Stormwater Master Plan (Draft)

Lauderdale-By-The-Sea

April 27, 2010

Prepared by:

CHEN&ASSOCIATES
Civil and Environmental Engineers

500 West Cypress Creek Road, Suite 410
Fort Lauderdale, FL 33309
State of Florida Engineering Business License No. 4593

Chen and Associates project number: 120.051

TABLE OF CONTENTS

1. Introduction
1.1 General....1-1
1.2 Purpose....1-1
1.3 Project Schedule....1-1
1.4 Project Team....1-2

2. Data Collection
2.1 General....2-1
2.2 Land Use....2-1
2.3 Soils....2-1
2.4 Floodplain Elevations....2-2
2.5 Topography....2-2
2.6 Drainage Atlas....2-2
2.7 Past Projects....2-3
2.8 Property Research....2-3
2.9 Existing Permits....2-3

3. Evaluation of Existing Stormwater System
3.1 General Conditions....3-1
3.2 System Assessment....3-2
3.2.1 Site Visits during Rainfall Events....3-2
3.2.2 Resident Complaints....3-3
3.2.3 Outfall Inventory....3-3
3.2.4 Pipe Inspection....3-3
3.3 Model Input Data....3-3
3.3.1 Basins....3-4
3.3.2 Hydrologic Parameters....3-4
3.3.3 Links....3-5
3.3.4 Boundary Conditions....3-5
3.3.5 Rainfall....3-6
3.4 System Requirements....3-6
3.4.1 Level of Service Criteria....3-7
3.4.2 Regulatory Requirements....3-7
3.5 Existing Conditions Model Results....3-9

4. Proposed Alternatives for Stormwater Improvements
4.1 Overview....4-1
4.2 Regional Alternatives....4-2
4.2.1 Swale Restoration Program....4-2
4.2.2 Outfall Maintenance Program....4-5
4.2.3 Pipe Maintenance Program....4-5
4.2.4 Pipe Repair and Rehabilitation Program....4-6
4.3 Local Alternatives....4-7
4.3.1 Bougainvilla Drive....4-7
4.3.2 Poinciana Street....4-8
4.3.3 Pavilion Area....4-8
4.3.4 El Mar Drive (North)....4-9
4.3.5 El Mar Drive (South)....4-9
4.3.6 Alleyways....4-10
4.3.7 West Tradewinds Avenue....4-10
4.3.8 Flamingo Avenue....4-10
4.3.9 Hibiscus Avenue....4-11
4.3.10 Datura Avenue....4-11
4.3.11 East Tradewinds Avenue....4-11

4.3.12 Harbor Drive 4-12
4.3.13 Terramar Drive 4-12

5. Conclusion
5.1 Summary 5-1
5.2 Cost Estimate 5-1
5.3 Funding Sources 5-2
5.3.1 Stormwater Utility Fee 5-2
5.3.2 Grant and Loan Opportunities 5-2
5.3.3 Financial Planning 5-3

6. Appendix
6.1 Plat Maps
6.2 Areas of Concern (Include Resident Complaints)
6.3 Outfall Inventory
6.4 Pipe Television Reports
6.5 Stage-Area Data
6.6 Hydrologic Parameters
6.7 Existing Conditions Peak Stages
6.8 Existing Conditions Peak Discharges
6.9 Existing Conditions Model Input Data
6.10 Cost Estimate for Proposed Alternatives
6.11 Roadway Cross Sections

List of Exhibits

Exhibit 2.1 – Project Limits
Exhibit 2.2 – Land Use Map
Exhibit 2.3 – USGS Soils Map
Exhibit 2.4 – FEMA Flood Plain Map
Exhibit 2.5 – Topography
Exhibit 2.6 – Existing Drainage Atlas Map
Exhibit 2.7 – Existing Permit Limits Map
Exhibit 3.1 – Photo Study – North Area
Exhibit 3.2 – Photo Study – South Area
Exhibit 3.3 – Areas of Concern
Exhibit 3.4 – Outfalls
Exhibit 3.5 – Photo Study – Outfalls
Exhibit 3.6 – Drainage Basin Map
Exhibit 3.7 – Sub-Basin Boundaries
Exhibit 3.8 – Parcel Analysis
Exhibit 3.9 – Nodal Diagram
Exhibit 3.10 – Potential Ponding Areas under Existing Conditions (North)
Exhibit 3.11 – Potential Ponding Areas under Existing Conditions (South)
Exhibit 4.1 – Existing Swale Conditions (North)
Exhibit 4.2 – Existing Swale Conditions (South)
Exhibit 4.3 – Potential Ponding Areas after Swale Program (North)
Exhibit 4.4 – Potential Ponding Areas after Swale Program (North)
Exhibit 4.5 – Proposed Alternative – Bougainvilla Drive
Exhibit 4.6 – Proposed Alternative – Poinciana Street
Exhibit 4.7 – Proposed Alternative – Pavilion Area
Exhibit 4.8 – Proposed Alternative – El Mar Drive (North)
Exhibit 4.9 – Proposed Alternative – El Mar Drive (South)
Exhibit 4.10 – Proposed Alternative – Alleyways
Exhibit 4.11 – Proposed Alternative – West Tradewinds Avenue
Exhibit 4.12 – Proposed Alternative – Flamingo Avenue
Exhibit 4.13 – Proposed Alternative – Hibiscus Avenue
Exhibit 4.14 – Proposed Alternative – Datura Avenue

Exhibit 4.15 – Proposed Alternative – Basin Drive
Exhibit 4.16 – Proposed Alternative – Harbor Drive
Exhibit 4.17 – Proposed Alternative – Terramar Drive

SECTION 1 - INTRODUCTION

1.1 GENERAL

Chen and Associates has been retained by the Town of Lauderdale-By-The-Sea to prepare a Stormwater Master Plan for the entire Town limits. The purpose of this Stormwater Master Plan is to identify any deficiencies in the existing stormwater management system and to recommend system improvements to meet regulatory level of service criteria. Within the Stormwater Master Plan, Chen and Associates shall provide recommendations for improvements to the system that will eliminate or reduce the ponding currently encountered within right-of-way areas during or after rainfall events. The Stormwater Master Plan will define the existing stormwater management system, summarize the results of the stormwater model for the existing conditions, prioritize the proposed improvements to the stormwater management system, and provide an estimated cost to construct these upgrades to the stormwater management system. The Stormwater Master Plan will allow the Town of Lauderdale-By-The-Sea to understand the necessary drainage improvements over the next few years and to budget accordingly.

1.2 PROJECT PURPOSE

The purpose of this Stormwater Master Plan for the Town of Lauderdale-By-The-Sea is as follows:

- Identify any deficiencies in the existing stormwater management system
- Recommend system improvements to meet regulatory level of service criteria
- Provide an estimated cost to construct these upgrades to the stormwater management system

1.3 PROJECT SCHEDULE

The project schedule for the Stormwater Master Plan for the Town of Lauderdale-By-The-Sea is listed below according to project milestones and deliverable submittals. The completion of the video inspection of the stormwater management system by Tele-Vac South, Inc. (Tele-Vac) was also an important component of the Stormwater Master Plan. The tentative project schedule is listed below:

- October 29, 2009 – Issuance of Project Purchase Order
- December 21, 2009 – Review Meeting with Town Staff and Tele-Vac
- December 22, 2009 – Site Visit during Rainfall Event
- December 30, 2009 – Outfall Inventory Inspection
- January 5, 2010 – Review Meeting with Town Staff and Tele-Vac
- January 8, 2010 – Submittal of Data Collection Technical Memorandum
- January 28, 2010 – Review Meeting with Town Staff
- February 26, 2010 – Submittal of Existing Conditions Model Technical Memorandum
- March 10, 2010 – Review Meeting with Town Staff
- March 12, 2010 – Site Visit during Rainfall Event
- April 27, 2010 – Submittal of Draft Stormwater Master Plan

1.4 PROJECT TEAM

Chen and Associates is the lead consultant for the Town of Lauderdale-By-The-Sea for this Stormwater Master Plan. The Project Team is as follows:

Principal:	Peter Moore, P.E., LEED AP
Project Manager:	James Barton, P.E., LEED AP
Technical Supervisor:	Jason McClair, P.E., LEED AP
Project Engineer:	Suzanne Dombrowski, P.E.
Project Engineer:	Meghan Wells, E.I., LEED AP

SECTION 2 – DATA COLLECTION

2.1 GENERAL

The Town of Lauderdale-By-The-Sea is located within Broward County, Florida. The general geographic boundaries of the Town of Lauderdale-By-The-Sea are Cypress Creek Drive on the north, the Atlantic Ocean on the east, Flamingo Avenue on the south, and the Intracoastal Waterway on the west, which encompasses approximately 1.5 square miles of area. The limits of the Stormwater Master Plan are defined within this section of the report on Exhibit 2.1 – Project Limits. Like other coastal communities in South Florida, the Town of Lauderdale-By-The-Sea is fully developed with chiefly residential properties mixed with commercial properties. The project area includes approximately 640 acres of land which are separated into 1,618 properties.

The Town of Lauderdale-By-The-Sea maintains its own stormwater facilities. Existing drainage facilities within the Town include catch basins connected by pipe of various materials and sizes to either exfiltration trench or positive outfalls into the Intracoastal Waterway and canals. Private drainage systems also discharge into the Intracoastal Waterway and canals. Unpaved swales are found within right-of-way areas for additional stormwater storage. The Town established a Stormwater Utility Fee in the past for the purpose of maintaining the existing stormwater management system, but the Stormwater Utility Fee has since been eliminated.

The initial task for this project was to collect and evaluate all available information on the existing conditions within the Town limits and on the existing stormwater management system. In order to prepare an accurate computer model of the existing conditions, Chen and Associates collected and evaluated available information, such as topographic data, drainage atlases, drainage as-built drawings, visual inspections, video inspection reports, maintenance logs, flooding complaint records, regulatory permits, and observations during rainfall events. All available information on the stormwater management system which was collected during the preparation of this report is summarized within the following sections.

2.2 LAND USE

Land use is an important factor used within the stormwater model for estimating the overall stormwater needs of the Town. Each land use category typically has a maximum allowable percentage of impervious area on each property. Properties with high percentages of impervious area will contribute more stormwater runoff into public right-of-way areas since there will be less pervious areas which allows stormwater runoff to infiltrate into the ground surface. The stormwater runoff will instead need to be collected for water quality treatment before it can be discharged into adjacent surface water bodies. Properties with a significant amount of green space or that have onsite drainage facilities to retain their stormwater onsite, including graded grass swales, will reduce the overall discharge of stormwater runoff from the Town. The current land uses of all properties within the Town's limits are defined within this section of the report on Exhibit 2.2 – Land Use Map.

2.3 SOILS

The soil conditions within the Town limit are important for the development of the Stormwater Master Plan since various soil types have different infiltration rates; this will control how quickly stormwater runoff infiltrates at the ground surface within grass swale areas or below ground via exfiltration trenches. The soil types within the Town of Lauderdale-By-The-Sea are typical for coastal areas within South Florida. In general, the soil conditions within the project area consist chiefly of sand, which can have high infiltration rates. The soil types within the Town limits as defined by U.S. Geological Survey (USGS) Soil Survey are displayed within this section of the report on Exhibit 2.3 – USGS Soil Map. The soil

types defined by USGS can be used to make general assumptions for the infiltration rates within the Town. During the development of recommendations for stormwater system improvements, Chen and Associates may have a geotechnical investigation conducted to obtain more accurate information on the soil conditions within the Town limits if necessary.

2.4 FLOODPLAIN ELEVATIONS

The floodplain information within the Town limits is important for the development of the Stormwater Master Plan since it can be used to identify low lying areas within the Town location below the FEMA flood elevation. These areas will likely experience flooding during heavy rainfall events. The floodplain limits defined by the Federal Emergency Management Agency (FEMA) are shown within this section of the report on Exhibit 2.4 – FEMA Floodplain Map. These floodplains are geographic areas that FEMA has defined according to varying levels of flood risk for properties within each area. Within each floodplain area, FEMA has defined maximum flood elevations during specified storms, which can be used to estimate the severity of potential flooding at certain areas within the Town and to provide an estimated maximum elevation of flooding during a specified storm event. For example, the 100-year flood elevation describes the elevation of flood water expected from a 100-year storm event. Typically, finish floor elevation of new construction must be set above the 100-year flood elevation defined by FEMA.

2.5 TOPOGRAPHY

The topographic elevation information within the Town is important for the development of the Stormwater Master Plan since it defines the locations where flooding will occur during storm events and controls the extent of the stormwater management system that will be needed to meet regulatory level of service criteria. The topographic information for the Town will be used to identify low lying areas within the Town where stormwater runoff from higher areas will collect. Chen and Associates obtained the topographic elevation data within the Town limits, which was developed using Light Detection and Ranging (LIDAR) technology. This technology uses laser pulses from aerial sources to estimate the elevation of a specific point on the ground surface. The LIDAR topographic elevation data for the Town includes over one million elevation points within the boundaries of Lauderdale-By-The-Sea.

Chen and Associates analyzed the LIDAR elevation data eliminate any extraneous data that did not fit within the Town limit. A Triangulated Irregular Network (TIN) model of the ground surface was created from these elevation points and was color coded to show the elevations throughout the Town as a contour map. As shown on Exhibit 2.5 – Topography within this section of the report, the lowest lying areas are in the neighborhoods of single family homes west of Ocean Boulevard. The stormwater runoff will have a tendency to flow from the condominium properties east of Ocean Boulevard that are at a higher elevation than the lower lying neighborhoods.

