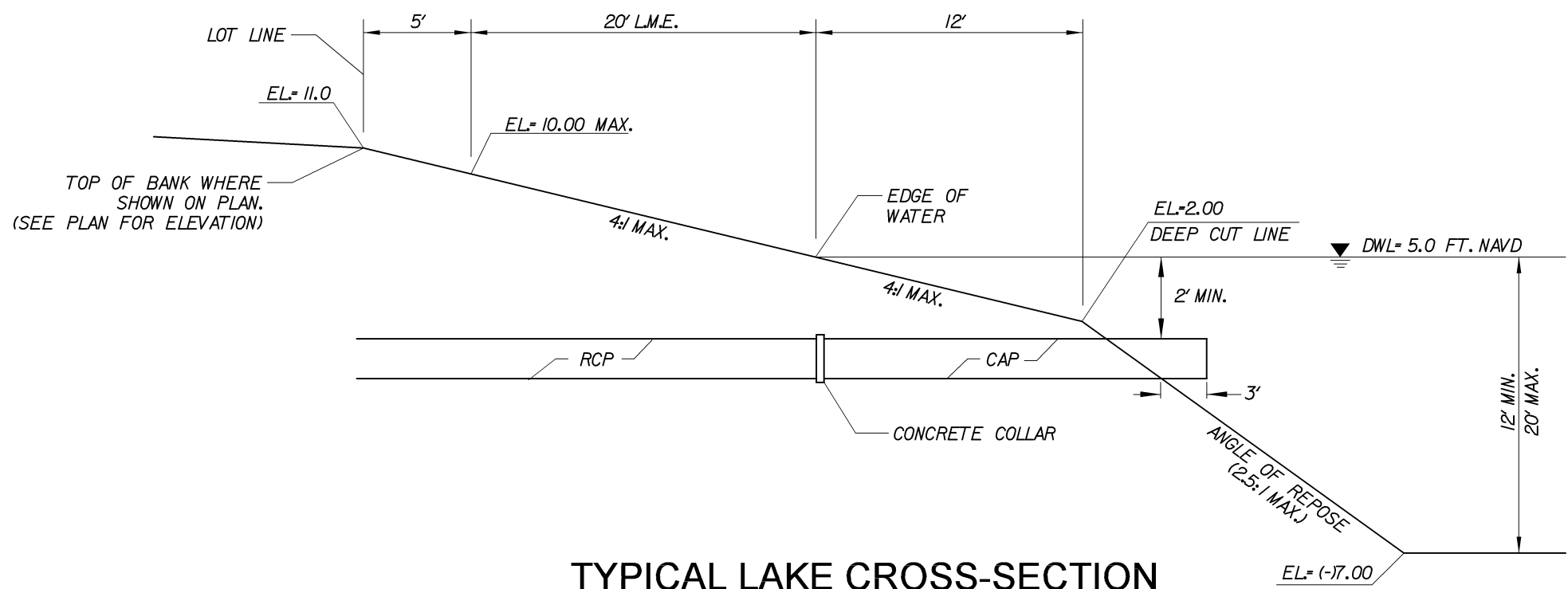
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SECTION "B"
N.T.S.



TYPICAL ROAD SECTION
40' ROAD TRACT
N.T.S.



TYPICAL LAKE CROSS-SECTION
N.T.S.

NOTE:
ALL ELEVATIONS ARE BASED UPON THE
NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

ORIGINAL:	OCT. 2022
REVISIONS:	
1	
2	
3	
4	
5	

PROJECT:	SPRINGDALE TOWNHOMES
TASK:	CONSTRUCTION DETAILS
LOCATION:	FLORIDA
MARGATE	

PROJECT:	SPRINGDALE TOWNHOMES
TASK:	CONSTRUCTION DETAILS
LOCATION:	FLORIDA
MARGATE	

Jeffrey T. Schnars, P.E.
Civil Engineer
Florida Registration No. 46697
(FOR THE FIRM)

JOB NO.	17180
DRAWN	RAD
DESIGNED	JTS
CHECKED	JWM
Q.C.	JTS
SHEET	5 OF 5

ATTACHMENT 2

BROWARD COUNTY'S ERU FACTOR



Public Works Department • Water & Wastewater Services

WATER & WASTEWATER ENGINEERING DIVISION

2555 West Copans Road • Pompano Beach, Florida 33369 • 954-831-0745 • FAX 954-831-0798/0925

EQUIVALENT RESIDENTIAL UNIT FACTORS

Date: April 2, 2012

Date Last Issued: October 1, 2011

Date First Issued: 1996

Broward County Water and Wastewater Services (WWS) uses Equivalent Residential Unit (ERU) factors for sizing water meters and determining certain fees and charges. By definition, one ERU equals a single family residence with a standard (5/8") meter. The following EQUIVALENT RESIDENTIAL UNIT FACTOR SCHEDULE lists ERU factors in terms of ERU per Unit for common types of use. To determine the ERU per Unit factor, locate the Type of Use in the table and note the Unit of Measure and ERU per Unit. For example, The Type of Use of Condominium/ Apartment is 0.707 ERU each and Merchandising is 0.185 ERU per 1000 SF (square feet of gross building area).

EQUIVALENT RESIDENTIAL UNIT FACTOR SCHEDULE

TYPE OF USE	UNIT OF MEASURE	ERU per UNIT	REF. CODE
Equivalent Residential Unit	----	1.000	----
Single Family House (5/8" meter)	each	1.000	R01
Single Family House (larger than 5/8" meter)	each	2.880	R02
Condominium/Apartment	each	0.707	R03
Mobile Home	lot	0.783	R04
Vehicular Repair	1000 SF	0.489	C01
Gas Station (fueling only)	fuel pump	0.353	C02
Laundry and/or Dry Cleaning (staff operated machines)	no longer a part of the schedule		C03
Laundry (coin operated machines)	1000 SF	6.560	C04
Merchandising	1000 SF	0.185	C05

TYPE OF USE	UNIT OF MEASURE	ERU per UNIT	REF. CODE
Warehouse (mixed use)	1000 SF	0.168	C06
Warehouse (homogenous, bulk storage use)	1000 SF	0.130	C07
Self-Service Storage	1000 SF	0.043	C08
Restaurant	1000 SF	1.788	C09
Fast Food Service	1000 SF	2.375	C10
Bar, Cocktail Lounge	no longer a part of the schedule		C11
Office	1000 SF	0.212	C12
Day Child Care	1000 SF	0.625	C13
Place of Worship	1000 SF	0.234	C14
School	student	0.043	C15
Hotel (with restaurant and/or meeting rooms)	has been replaced by C19		C16
Hotel (without restaurant and meeting rooms)	has been replaced by C19		C17
Movie Theater	no longer a part of the schedule		C18
Hotel	rental room	0.473	C19
Single Family Lot Irrigation	lot	2.582	I01
Landscape and Lawn Irrigation (under 20 acres)	1000 SF	0.549 less credit	I02
Road ROW Irrigation	1000 SF	0.538	I03

Most of the data for the Schedule was obtained in 2011 by determining the water usage characteristics for actual WWS customers for July 2009 through June 2010. The 2011 study included 21,894 apartments and condominiums; 4,493 mobile homes; 43,000 square feet of laundries; 819,000 square feet of merchandising; 3,865,000 square feet of warehousing; 710,000 square feet of self-service storage; 5,579,000 square feet of office space; 25,808 school students; 2,228 hotel rooms; and 952,000 square feet of landscape and lawn irrigation. In total, the 2011 study considered commercial customers with a total potable water consumption of 1,083,000 gallons per day, non-single family residential customers with a total potable water consumption of 3,494,000 gallons per day and irrigation with a total potable water consumption of 166,000 gallons per day.

The raw data used in the study contained a range of data points. To mitigate a small number of low or high data points skewing the result, WWED used the average of the 10th percentile through 90th percentile gallons per day per unit data points to calculate the values in the Schedule. Even so, the middle range of data used to calculate the ERU factor routinely had low values lower than 70% of the average and high values higher than 130% of the average.

Exhibit C

Economic Impact Study

Fiscal Impact Study for Nove of Margate

Date: October 18, 2023

Submitted by Peter Angelides, Ph.D., AICP

Submitted to Fimiani Development Corporation



ESI **ECONSULT**
SOLUTIONS INC.

economics | policy | strategy

Fimiani Development Corporation is proposing a 132-townhome community in Margate, Florida, on the site of the former Margate Executive Golf Course. The City requires a study of “The projected net fiscal impact on the tax base of the city.” This study serves as the required analysis.

The fiscal impact calculation is based on the current and anticipated future assessed value of the former Margate Executive Golf Course, 7870 and 7705 Margate Boulevard, which consists of two parcels. The parcels’ current combined assessed value of \$408,910 generates \$8,237 in total annual real estate taxes to the Broward County Government, Broward County School Board, SO Florida Water Management, and the City of Margate, based on 2023 millage rates (see Figure 1).¹

Figure 1: 2023 Millage Rates, Margate, Florida

	Millage Rate
Broward County Government	5.6690
Broward County School Board	6.6156
SO Florida Water Management	0.2589
City of Margate	7.6004
Total Millage	20.1439

Source: Broward County Property Appraiser (2023)

This analysis uses Broward County’s Tax Roll to estimate the projected assessed value of the future townhome development.² According to this source, the median property value (for improvements only) for townhomes in Margate, Florida is \$222,910 overall, and \$310,280 for townhomes constructed in 2010 or later. These values are used for the low-end and high-end estimates of the baseline anticipated real estate taxes for the future development (see Figure 2). The land value is not considered, as that is assumed to be unaffected by development. Therefore, the incremental increase in property value is understood to be determined by the anticipated change in improvement value only.

Figure 2: Median Assessed Values (Improvement Only), Townhomes in Broward County

	Properties	Median Land Value	Median Building Value	Median Overall Value
All Townhomes	1,955	\$16,400	\$222,910	\$239,310
Built 2010 or later	145	\$26,550	\$310,280	\$336,830

Source: Broward County Property Appraiser Tax Roll (2022)

¹ Parcel 4841 35 05 0030 has a 2023 assessed value of \$340,310 (its listed just/market value includes \$1,814,270 in land value and \$30,820 in improvement value), for \$6,855.17 in real estate taxes in 2023. Parcel 4841 35 08 0010 has a 2023 assessed value of \$68,600 (including \$38,520 in land value and \$30,080 in improvement value), for \$1,381.87 in real estate taxes.

² The dataset (a Microsoft Access file) was purchased from the Broward County Property Appraiser’s website on September 8, 2022. Properties are filtered by location (Margate, Florida) and use type and class (townhomes). Properties with building assessed values of less than \$1,000 are excluded from the analysis.

Impact on Property Tax Revenue

With an assessed value for improvements (excluding land value) of approximately \$29.4 to \$41.0 million based on comparable townhome developments elsewhere in Margate, this development is expected to generate an increase in annual property tax revenues of approximately \$592,000 to \$824,000 beyond the amount currently generated by the property (see Figure 3).

Figure 3: Anticipated Tax Revenue Increase Associated with the Development (without exemptions)

Tax Type	Current (improvement only)	Future (low end)	Future (high end)	Increase (low end)	Increase (high end)
County Government	\$325	\$166,805	\$232,185	\$166,480	\$231,860
County School Board	\$379	\$194,658	\$270,955	\$194,279	\$270,576
SO FL Water Management	\$15	\$7,618	\$10,604	\$7,603	\$10,589
City of Margate	\$436	\$223,635	\$311,289	\$223,199	\$310,853
Total	\$1,155	\$592,717	\$825,033	\$591,561	\$823,878

Source: Broward County Property Appraiser Tax Roll (2023), Econsult Solutions, Inc. (2023)

Homestead Exemption

Florida offers a homestead exemption of \$25,000 for school district taxes and \$50,000 for other real estate taxes (for properties assessed at \$75,000 or higher).³ Although not all properties would qualify for the homestead exemption, Figure 4 shows adjusted anticipated property values for properties with the homestead exemption.

Figure 4: Adjusted Anticipated Townhome Assessed Values (Improvement Only) for Fiscal Impact Calculations

	Median Value	Median Value with \$25,000 Exemption (School Board)	Median Value with \$50,000 Exemption (Other Taxes)
All Townhomes	\$222,910	\$197,910	\$172,910
Built 2010 or later	\$310,280	\$285,280	\$260,280

Source: Broward County Property Appraiser (2022)

Applying the 2023 millage rates (Figure 1) to the adjusted assessed values for the 132 townhomes, the anticipated increase in real estate tax revenue would range from approximately \$480,000 to \$713,000

³ Broward County Property Appraiser, <https://bcpa.net/homestead.asp> (accessed September 12, 2022).

beyond the amount currently generated by the property, if all 132 properties were to receive the homestead exemption (see Figure 5).⁴

Figure 5: Anticipated Tax Revenue Increase Associated with the Development (with all 132 townhomes receiving the Homestead Exemption)

Tax Type	Current (improvement only)	Future (low end)	Future (high end)	Increase (low end)	Increase (high end)
County Government	\$325	\$129,390	\$194,770	\$129,065	\$194,445
County School Board	\$379	\$172,827	\$249,123	\$172,447	\$248,744
SO FL Water Management	\$15	\$5,909	\$8,895	\$5,894	\$8,880
City of Margate	\$436	\$173,472	\$261,127	\$173,037	\$260,691
Total	\$1,155	\$481,598	\$713,915	\$480,443	\$712,760

Source: Broward County Property Appraiser Tax Roll (2023), Econsult Solutions, Inc. (2023)

⁴ For simplicity, the full amount of the homestead exemption is applied to the improvement value in this analysis. This provides a conservative estimate of the increased value with the homestead exemption in place.

Appendix A

About Econsult Solutions, Inc.

This report was produced by Econsult Solutions, Inc. (“ESI”). ESI is a Philadelphia-based economic consulting firm that provides businesses and public policy makers with economic consulting services in urban economics, real estate economics, transportation, public infrastructure, development, public policy and finance, community and neighborhood development, planning, as well as expert witness services for litigation support. Its principals are nationally recognized experts in urban development, real estate, government and public policy, planning, transportation, non-profit management, business strategy and administration, as well as litigation and commercial damages. Staff members have outstanding professional and academic credentials, including active positions at the university level, wide experience at the highest levels of the public policy process and extensive consulting experience.

<https://econsultsolutions.com/>

Appendix B

PETER A. ANGELIDES, PhD, AICP

Econsult Solutions, Inc.
1435 Walnut Street, 4th Floor
Philadelphia, PA 19102
215-717-2777
Email: angelides@econsultsolutions.com

EDUCATION

University of Minnesota

Doctor of Philosophy in Economics, February 1998
Master of Science in Economics, December 1996
Thesis topic: “Auto Ownership and Mode Choice: A Structural Approach”
Fields: Industrial Organization, Financial Economics

University of Pennsylvania

Master of City Planning, May 1988
Bachelor of Arts – Major: Urban Studies (Honors); Minor: Mathematics, May 1987

WORK EXPERIENCE

CURRENT POSITIONS

Econsult Solutions, Inc., Philadelphia, PA – President (Principal, 2013 –)

- Real estate development, transportation, economic development, economic and fiscal impacts, and financial modeling.

Passyunk Avenue Revitalization Corporation – Chair 2021 (Board 2019-)

Racquet Club of Philadelphia—President (Board of Governors 2016-)

Urban Land Institute –Technical Assistance Program Council, 2013, (Co-Chair, 2017-2020)

PAST POSITIONS

Econsult Corporation, Philadelphia, PA, *Vice President and Director*, 2008 – 2012.

PricewaterhouseCoopers, Philadelphia, PA, *Manager, Director*, 2001 – 2008

- Provided economic and statistical modeling and analysis in business consulting, litigation and regulatory matters.

- Major work included litigation support in a variety of industries and case-types, setting prices for intellectual property and services, and evaluating the impact of royalty licensing agreements.

Charles River Associates, *Senior Associate*, Washington, DC, 1999-2001

- Provided economic analysis, primarily for Fortune 500 companies seeking Federal regulatory approval for mergers or joint ventures. Antitrust, commercial damages.