2.6 DRAINAGE ATLAS

Chen and Associates created a drainage atlas for the Town of Lauderdale-By-The-Sea in August 2008 in GIS format based on available paper atlas drawings, drainage as-built drawings, and site inspections. This drainage atlas depicted the geographic locations of the stormwater catch basins, surface inlets, manholes, outfalls, and pipe. The drainage atlas also included the drainage pipe sizes when this information was available. Further information on the stormwater management system, such as rim elevations, invert elevations, water quality measures (i.e., baffles, weirs, etc.), pipe diameter, and pipe material is needed for the development of the existing conditions model. Chen and Associates obtained additional as-built drawings which include some of this information. Chen and Associates transferred this additional information into the Geographic Information Systems (GIS) drainage atlas. The updated

drainage atlas for the Town of Lauderdale-By-The-Sean is shown within this section of the report on Exhibit 2.6 – Existing Drainage Atlas. The table below defines the components of the Town's stormwater management system.

Table 1: Drainage System

Drainage Item	Quantity
Catch Basins	520
Curb Inlets	31
Outfalls	59
Drainage Pipe	48,961 LF

Chen and Associates coordinated with Tele-Vac South, Inc., which has been retained by the Town to assist with the verification of the drainage atlas. Tele-Vac has been using the original drainage atlas to assist with their cleaning and televising of existing drainage pipes within the Town. Telev-Vac has provided Chen and Associates with updates on the existing stormwater management system as their work progresses. Coordination between Tele-Vac and Chen and Associates will be ongoing as the work progresses to provide both projects with the most accurate information possible.

2.7 PAST PROJECTS

As Town Engineer, Chen and Associates was able to draw on experience with recent drainage improvement projects completed within the Town limits. Chen and Associates reviewed all available plans for these recent drainage improvements within Town right–of-way areas to ensure any recommended improvements are implemented in conjunction with these existing facilities. Some minor drainage improvements were completed by the Town, which included the repair of a collapsed drainage pipe and the installation of a limited french drain to address localized ponding. In addition to these minor improvements, the following drainage improvement projects were considered during the completion of the Stormwater Master Plan:

- Seagrape Drive between Commercial Boulevard and North Tradewinds Avenue
- Seagrape Drive between Hibiscus Avenue and Commercial Boulevard
- El Mar Drive between Datura Avenue and Commercial Boulevard (Oriana Development)
- El Mar Drive between El Prado Avenue North and South (Minto Development)

2.8 PROPERTY RESEARCH

Chen and Associates gathered the plat maps for all of the properties within the Town to locate any drainage easements found within the Town. The plat maps for the Town are included within Appendix 6.1. The majority of the Town's drainage infrastructure is located in the right-of-way. However, some outfalls and pipe connecting to these outfalls are on private property. Based on this plat research, most of the existing outfalls are not located within easements. However, newer plats that have not yet been published by Broward County may record some easements. If the Town constructs drainage improvements to the pipe connecting the outfalls, the acquisition of additional easements may be required.

2.9 EXISTING PERMITS

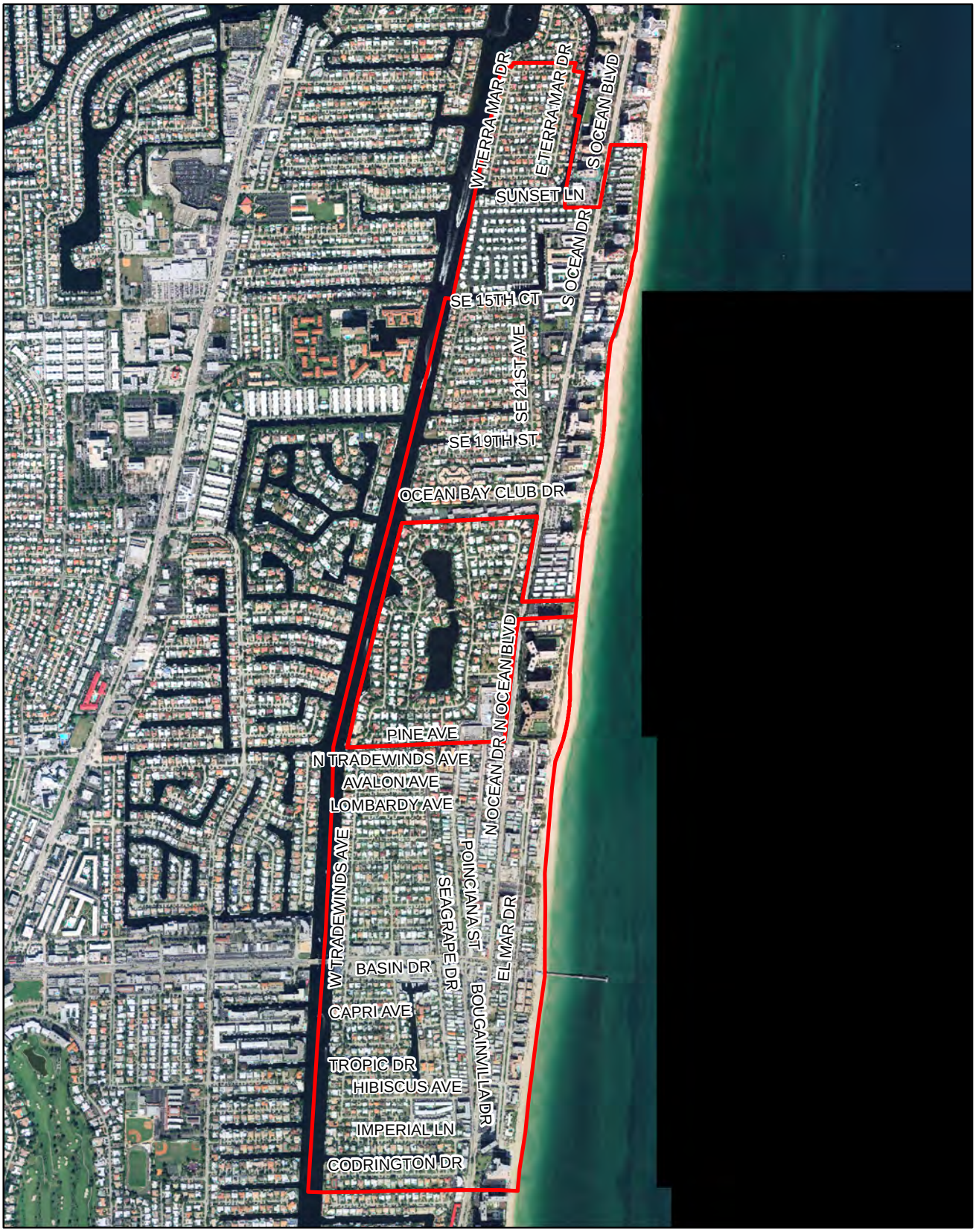
Chen and Associates conducted research at South Florida Water Management District (SFWMD) and Broward County Environmental Protection and Growth Management Division (BCEPGM) to obtain any existing stormwater permits for the Town's drainage system. These permits show the original intent of the stormwater collection system, water quality treatment methods which are in place, and the allowable

discharge rate from outfalls by the permittee. This allowable discharge rate will be compared to the results from the existing conditions model. Based on our research, the existing permits on file at SFWMD and BCEPGM were limited due to the age of the existing system within the Town. The bulk of the existing drainage system within the Town was installed prior to drainage oversight by these agencies over the Town, which explains the lack of available permit data. The extent of the existing permit coverage is displayed within this section of the report on Exhibit 2.7 – Existing Permit Limits. A table of the existing permits in the Town is found below.

Table 2: Existing Regulatory Permits

Permit Name	Regulatory Agency	Permit Number
Terra Mar Neighborhood Improvement Project	Broward County	SWM2005-014-0
Bridge over Spanish River at Terra Mar Drive	South Florida Water Management District	GP80-140
State Road A1A	South Florida Water Management District	88-73
Ocean Walk Condominiums	South Florida Water Management District	06-02806-P

Exhibit 2.1: Project Limits



N

Legend

Town Boundary

0 500 1,000 2,000 3,000 4,000 Feet

CHEN&ASSOCIATES Civil and Environmental Engineers

Exhibit 2.2
Land Use Map

Legend

BoundaryLine

Town Boundary

Zoning District Line

Town Zoning District

	RS-5	Residence, Single - Family Dwelling (5 Dwelling Units)
	RD-10	Residence, Two- Family Dwelling (Duplex) (10 Dwelling Units)
	RM-25	Residence, Apartments, Hotels, etc (Multiple Dwellings) (25 Dwelling Units)
	RM-50	Hotel, Motel, Apartment Hotel, Apartments (Hight - Rise) (50 Dwelling Units)
	B-1A	Business, Retail Business
	B-1	Business, Retail Business

Broward County Zoning Districts

	RS-4	Residence, Single - Family Dwelling (4 Dwelling Units)
	RS-5	Residence, Single - Family Dwelling (5 Dwelling Units)
	RM-15	Residence, Apartments, Hotels, etc. (Multiple Dwelling) (15 Dwelling Units)
	RM-16	Residence, Apartments, Hotels, etc. (Multiple Dwelling) (16 Dwelling Units)
	RM-25	Residence, Apartments, Hotels, etc. (Multiple Dwelling) (25 Dwelling Units)
	R-5	Motel District
	PUD	Planned Unit Development District
	Water	Unzoned Area

Overlay Districts

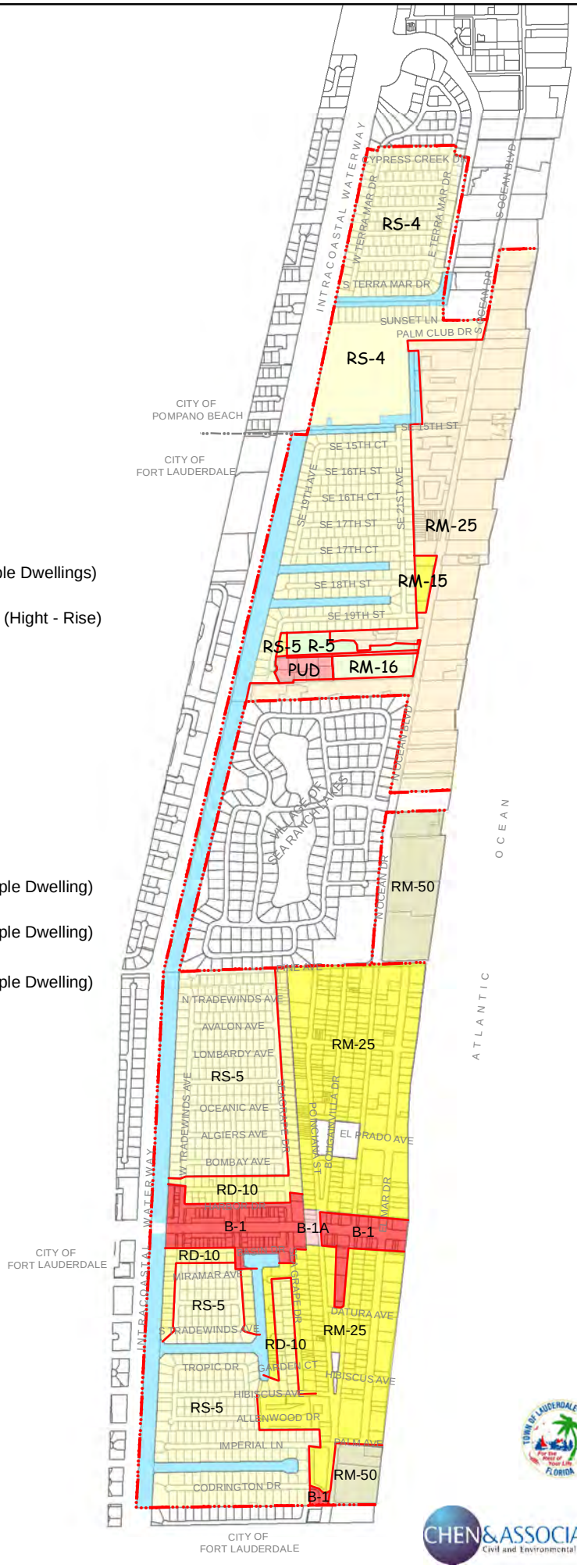
Hospitality

Marina Village

Town Village

N

0 800 1,600 3,200 Feet



CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 2.3
USGS Soils Map

Legend

Town Boundary

Soil Type

- ARENTS - URBAN LAND COMPLEX
- ARENTS, ORGANIC SUBSTRATUM - URBAN LAND COMPLEX
- BEACHES
- CANAVERAL - URBAN LAND COMPLEX
- PALM BEACH - URBAN LAND COMPLEX
- PALM BEACH SAND
- URBAN LAND
- WATER

0 405 810 1,620 2,430 3,240 Feet

CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

Exhibit 2.4
FEMA Flood Plain Map

Legend

Town Boundary

FEMA Flood Zones and Elevation

AE, 6.00

AO, 2.00

VE, 10.00

X (AREAS DETERMINED TO BE OUTSIDE 500 YEAR FLOOD ELEVATION)