PHB Hagler Bailly / Putnam, Hayes & Bartlett, *Consultant*, Washington, DC, 1997-1999

- Economic and litigation consulting in the telecom, energy, pharmaceutical, and postal industries

Wallace Roberts & Todd, Philadelphia, PA, *Urban and Environmental Planner*, 1990-1992

- Provided planning services to private developers, state and county government, and the Washington Metropolitan Area Transportation Authority.
- Projects included preparation of county level master plans, analyzing the impact of statewide zoning changes, updating municipal zoning codes, and preparation of environmental impact statements.

Central Philadelphia Development Corporation, *Planner/Intern*, 1988-1990

- Supported the activities of CPDC committees and conducted numerous analyses in support of CPDC's initiative to create what became the Center City District.

Delaware Valley Smart Growth Alliance – Juror, Board member, Treasurer – 2012-2021

Design Advocacy Group – Steering Committee, 2014-2020

Healthy Rowhouse Project – Philadelphia, PA – Working Team, 2014-2015

Healthy Rowhouse Project – Strategic Vision Team, Philadelphia, 2016-2018

Transportation Research Board, Washington, DC – TCRP G-15 Panel Member, 2015

St. Peter's School – Finance Committee, 2010-2016

Mayor's Task Force on Historic Preservation, Philadelphia, 2017-2019

American Institute of Certified Planners – Exam question writing task force, 2012-2018

PenTrans – Board of Directors, 2015

TEACHING

University of Pennsylvania, Philadelphia, PA

Jefferson University, Philadelphia, PA

University of Minnesota, Minneapolis, MN

SELECTED PROJECTS

Consulting and Planning

- Economic Development and Retail Revitalization Plans
 - Chester, PA – *Revitalization Plan for the Chester Transportation Center.*
 - Coatesville, PA – Economic Development Strategy
 - City of Coatesville, PA – *Vision plan and retail study as part of Coatesville’s economic development strategy*
 - City of Trenton, NJ – Analyzed the impact of the potential reconfiguration of Rt. 29.
 - Marcus Hook – *Economic Development Agenda for Marcus Hook.*
 - Media Borough, PA – Economic development, retail, and placemaking plan
 - Ohio City, Cleveland, OH – Economic development and retail analysis and strategy
 - Regional Municipality of Wood Buffalo (Alberta, Canada) – *Real Estate Solutions for the Regional Municipality.*
 - Rowan College at Gloucester County – Market feasibility analysis for several development scenarios, including student housing, retail, and an academic building.
 - Sussex County, DE – Economic development, retail, and placemaking plan
 - Williamsburg, VA – Economic development, retail, and placemaking plan
- Economic Impact Studies
 - ARIPPA – Economic and environmental impact of waste-coal fires power plants
 - Kentucky –Economic impact of a proposed coal mine on Kentucky.
 - SEPTA – *Understanding SEPTA’s Statewide Economic Impact.*
 - US Squash – Evaluated the economic impact of the new US Squash headquarters in Philadelphia
 - Virtua Health – Evaluated the economic impact of a new hospital facility.
 - Bethlehem Pedestrian Bridge - Feasibility and Impact Study
 - Marcal Paper plant – New Jersey
- Fiscal Impact Studies
 - Chappaqua School District – Evaluated the enrollment and fiscal impacts of proposed town zoning changes.
 - Concord Township – Evaluated fiscal impact of a proposed residential development on the host municipality and school district
 - Camden – Evaluated the fiscal impact of several development projects, including two phases of a mixed-use project on the waterfront and an industrial expansion
 - South Fayette Township – Evaluated fiscal impact of a proposed mixed use development. The analysis included a custom calculation of potential public school children likely to live in the development.
 - Upper Darby Township – Evaluated comminute impact of a proposed new middle school
 - Walden Neighborhood

- Market Studies
 - RAL – Market study for 1300 Fairmount Avenue
 - Camden, NJ – Proposed market rate apartments
 - Hoboken, NJ – North End Redevelopment Plan
 - State College – Proposed condominiums
 - Laurel Hill Cemetery – Market analysis
 - Willingboro – Reuse of JFK high school
- Affordable Housing
 - New Jersey Municipalities – Created a comprehensive methodology to assist municipalities calculate their “fair share” affordable housing obligations in Mt. Laurel cases in New Jersey, pursuant to the Mt. Laurel IV and Mt. Laurel V rulings in March 2015 and January 2017.
 - New Jersey Housing and Mortgage Finance Agency (HMFA) – Analyze the economic feasibility of multiple housing developments with and without tax credit assistance. (New Jersey). More than 40 projects evaluated since 2013.
 - New Jersey League of Municipalities – Analyzed a report quantifying each municipality’s “fair share” of affordable housing under the Mt. Laurel IV court case.
 - New Jersey Council On Affordable Housing (COAH)
 - Created a general real estate development feasibility model for COAH to review development proposals.
 - Analyzed housing and employment growth at the municipal level for purposes of determining affordable housing requirements in the state.
 - New Jersey Housing Mortgage and Finance Agency (HMFA) – *Analysis of Four HOPE VI Development Proposals*. Evaluated the appropriateness of development costs for several affordable housing projects. (New Jersey)
- Gaming
 - Commonwealth of Pennsylvania, Legislative Budget and Finance Committee - *The Current Condition and Future Viability of Casino Gaming in Pennsylvania*. Assessed the state of the casino industry in Pennsylvania, forecast future revenue for the state in the face of increasing competition from other states, identified profit enhancing regulatory changes, and estimated the value of potential additional forms of gaming.
- Tax Analyses
 - Philadelphia Growth Coalition – Modeling impacts on Philadelphia employment, real estate values and tax revenues from proposed changes in Philadelphia’s tax structure.
 - Earned Income Tax Calculations: Estimated the value of potential tax receipts if a community implemented an Earned Income Tax. Conducted the analysis for several communities, including:
 - Middletown Township, Bucks County
 - Bensalem Township, Bucks County

- Falls Township, Bucks County
 - Upper Darby Township, Delaware County
- Coalition for Main Street Fairness - *The Impact of Not Collecting Sales and Use Taxes from Internet Sales into Pennsylvania*. Analyzed the economic consequences to Pennsylvania if it were able to collect sales tax from all internet retailers (Pennsylvania)
- Philadelphia Parking Association – Analyzed impact of the Parking tax on the ability to construct new facilities profitably. Estimated the potential revenue from changes to meter rates, loading zone fees, and similar charges.
- Analyzed the impact of an increase in the statewide transfer tax on the overall level of sales before and after the imposition of the tax
- General Real Estate
 - Hoboken – Performing Arts Center Feasibility Study
 - Downtown DC BID – Employment Study
 - Lower Merion Township - Property tax estimates for a large mixed-use development.
 - Analyzed the potential for Tax increment Financing in a suburban Philadelphia municipality, including calculating financial benefits to the local jurisdictions.
 - Mantua township, NJ - Analyzed the demand for a liquor license and restaurant
 - University of Delaware – Participated in the creation of a strategic plan for a large newly acquired parcel adjacent to its main campus. (Newark, DE)
 - Philadelphia Water Department – *Economic Analysis of Stormwater Fee Changes on Philadelphia Businesses* (Philadelphia, PA)
 - King of Prussia Business Improvement District – Development Incentives Package For the King of Prussia Business Improvement District (King of Prussia, PA)
 - Studied strategic investments in commercial corridors in Philadelphia. The study combined extensive, locally unprecedented data gathering with thorough econometric analysis to investigate the drivers of commercial success for all 265 retail corridors in Philadelphia. The study included an examination of which City and non-profit based interventions in corridors were effective in improving corridor performance. The analysis also included a simulation tool to model and predict the impact of future interventions on corridors.
 - Lower Merion Township TOD - Evaluated proposals for the mixed-use, transit-oriented development in Ardmore, PA. Helped Lower Merion Township evaluate alternative development proposals for downtown Ardmore.
 - Bureau of Labor Statistics - *Analysis of Possible Data Sources for the Estimation of Owner Equivalent Rent*. Conducted four analyses for the BLS to help them improve calculation of the Consumer Price Index. (Washington, DC)
 - Parkway Council Foundation – Strategic plan (Philadelphia, PA)
- Transportation

- Delaware Valley Regional Planning Commission – *Using Toll Revenue to Finance Highway and Transit Capital Improvements*. Analyzed the ability of tolls on US 422 to finance roadway upgrades and the re-establishment of commuter rail service to Philadelphia. (Pennsylvania)
- Select Greater Philadelphia – *US 422 Improvements – Potential Economic Impacts*. Prepared an assessment of the potential economic impacts of restored passenger rail service and upgraded highway infrastructure in the US 422 corridor. (Pennsylvania)
- Central Philadelphia Development Corporation (CPDC) – Fiscal Impacts of the Proposed 22nd Street Subway Station. Evaluated potential economic and fiscal impacts. (Philadelphia, PA).
- Prepared Environmental Impact Statements for the Washington Metropolitan Transportation Authority as it sought regulatory approval for the expansion of its heavy rail network.
- Examined alternatives for reconfiguring Eakins Oval in front of the Philadelphia Museum of Art and the intersection of 25th Street, Pennsylvania Avenue, Kelly Drive and Fairmount Avenue.
- Surveyed users of parking and loading zones on Washington Avenue (Philadelphia, PA)
- Benefit-Cost Analysis
 - Many of these BCA's were prepared for Transportation Investment Generating Economic Recovery (TIGER), Better Utilizing Investments to Leverage Development (BUILD) and similar grant programs:
 - Akron – Bicycle and Pedestrian improvements
 - Atlantic Beach, South Carolina – Road, bicycle and pedestrian improvements.
 - Bronx River Alliance – Bronx River Greenway multiuse trail (New York City). \$10 million awarded.
 - Camden County – Bicycle trails
 - Central Philadelphia Development Corporation
 - Bicycle Lanes and Pedestrian Improvements to Market Street and JFK Boulevard (Philadelphia, PA)
 - Central Philadelphia Development Corporation – Renovation of Dilworth Plaza (Philadelphia, PA). \$15 million awarded.
 - Delaware River and Bay Authority – Bridge abutments protection project
 - Haddam and East Haddam – Side path for a swing bridge (Connecticut)
 - Hampton Roads transit – New bus garage
 - Hoboken – Rebuild by Design – Prepared a BCA for the proposed storm surge barrier in Hoboken, NJ. Submitted to the Army Corps of Engineers.
 - King of Prussia – New slip ramp from I-76 to First Avenue (King of Prussia, PA)
 - Lower Merion Township – Ardmore Transportation Center (Lower Merion, PA)
 - New Haven (City) – Downtown Crossing urban boulevard, Phase II (New Haven, CT)
 - Norwalk – Route 7 intersection redesign (Norwalk, CT)

- PATCO – Franklin Square station reopening (Philadelphia, PA). \$12 million awarded.
- Passaic County – Paterson-Hamburg Turnpike Intersection at Alps Road
- Passaic City – infrastructure upgrades along Main Avenue
- Philadelphia Museum of Art – Roadway and Pedestrian Concourse Improvements (Philadelphia, PA)
- Philadelphia Regional Port Authority
 - Infrastructure investment to improve capacity and warehousing (Philadelphia, PA)
 - Cargo capacity expansion
- Philadelphia City
 - Eakins Oval
 - Roosevelt Boulevard Infrastructure Improvements
 - Scattered Site Safety Improvements
- Sandusky, Ohio – Riverfront Greenway
- Streetworks – Quincy Green project (Quincy, MA)
- Waretown – Roadway Improvements for a New Town Center (Waretown, NJ)
- Secaucus Brownfield Development Corporation – Parking lot at the Lautenberg – Secaucus Train Station (Secaucus, NJ)
- Southeastern Pennsylvania Transportation Authority (SEPTA)
 - Track Segregation of the West Trenton line so CSX and SEPTA traffic does not intermix (Bucks County, PA). \$10 million awarded.
 - 19th and 37th Street stations ADA access.
 - 30th Street Station Rehabilitation. \$15 million awarded.
 - 5th Street Station Rehabilitation
 - Lawndale Grade Separation. \$5 million awarded.
 - Norristown – Bridgeport viaduct replacement
 - Grade Crossing improvements
- Tobyhanna Township – infrastructure improvements as part of the Pocono Summit Economic Development District
- Waterbury Connecticut – Waterbury Green bicycle path, access improvements and other greening elements (Waterbury, CT) \$10 million awarded
- Wilmington – Wilmington Riverfront Transportation Infrastructure Project. Full application. \$17 million awarded
- WILMAPCO – 7th Street improvements
- General Analysis
 - BWI Airport – Underlying demand factors driving retail sales at BWI airport
 - Delaware Valley Healthcare Funders – *The Economic and Fiscal Impacts of Medicaid Expansion in Pennsylvania*. Conducted analysis regarding the incremental effect of Medicaid expansion from the baseline set by the Affordable Care Act.
 - District of Columbia – Staffed the 2015 District of Columbia Infrastructure Task Force.

- Evaluated the rates and claims experience of a health plan for a major health insurance company investigating the cause of an increase in claims from one of its clients.
- Reviewed the numerical advertising claims of a software company for accuracy and appropriateness.
- New York City Economic Development Corporation – Assessed the competitiveness of trash collection market in New York City. (New York City Economic Development Corporation)

Litigation and Regulatory

- Regulatory
 - Analyzed the sales patterns of “premium cigars” by consolidating transaction level sales data from the leading online cigar retailers. (Submitted to the Food and Drug Administration)
 - Electricity Markets - market power analyses (Submitted to the Federal Energy Regulatory Commission)
 - Ancillary services for the California Independent System Operator on behalf of Pacific Gas & Electric and Southern Energy.
 - Market based rate authority for sale of ancillary services to ISO New England. (FERC Section 203)
 - Market power studies in support of the purchase by the Southern Company of several generating units in New England. (FERC Section 205)
 - Market power studies in support of the purchase by the Southern Company of several generating units in New York
 - Postal Rate Commission
 - Analyzed the rate structure of the U.S. Postal Service in an omnibus postal rates case, focusing on parcel post
 - Analyzed U.S. Postal Service volume forecasts and rate design for media mail and submitted testimony.
- Real Estate Litigation
 - New Jersey Municipalities – Created a comprehensive methodology to assist municipalities New Jersey Municipalities – Created a comprehensive methodology to assist municipalities calculate their “fair share” affordable housing obligations in Mt. Laurel cases in New Jersey, pursuant to the Mt. Laurel IV and Mt. Laurel V rulings in March 2015 and January 2017. Testified in trials in:
 - Mercer County
 - Middlesex County
 - Ocean County
 - Economic hardship analysis before the Philadelphia Historical Commission – Analyzed the financial feasibility of reusing historic structures.
 - Boyd Theater (2014)

- Royal Theater (2015)
- 1904-1920 Sansom Street (2015)
- Trinity Church Oxford (2017)
- St Laurentius (2020)
- 733 Chestnut (2022)
- 1206 Chestnut (2022)
- Evaluated the impact of water quality regulations on the feasibility of real estate developments in Monroe County, Pennsylvania
- Real Estate Tax Assessments – analyzed real estate tax appeals made by school districts in Pennsylvania. Projects included analyses on behalf of school districts and on behalf of taxpayers.
 - Upper Merion School District
 - Lower Merion School District
 - Maple-Newtown School District
 - Delaware County
 - Chester County
 - Downingtown Area School District
 - Coatesville Area School District
 - Monroe County
- Calculate potential escalation in construction costs during litigation related delay
 - Institute for Advanced Study
 - 625 N. Broad Street Associates
 - Hankin Group – Eagleview
 - Prickett Preserve at Edgewood
- Calculated potential damages to a real estate developer due to frivolous appeal of permits
- Calculated the value of an easement for a billboard in a property taking case.
- Analyzed the potential profitability of a real estate development as part of lawsuits between developers and their lenders
 - Single family home subdivision in the western suburbs of Kansas City
 - Single family home subdivision in the eastern suburbs of Kansas City
 - Vacation and primary residences in the Poconos – Monroe County, PA
- Calculated the damages to the developer of a \$1 billion condominium building in New York of delay in selling units because of an error in condominium documentation.
- Calculated the profitability of commercial real estate development along the Philadelphia waterfront in the absence of tax incentives.
- Calculated the value of a ground lease to the owners of an undeveloped restaurant pad.
- Analyzed the likely impact of a shopping center redevelopment on a lead tenant in the center.
- Calculated the fiscal impact of a tax credit to a developer on a municipality.
- Assessed the impact of a marijuana dispensary on nearby properties

- Variance approval – assessed the appropriateness of proposed developments.
- Calculated property value of cemeteries in assessment appeals cases.
- Intellectual Property Litigation and Analysis
 - Microsoft – Royalties for Windows Server protocols. Determined the appropriate royalty program, including royalty rates, maximums, minimums and other terms, for sets of Windows Server protocols that the European Union required Microsoft to License as part of the remedy in an antitrust case against Microsoft.
 - Microsoft – Impact of licensing. The analysis included calculating royalties paid, assessing the markets for products based on the licensed technology, and determining the ways in which the licensees' products were complimentary or competitive to the licensor's products.
 - Johnson & Johnson - Defended patent validity in a case involving an over-the-counter medication.
 - Determined damages in a copyright infringement case involving a luxury jewelry manufacturer and retailer.
 - For a direct response television marketer, determined damages in a copyright infringement case against a competing firm.
 - Analyzed a royalty distribution model used to determine payments to content creator in situations where no record of the originator of the content was kept.
 - Conducted reasonable royalty calculations in a patent infringement case. The case involved both the review of the Georgia-Pacific factors to determine a reasonable royalty, and a critique of another calculation of a reasonable royalty.
 - Modeled revenues for several pharmaceutical products in an intellectual property and breach of contract dispute.
- General Litigation
 - Reviewed, analyzed and critiqued an econometrically based damage analysis that estimated how quickly shares of stock in a publicly held company could sell on the London AIM market in a marital dissolution matter.
 - Calculated damages by valuing the lost advertising value of missed appearances of an injured performed on a national television show.
 - Calculated the damages from failure to divide proceeds from the sale of a business and the associated real estate evenly among the heirs of an estate.
 - Determined the appropriate cram down interest rate in a bankruptcy proceeding.
 - Assessed the ability of a private, for-profit, golf course to continue operations as a golf course by forecasting club profit and loss based on industry growth forecasts and financing commitments made by the owners of the course.
 - Calculated the impact of a municipal regulation severely restricting the sale of cigars in packages of fewer than five cigars.
 - Determined the appropriate discount rate to use in a marital dissolution matter.

- Assisted American Express in the preparation of its business interruption insurance claim related to damages suffered as a result of the September 11 attacks on the World Trade Center.
- Assisted a health insurance company investigate the impact of errors in claims processing on the appropriate purchase price of the company that made the errors
- Calculated damages to purchasers of variable universal life insurance, who allege they purchased policies based on misrepresentations made by the insurance agent.
- Calculated damages and analyzed opposing expert's report in a state-wide class action suit between a health insurance company and member pharmacies.
- Calculated damages to a not-for-profit organization from the allegedly wrongful actions of a local government.
- Calculated damages resulting from a company's withdrawal of its long-term care insurance products on its outside sales forces.
- For a large pharmaceutical company, evaluated the potential exposure of the company in a large class action lawsuit regarding drug pricing.
- Performed several analyses with respect to drug pricing for a large pharmaceutical company.
- In a suit alleging that an insurer with a retrospective workers compensation policy was overpaying claims, reviewed records of the largest claims to determine the appropriateness of the payments.
- Determined overcharges in a class-action dispute between resellers of toll-free 800 service and several Local Exchange Carriers.
- Conducted analyses, including a damages calculation, for an independent power producer in a breach of contract dispute with its host utility.
- Calculated damages in a breach of contract dispute between the owners of a chain of cell-phone kiosks in a major discount store with the host discount store.
- Wage Arbitration
 - City of Allentown – Assisted the City of Allentown, Pennsylvania negotiate with its police union.
 - Upper Darby Township – Tax Base Analysis for Upper Darby Township. Conducted a tax base analysis and testified at arbitration for Upper Darby as part of its contract negotiations with its police union. (Upper Darby, PA)
- Antitrust and Securities Litigation
 - 10b-5 damages for a provider of services to internet and small-scale retailers.
 - Evaluated the effect of the defendant's dealer-loyalty program on the ability of new entrants to gain market share.
 - 10b-5 damages against the auditors of a manufacturer of building supplies.
 - CBS-Viacom Merger Review - evaluated the effect on the broadcast advertising market, the market for the sale of first-run television programs to the networks, and

- the sale of syndicated shows to the local broadcast stations. (Federal Trade Commission)
- Coastal and El Paso Merger Review - evaluated horizontal overlaps in several geographic regions. (Federal Trade Commission).
 - El Paso and Southern Company Joint Venture review - evaluated several market overlaps and investigated the validity of the government's anticompetitive theories, especially vertical exclusion issues (Federal Trade Commission).
 - Diageo, Pernod, and Seagrams merger review - evaluated the effect of the combination of brands on the consumer. (Department of Justice)

RELEVANT SKILLS

COURSES TAUGHT

University of Pennsylvania, 2004-present

CPLN 502/633: Urban and Regional Economics

CPLN 502: Urban Redevelopment and Infrastructure Finance

CPLN 540: Introduction to Property Development

CPLN 705: Studio

GAFL 622/522: Economic Principals of Public Policy

GAFL 724/534: Infrastructure Investment and Economic Growth

URBS 456: Economics and Urban Affairs

Jefferson University, 2021

MRE 620: Urban Revitalization

University of Minnesota, 1993-1997

Cost - Benefit Analysis, Industrial Organization, Welfare Economics, Principals of Microeconomics, Intermediate Microeconomics, Principals of Macroeconomics, International Trade and Payments

STUDENTS SUPERVISED

Joshua Warner – Commercial Corridor Revitalization. University of Pennsylvania, PhD in City Planning, 2020

Mengke Chen – *Agglomeration Economies and High Speed Rail*. University of Pennsylvania, PhD in City Planning, Independent Study, 2012

Jonathan Broder – *New York City Highline*. University of Pennsylvania, Master of Liberal Arts, Capstone Paper, 2011

University of Pennsylvania Studio – *Cost Benefit Analysis for High Speed Rail in the Northeast Corridor*, City Planning Studio, 2011

Allyson Randolph – *The Reinvestment Fund in Baltimore: A Model for CDFI Expansion*. University of Pennsylvania, Master of Liberal Arts, Capstone Paper, 2009

Scott Zeigler – *Identifying Housing Bubbles: An Analytical Approach*. University of Pennsylvania, Master of Liberal Arts, Capstone Paper, 2008

John Culbertson – *Microfinance*. University of Pennsylvania, Master of Liberal Arts, Capstone Paper, 2007

PROFESSIONAL MEMBERSHIPS

American Economics Association

American Planning Association

American Institute of Certified Planners

Urban Land Institute

Last updated August 2, 2022



1435 Walnut Street, 4th Floor, Philadelphia, PA 19102
Econsultsolutions.com | 215-717-2777

Exhibit D

1 Mile Radius Zoning Map

Exhibit E

Locational Map

Nove of Margate Margate, Florida

GENERAL LOCATION MAP

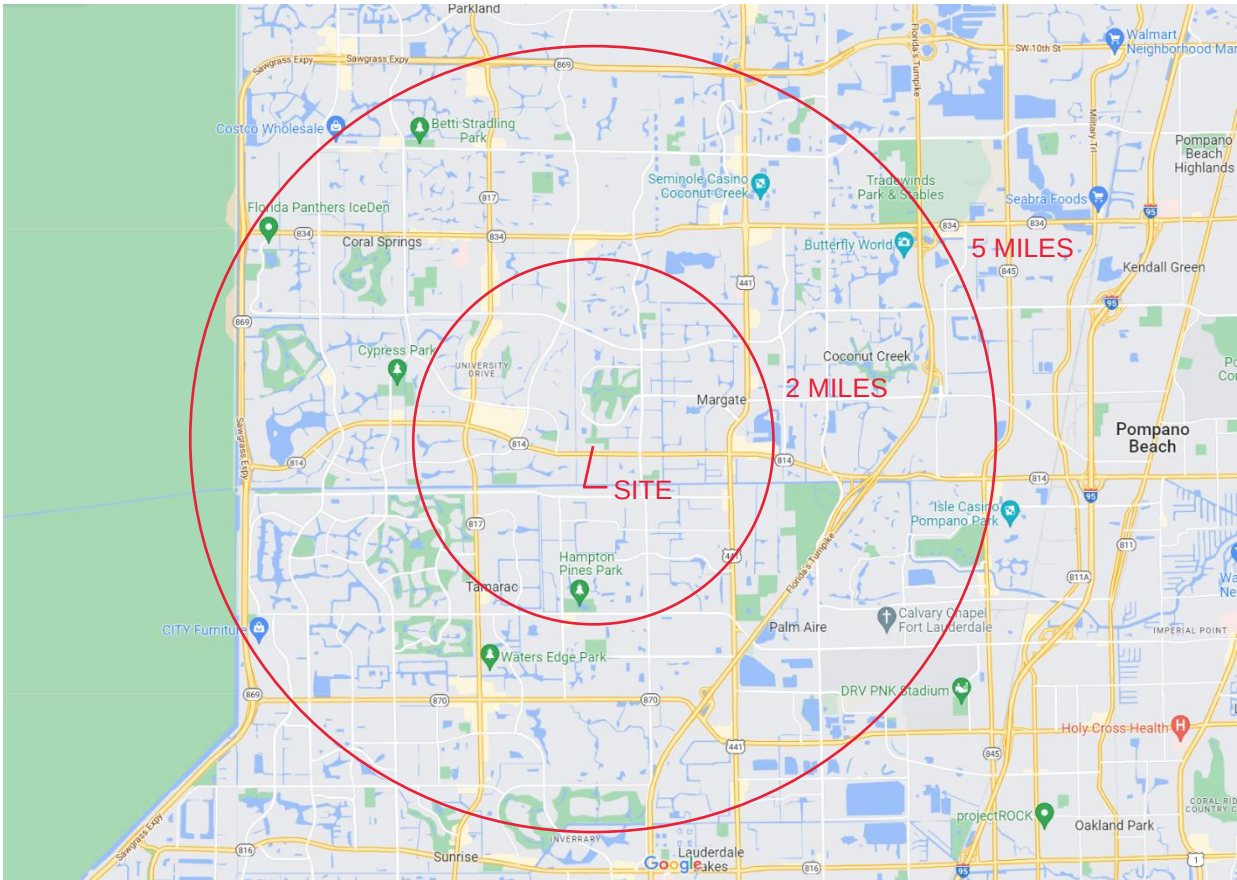


Exhibit F

Drainage Calculations

Surface Water Management Calculations

For:

Nove of Margate

City of Margate, Florida

Jeffrey T. Schnars, Professional Engineer, State of Florida, License No. 46697.

This item has been digitally signed and sealed by Jeffrey T. Schnars, P.E. on 10/16/2023.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Date: October 16, 2023

Project No. 17180

Prepared By:

Jeffrey T. Schnars, P.E.

Civil Engineer

Florida Reg. No. 6640

(FOR THE FIRM)

COA No. 6640

SCHNARS
ENGINEERING CORPORATION

947 Clint Moore Road, Boca Raton, Florida 33487

Phone: 561-241-6455

Fax: 561-241-5182

Nove of Margate Drainage Report

Project Introduction/Location

The proposed project is a redevelopment of the existing and inactive Margate Executive Golf Course into a new 132-unit residential town home community. The site is comprised of two parcels totaling 21.30 acres of land that are located on the north side of Atlantic Blvd., west of Rock Island Road and south of Margate Blvd. in the City of Margate. The entire golf course site is anticipated to be demolished to accommodate the new residential community.

Existing Conditions

This surface water management responsibility for the property lies within the governmental jurisdictional agencies of South Florida Water Management District (SFWMD), Broward County, and the City of Margate. The subject property is an inactive golf course facility and, according to our research, there are no available SFWMD permits for the properties. It appears all the surrounding lands drain through the properties including the existing Oriole Homes Golf and Tennis Club (SFWMD Permit No. 06-00144-S) north of Margate Blvd. The site has a public and City of Margate 30' drainage flowage easement. The flow must be maintained, and new flowage easements will be granted to each of the adjacent property owners. The subject properties flow south unrestricted to the SFWMD C-14 canal via the City of Margate drainage system. To establish the existing permitting criteria, a pre-development analysis of the water quality and quantity will be performed. The site will be cleared and graded to accommodate the new community. Any loss of the golf course site storage, soil storage, and an increase in the impervious area above the original conditions will require supplemental detention.

Stormwater Treatment

In accordance with SFWMD criteria, detention for water quality purposes shall be provided in the amount of 2.5 inches times the percentage of imperviousness or the first inch of runoff, whichever is greater. The water quality volume will be detained in the proposed on-site lakes and will be greater than pre-development volume. The site is located within an impaired water body discharge area and will require an additional 50% water quality detention volume and a pre-post nutrient analysis, see attached map. According to the attached BMP analysis, the pre-development nutrient loadings exceed the post development nutrient loadings and will not require additional pre-treatment.

Stormwater Attenuation

The surface water management system will consist of a series of catch basins and pipe which will direct runoff to the proposed on-site lakes that will be designed to protect the proposed finished floor elevation above the calculated 100 year-3 day zero discharge storm elevation, the elevation specified by FEMA (Zone AE) + 1 foot, the Broward County Future Conditions 100 year flood elevation, or 18 inches above the average adjacent road crown, whichever is higher. According to the SFWMD C-14 East basin criteria, off-site discharge will be limited to 69.2 CSM at the 25 year – 3 day storm event. However, since the site is currently flowing unrestricted, off-site discharge will be limited to the pre-development stages in the SFWMD C-14 canal via the existing City of Margate drainage system. The crown of the on-site roadway will be designed above the Broward County 10 year flood map elevation and the calculated 10 year - 1 day storm event elevation.

Drainage Summary

Federal Emergency Management Agency (FEMA) Flood Zones

According to the FEMA FIRM Community Panel Number 12011C0355H dated August 18, 2014, as published by the Federal Emergency Management Agency (FEMA), the site contains the following flood designations: Zone AE, base flood elevations of 10.0' and 11.0' NAVD and Zone X.

The proposed calculated stages below are consistent with the pre-development criteria as follows:

Storm Event	Pre- Dev. Flood Contour	B.C. Map	City of Margate	This Proj. Calculated/ Proposed
Finished Floor 100year-3day	10.76'NAVD	12.50' NAVD	FEMA 11'+1' = 12.0' NAVD	10.74' NAVD 12.50' NAVD
25 year-3 day	10.02' NAVD			9.30' NAVD 9.30' NAVD
Road Crown 10 year-1 day	8.11' NAVD	10.5' NAVD		7.54' NAVD 10.50' NAVD
Discharge Allowable Proposed	Unrestricted			
Lake Design Water	5.00' NAVD	5.00' NAVD	5.00' NAVD	5.00' NAVD
Water Quality Det. & El.	1.78 ac-ft 5.92' NAVD			2.67 ac-ft 5.68' NAVD

Post-Development Surface Water Management Calculations

For:

Nove of Margate

City of Margate, Florida

Nove of Margate

Margate, Florida

Schnars Engineering Corp. Project No. 17180

SFWMD SURFACE WATER MANAGEMENT CALCULATIONS

<u>1) SITE AREA DATA:</u>	<u>ACRES:</u>	<u>2) STAGE ELEVATIONS: (NAVD)</u>
<u>Land Use</u>		<u>Percent:</u> <u>From:</u> <u>To:</u>
Buildings	3.81 Ac.	17.9% 12.50 up
Roads/Park	2.95 Ac.	13.8% 10.30 11.75
Lake	3.79 Ac.	17.8% 5.00 up
Lake Bank	1.64 Ac.	7.7% 5.00 10.00
Driveways	1.22 Ac.	5.7% 10.50 13.00
Green	6.59 Ac.	30.9% 10.00 13.00
S/W Courts Patios	1.30 Ac.	6.1% 10.50 13.00
N/A	<u>0.00 Ac.</u>	<u>0.0%</u> 0.00 0.00
TOTAL:	21.30 Ac.	100%

Total Impervious:	13.07 61.36%	Average Existing Grade: 10.40 NAVD
		Average Proposed Grade: 10.97 NAVD
		(B.C. Future Cond.) Lake, Water Table: 5.0 NAVD
Total Pervious:	8.23 38.64%	Depth to Water Table: 6.0 ft.