0 415 830 1,660 2,490 3,320 Feet

CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

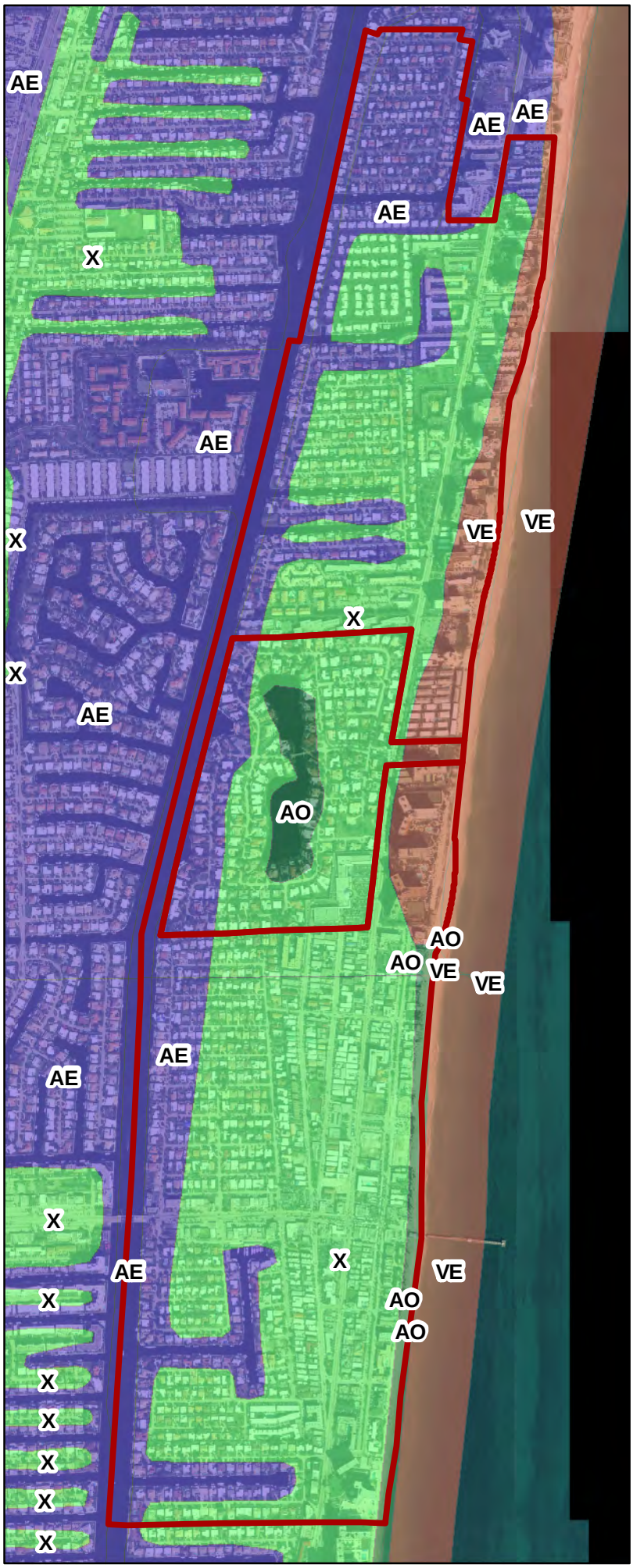


Exhibit 2.5
Topography
(LIDAR Data)

Legend

Town Boundary

Elevation (ft)

- 25 - 27
- 22 - 25
- 19 - 22
- 16 - 19
- 13 - 16
- 10 - 13
- 8 - 10
- 6 - 8
- 4 - 6
- 2 - 4
- 0 - 2
- -2 - 0
- -4.97 - -2

N

0 430 860 1,720 2,580 3,440 Feet

CHEN&ASSOCIATES
Civil and Environmental Engineers

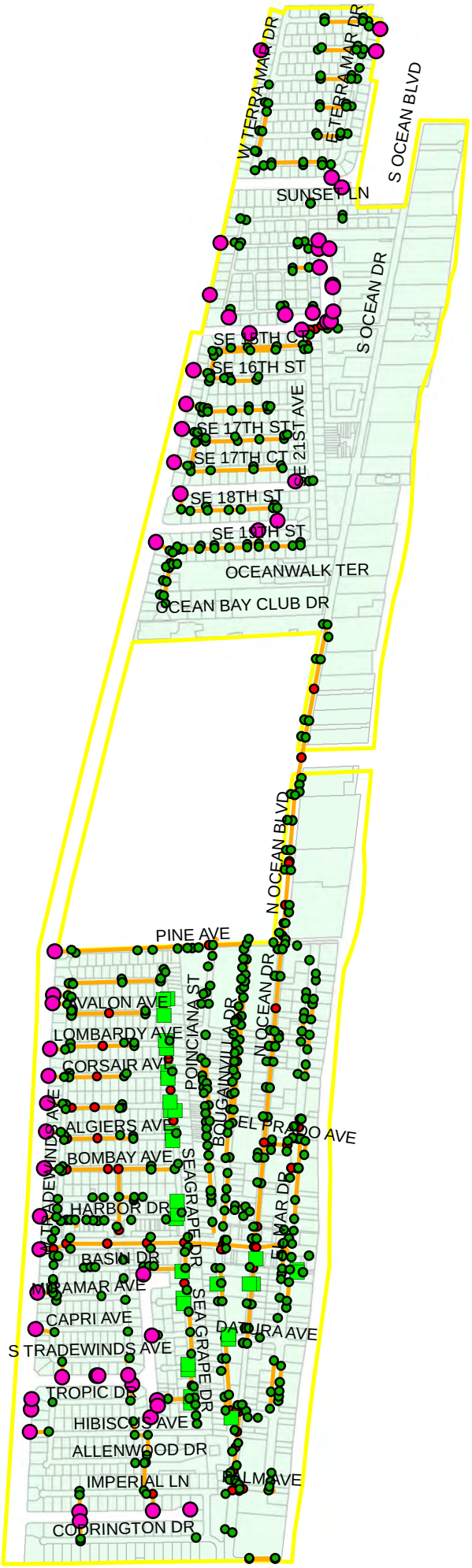
TOWN OF LAUDERDALE-BY-THE-SEA
FLORIDA

Exhibit 2.6
Existing Drainage Atlas

Legend

- Outfall
- Catch_Basin
- Curb_Inlet
- Drainage_MH
- Drainage_Pipe
- Parcels

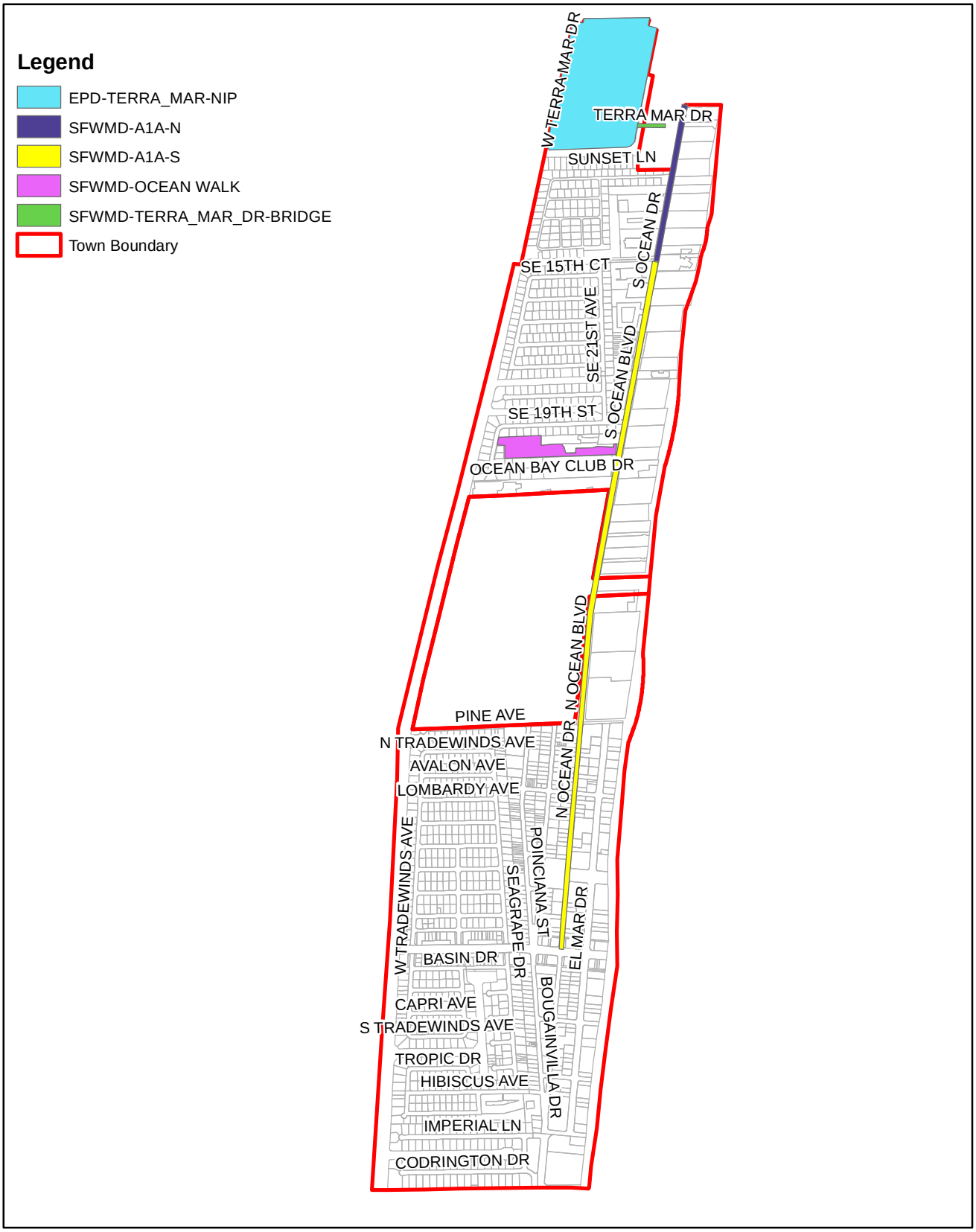
N



CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

Exhibit 2.7: Existing Permit Limits



N

0 500 1,000 2,000 3,000 4,000 Feet

CHEN&ASSOCIATES Civil and Environmental Engineers

SECTION 3 – EVALUATION OF EXISTING STORMWATER SYSTEM

3.1 GENERAL CONDITIONS

During the field visits during heavy rainfall December 22, 2009 and March 12, 2010, several areas of ponding were witnessed throughout the Town within the public right-of-way. Based on our observations during these rainfall events, the majority of the standing water receded within three hours after the rainfall. The majority of the standing water had receded while small pools remained within roadways and paved swale areas. The ponding of stormwater runoff within the Town right-of-way can be caused by various conditions, which can be defined by the following four categories:

Category 1 – Improperly Graded Swale Areas

The sheet flow of stormwater runoff over the roadway areas was encountered throughout the Town due to the lack of properly graded grass swale areas along roadways. Under this category, the overbuilt swale areas can block stormwater runoff from flowing laterally off of the roadway surface and cause the stormwater runoff to accumulate on the roadway until it eventually flows to the nearest drainage structure. This flooding of the roadway surfaces could be eliminated with proper maintenance of the adjacent grass swale areas. If the swale areas were properly graded to be deeper than the adjacent roadway surface, stormwater runoff would flow laterally into the adjacent grass swales away from the travel lanes instead of along the roadway surface to the nearest catch basin inlet. The majority of the stormwater runoff in these swales would be able to infiltrate back into the groundwater by seepage. The grass swale areas also improve the quality of stormwater runoff reaching the canals via outfall. During heavy rains, the first flush of stormwater from the roadway areas would enter the grass swales and reduce the amount of overall flooding within roadway areas, which is a safety hazard.

Category 2 – Low Lying Areas

Localized flooding was encountered at low spots within roadway areas. Typically, localized flooding within a roadway area is created by a low lying surface elevation. There were isolated locations with low roadway elevations within the Town. Stormwater runoff flowed down the roadway area and accumulated in these low lying areas. The installation of pervious swale areas along the roadway would reduce the amount of water accumulating in these low lying areas since much of the stormwater runoff would be diverted off the roadway areas before reaching the low spots. If flooding problems persist in these areas, additional underground drainage improvements may be required to alleviate the flooding in these areas.

Category 3 – Paved Shoulders

Paved shoulders along asphalt roadways were encountered throughout the Town, which can lead to the flooding of roadway areas. The paved shoulders are typically located in front of private properties with pull-in parking. Paved roadway shoulders prevent stormwater runoff from infiltrating into the groundwater, since asphalt pavement is an impervious surface. Although some stormwater runoff flowed along the paved roadway shoulders into an adjacent drainage inlet, some of the paved roadway shoulders were improperly graded with low spots that did not coincide with location of drainage inlets. Stormwater accumulated in these low lying areas and could only dissipate through evaporation, which can take a significant amount of time. This resulted in standing water remaining in paved roadway shoulders for days while it evaporated. The solutions include replacement with grass swale areas, re-grading the paved shoulder to allow proper flow, installation of additional drainage structures at low spots, and/or the use of pervious concrete materials to allow for infiltration into the ground surface. Some paved roadway shoulders cannot be replaced with grass swale area since it is required for access to parking on private property.

Category 4 – Inadequate Drainage Infrastructure

Some of the neighborhoods within the Town encountered ponding throughout large sections of the neighborhoods due to the lack of underground drainage infrastructure or entire drainage systems being overwhelmed with stormwater runoff during heavy rainfall events. These areas of the Town right-of-way have an insufficient drainage system to handle the stormwater runoff and will require extensive drainage improvements to meet level of service criteria. These areas of the Town were analyzed further to determine the best solutions for improving the existing stormwater systems to alleviate the heavy flooding after large rainfall events.