2) FLOOD AND RAINFALL CRITERIA:

24 Hour Rainfall:		
5 Year	7.25 in.	
10 Year	8.00 in.	Min. Road Crown: 10.50 NAVD
25 Year	9.565 in.	
100 Year	13.245 in.	Min. Floor Elevation: 12.50 NAVD

Soil Storage:

Depth to	Natural Available	Developed Available
Water Table (ft.)	Storage (in.)	Storage (in.)
3.00	4.40	3.30
4.00	6.80	5.10

Maximum Available Soil Storage, SFWMD: 5.1 in. Depressional Stor.

3) COMPUTE STAGE STORAGE: (Stage = FT, NAVD; Storage = AC-FT)

<u>Stage:</u>	<u>Roads/Par</u>	<u>Driveways</u>	<u>Green</u>	<u>Lake</u>	<u>S/W</u> <u>Courts</u> <u>Patios</u>	<u>N/A</u>	<u>Lake</u> <u>Bank</u>	<u>Total:</u>
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.50	0.00	0.00	0.00	1.90	0.00	0.00	0.04	1.94
6.00	0.00	0.00	0.00	3.79	0.00	0.00	0.16	3.95
6.50	0.00	0.00	0.00	5.69	0.00	0.00	0.37	6.06
7.00	0.00	0.00	0.00	7.58	0.00	0.00	0.66	8.24
7.50	0.00	0.00	0.00	9.48	0.00	0.00	1.03	10.51
8.00	0.00	0.00	0.00	11.37	0.00	0.00	1.48	12.85
8.50	0.00	0.00	0.00	13.27	0.00	0.00	2.01	15.28
9.00	0.00	0.00	0.00	15.16	0.00	0.00	2.62	17.78
9.50	0.00	0.00	0.00	17.06	0.00	0.00	3.32	20.38
10.00	0.00	0.00	0.00	18.95	0.00	0.00	4.10	23.05
10.50	0.04	0.00	0.27	20.85	0.00	0.00	4.92	26.08
11.00	0.50	0.06	1.10	22.74	0.07	0.00	5.74	30.21
11.50	1.46	0.24	2.47	24.64	0.26	0.00	6.56	35.63
12.00	2.88	0.55	4.39	26.53	0.59	0.00	7.38	42.32
12.50	4.35	0.98	6.86	28.43	1.04	0.00	8.20	49.86

Nove of Margate

Margate, Florida

Schnars Engineering Corp. Project No. 17180

SWFMD SURFACE WATER MANAGEMENT CALCULATIONS

4) WATER QUALITY:

Greater of the following (5A. & 5B.)

Store the first inch for the entire site or the amount of 2.5 times the percentage of imperviousness.

A. First Inch:

$V = 1 \text{ in.} \times \text{Total Area} \times 1 \text{ ft./12 in.}$

<u>Total (Ac.):</u>	<u>V = (ac-ft)</u>
21.30	1.78

B. 2.5 Times Percent Impervious:

1. Site Area = Total Area - (Lake Area + Bldg. Area)

<u>Total (Ac.):</u>	<u>Lake:</u>	<u>Bldg.:</u>	<u>Site (Ac.):</u>
21.30	3.79	3.81	13.70

2. Impervious Area = Site Area - Pervious Area

<u>Site (Ac.):</u>	<u>Pervious:</u>	<u>Imperv.:</u>
13.70	8.23	5.47

3. Percent Impervious = Impervious Area / Site Area x 100

39.93 % is less than 60% and will not require dry pre

4. 2.5 in. x % Imperv x (Total Area - Lake Area) x 1 ft./12 in.

<u>Treated (in.)</u>	<u>V=(ac-ft)</u>
1.00	1.46

C. Total Required Detention:

1. The total required detention for water quality is either the first inch or 2.5 times the percent whichever is greater. The total required detention

<u>Water Quality (ac-ft):</u>	<u>Water Quality (Elev.):</u>
2.67	5.68 NAVD

Includes 50% additional for impaired water discharge

3. Allowable C-14 Basin discharge: 69.2 CSM

<u>Total (Ac.):</u>	<u>Allow CFS</u>
21.30	2.30

Nove of Margate

Margate, Florida

Schnars Engineering Corp. Project No. 17180

SFWMD SURFACE WATER MANAGEMENT CALCULATIONS

5) RUNOFF (ZERO DISCHARGE)

A. Soil Storage

1. Soil Storage (S) = Available Soil Storage x Pervious Area/Total Area
(See F-1, SFWMD ERP Manual Vol.II)

Av. Soil St.	Pervious:	Total (Ac.)	S = (in.):
5.10	8.23	21.30	1.97

B. 100 Yr.-3 Day Storm Event

Finished Floor Elevation: **12.50 NAVD**

1. Rainfall - 3 Day Duration (P):

$$P72 = P24 \times 1.359$$

P24 = 13.245 in.

P72 = 18.00 in.

2. Runoff, Q (in.)

$$Q = \{(P - 0.2 \times S)^2\} / (P + 0.8 \times S)$$

P72 (in.):	S = (in.):	Q (in.):
18.00	1.97	15.83

3. Total Runoff Volume, V (ac-ft.)

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

Q (in.):	Total (Ac.):	V=(ac-ft.):
15.83	21.30	28.10

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between... 10.50 11.00

Interpolate Runoff between... 26.08 30.21

Stage: 10.74 NAVD

The stage is at or below the Minimum Finished Floor Elevation.

C. 25 Yr.-3 Day Storm Event (Perimeter Berm)

1. Rainfall - 3 Day Duration (P):

$$P72 = P24 \times 1.359$$

P24 = 9.565 in.

P72 = 13.00 in.

2. Runoff, Q (in.)

$$Q = \{(P - 0.2 \times S)^2\} / (P + 0.8 \times S)$$

P72 (in.):	S = (in.):	Q (in.):
13.00	1.97	10.90

3. Total Runoff Volume, V (ac-ft.)

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

Q (in.):	Total (Ac.):	V = (ac-ft.):
10.90	21.30	19.35

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between... 9.00 9.50

Interpolate Runoff between... 17.78 20.38

Stage: 9.30 NAVD

Nove of Margate

Margate, Florida

Schnars Engineering Corp. Project No. 17180

SFWMD SURFACE WATER MANAGEMENT CALCULATIONS

D. 10 Yr.-1 Day Storm Event (Roadway Criteria)

1. Rainfall - 1 Day Duration (P):

P24 = 8.00 in.

2. Runoff, Q (in.)

$$Q = \{(P - 0.2 \times S)^2\} / (P + 0.8 \times S)$$

<u>P24 (in.):</u>	<u>S = (in.):</u>	<u>Q (in.):</u>
8.00	1.97	6.04

3. Total Runoff Volume, V (ac-ft.)

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

<u>Q (in.):</u>	<u>Total (Ac.):</u>	<u>V = (ac-ft.):</u>
6.04	21.30	10.72

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between...	7.50	8.00
Interpolate Runoff between...	10.51	12.85

Stage: 7.54 NAVD

E. 5 Yr.-1 Day Storm Event

Minimum Road Crown Elev: **10.50 NAVD**

1. Rainfall - 1 Day Duration (P):

P24 = 7.25 in.

2. Runoff, Q (in.)

$$Q = \{(P - 0.2 \times S)^2\} / (P + 0.8 \times S)$$

<u>P24 (in.):</u>	<u>S = (in.):</u>	<u>Q (in.):</u>
7.25	1.97	5.33

3. Total Runoff Volume, V (ac-ft.)

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

<u>Q (in.):</u>	<u>Total (Ac.):</u>	<u>V = (ac-ft.):</u>
5.33	21.30	9.46

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between...	7.00	7.50
Interpolate Runoff between...	8.24	10.51

Stage: 7.27 NAVD

The stage is at or below the Minimum Road Crown Elevation.

Nove of Margate

Margate, Florida

Schnars Engineering Corp. Project No. 17180

SWFMD SURFACE WATER MANAGEMENT CALCULATIONS

6) SITE AREA BREAKDOWN:

<u>Land Use</u>	<u>Pervious</u>		<u>Impervious</u>		<u>Total</u>
Buildings	0.00	Ac.	3.81	Ac.	3.81 Ac.
Roads/Park	0.00	Ac.	2.95	Ac.	2.95 Ac.
Lake	0.00	Ac.	3.79	Ac.	3.79 Ac.
Lake Bank	1.64	Ac.	0.00	Ac.	1.64 Ac.
Driveways	0.00	Ac.	1.22	Ac.	1.22 Ac.
Green	6.59	Ac.	0.00	Ac.	6.59 Ac.
S/W Courts F	0.00	Ac.	1.30	Ac.	1.30 Ac.
N/A	<u>0.00</u>	Ac.	<u>0.00</u>	Ac.	<u>0.00</u> Ac.
Totals:	8.23	Ac.	13.07	Ac.	21.30 Ac.

7) SUMMARY

Required Water Quality Storage:	2.67 ac-ft
Site Soil Storage:	1.97 in
B.C. 100 yr. Future Cond. Flood Map El.:	12.5' NAVD
FEMA 100 yr. 2021 Flood Map El.:	Flood Zone AE (11.0') NAVD
City of Margate Min. FF El.:	AE (11.0) + 1' NAVD
B.C. 10 yr. Flood Map El.:	10.5' NAVD

POST DEVELOPMENT ZERO DISCHARGE

5 Yr.-1 Day Storm:	9.46 ac-ft	7.27 NAVD Stage Elevation
10 Yr.-1 Day Storm:	10.72 ac-ft	7.54 NAVD Stage Elevation
25 Yr.-3 Day Storm:	19.35 ac-ft	9.30 NAVD Stage Elevation
100 Yr.-3 Day Storm:	28.10 ac-ft	10.74 NAVD Stage Elevation

FLOOD ROUTINGS

5 Yr.-1 Day Storm:	N/A NAVD	N/A cfs Disch.
10 Yr.-1 Day Storm:	N/A NAVD	N/A cfs Disch.
25 Yr.-3 Day Storm:	N/A NAVD	N/A cfs Disch.

<u>DATE PRINTED:</u>	<u>PREPARED BY:</u>	<u>REVISED BY:</u>	<u>DATE:</u>
16-Oct-23	JWM	JTS	

Pre-Development
Surface Water Management Calculations

For:

Nove of Margate

City of Margate, Florida

Nove of Margate (formerly Margate Executive G.C.)

Margate, Florida

Project No. 17180

PRE-DEVELOPMENT SFWMD SURFACE WATER MANAGEMENT CALCULATIONS

<u>1) SITE DATA:</u>	<u>ACRES:</u>	<u>2) STAGE ELEVATIONS (NAVD):</u>
<u>Landuse</u>		<u>Percent:</u> <u>From:</u> <u>To:</u>
Buildings	0.01 Ac.	0.0%
Pavement	0.60 Ac.	2.8%
Lake	1.80 Ac.	8.5%
Lake Bank	0.82 Ac.	3.8%
Green	18.07 Ac.	84.8%
Lots	0.00 Ac.	0.0%
N/A	0.00 Ac.	0.0%
N/A	<u>0.00 Ac.</u>	<u>0.0%</u>
TOTAL AREA:	21.30 Ac.	100%

Total Impervious:	2.41 11.31%	Average Existing Grade:	10.66
		Average Proposed Grade:	11.00
		Lake, Water Table:	5.00
Total Pervious:	18.89 88.69%		

2) FLOOD AND RAINFALL CRITERIA:

24 Hour Rainfall:			
10 Year	8.00 in.	Min. Road Crown:	10.09 NAVD
25 Year	9.57 in.		
100 Year	13.245 in.	Min. Floor Elev:	11.89 NAVD

Maximum Available Soil Storage, SFWMD: 5.1 in. Depressional Storage

3) COMPUTE STAGE STORAGE: (Stage = FT, NAVD; Storage = AC-FT)

<u>Stage:</u>	<u>Pavement</u>	<u>Green</u>	<u>Lots</u>	<u>Lake</u>	<u>N/A</u>	<u>N/A</u>	<u>Lake Bank</u>	<u>Total:</u>
5.00								0.00
5.50								0.97
6.00								2.05
6.50								3.22
7.00								4.49
7.50								5.86
8.00								7.33
8.50								8.92
9.00								10.66
9.50								12.68
10.00								15.45
10.50								20.02
11.00								26.81
11.50								35.14
12.00								44.37
								54.12

See Geopak calculations

Nove of Margate (formerly Margate Executive G.C.)

Margate, Florida

Project No. 17180

PRE-DEVELOPMENT SFWMD SURFACE WATER MANAGEMENT CALCULATIONS

4) WATER QUALITY:

Greater of the following (4A and 4B)

Store the first inch for the entire site or the amount
of 2.5 times the percentage of imperviousness.

A. First Inch:

$V = 1 \text{ in.} \times \text{Total Area} \times 1 \text{ ft./12 in.}$

<u>Total (Ac.):</u>	<u>V = (ac-ft)</u>
21.30	1.78

B. 2.5 Times Percent Impervious:

1. Site Area = Total Area - (Lake Area + Bldg. Area)

<u>Total (Ac.):</u>	<u>Lake:</u>	<u>Bldg.:</u>	<u>Site (Ac.):</u>
21.30	1.80	0.01	19.49

2. Impervious Area = Site Area - Pervious Area

<u>Site (Ac.):</u>	<u>Pervious:</u>	<u>Imperv.:</u>
19.49	18.89	0.60

3. $2.5 \text{ in.} \times \text{Imperv./Site} \times \text{Total Area} \times 1 \text{ ft./12 in.}$

<u>Imperv.:</u>	<u>V=(ac-ft)</u>
0.6	0.14

C. Total Required Detention:

1. The total required detention for water quality is either the first inch or 2.5 times the percent impervio
whichever is greater. The total required detention is:

<u>Water Quality (ac-ft):</u>	<u>Water Quality (elev):</u>
1.78	5.92

5) RUNOFF (ZERO DISCHARGE)

A. Soil Storage

1. Soil Storage (S) = Available Soil Storage x Pervious Area/Total Area

(See C-35, SFWMD Vol.IV)

<u>Av. Soil St.</u>	<u>Pervious:</u>	<u>Total (Ac.):</u>	<u>S = (in.):</u>
5.10	18.89	21.30	4.52

Nove of Margate (formerly Margate Executive G.C.)

Margate, Florida

Project No. 17180

PRE-DEVELOPMENT SFWMD SURFACE WATER MANAGEMENT CALCULATIONS

B. 100 Yr.-3 Day Storm Event

Finished Floor Elevation: 11.89 NAVD

1. Rainfall - 3 Day Duration (P):

$$P72 = P24 \times 1.359$$

P24 = 13.245 in.

P72 = 18.00 in.

2. Runoff, Q (in.)

$$Q = \{(P - 0.2 \times S)^2\} / (P + 0.8 \times S)$$

<u>P72 (in.):</u>	<u>S = (in.):</u>	<u>Q (in.):</u>
18.00	4.52	13.52

3. Total Runoff Volume, V (ac-ft.)

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

<u>Q (in.):</u>	<u>Total (Ac.):</u>	<u>V=(ac-ft):</u>
13.52	21.30	24.00

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between...	10.50	11.50
------------------------------	-------	-------

Interpolate Runoff between...	20.02	35.14
-------------------------------	-------	-------

Stage: 10.76

The stage is at or below the Minimum Finished Floor Elevation.

C. 25 Yr.-3 Day Storm Event (Basin Design)

1. Rainfall - 3 Day Duration (P):

$$P72 = P24 \times 1.359$$

P24 = 9.57 in.

P72 = 13.01 in.

2. Runoff, Q (in.)

$$Q = \{(P - 0.2 \times S)^2\} / (P + 0.8 \times S)$$

<u>P72 (in.):</u>	<u>S = (in.):</u>	<u>Q (in.):</u>
13.01	4.52	8.81

3. Total Runoff Volume, V (ac-ft.)

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

<u>Q (in.):</u>	<u>Total (Ac.):</u>	<u>V = (ac-ft):</u>
8.81	21.30	15.64

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between...	10.00	11.00
------------------------------	-------	-------

Interpolate Runoff between...	15.45	26.81
-------------------------------	-------	-------

Stage: 10.02

Nove of Margate (formerly Margate Executive G.C.)

Margate, Florida

Project No. 17180

PRE-DEVELOPMENT SFWMD SURFACE WATER MANAGEMENT CALCULATIONS

D. 10 Yr.-1 Day Storm Event (Local Road Criteria)

Min. Road Elevation 10.09 NAVD

1. Rainfall - 1 Day Duration (P):

P24 = 8.00 in.

2. Runoff, Q (in.)

$$Q = \{(P - 0.2 \times S)^2 / (P + 0.8 \times S)\}$$

<u>P24 (in.):</u>	<u>S = (in.):</u>	<u>Q (in.):</u>
8.00	4.52	4.33

3. Total Runoff Volume, V (ac-ft.)

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

<u>Q (in.):</u>	<u>Total (Ac.):</u>	<u>V = (ac-ft):</u>
4.33	21.30	7.69

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between...	8.00	9.00
------------------------------	------	------

Interpolate Runoff between...	7.33	10.66
-------------------------------	------	-------

Stage: 8.11

The stage is at or below the Minimum Road Crown Elevation.

6) SUMMARY

Required WQ Storage: 1.78 ac-ft

Soil Storage: 4.52 in

ZERO DISCHARGE

10 Yr.-1 Day Storm:	7.69 ac-ft	8.11 NAVD Stage Elevation
---------------------	------------	---------------------------

25 Yr.-3 Day Storm:	15.64 ac-ft	10.02 NAVD Stage Elevation
---------------------	-------------	----------------------------

100 Yr.-3 Day Storm:	24.00 ac-ft	10.76 NAVD Stage Elevation
----------------------	-------------	----------------------------

FLOOD ROUTING

10 Yr.-1 Day Storm:	N/A NAVD	N/A cfs Disch.
---------------------	----------	----------------

25 Yr.-3 Day Storm:	N/A NAVD	N/A cfs Disch.
---------------------	----------	----------------

<u>DATE PRINTED:</u>	<u>PREPARED BY:</u>	<u>REVISED BY:</u>	<u>DATE:</u>
16-Oct-23	JTS		

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Project No. 17180

PRE-DEVELOPMENT SFWMD SURFACE WATER MANAGEMENT CALCULATIONS

7) Site Data Breakdown:

<u>Landuse</u>	<u>Pervious</u>		<u>Impervious</u>		<u>Total</u>	
Buildings	0.00	Ac.	0.01	Ac.	0.01	Ac.
Pavement	0.00	Ac.	0.60	Ac.	0.60	Ac.
Lake	0.00	Ac.	1.80	Ac.	1.80	Ac.
Lake Bank	0.82	Ac.	0.00	Ac.	0.82	Ac.
Green	18.07	Ac.	0.00	Ac.	18.07	Ac.
Lots	0.00	Ac.	0.00	Ac.	0.00	Ac.
N/A	0.00	Ac.	0.00	Ac.	0.00	Ac.
<u>N/A</u>	<u>0.00</u>	<u>Ac.</u>	<u>0.00</u>	<u>Ac.</u>	<u>0.00</u>	<u>Ac.</u>
Totals:	18.89	Ac.	2.41	Ac.	21.30	Ac.


```

*****
**
** Plane To TIN Volume Report -- Thu May 19 12:57:29 2022
**
** From Elevation <14.000> to TIN <17180_exist.tin>
**
** Prismoïdal Volume
**
*****
**
** Total Cut =          137459.332 Cubic Yards
** Total Fill =          65.547 Cubic Yards
** Area =          103136.983 Sq Yards
** Balance =          137393.784 Cubic Yards
**
** Elevation Range Used
** 5.000 to 5.500      Cut = 1569.229   Fill = 0.000
** 5.500 to 6.000      Cut = 1735.793   Fill = 0.000
** 6.000 to 6.500      Cut = 1890.626   Fill = 0.000
** 6.500 to 7.000      Cut = 2047.476   Fill = 0.000
** 7.000 to 7.500      Cut = 2208.864   Fill = 0.000
** 7.500 to 8.000      Cut = 2380.507   Fill = 0.000
** 8.000 to 8.500      Cut = 2565.731   Fill = 0.000
** 8.500 to 9.000      Cut = 2802.417   Fill = 0.000
** 9.000 to 9.500      Cut = 3262.699   Fill = 0.000
** 9.500 to 10.000     Cut = 4456.444   Fill = 0.000
** 10.000 to 10.500    Cut = 7386.815   Fill = 0.000
** 10.500 to 11.000    Cut = 10945.905   Fill = 0.000
** 11.000 to 11.500    Cut = 13434.684   Fill = 0.000
** 11.500 to 12.000    Cut = 14892.138   Fill = 0.000
** 12.000 to 12.500    Cut = 15737.449   Fill = 0.000
** 12.500 to 13.000    Cut = 16353.457   Fill = 0.000
** 13.000 to 13.500    Cut = 16783.196   Fill = 0.000
** 13.500 to 14.000    Cut = 17004.024   Fill = 0.000
**
** Boundary Polygon Used
*****

```

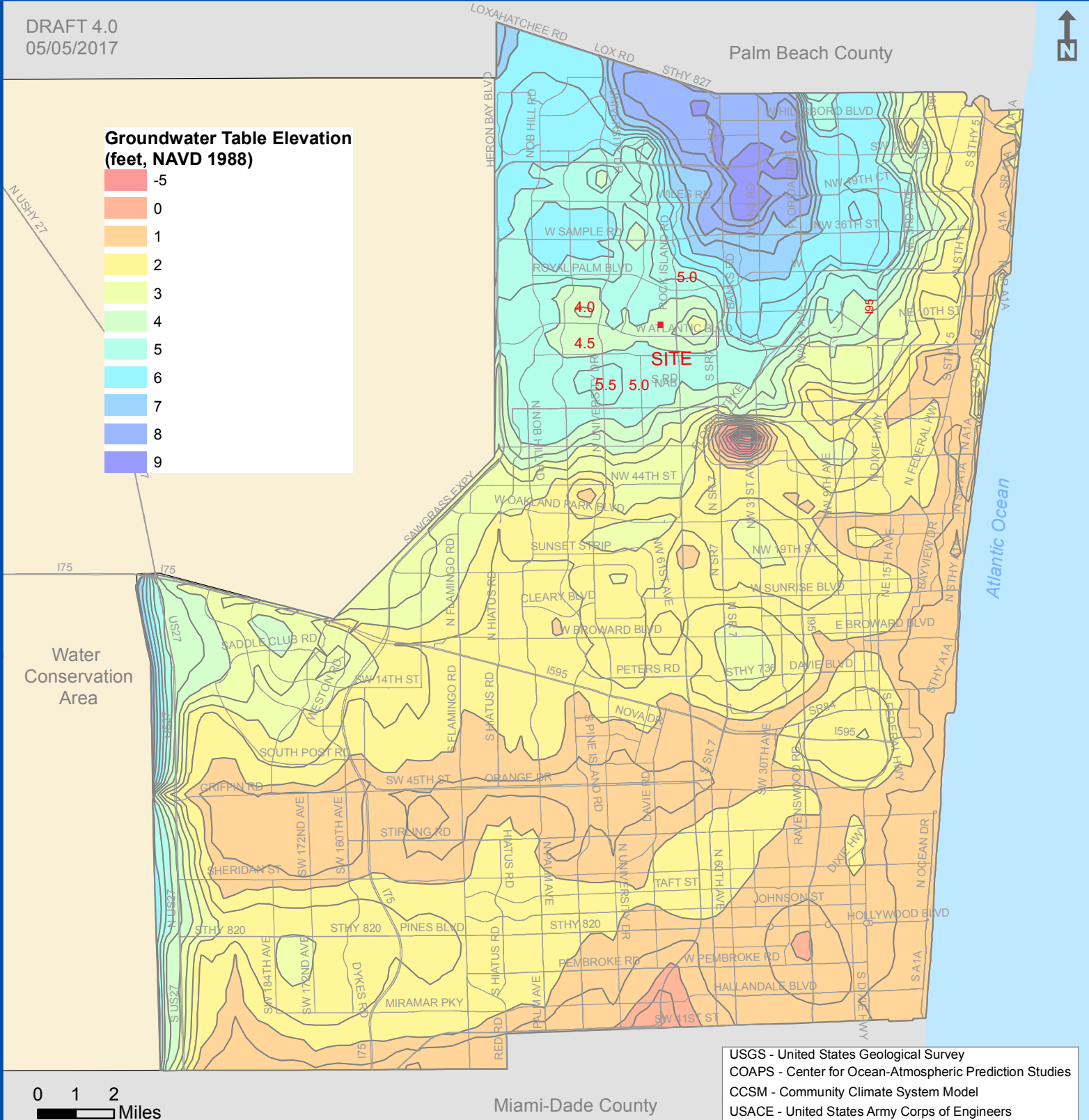
Nove of Margate

City of Margate, Florida

“Maps”

DRAFT 4.0
05/05/2017

Groundwater Table Elevation (feet, NAVD 1988)



USGS - United States Geological Survey
COAPS - Center for Ocean-Atmospheric Prediction Studies
CCSM - Community Climate System Model
USACE - United States Army Corps of Engineers
NRC3 - National Research Council Curve 3
NAVD 88 - 1988 North American Vertical Datum

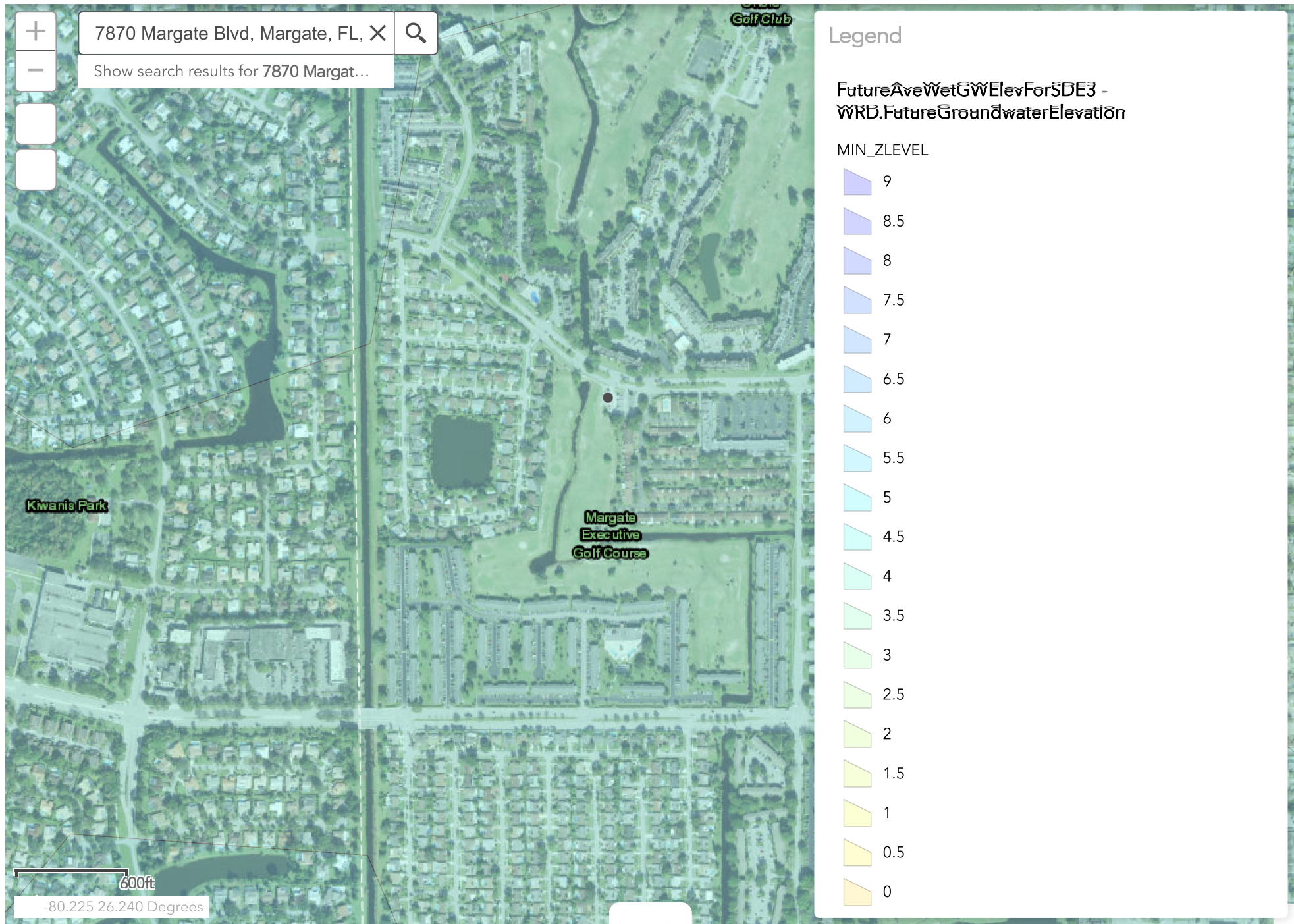
Division Name: Environmental Planning and Community Resilience
Department Name: Environmental Protection and Growth Management

The map represents the expected future average wet season groundwater elevations for Broward County. The average is based on model outputs for the months of May through October over the period of 2060-2069. The models used are The Broward County Inundation Model and the Broward County Northern Variable Density model, both developed by the USGS and MODFLOW based. The future conditions that are modified in the models are both precipitation and sea level rise. The future precipitation pattern is based on the COAPS downscaled CCSM global model and represents an increase of 9.1% rainfall from the base case of 1990-1999 (53.4 in/yr to 58.2 in/yr). Sea level rise was based on the USACE NRC3 curve which equates to an increase of 26.6 to 33.9 inches to the future period from 1992 levels. Final results are presented in NAVD 88.

This map is for planning purposes and should not be used for legal boundary determinations.