3.2 SYSTEM ASSESSMENT

Upon compiling and evaluating all of the relevant information on the existing stormwater management system within the Town, Chen and Associates assessed the actual performance of the system based on observations during rainfall events and feedback from City staff and the general public. The purpose of this system assessment is to compare the "problem areas" within each basin with the results of the stormwater model of each basin. The system assessment will allow any recommended system improvements to be properly configured to alleviate potential ponding within these "problem areas."

3.2.1 SITE VISITS DURING RAINFALL EVENTS

On December 22, 2009 and March 12, 2010, Chen and Associates performed a field study of the Town during rainfall events. The purpose of the study was to investigate all areas of the Town during heavy rainfall, photograph localized street flooding, and document our observations. The inspection of the north half of the Town was completed during the morning rainfall on December 22nd. The inspection of the southern half of the Town was conducted 3 hours after the rain event on December 22nd. Subsequently, the entire Town was revisited during the rainfall on March 12th for further observations. After taking site photographs during these field visits, Chen and Associates prepared a photo study map with the locations of the photograph defined, which is included as Exhibit 3.1 – Photo Study (North Area) and Exhibit 3.2 – Photo Study (South Area). Based on our observations during these rainfall events, Chen and Associates developed a list of "problem areas" where standing water was observed during or after the rainfall event.

Chen and Associates conducted an interview with Town staff and staff of Tele-Vac South on January 5, 2010 and December 21, 2009, respectively, to obtain additional information on the performance of the existing drainage system and obtain any insights on "problem areas" within the Town. The purpose of these interviews was to determine where the Town had received complaints of flooding from residents and/or business owners and to discuss where flooding was observed by Town staff. The Town staff indicated that portions of the stormwater management system did not have adequate capacity based on observations during heavy rainfalls. Town staff provided a list of areas where recent flood complaints were received from residents during rainfall events. Staff also provided some photos taken during flood events.

Based on these interviews with Town staff, observations during our field studies, and our past project experience, Chen and Associates prepared a map of "problem areas," which is displayed within this section on Exhibit 3.3 – Areas of Concern Map. Additional details on these "problem areas" are included within this report as Appendix 6.2 – Areas of Concern. This list of areas of concern was used to organize information, delineate basin boundaries, set up the computer model conditions and identify areas of the Town which require more detailed analysis.

3.2.2 Resident Complaints

The Town provided Chen and Associates with the resident complaints regarding stormwater issues from December 2008 through August 2009. These complaints were incorporated into Appendix 6.2 – Areas of Concern and visually depicted within Exhibit 3.3 – Areas of Concern. Section 4 provides proposed alternatives to address these complaints.

3.2.3 OUTFALL INVENTORY

The information on the positive outfalls from the Town's stormwater management system is a crucial component of the existing stormwater model to be developed. If an outfall is not operating correctly, the impact will affect the performance of the entire drainage network and could cause additional ponding, regardless of any direct pipe connections to the outfalls. Chen and Associates conducted a concentrated effort to obtain as much information as possible for the existing outfalls from the Town's stormwater management system. The locations of the existing drainage outfalls in the Town limits are displayed within Exhibit 3.4 – Outfalls.

Chen and Associates conducted a field investigation to identify the actual outfall locations and to compare this information with the original drainage atlas. During these field visits, Chen and Associates took photographs of each outfall, which are included as Exhibit 3.5 – Photo Study (Outfalls). As necessary, Chen and Associates adjusted, removed, or added outfall information within the GIS drainage atlas based on the results of the field inspection. Private property outfalls less than 6 inches in diameter were not added; however, this type of outfall is extremely common throughout the Town. During the field inspection of each outfall, Chen and Associates noted the distance between the pipe invert and the water level, the distance between the top of the headwall and the water level, and the pipe diameter. Based on these measurements along with the estimated tide level at the time of measurement, the invert elevation and top of the headwall elevation were estimated and added to the drainage atlas. Additional details on these outfalls are included within this report as Appendix 6.3 – Outfall Inventory.

3.2.4 PIPE INSPECTION

The Town contracted Tele-Vac South to televise the Town's drainage system. The purpose of this pipe inspection was to verify the condition of the existing underground drainage and to locate any pipe breaks, blockages, or obstructions. Chen and Associates coordinated with Tele-Vac South to obtain these television reports and to review the condition of the existing drainage pipe. The pipe inspection reports are included within Appendix 6.4 – Pipe Television Report.

3.3 MODEL INPUT DATA

Chen and Associates created the hydrologic and hydraulic computer model using Interconnected Pond Routing (ICPR) software by Streamline Technologies. In order to estimate the performance of the existing drainage system with the existing conditions computer model, Chen and Associates conducted an analysis of peak flood stage elevations, peak discharges via existing outfalls, and other stormwater management information throughout the study area under the various storm scenarios. The stormwater model was used to provide a better understanding of the performance of the existing stormwater system and to identify existing "problem" locations which may require future stormwater improvements. The ICPR Input Data Report is enclosed within this report as Appendix 6.9. The input data for the development of the existing conditions stormwater model is further defined within the following sections.

3.3.1 BASINS

Chen and Associates developed drainage basins within the Town based on the existing topography and the limits of the existing drainage system. These drainage basins were created to divide the study area into smaller areas that can be analyzed in more detail during the development of the existing conditions stormwater model. The limits of these drainage basins are displayed on Exhibit 3.6 – Drainage Basin Map. When the existing conditions model was created, the basins were analyzed individually and then the results from each basin were combined to evaluate the overall study area. The proposed conditions model uses the same drainage basins to evaluate the proposed conditions. Therefore, specific areas can be compared and rated based on the need for improvements to the stormwater management system.

During the preparation of the stormwater model, the Town was subdivided into drainage basins for the purpose of analyzing flood stages in all areas of the Town under various storm events. The boundaries of the stormwater basins were defined based on the ground surface contours, the configuration of the existing stormwater management system and the location of retention areas, surface water bodies, and roadways. Basically, the boundaries of the stormwater sub-basins were defined by the high points of the ground surface. The stormwater sub-basins were used within the stormwater model to estimate the routing and staging of stormwater runoff during various storm events. Each sub-basin was correlated to a node within the stormwater model, which includes all sub-basin characteristics such as stormwater stage storage volumes and various hydrologic parameters. The stormwater sub-basins used for the stormwater modeling efforts are displayed on Exhibit 3.7 – Sub-Basin Boundaries.

The stage storage information for each basin was important for the development of the stormwater model since it defines the available volume of stormwater storage within the basin as the flood levels increase. The stage storage data for each basin was determined by analyzing the topographic data to calculate elevation contours within each basin and calculating the available volume of stormwater storage at each flood stage or elevation. A summary of the stage area data is shown in Appendix 6.5. This data was entered into the existing conditions model to mimic the volume of existing stormwater runoff that can be stored above the ground surface within each sub-basin.

3.3.2 HYDROLOGIC PARAMETERS

Chen and Associates conducted some preliminary analysis of each drainage basin in preparation for the existing conditions stormwater model. Each drainage basin was divided into sub-basins depending on land use and the percentage of impervious area. The impervious area was determined for a selection of parcels in each sub-basin for the purpose of calculating an average curve number for the sub-basin. The results of these calculations are displayed on Exhibit 3.8 – Stormwater Curve Number. These curve number (CN) values were inputted into the existing conditions model to determine the amount of stormwater runoff that is generated from each basin and eventually enters the stormwater management system.

The ICPR software required the use of the following hydrologic parameters for each basin: directly connected impervious area (DCIA), time of concentration, and CN. These hydrologic parameters were applied to each node within the existing conditions model based on the existing conditions within each basin. The purpose of each hydrologic parameter is defined as follows:

- DCIA is typically defined as the impervious areas of a basin which is hydraulically connected to the stormwater conveyance system without flowing over pervious area. The impervious areas within the study area chiefly consist of roadways, driveways, parking lots and buildings, while the pervious areas consist of grass swale retention areas. Chen and Associates calculated the DCIA for each basin by determining the impervious and pervious area within each sub-basin based on aerial photography.

- Time of concentration is typically defined as the longest travel time that it takes a particle of water to reach the discharge point of the basin, which is typically representative of the travel time of stormwater runoff. The time of concentration was conservatively assumed to be 10 minutes for all sub-basins due to similar size, asphalt coverage, and existing stormwater infrastructure within each sub-basin.

- The CN is an empirical parameter which is used to estimate the stormwater runoff characteristics based on the land cover characteristics and soil conditions with the basin. Chen and Associates calculated the curve numbers for each basin based on the DCIA parameter and the USGS soil category.

These hydrologic parameters were important to establish the flow conditions of surface runoff across these basins into the stormwater management system. Chen and Associates calculated these parameters based on available information on the existing conditions within each sub-basin. Once these hydrologic parameters were calculated for each sub-basin, the hydrologic parameters of each sub-basin were loaded into the stormwater model based on the characteristics of each basin. A summary of these hydrologic parameters for each sub-basin can be found in Appendix 6.6 – Hydrologic Parameters.

3.3.3 LINKS

The stormwater management system was composed of the pipe and structure network which interconnects all of the basins within the project area to the receiving water bodies. The link data within the stormwater model was based on the existing drainage atlas. The pipe and structure network was included within the stormwater model to estimate the flow from basin to basin for eventual discharge into the receiving water bodies. Within the ICPR software, the components of the stormwater management system, such as pipes, weirs, and control structures, were entered as links between sub-basins within the stormwater model. The data from the drainage atlas that was entered into the model included outfall and control structure elevations, structure rim elevations, pipe diameters, pipe lengths, and pipe materials. All pipes which form a connection between basins were included in the stormwater model to ensure that the transfer of stormwater runoff in the stormwater model mimics the actual conditions. A schematic junction map or nodal diagram, which includes the links between basins within the ICPR model, is shown in Exhibit 3.9 – Nodal Diagram.

3.3.4 BOUNDARY CONDITIONS

The hydraulic boundary conditions at each outfall from the stormwater management system must be defined for the receiving water bodies to simulate the effects of the tailwater conditions, which is the surface elevation of the receiving water body. The existing stormwater management system for the Town is currently connected to various canals, the Intracoastal Waterway, and to the FDOT US-1 right-of-way via outfall structures. These canals are impacted by tidal fluctuation due to the connection to the Intracoastal Waterway, which interconnects with the Atlantic Ocean. The USGS and the SFWMD have been monitoring canal water levels daily at many locations around South Florida since 1984. As necessary, Chen and Associates utilized the historic water levels from the available SFWMD data for verification purposes.

For the stormwater model, Chen and Associates assumed a water level elevation of +0.40 feet NAVD (+2.00 feet NGVD) for the receiving water body elevations of the stormwater management system. These standard water levels were defined by Broward County for regulatory permitting and were used to create consistency for all the stormwater permit models developed within Broward County.

The elevation of the groundwater in the study area was important for the preparation of a stormwater model because the ground water elevation determines the amount of available storage in the soil. As runoff travels over pervious area to the catch basins and/or retention/detention areas, some of this runoff is captured and stored in the soil where it percolates into the ground. The available soil storage was needed to ensure that the proper runoff volume reaches the stormwater management system within the stormwater model. BCEPGMD and SFWMD will require the use of their standard groundwater elevation of +0.40 feet NAVD (+2.00 feet NGVD) within the stormwater model as part of their permit application process. However, it is important to understand the actual groundwater elevations during the design of the stormwater management system because the presence of a higher than expected groundwater elevation can impede the infiltration of stormwater runoff. To avoid these potential issues, the designer of specific stormwater improvements should use actual groundwater elevations and not rely on the groundwater elevations required by regulatory agencies.

3.3.5 RAINFALL

The amount of rainfall that has historically been encountered within the Town's limits was necessary to properly create this stormwater model. Standard rainfall data is typically provided by local stormwater management districts to ensure the stormwater models submitted with permit applications all use consistent rainfall data. For the Broward County area, SFWMD, BCEPGMD, and FDOT use standard rainfall amounts for design storm events for preparation of the permitted stormwater models. The use of standard design storms was required within the stormwater model to verify whether the Level of Service (LOS) required by the regulatory agencies is met by the stormwater management system. Rainfall data from standard design storms was used within the stormwater model to evaluate the flow of stormwater runoff within each basin into the stormwater management system for disposal via the various outfalls. The rainfall data for these standard design storms included total storm quantity in inches, storm intensity in inches per hour, storm return period (year), and storm duration (hours).

Rainfall data for standard design storms is defined by the SFWMD within the Permit Information Manual IV. According to the Manual, the 72-hour storm data is generated by multiplying the 24-hour storm data by 1.359. The rainfall intensities were applied within the stormwater model according to the SFWMD rainfall distribution. The following standard storm events from SFWMD and BCEPGMD were used within the stormwater model to evaluate the performance of the existing stormwater management system under various scenarios:

Design Storm Intensity

Storm Event	Rainfall
5 year – 1 day	7"
10 year – 1 day	9"
25 year – 3 day	14"
100 year – 3 day	18"

3.4 SYSTEM REQUIREMENTS

The performance of the stormwater management system in the study area must be compared to the regulatory agency guidelines to ensure structures and roadways do not flood during various storm events. The stormwater management system must also provide a minimum level of water quality treatment of stormwater runoff prior to discharge into adjacent surface waters.