Future Conditions Groundwater Elevation

Average Wet Season



ENVIRONMENTAL RESOURCE PERMIT APPLICANT'S HANDBOOK VOLUME II
Effective: MAY 22, 2016

Appendix A: SFWMD - ALLOWABLE DISCHARGE FORMULAS

<u>Canal</u>	<u>Allowable Runoff</u>	<u>Design Frequency</u>
C-1	$Q = \frac{(112 + 31) A}{\sqrt{A}}$	10 year
C-2	Essentially unlimited inflow by gravity connections southeast of Sunset Drive: 54 CSM northwest of Sunset Drive	200 year +
C-4	Essentially unlimited inflow by gravity connections east of S.W. 87 th Avenue	200 year +
C-6	Essentially unlimited inflow by gravity connections east of FEC Railroad	200 year +
C-7	Essentially unlimited inflow by gravity connection	100 year +
C-8	Essentially unlimited inflow by gravity connection	200 year +
C-9	Essentially unlimited inflow by gravity connection east of Red Road; 20 CSM pumped, unlimited gravity with development limitations west of Red Road or Flamingo Blvd.	100 year +
C-10	-----	200 year +
C-11	20 CSM west of 13A; 40 CSM east of 13A	-----
C-12	90.6 CSM	25 year
C-13	75.9 CSM	25 year
C-14	69.2 CSM	25 year
C-15	70.0 CSM	25 year
C-16	62.6 CSM	25 year
C-17	62.7 CSM	25 year
C-18	41.6 CSM	25 year
C-19	57.8 CSM	-----
C-23	31.5 CSM	10 year
C-24	30.25 CSM	10 year
C-25	$Q = \frac{(47 + 28) A}{\sqrt{A}}$ (Under Review)	10 year
C-38	31.1 CSM (subject to restrictions of Basin Rule)	10 year
C-40, 41, 41A	35.4 CSM	10 year
Hillsboro Canal (east of S-39)	35 CSM	25 year
North New River (east of S-34)	70.8 CSM	25 year
Everglades Ag. Area (all canals)	20 CSM	5 year
L-28	11.8 CSM	-----
C-51	35 CSM east of Turnpike; 27 CSM west of Turnpike (subject to restrictions of Basin Rule)	10 year
C-100, 100A, 100B, 100C, 100D:	$Q = \frac{(104 + 43) A}{\sqrt{A}}$	10 year
C-102	$Q = \frac{(119 + 25) A}{\sqrt{A}}$	10 year
C-103N, C103-S	$Q = \frac{(107 + 39) A}{\sqrt{A}}$	10 year