3.4.1 LEVEL OF SERVICE (LOS) CRITERIA

Chen and Associates reviewed the typical LOS criteria defined by the regulatory agencies with jurisdiction within the Town. These criteria for the stormwater management system within the study area were based on the guidelines from SFWMD, Florida Department of Environmental Protection (FDEP), and BCEPGMD. The most stringent requirement from these agencies was incorporated into the LOS for the study area to ensure a conservative approach to evaluating the existing infrastructure. The stormwater model was used to verify whether existing systems meet the following LOS requirements:

- Building Structures – The flood level shall not exceed the finish floor elevation of all building structures within the study area during the 100-year, 3-day storm event.

- Roadways and Parking Lots – Stormwater ponding shall not encroach onto any roadway centerlines during the 10-year, 1-day storm event. Stormwater ponding shall not encroach onto any roadway edge of pavement during the 5-year, 1-day storm event.

- Outfall Discharges – The outfall discharge shall not exceed the allowable peak discharge during a 25-year, 3-day rainfall event as defined by the existing permit requirements. If the existing outfalls do not have a maximum discharge assigned by existing permits, the regulatory agencies will require "pre-development" versus "post-development" discharge analysis to ensure the stormwater discharge into adjacent surface waters does not increase after the proposed construction.

3.4.2 REGULATORY REQUIREMENTS

SFWMD and BCEPGMD are the primary regulatory agencies with jurisdiction over stormwater issues in the Town of Lauderdale-By-The-Sea. Chapter 40E-4 of the Florida Administrative Code (FAC) creates and empowers the SFWMD to regulate all matters related to stormwater management and groundwater withdrawal. Chapter 27, Article V of the Broward County Code of Ordinances similarly empowers the BCEPGMD with similar regulatory duties. Based on these regulations, any future construction project which impacts the stormwater management system in the Town will require obtaining a permit from these agencies. SFWMD and BCEPGMD will define the minimum quantity of stormwater runoff which the stormwater management system must handle. The regulatory requirements of any stormwater permit for the Town will require the stormwater management system to meet the following minimum criteria, which were incorporated into the LOS criteria defined within the previous section:

- Finish floor of building structures shall be at or above the 100 year flood elevation. This is a standard criteria for all regulatory agencies with jurisdiction over the Town of Lauderdale-By-The-Sea, including SFWMD, BCEPGMD, and FEMA.

- Peak discharge during a 25-year, 3-day rainfall event shall not exceed the previously permitted peak discharge according SFWMD and/or BCEPGMD. Each existing drainage system should be previously permitted and is allowed a maximum discharge rate under each stormwater permit.

- Peak Stages shall not encroach on roadway centerlines or parking lots during the 5-year, 1-day storm event.

In addition to the quantity of stormwater runoff, these regulatory agencies also define the level of water quality treatment to stormwater runoff required prior to discharge via outfalls into adjacent surface water bodies. The water quality criteria for the Town is based on the SFWMD standards. These standards require treatment of the first inch of stormwater runoff generated from the entire site area or 2.5 inches of stormwater runoff generated from all impervious areas within the site area (whichever is greater). The

SFWMD provide credits for various Best Management Practices (BMP) types and includes further requirements for various land uses. These issues are fully detailed in SFWMD Environmental Resource Permitting Manual and in Broward County Chapter 27. These water quality requirements are standard among other South Florida municipalities and are consistent with criteria from BCEPGMD.

Chen and Associates is currently tracking potential changes to stormwater regulations which could impact the implementation of the Stormwater Master Plan. All water quality treatment components, such as exfiltration trench, retention areas, or swale areas, were sized based on the current stormwater regulations. Please note the "New Statewide Stormwater Rule" is currently under consideration by the FDEP, which could impact the configuration of the proposed stormwater improvements. If the "New Statewide Stormwater Rule" is implemented, the proposed stormwater improvements which are connected to a positive outfall to a surface water body will need to be reassessed during the design phase to verify adequate water quality components are included. Some of the potential changes to stormwater regulations include the following items:

- FDEP – Water Body Reclassification: There are currently five classes of surface water bodies in the State of Florida, which range from Class I (drinking water supply) to Class V (industrial use). More information on the water body classifications can be found at http://www.dep.state.fl.us/water/wqssp/classes.htm. Most of the water bodies in South Florida default to a designation of Class III, which are called "Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife" waters. To protect present and future beneficial uses of the waters, water quality criteria has been established for each classification. While some criteria are intended to protect aquatic life, others are designed to protect human health. The criteria are located in Rules 62-302.500 and 62-302.530 F.A.C. Water quality standards also include narrative criteria for pollutants and other conditions not specifically listed. These criteria are the guidelines for the required treatment prior to discharge. The future reclassification of these water bodies will basically change the allowable levels of nutrients and pollutants into these water bodies. Currently, FDEP is reviewing the creation a Class III-R status that should be similar to the current Class III standards, but this is not finalized yet.
- FDEP – State Stormwater Rule: As a result of a lawsuit in the Southwest Florida Water Management District (SWFWMD), the FDEP is working on a rule to make all of the water quality criteria consistent throughout the State of Florida. This New State Stormwater Rule was originally set to be released in Summer 2009, but has been put on hold pending the numeric criteria rulemaking.
- EPA – Numeric Criteria Standard: As a result of another lawsuit, the EPA is attempting to set specific numeric (as opposed to narrative) criteria for nutrient levels in water bodies. The proposed levels under discussion could cause many water bodies fall into an "impaired" classification. This will require that all the areas that contribute to these water bodies will need to reduce their nutrient discharge. This is in draft rule form and there have been public hearings going on this month. Under the current schedule, the Numeric Criteria Standard could become a rule in October 2010. The FDEP proposed different Numeric Criteria Standard and is trying to get the EPA to modify their criteria, but that is yet to be determined.
- EPA – New NPDES Permit: For many years, the National Pollution Discharge Elimination System (NPDES) program has required municipalities to perform activities to reduce the pollution to surface waters. They first started with industrial point sources and then moved to non-point sources, such as construction sites and drainage systems. EPA is now planning to "drill down" this approach to outfalls and potentially apply the numeric criteria standards. Although this change is probably about two years away, it would immediately impact NPDES permit-holders.

3.5 EXISTING CONDITIONS MODEL RESULTS

Chen and Associates utilized the information acquired in Task 1 to prepare the stormwater model of the existing conditions. The stormwater model used the ICPR software to conduct iterative mass balance calculations to determine the routing of stormwater runoff between basins via the link connections which mimic the stormwater management system for the Town. The model simulations of the existing conditions were run for four design storms (5-year / 24-hour; 10-year / 24-hour; 25-year / 72-hour; 100-year / 72-hour). The key results of the stormwater model are the peak flood elevation and the peak discharge rate via outfalls into the receiving water bodies. These results determined whether the existing stormwater management system meets the required LOS under various design storms. The summary of the peak flood stages per basin during 5-year / 24-hour, 10-year / 24-hour, and 100-year / 72-hour design storms is included within Appendix 6.7 – Existing Conditions Peak Stages, as generated by the ICPR software, to allow for comparison between design storms. For each scenario, Chen and Associates reviewed the results of the computer model on a basin by basin basis to verify whether the maximum flood stage was exceeded based on two LOS criteria.

First, Chen and Associates reviewed the maximum flood stage in each basin during the 100-year, 3-day design storm to verify it did not exceed the finish floor elevation of any structures located in the basin. Although we did not have access to the actual finish floor elevations for buildings located within the Town, assumptions were made to estimate the lowest finish floor elevation within each sub-basin using the LIDAR elevation data, which was gathered during Task 1. Basically, the low lying areas of each sub-basin were identified according to the LIDAR elevation data. The lowest finish floor elevation within each sub-basin was assumed to be 6-inches above the ground surface elevation of the lowest private property area within the sub-basin. According to the model results, the maximum flood stage during the 100-year, 3-day design storm will likely exceed the assumed finish floor elevation of the lowest building within 28 of 41 total sub-basins. The deviation from the assumed low finish floor elevation within each sub-basin is defined within Appendix 6.7 – Existing Conditions Peak Stages.

Second, Chen and Associates reviewed the maximum flood stage in each basin during the 5-year, 1-day design storm to verify it did not exceed the lowest pavement elevation for any roadways located in the basin to ensure ponding did not encroach across any roadway. Although we did not have access to survey grade elevations of the roadways located within the Town, assumptions were made to estimate the lowest roadway elevation within each sub-basin using the LIDAR elevation data, which was gathered during Task 1. Basically, the low point of all roadways within each sub-basin was identified according to the LIDAR elevation data. According to the model results, the maximum flood stage during the 5-year, 1-day design storm will likely exceed the lowest roadway elevation within 35 of 41 total sub-basins. The deviation from the assumed low roadway elevation within each sub-basin is defined within Appendix 6.7 – Existing Conditions Peak Stages. Based on the peak stage results, the extent of the flooding within the Town's right-of-way is displayed on Exhibit 3.10 – Potential Ponding Areas under Existing Conditions (North) and Exhibit 3.11 – Potential Ponding Areas under Existing Conditions (South).

Typically, the maximum allowable discharge from an existing outfall cannot exceed the allowable peak discharge rate according to permit requirements. If the existing outfalls do not have a maximum discharge assigned by existing permits, the regulatory agencies will require "pre-development" versus "post-development" discharge analysis to ensure the stormwater discharge into adjacent surface waters does not increase after the proposed construction. During the permitting stage, the future infrastructure improvements in the Town will have to ensure that the peak discharge from the outfalls does not exceed the peak discharge under the 25-year / 72-hour design storm established by the existing conditions model. The summary of the peak discharge per outfall for the 25-year / 72-hour design storm is included for the

existing conditions in Appendix 6.8 - Existing Conditions Peak Discharge per Outfall, to allow for comparison under the various scenarios.

Chen and Associates reviewed the results of the existing conditions model for the purpose of identifying "potential ponding areas" where consistent standing water is likely during rainfall events. Based on the results of the existing conditions model, Chen and Associates developed maps which display the limits of "potential ponding" within the Town during and/or after a heavy rainfall event. The limits of "potential ponding" within the Town are displayed within Exhibit 3.10 – Potential Ponding Areas under Existing Conditions (North) and Exhibit 3.11 – Potential Ponding Areas under Existing Conditions (South). Chen and Associates utilized the information produced by the existing conditions model to provide recommendations for improvements to the existing Town stormwater system, as defined within the following section. These stormwater improvements were sized to minimize or eliminate the ponding issues throughout the Town. These improvements will also meet SFWMD and BCEPGMD criteria for water quality and quantity.

Exhibit 3.1
Photo Study - North Area

Legend

Town Boundary

N

0 290 580 1,160 1,740 2,320 Feet

CHEN&ASSOCIATES Civil and Environmental Engineers

Exhibit 3.2
Photo Study - South Area

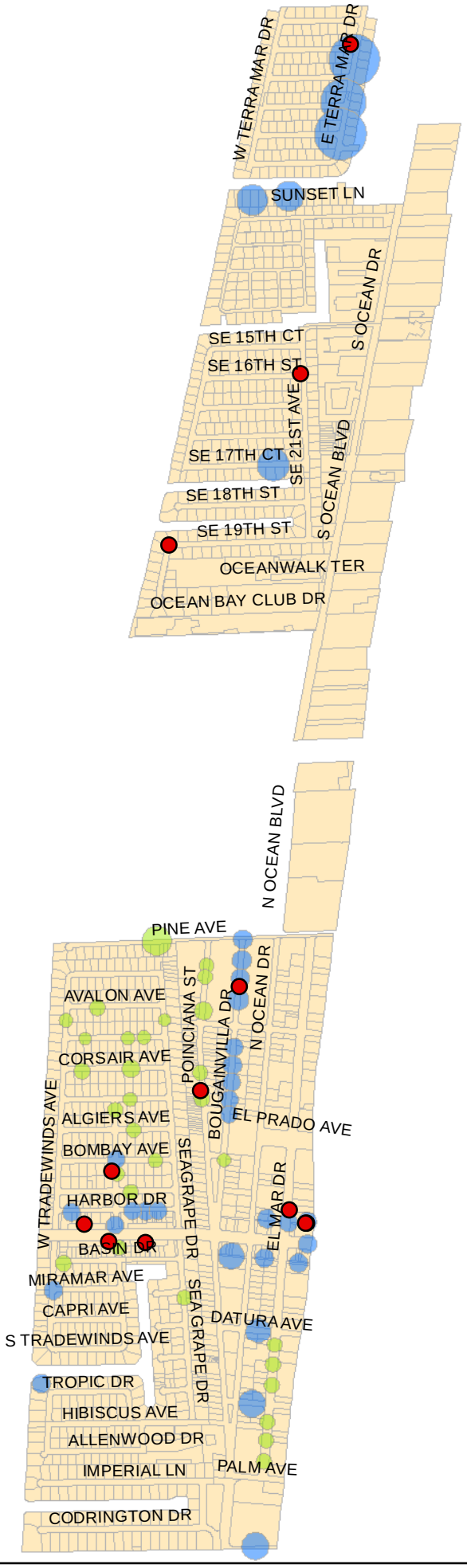
Exhibit 3.3
Historical Areas of Concern

Legend

- Resident Complaints
- Areas of Ponding
- Minor Road Ponding

Ü

0 500 1,000 2,000 3,000 4,000 Feet



TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 3.4
Outfall Locations

Legend

- Outfall
- Catch_Basin
- Curb_Inlet
- Drainage_MH
- Drainage_Pipe
- Parcels
- Waterway

N

CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

Exhibit 3.5
Photo Study - Outfalls

Legend

- Outfalls
- Parcels
- Waterway

N

0 425 850 1,700 2,550 3,400 Feet

CHEN&ASSOCIATES Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA FLORIDA

Exhibit 3.6
Drainage Basin Map

Legend

- Parcels
- Waterways
- Town Boundary

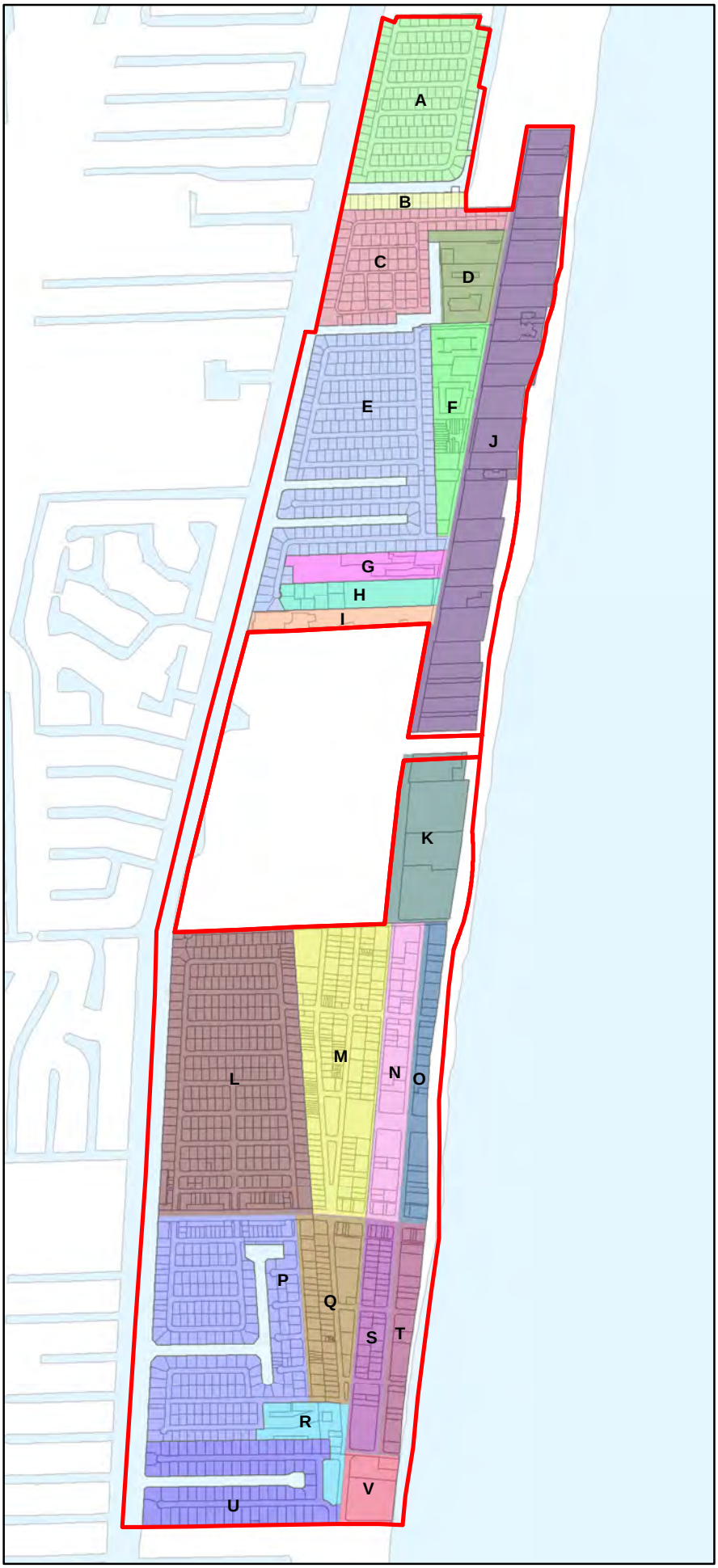
Drainage Basins

Name

- A
- B
- C
- D
- E
- F
- G
- H
- I
- J
- K
- L
- M
- N
- O
- P
- Q
- R
- S
- T
- U
- V

N

0 462.5 925 1,850 2,775 3,700 Feet

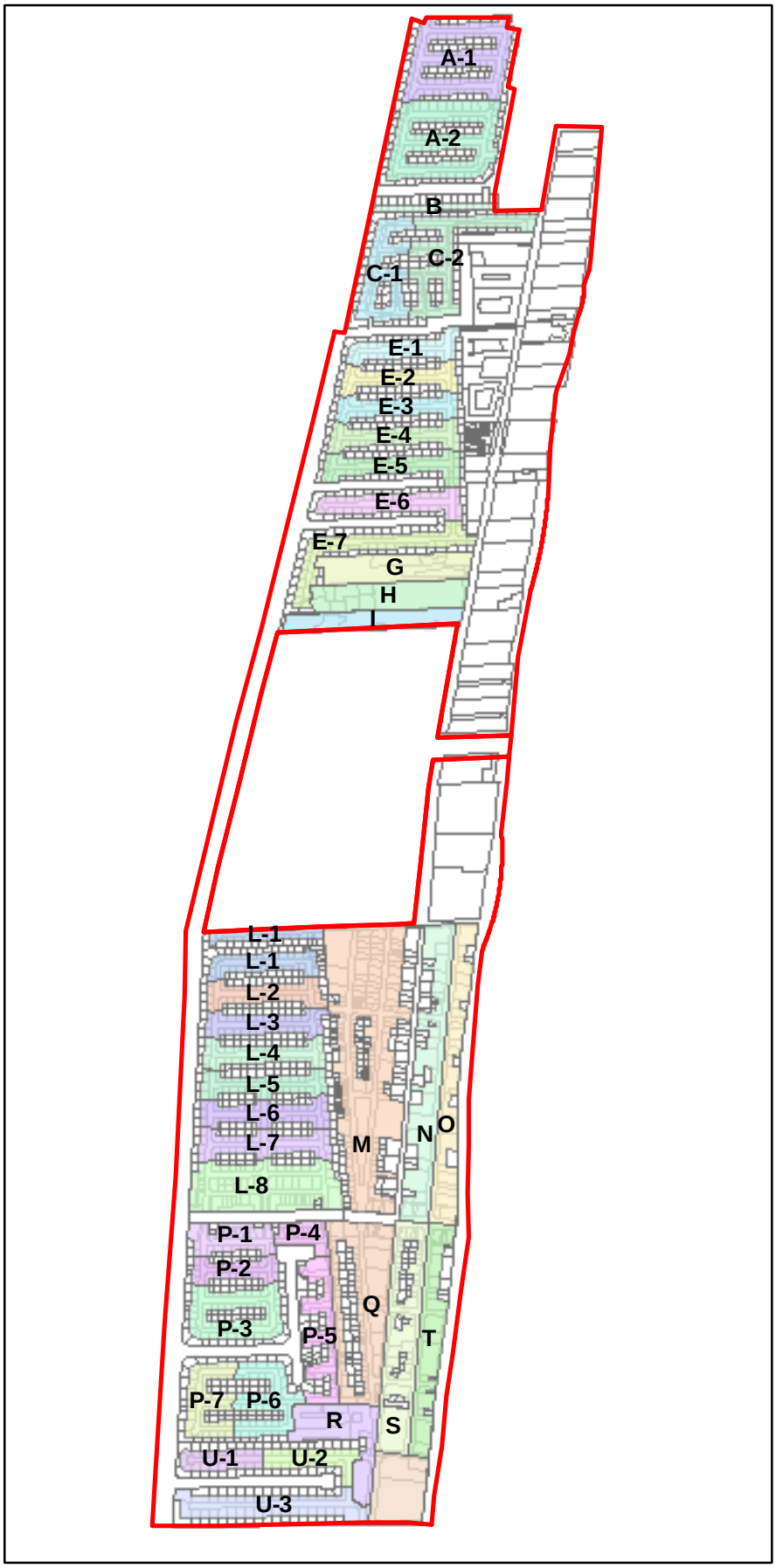


CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 3.7
Sub-Basin Boundaries

Legend

- Town Boundary
- A-1 Boundary
- A-2 Boundary
- B Boundary
- C-1 Boundary
- C-2 Boundary
- E-1 Boundary
- E-2 Boundary
- E-3 Boundary
- E-4 Boundary
- E-5 Boundary
- E-6 Boundary
- E-7 Boundary
- G Boundary
- H Boundary
- I Boundary
- L-1 Boundary
- L-2 Boundary
- L-3 Boundary
- L-4 Boundary
- L-5 Boundary
- L-6 Boundary
- L-7 Boundary
- L-8 Boundary
- M Boundary
- N Boundary
- O Boundary
- P-1 Boundary
- P-2 Boundary
- P-3 Boundary
- P-4 Boundary
- P-5 Boundary
- P-6 Boundary
- P-7 Boundary
- Q Boundary
- R Boundary
- S Boundary
- T Boundary
- U-1 Boundary
- U-2 Boundary
- U-3 Boundary
- V Boundary
- Parcels



0 550 1,100 2,200 3,300 4,400 Feet

Exhibit 3.8
Parcel Analysis
Stormwater Curve Number

Legend

- Town Boundary
- Parcels
- Waterways

Curve Number

- 39 - 40
- 41 - 62
- 63 - 69
- 70 - 74
- 75 - 80
- 81 - 86
- 87 - 92
- 93 - 98

N

0 500 1,000 2,000 3,000 4,000 Feet

CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

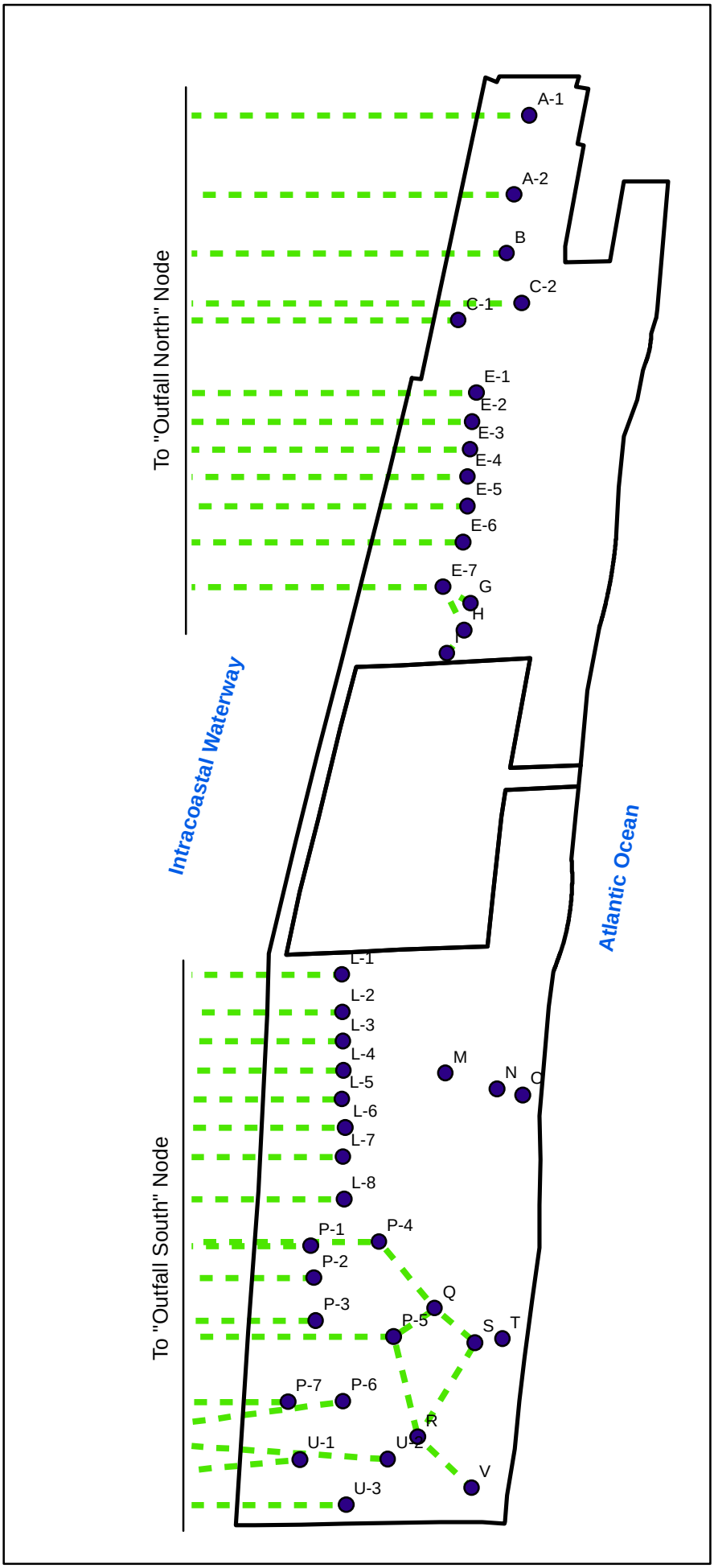
Exhibit 3.9
Nodal Diagram

Legend

- Town Boundary
- Nodes
- Sub-Basin Boundaries
- Links

N

0 465 930 1,860 2,790 3,720 Feet



CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 3.10
Potential Ponding Areas
Under Existing Conditions
(North)

Legend

- Town Boundary
- Waterways
- Ponding
- A-1 Boundary
- A-2 Boundary
- B Boundary
- C-1 Boundary
- C-2 Boundary
- E-1 Boundary
- E-2 Boundary
- E-3 Boundary
- E-4 Boundary
- E-5 Boundary
- E-6 Boundary
- E-7 Boundary
- G Boundary
- H Boundary
- I Boundary
- Parcels