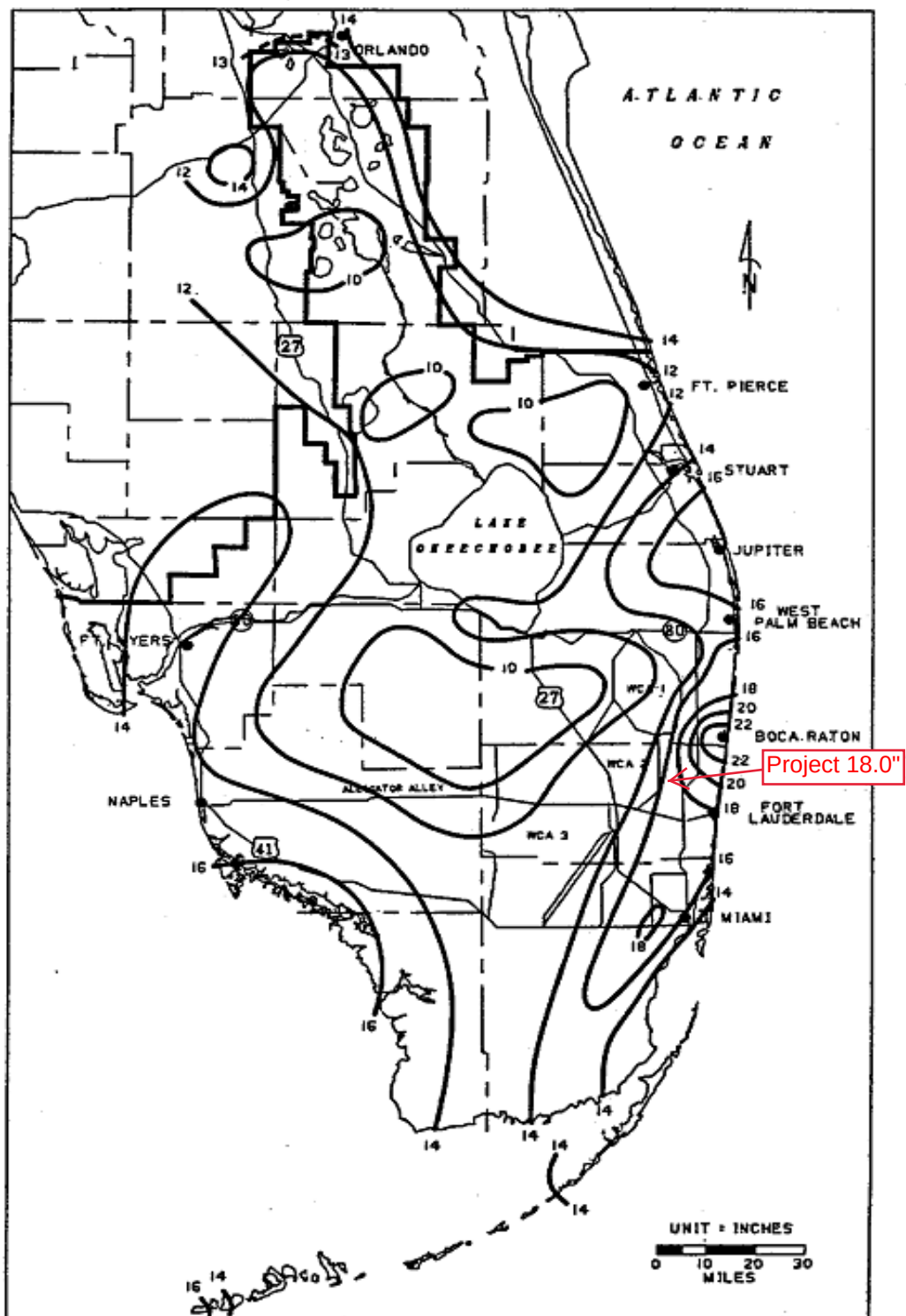


FIGURE C-9. 3-DAY RAINFALL: 100-YEAR RETURN PERIOD

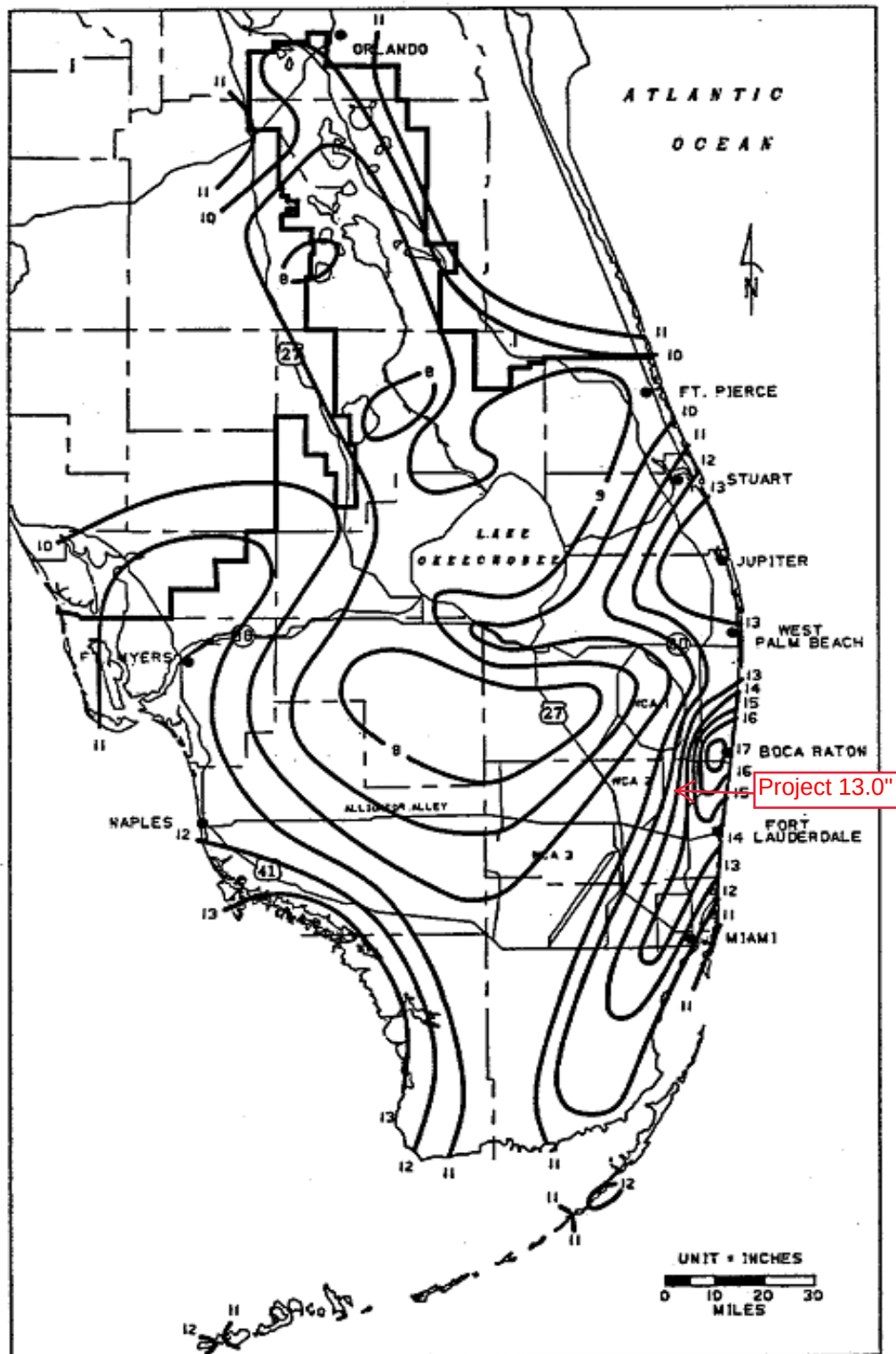


FIGURE C-8. 3-DAY RAINFALL: 25-YEAR RETURN PERIOD

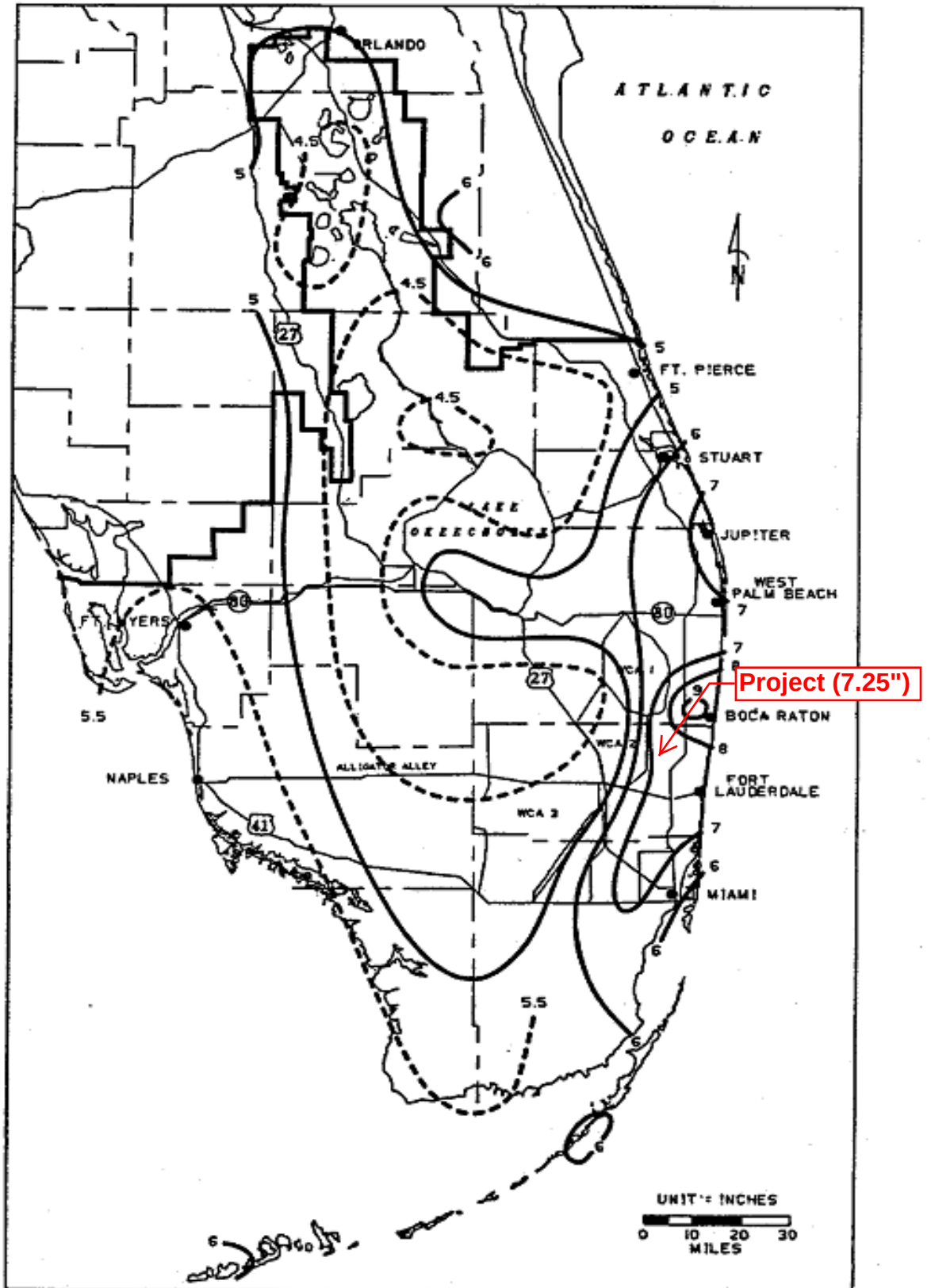


FIGURE C-3. 1-DAY RAINFALL: 5-YEAR RETURN PERIOD

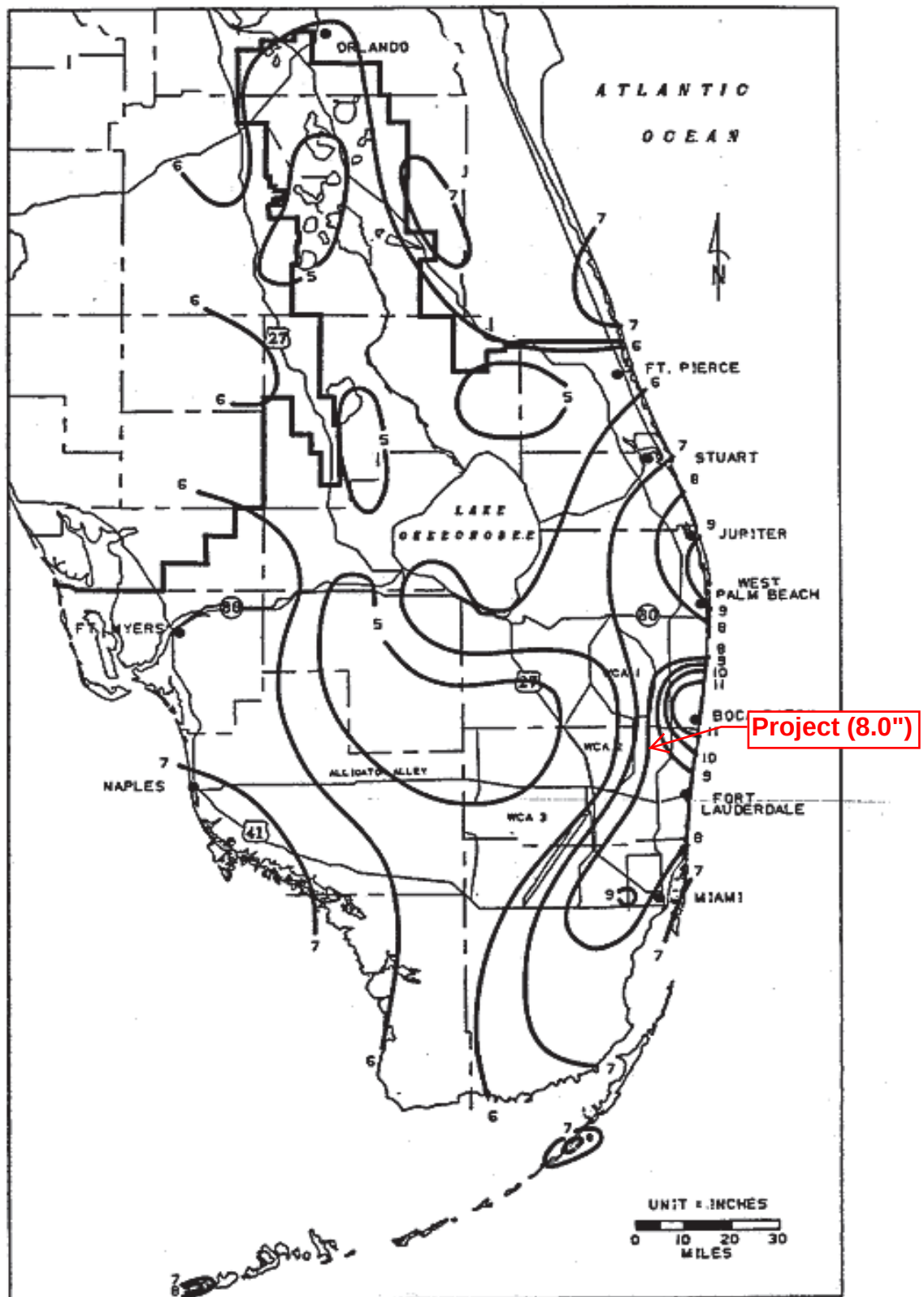
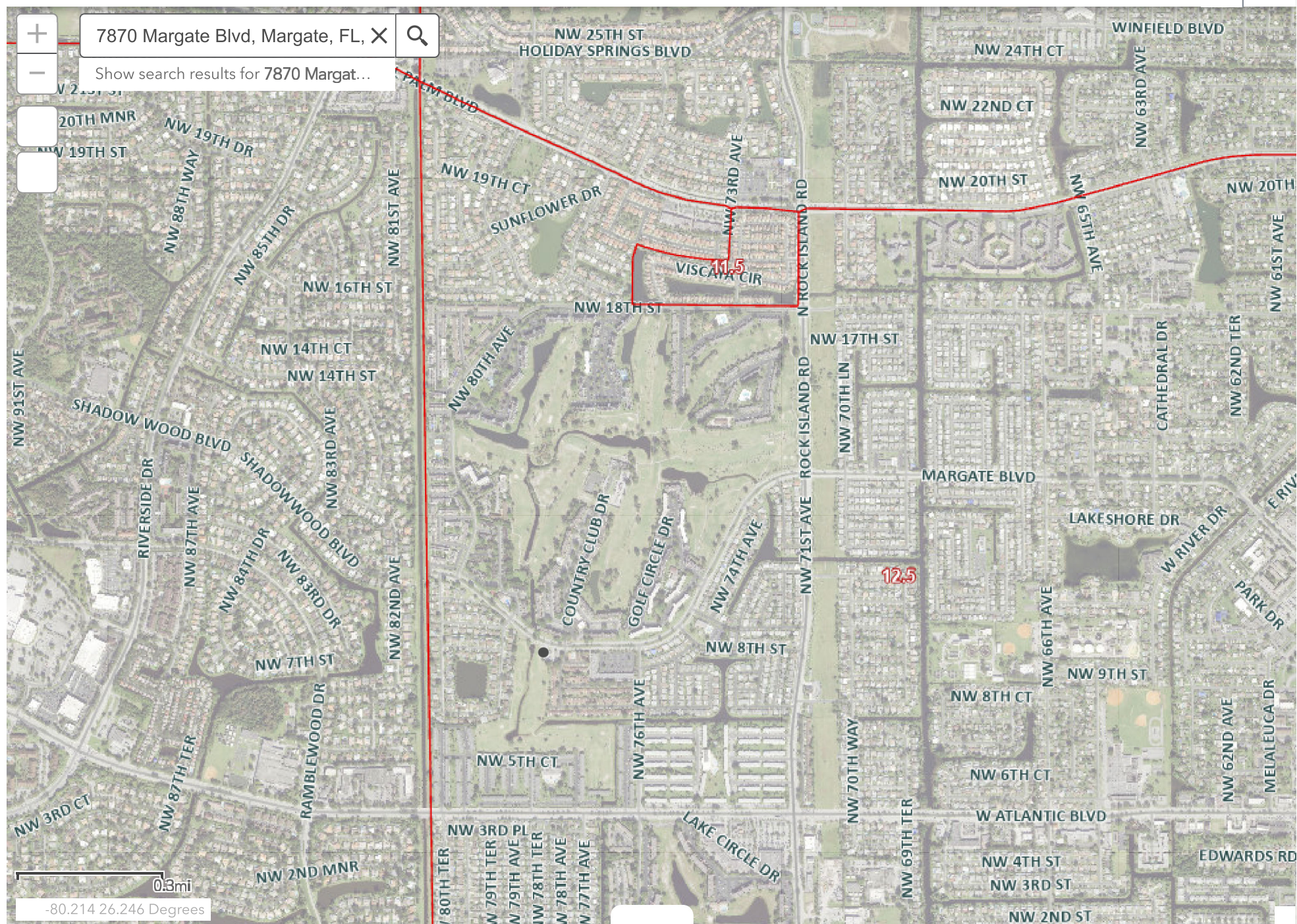


FIGURE C-4. 1-DAY RAINFALL: 10-YEAR RETURN PERIOD

Future Conditions 100-Year Flood Map 2060



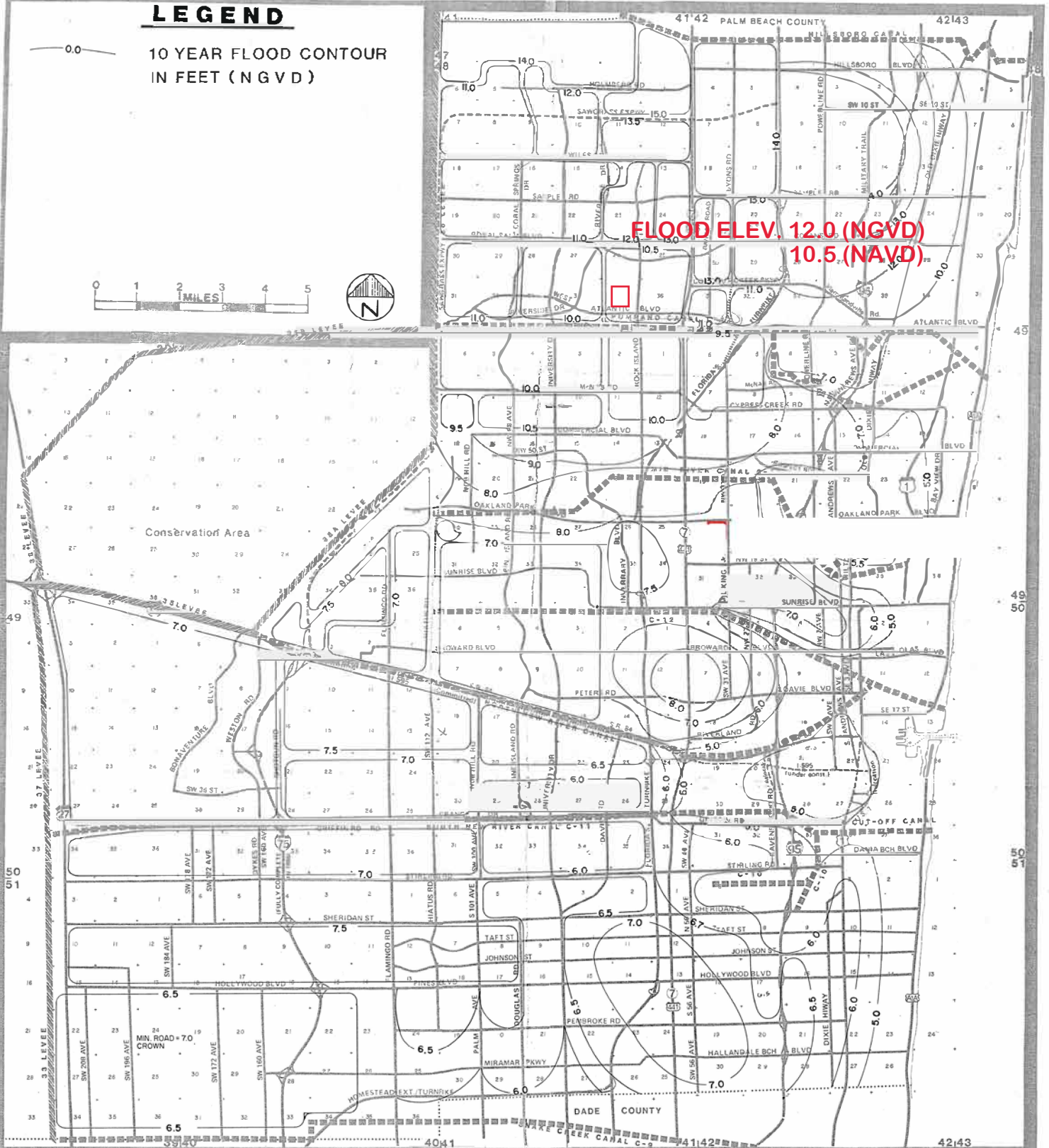
LEGEND

10 YEAR FLOOD CONTOUR
IN FEET (NGVD)

0.0



**FLOOD ELEV. 12.0 (NGVD)
10.5 (NAVD)**



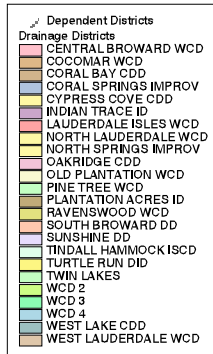
BOARD OF COUNTY COMMISSIONERS
PUBLIC WORKS DEPARTMENT
WATER RESOURCES MANAGEMENT DIVISION
BROWARD COUNTY FLORIDA

10 YEAR FLOOD ELEVATION MAP

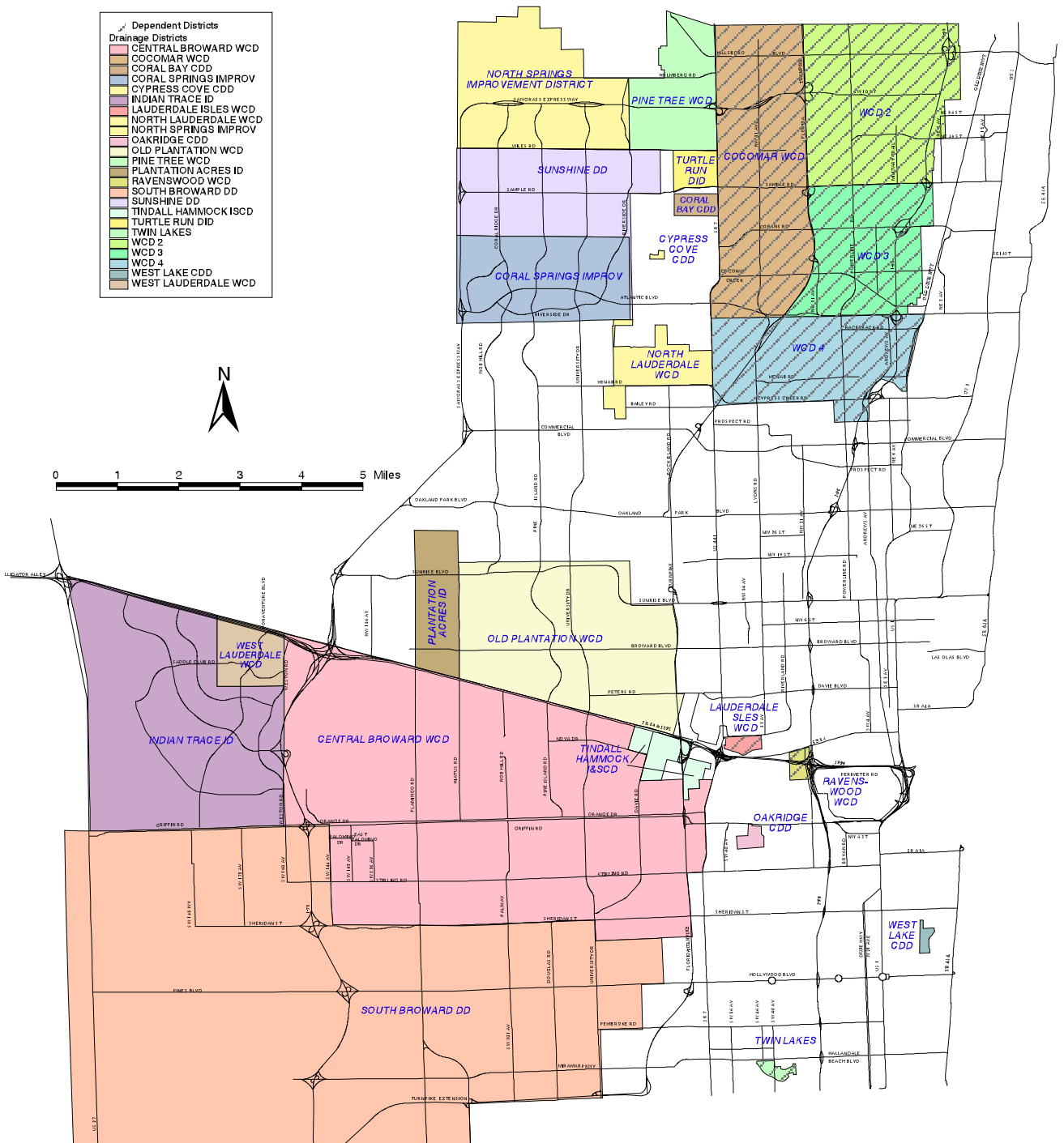
NO.	REVISIONS	DATE

DATE 8-20-87 SHEET 1 OF 1 DRAWN BY JB

Drainage Districts Broward County, Florida



0 1 2 3 4 5 Miles

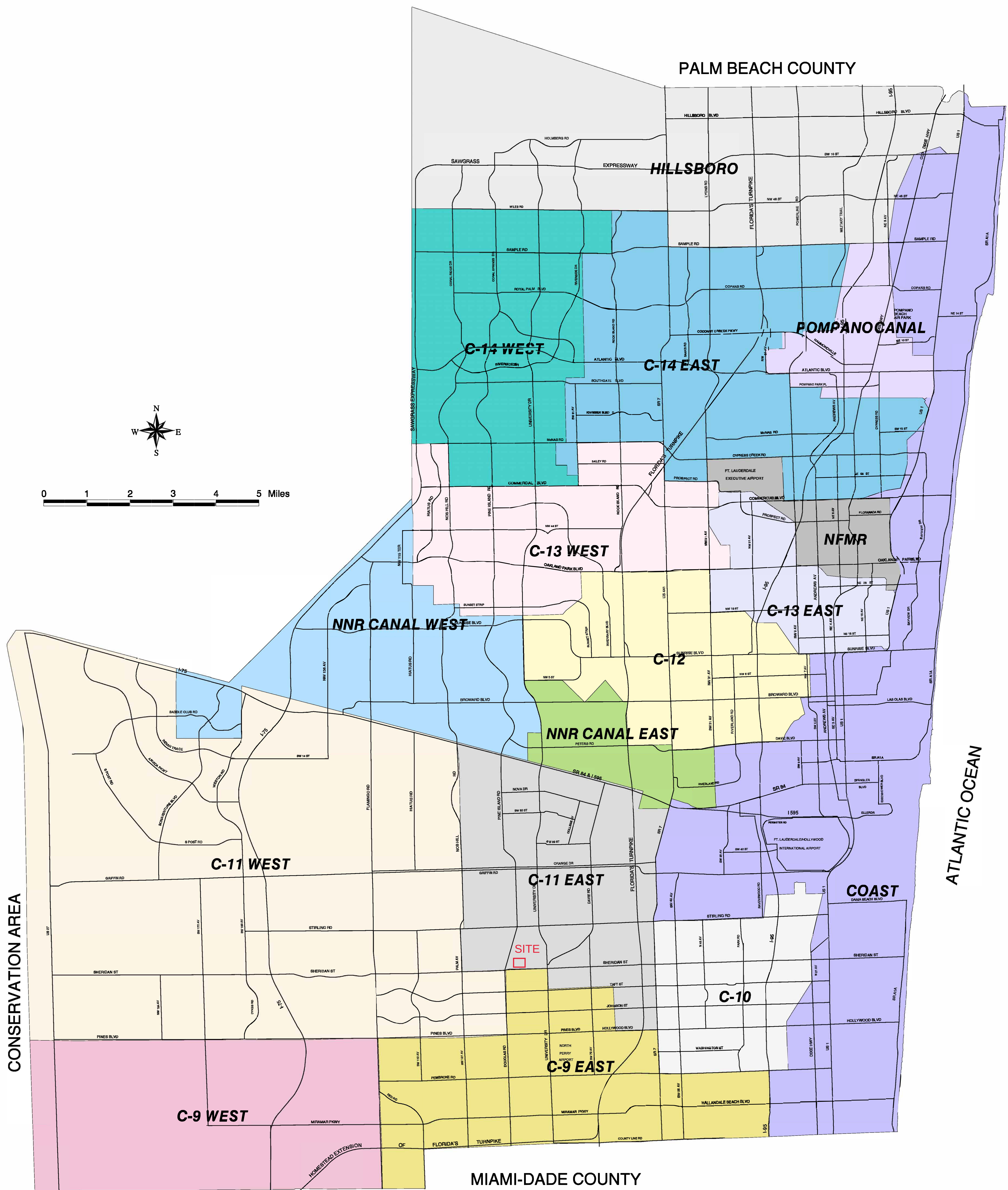


Broward County Department of
Planning and Environmental Protection
Geographic Information Systems
Water Resources Division