N

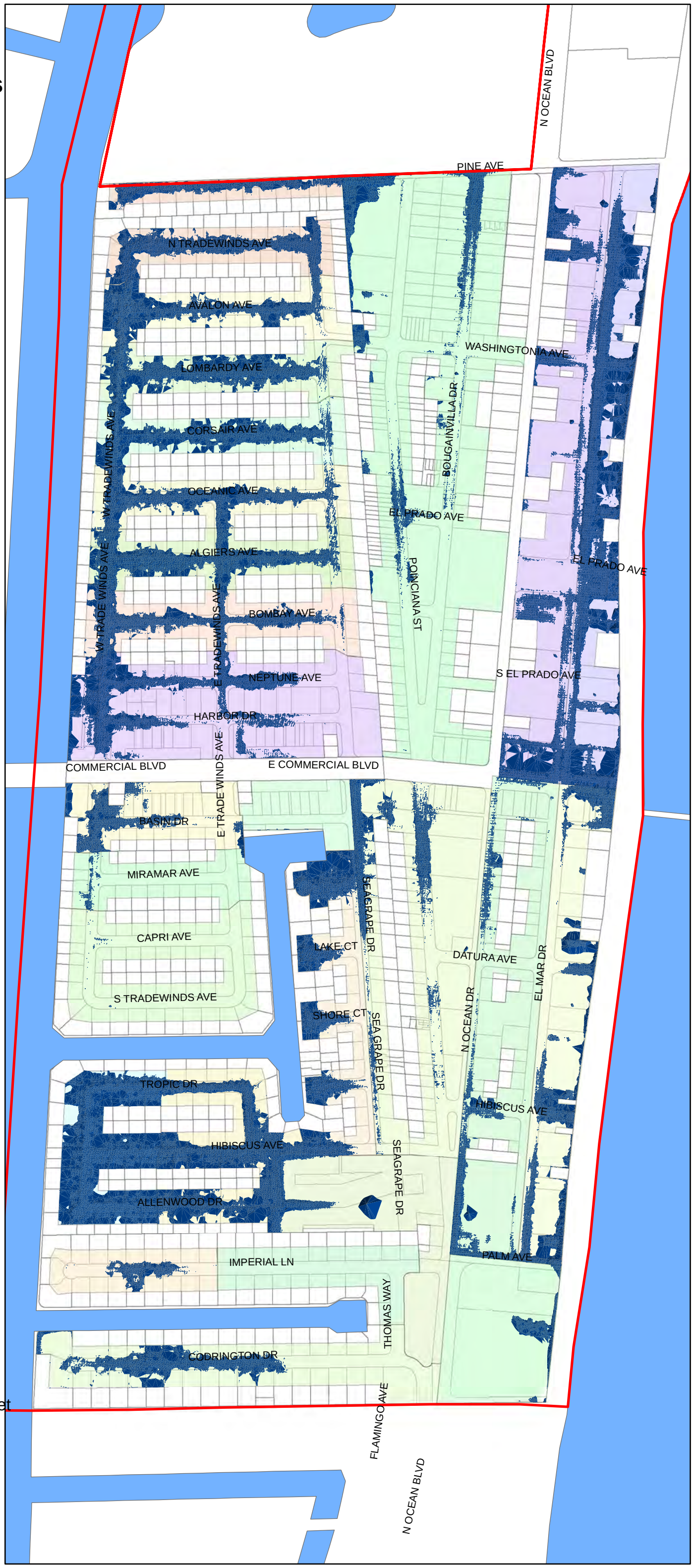
0 140 280 560 840 1,120 Feet

CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 3.11
Potential Ponding Areas Under Existing Conditions (South)

Legend

- Town Boundary
- Waterways
- Parcels
- Ponding
- L-1 Boundary
- L-2 Boundary
- L-3 Boundary
- L-4 Boundary
- L-5 Boundary
- L-6 Boundary
- L-7 Boundary
- L-8 Boundary
- M Boundary
- N Boundary
- O Boundary
- P-1 Boundary
- P-2 Boundary
- P-3 Boundary
- P-4 Boundary
- P-5 Boundary
- P-6 Boundary
- P-7 Boundary
- Q Boundary
- R Boundary
- S Boundary
- T Boundary
- U-1 Boundary
- U-2 Boundary
- U-3 Boundary
- V Boundary



N

0 145 290 580 870 1,160 Feet

TOWN OF LAUDERDALE-BY-THE-SEA FLORIDA

CHEN&ASSOCIATES Civil and Environmental Engineers

SECTION 4 – PROPOSED ALTERNATIVES FOR STORMWATER IMPROVEMENTS

4.1 OVERVIEW

Chen and Associates collected all available information on the Town's stormwater management system for the purpose of creating an existing conditions stormwater model and preparing a Stormwater Master Plan to identify necessary drainage improvements. As part of this Stormwater Master Plan, Chen and Associates has developed a conceptual design for stormwater improvements throughout the Town to address deficiencies with the existing stormwater management system. The conceptual design was prepared based on a combination of public complaints, staff observations, site inspections during rainfall events, the results of the stormwater model, and regulatory requirements. As feasible, the proposed stormwater improvements were sized to meet the level of service criteria defined within Section 3.4.1 of this report. Please note these conceptual layouts are based on various assumptions. The conceptual layouts will need to be evaluated in more depth during the design phase of each project to verify the feasibility of each layout. The conceptual design for each basin was developed based on the following assumptions:

- The proposed drainage improvements were recommended within Town right-of-way areas only. Drainage improvements were not recommended for portions of these basins which were either FDOT right-of-way or private property. It was assumed drainage facilities were provided within these areas.
- Any proposed underground drainage facilities were configured to avoid horizontal conflicts with the existing water distribution system, gravity sewer system, and force main network based on the Town's GIS Utility Atlas.
- The depth of the City's utilities was not verified via testholes during the completion of this Stormwater Master Plan. Any crossings between the proposed underground drainage facilities with the existing underground utilities will need to be evaluated further during the design phase to ensure adequate vertical clearance is available.
- The as-built drawings or atlases for other existing underground facilities, such as FPL, Bellsouth, gas, and cable, were not made available during the completion of this Stormwater Master Plan. The location of other existing underground facilities, such as FPL, Bellsouth, gas, and cable, will need to be evaluated in more depth during the design phase of each project.
- All existing stormwater outfalls along with associated drainage pipe were assumed to be in good condition and fully operable. Although a limited inspection of the Town's drainage system was recently completed by Tele-Vac, the existing outfalls and drainage pipe should be inspected during the design phase of each project to verify the condition of the existing facilities.
- The Town's drainage atlas did not differentiate solid drainage pipe from exfiltration pipe in all locations, especially within older drainage systems. The drainage networks connected with positive outfalls to surface water bodies were assumed to consist of entirely solid pipe. The close drainage networks without a positive outfall to a surface water body were assumed to include exfiltration trench.
- The proposed exfiltration trench was assumed to consist of 24-inch reinforced concrete pipe (RCP) within a 4-feet wide trench. The cross section of the proposed exfiltration trench can be resized as needed during the design phase.
- The proposed exfiltration trenches were sized based on assumed percolation rates based on the USGS soil types within each basin. Exfiltration testing will be required during the design phase of each project in order to verify the minimum length of exfiltration trench required.
- Any proposed drainage improvements which will connect to an existing drainage system with positive outfall to a surface water body was assumed to require a control structure with a weir to ensure stormwater runoff is retained for water quality treatment.
- All water quality treatment components, such as exfiltration trench, retention areas, or swale areas, were sized based on the current stormwater regulations. Please note the "New Statewide Stormwater

Rule" is currently under consideration by the FDEP, which could impact the configuration of the proposed stormwater improvements. If the "New Statewide Stormwater Rule" is implemented, the proposed stormwater improvements which are connected to a positive outfall to a surface water body will need to be reassessed during the design phase to verify adequate water quality components are included.

- For the stormwater model, the water level elevation was assumed to be 0.40 feet NAVD (2.00 feet NGVD) for the receiving water body elevations of the stormwater management system. These standard water levels are based off the average wet season water table elevation as defined by Broward County and are used to create consistency for all the stormwater permit models developed within the County.
- Within construction areas of the proposed drainage improvements, all existing grass swale areas within the public right-of-way were assumed to be available to be regraded to provide additional storage for stormwater runoff. During the design phase, the right-of-way areas within proposed construction areas should be inspected in more detail to ensure existing utility poles, trees, or other obstructions do not prevent the swale areas from being regraded.

Based on our analysis, Chen and Associates developed proposed alternatives for stormwater improvements within the Town which can be separated into two categories. The first category is regional alternatives which include the annual operational maintenance of the existing stormwater management system, such as the restoration of grass swales, the cleaning of drainage pipes and outfalls, and the repair of existing drainage pipe. The second category is local alternatives which include project specific drainage improvements to address localized flooding issues with a certain area of the Town. The conceptual design for each proposed alternative is further defined within the following sections.

4.2 REGIONAL ALTERNATIVES

The regional alternatives are intended to be systematic improvements which can be implemented throughout the Town's entire stormwater management system with the goal of meeting level of service criteria. The purpose of these regional alternatives is to improve the overall performance of the Town's stormwater management system through proper routine maintenance. The Town should budget for these regional alternatives on an annual basis to ensure the stormwater management will continue to operate at peak capacity. These regional alternatives include the restoration of grass swales, the cleaning of drainage pipes and outfalls, and the repair of existing drainage pipe. Chen and Associates has developed recommendations for regional alternatives for implementation by the Town, which are defined in more detail in the following sections.

4.2.1 SWALE RESTORATION PROGRAM

Grass swale areas within the right-of-way are intended to collect stormwater runoff from adjacent roadways, to provide water quality treatment by filtering pollutants and sediments carried by the stormwater runoff, and to control flooding by providing stormwater storage volume and allow stormwater to infiltrate into the ground surface. The majority of residential properties within the Town, especially on west side, have grass swale areas located within the right-of-way areas adjacent to the roadways. These grass swales areas were intended to be the primary component of the stormwater management system. Although limited existing underground drainage facilities are found within these residential neighborhoods, the grass swale areas were supposed to provide storage capacity for stormwater runoff before it reaches the underground drainage facilities for eventual disposal via the existing outfalls.

Based on our observations of the existing conditions, the grass swale areas are typically overgrown and overbuilt throughout the Town's residential neighborhoods, which causes ponding within roadway areas during rainfall events. This can happen if the swales were not originally constructed properly, if the

resident modifies the swale by adding landscape features, or if sediment builds up within the swale over time. Typically, the center of the grass swale areas should be 3" to 6" deeper than the edge of pavement elevation. Since the existing swale areas within the Town residential areas are not properly graded to provide adequate storage for stormwater runoff and to allow for infiltration into the ground surface, the stormwater management system does not meet level of service criteria for the roadways. The overbuilt swales can cause stormwater ponding within roadway areas in various ways. The overbuilt swale will block stormwater runoff from flowing off the roadway areas, which can create ponding within the travel lanes. The overbuilt swale can prevent stormwater runoff from reaching drainage inlets by trapping it in low lying areas, such as driveway approaches. The overbuilt swale can also cause stormwater runoff to collect initially over impervious surfaces, which prevents any infiltration into the ground surface.

The most cost effective method of reducing flooding within the roadway areas is to regrade grass swale areas within the right-of-way areas to provide additional storage volume for stormwater runoff. The regrading of the grass swales will increase the depth of swale areas to provide additional storage volume. Since the regraded grass swale areas will now be at a lower elevation than the adjacent roadway, stormwater runoff will flow from the roadway and accumulate in the swale areas to infiltrate into ground surface. Based on the soil conditions within the Town, the stormwater runoff from these residential roadways can be expected to infiltrate into the ground surface within 6 hours if the swale area is properly graded. Properly graded grass swale areas will reduce the flooding of roadway areas by providing additional storage capacity and reducing the total discharge from the existing outfalls by allowing for infiltration into the ground surface.

Based on our analysis, the bulk of the localized ponding within the residential neighborhoods on the west side of the Town is chiefly due to improperly graded grass swale areas adjacent to the roadways. The City should implement an annual swale program to systematically regrade grass swale areas within the residential neighborhoods to address localized ponding issues by providing additional storage volume for stormwater runoff adjacent to the roadway. The Swale Restoration Program will need to rehabilitate swales throughout entire neighborhoods since restoration of isolated swales will not be sufficient to resolve flooding issues. In order for the Swale Restoration Program to be effective, all non-essential items will need to be removed from the public right-of-way to allow the existing swales excavated to be 6 inches deeper than the edge of pavement elevation. Upon completion of the grading operation, the swale area should be immediately re-sodded. The existing grass swale areas to be included within the Swale Restoration Program are identified on Exhibit 4.1 – Existing Swale Conditions (North) and Exhibit 4.2 – Existing Swale Conditions (South). The effectiveness of the Swale Restoration Program is displayed on Exhibit 4.3 – Potential Ponding Areas after Swale Program (North) and Exhibit 4.4 – Potential Ponding Areas after Swale Program (South). Chen and Associates has developed the budget for the Swale Restoration Program based on the assumption it will cost approximately $25 per square yard of swale area. The overall budget for the Swale Restoration Program is defined within Table **4.2.1**. Since it will not be feasible to implement the Swale Restoration Program across the entire Town immediately, the Town should plan on implementing the program on a basin by basin basis. The Town should use the budget level cost estimate for the Swale Restoration Program to develop a long range budget for implementing the program.