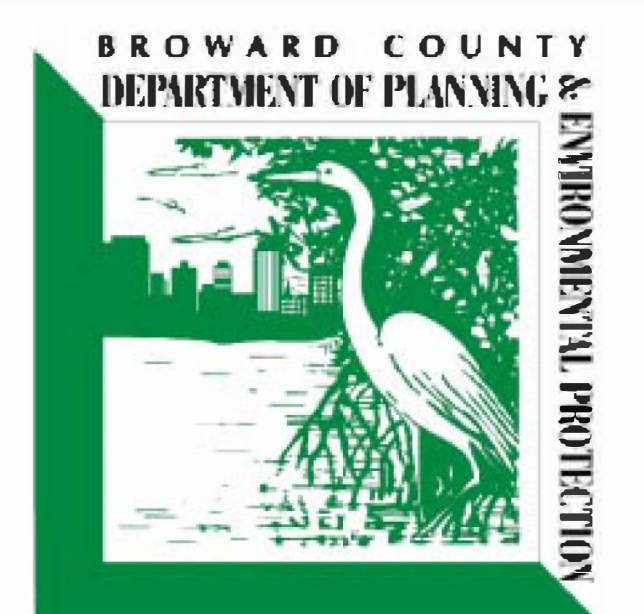
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Drainage Basins



**Broward County Department of
Planning & Environmental Protection
Geographic Information Systems**

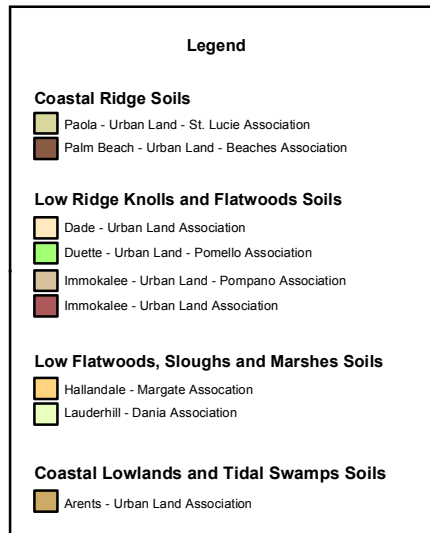
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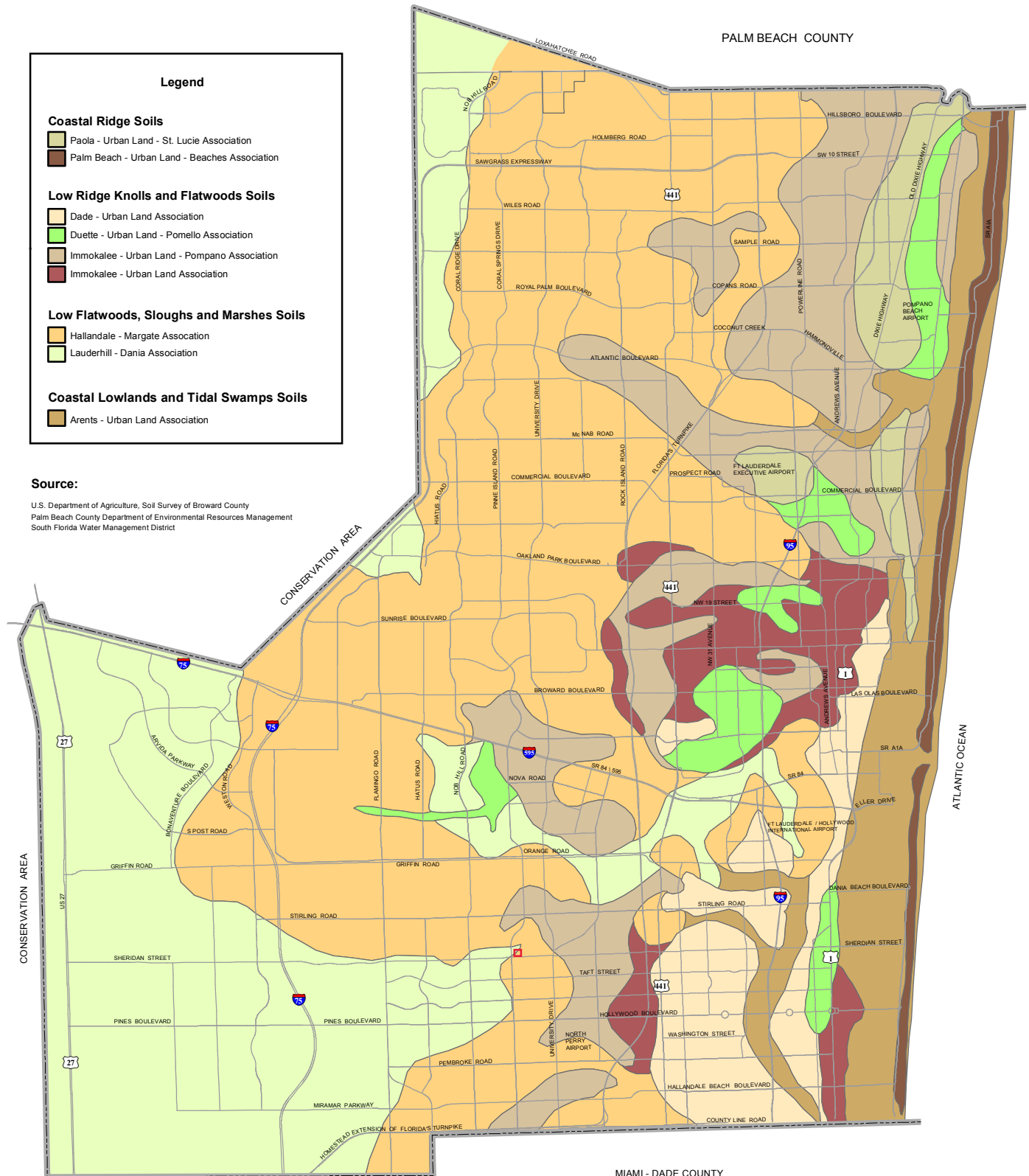
BROWARD COUNTY LAND USE PLAN

Natural Resource Map Series- Eastern Broward County: Soils



Source:

U.S. Department of Agriculture, Soil Survey of Broward County
Palm Beach County Department of Environmental Resources Management
South Florida Water Management District



MIAMI - DADE COUNTY



Broward County Wellfield Map

Broward County Board of County Commissioners Chapter 27- Article XIII Rule of 6/11/2013

Legend

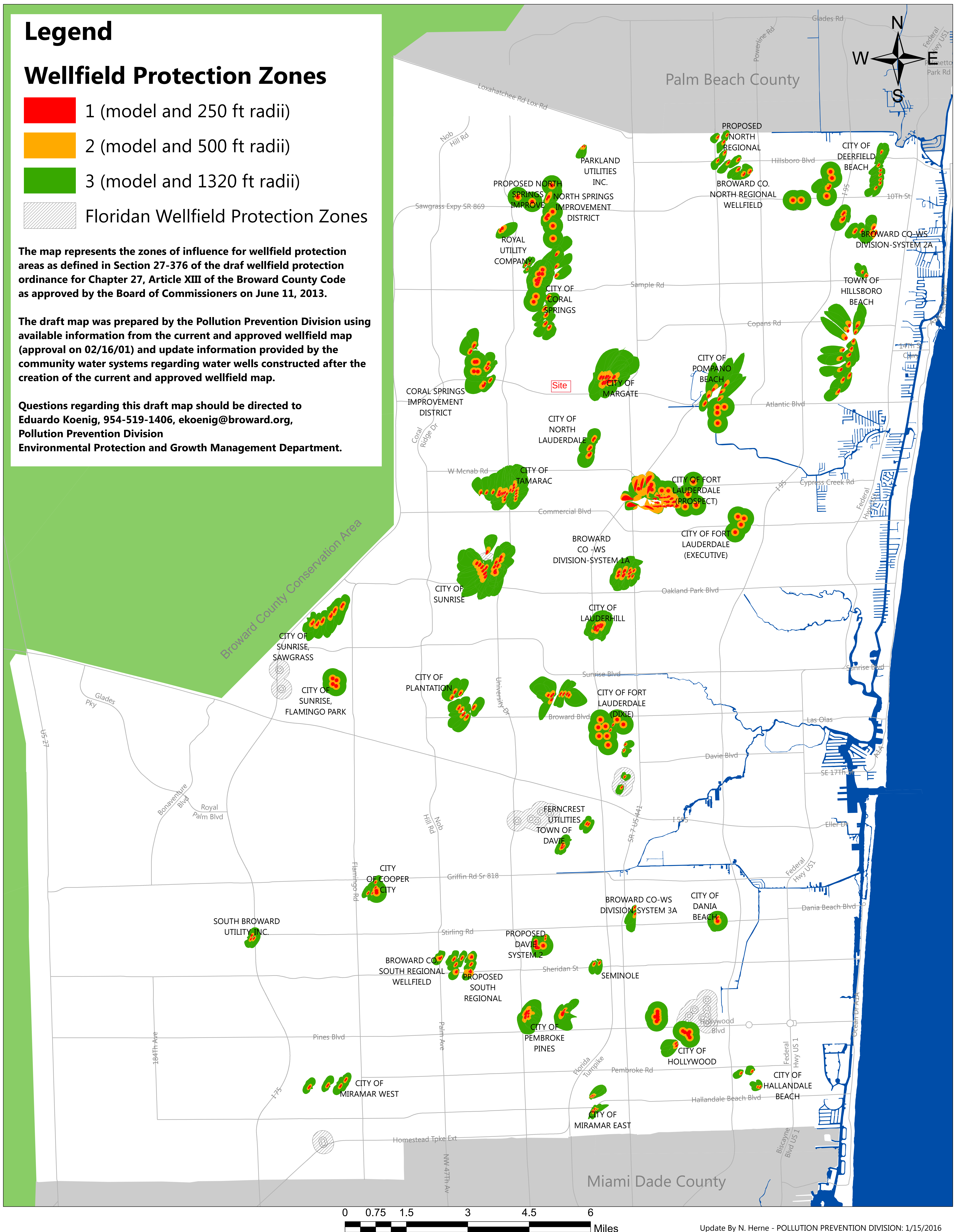
Wellfield Protection Zones

- 1 (model and 250 ft radii)
- 2 (model and 500 ft radii)
- 3 (model and 1320 ft radii)
- Floridan Wellfield Protection Zones

The map represents the zones of influence for wellfield protection areas as defined in Section 27-376 of the draft wellfield protection ordinance for Chapter 27, Article XIII of the Broward County Code as approved by the Board of Commissioners on June 11, 2013.

The draft map was prepared by the Pollution Prevention Division using available information from the current and approved wellfield map (approval on 02/16/01) and update information provided by the community water systems regarding water wells constructed after the creation of the current and approved wellfield map.

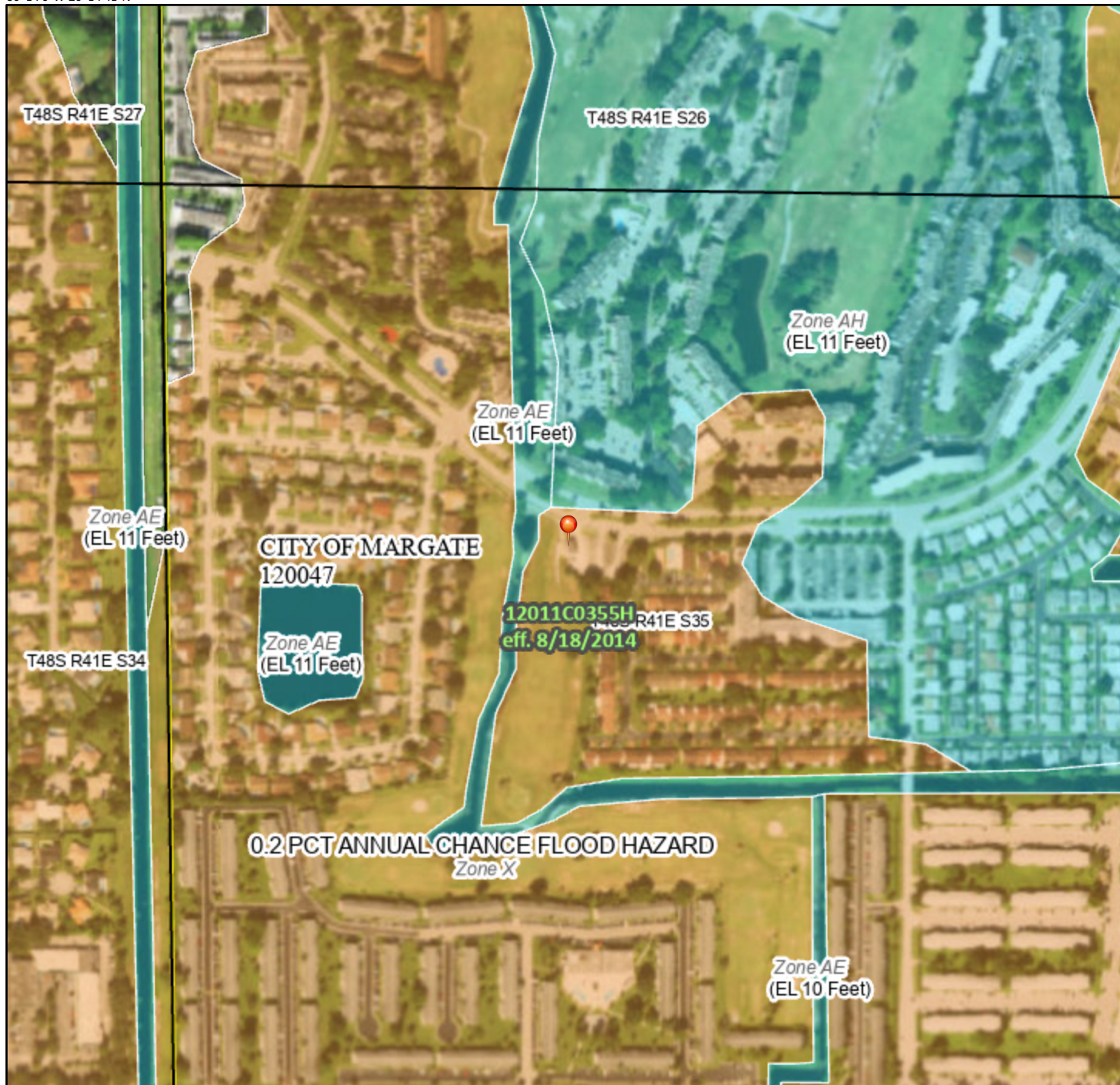
Questions regarding this draft map should be directed to Eduardo Koenig, 954-519-1406, ekoenig@broward.org, Pollution Prevention Division Environmental Protection and Growth Management Department.



National Flood Hazard Layer FIRMette



80°14'6"W 26°14'41"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

80°13'29"W 26°14'8"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **6/15/2022 at 3:45 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Home ▾ Water Quality Assessments, TMDLs, and BMAPs