The Town should expect some opposition to the Swale Restoration Program from residents since most view the grass swale areas within the right-of-way to be their private property, which is not the case. Prior to any implementation of the Swale Restoration Program, the Town should develop a Community Outreach Program on the importance of the swale restoration program. The purpose of the Community Outreach Program is to provide educational information to residents on the objectives of the Swale Restoration Program along with the flood control and environmental benefits. The Town should also consider various implementation strategies for the Swale Restoration Program. Some other municipalities within South Florida implement their Swale Restoration Program using the following options:

- Voluntary: Town will allow residents to volunteer for the Swale Restoration Program. Town shall begin swale restoration along a roadway once sufficient percentage of residents along the roadway volunteer for Swale Restoration Program.
- Mandatory: Town will provide residents an adequate amount of time to remove private landscaping and other items from right-of-way before beginning the restoration of the swale areas
- Mandatory: Town will be responsible for the relocation of private landscaping and other items from the right-of-way to private property before beginning the restoration of the swale areas.

Table 4.2.1 - Swale Restoration Program

Sub-Basin	Swale Area (SY)	Budget ($)
A-1	7,220	$180,500
A-2	6,615	$165,375
E-1	3,360	$84,000
E-2	2,760	$69,000
E-3	2,760	$69,000
E-4	3,335	$83,375
E-5	2,850	$71,250
E-6	2,590	$64,750
E-7	3,950	$98,750
L-1	3,170	$79,250
L-2	2,710	$67,750
L-3	1,965	$49,125
L-4	2,195	$54,875
L-5	2,965	$74,125
L-6	2,980	$74,500
L-7	3,340	$83,500
L-8	3,710	$92,750
M	3,259	$81,475
N	191	$4,775
P-1	1,730	$43,250
P-2	1,780	$44,500
P-3	3,775	$94,375
P-4	94	$2,350
P-5	1,935	$48,375
P-6	3,460	$86,500
P-7	2,895	$72,375
S	90	$2,250
T	25	$625
U-1	1,570	$39,250
U-2	2,336	$58,400
U-3	3,750	$93,750
Total	85,365	$2,134,125

4.2.2 OUTFALL MAINTENANCE PROGRAM

To ensure the existing drainage system operates at full capacity, the City should budget for routine system maintenance, such as the inspection and cleaning of existing outfall piping. Typically, sediments can accumulate within drainage piping over time if the drainage system does not undergo routine cleaning. During the completion of the outfall inventory with Tele-Vac South, many of the existing outfalls were observed to have a build up of sediment and/or barnacles, which can negatively impact the performance of the existing stormwater management system. A partial blockage of the outfall pipe can significantly reduce the peak discharge capacity via the outfall, which will slow the draining of stormwater runoff from the right-of-way areas during a heavy rainfall event. The observed conditions of the existing outfalls is defined within Appendix 6.3 – Outfall Inventory. Based on our observations, approximately 15 of the 59 existing outfalls are partially blocked, chiefly by barnacle growth, and are in need of immediate maintenance. There also could be additional blockages within the terminal run of outfall pipes that could not be observed during the outfall inventory.

Based on our analysis, localized ponding within the Town could be reduced by the proper maintenance of the existing positive outfalls. The City should implement an annual outfall maintenance program to systematically inspect and clean the existing outfall piping to ensure the stormwater management system operates at full capacity. Chen and Associates has developed the budget for the Outfall Maintenance Program based on the assumption it will cost approximately $8.00 per linear foot of outfall pipe. The overall budget for the Outfall Maintenance Program is defined within the table below. Since it will not be feasible to implement the Outfall Maintenance Program across the entire Town immediately, the Town should plan on implementing the program on a basin by basin basis. The Town should use the budget level cost estimate for Outfall Maintenance Program to develop a long range budget for implementing the program.

Table 4.2.2 - Outfall Maintenance Program

Basin	Outfall Pipe (LF)	Budget ($)
A	275	$2,200.00
E	1,015	$8,120.00
L	1,335	$10,680.00
P	1,025	$8,200.00
U	350	$2,800.00
Total	4,000	$32,000.00

4.2.3 PIPE MAINTENANCE PROGRAM

To ensure the existing drainage system operates at full capacity, the City should budget for routine system maintenance, such as the inspection and cleaning of existing drainage piping, especially exfiltration piping. Typically, sediments can accumulate within drainage piping over time if the drainage system does not undergo routine cleaning. The accumulation of sediments within the drainage piping can significantly reduce the transmission capacity of the pipe and slow the percolation rate via exfiltration trenches, which will slow the draining of stormwater runoff from the right-of-way areas during a heavy rainfall event. The Town recently retained Tele-Vac South to clean and televise a portion of the Town's stormwater management system for the purpose of eliminating any accumulated sediments along with locating any pipe sections which are damaged or collapsed. Under their contract, Tele-Vac South only addressed a small portion of the Town's stormwater management system.

Based on our analysis, localized ponding within the Town could be reduced by the proper maintenance of drainage piping. The City should implement an annual pipe maintenance program to systematically inspect and clean both the existing and proposed piping to ensure the stormwater management system operates at full capacity. Chen and Associates has developed the budget for the Pipe Maintenance Program based on the assumption it will cost approximately $5 per linear foot of pipe. The overall budget for the Pipe Maintenance Program is defined within the table below. Since it will not be feasible to implement the Pipe Maintenance Program to across the entire Town immediately, the Town should plan on implementing the program on a basin by basin basis. The Town should use the budget level cost estimate for Pipe Maintenance Program to develop a long range budget for implementing the program.

Table 4.2.3 - Pipe Maintenance Program

Basin	Drainage Pipe (LF)	Budget ($)
A	3,329	$16,645
E	9,610	$48,050
L	11,718	$58,590
M	14,162	$70,810
N	2,535	$12,673
O	2,902	$14,508
P	3,379	$16,895
Q	3,260	$16,300
S	4,158	$20,790
T	3,174	$15,870
U	504	$2,520
V	1,531	$7,655
Total	60,261	$301,305

4.2.4 PIPE REPAIR AND REPLACEMENT PROGRAM

Due to the age of most of the Town's existing drainage infrastructure, it can be expected that some sections of drainage pipe are damaged and partially collapsed due to deterioration. Based our experience within the Town, localized "sinkholes" have occurred within Town right-of-way due to the collapse of existing drainage pipe. Future "sinkholes" due to pipe collapse are likely unless the Town decides to proactively repair or replace damaged pipe sections. The Town can repair partially damaged pipe sections by the installation of a new pipe lining along the entire pipe. The Town will need to replace partially collapsed pipe sections since the installation of a new pipe lining would not be effective. The location of any damaged drainage pipe can be identified in conjunction with the Pipe Maintenance Program through the televising of existing drainage pipe. The Town recently retained Tele-Vac South to televise a portion of the Town's stormwater management system for the purpose of locating any pipe sections which are damaged or collapsed. Under their contract, Tele-Vac South only addressed a small portion of the Town's stormwater management system. Based on our review of the television inspection reports from Tele-Vac South, approximately 35% of the televised drainage piping was identified to be damaged.

The City should budget for a Pipe Repair and Replacement Program to address any damaged or partially collapsed drainage pipe, which is identified during the implementation of the Pipe Maintenance Program. Chen and Associates has developed the budget for the Pipe Repair and Replacement Program based on the assumption that there is the same percentage of damaged pipe throughout the Town's stormwater management system as observed during the limited television inspection completed by Tele-Vac South.

The overall budget for the Pipe Repair and Replacement Program is defined within the table below. Since it is not be feasible to accurately estimate the amount of pipe in need of repair or replacement until the Pipe Maintenance Program is completed, the Town should plan on implementing the program on an as needed basis. The Town should use the budget level cost estimate for Pipe Repair and Replacement Program to develop a long range budget for implementing the program.

Table 4.2.3 - Pipe Maintenance Program

Basin	Damaged Pipe (LF)	Budget ($)
A	1,697	$140,575
E	4,882	$404,050
L	4,898	$405,750
M	2,902	$240,400
N	330	$27,350
O	598	$49,550
P	1,391	$115,225
Q	1,542	$127,750
S	575	$47,625
T	468	$38,750
U	257	$21,275
V	347	$28,725
Total	19,887	$1,647,025

4.3 LOCAL ALTERNATIVES

The local alternatives are intended to be drainage infrastructure improvements which can be implemented on a project by project basis to address localized ponding issues identified during the preparation of the Stormwater Master Plan. The purpose of these local alternatives is to improve the overall performance of the Town's stormwater management system through infrastructure improvements intended to satisfy the level of service criteria. The Town should budget for these local alternatives as part of a Stormwater Capital Improvement Program. These local alternatives typically include the installation of new underground infrastructure with exfiltration trench. Chen and Associates has developed recommendations for local alternatives for implementation by the Town, which are defined in more detail in the following sections. Please note the conceptual layout for the stormwater improvements will need to be analyzed in more detail during the design phase of each project. The conceptual layout of the stormwater improvements were based on current regulatory requirements. Future changes to the regulatory requirements related to the water quality of stormwater runoff entering surface water bodies could impact the extent of stormwater facilities required along with the associated costs.

4.3.1 BOUGAINVILLA DRIVE

Based on our analysis, the stormwater improvements are necessary along Bougainvilla Drive between El Prado Avenue and Pine Avenue to meet level of service criteria. The existing conditions model identified this section of roadway to be prone to ponding during heavy rainfall events, especially at the north end near Pine Avenue. The flooding issues along Bougainvilla Drive were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. Although there is extensive existing drainage infrastructure located along Bougainvilla Drive, it is not sufficient to handle the stormwater runoff from this area due to the presence of paved shoulders instead of grass shoulders. The existing drainage infrastructure along Bougainvilla Drive is chiefly limited to small inlet structures

with limited dry rock pits for infiltration purposes. The inlet structures are typically interconnected with small diameter solid pipe. The existing system does not provide adequate storage capacity or infiltration capacity to handle the stormwater runoff generated by this section of right-of-way, which lead to the standing water typically encountered after rainfall events.

In order to implement the appropriate drainage infrastructure along Bougainvilla Drive, it will be necessary to completely remove and replace the existing drainage infrastructure. The installation of exfiltration trench system will be required to provide adequate protection to the right-of-way area. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.5 – Proposed Alternative: Bougainvilla Drive. The proposed infrastructure includes approximately 1,800 linear feet of 24-inch exfiltration trench with 15 inlets. Due to the extensive demolition and underground construction, complete roadway improvements will be required during the restoration, which will allow the ground surface to also be regraded to have proper surface flow characteristics. The Town could use this opportunity to implement streetscaping and/or landscaping improvements simultaneous.

4.3.2 POINCIANA STREET

Based on our analysis, the stormwater improvements are necessary along Poinciana Street between El Prado Avenue and just south of Pine Avenue to meet level of service criteria. The existing condition model identified this section of roadway to be prone to ponding during heavy rainfall events, especially near the intersection with North El Prado Avenue. The flooding issues along Poinciana Street were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. Although there is extensive existing drainage infrastructure located along Poinciana Street, it is not sufficient to handle the stormwater runoff from this area. The existing drainage infrastructure along Poinciana Street is chiefly limited to small inlet structures with limited dry rock pits for infiltration purposes. Some of the inlet structures are interconnected with small diameter solid pipe. The existing system does not provide adequate storage capacity or infiltration capacity to handle the stormwater runoff generated by this section of right-of-way, which lead to the standing water typically encountered after rainfall events.

In order to implement the appropriate drainage infrastructure along Poinciana Street, it will be necessary to completely remove and replace the existing drainage infrastructure. The installation of an exfiltration trench system will be required to provide adequate protection to the right-of-way area. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.6 – Proposed Alternative: Poinciana Street. The proposed infrastructure includes approximately 1,645 linear feet of 24-inch exfiltration trench with 16 inlets. Due to the extensive demolition and underground construction, complete roadway improvements will be required during the restoration, which will allow the ground surface to also be regraded to have proper surface flow characteristics. The Town could use this opportunity to implement streetscaping and/or landscaping improvements simultaneously.

4.3.3 PAVILION AREA

Based on our analysis, the stormwater improvements are necessary within the Town's Pavilion Area to meet the level of service criteria. The Pavilion Area includes Commercial Boulevard to the east of North Ocean Drive. The existing conditions model identified this section of roadway to be prone to extensive ponding during heavy rainfall events. The flooding issues within the Pavilion Area were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The ponding issues within this area are chiefly due to stormwater runoff flowing from the adjacent private parking lots along with runoff from Commercial Boulevard. Due to the existing conditions of the ground surface, it is not feasible to prevent the flow of stormwater runoff from adjacent properties. The

installation of an exfiltration trench system will be required to provide adequate protection to the Pavilion Area. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.7 – Proposed Alternative: Pavilion Area. The proposed infrastructure includes approximately 585 linear feet of 24-inch exfiltration trench with 6 inlets which will be connected to the existing drainage system. A gravity injection well has been included to handle the excess stormwater caused by adjacent properties. The Town should consider some modification to the adjacent beach access point from the Pavilion Area to prevent the transfer of sand from the beach areas to the new drainage infrastructure. The Town could use this opportunity to implement streetscaping and/or landscaping improvements simultaneously.

4.3.4 EL MAR DRIVE (NORTH)

Based on our analysis, the stormwater improvements are necessary along El Mar Drive between Commercial Boulevard and Pine Avenue to meet level of service criteria. The existing conditions model identified this section of roadway to be prone to extensive ponding during heavy rainfall events. The flooding issues along El Mar Drive were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The ponding issues within this area are chiefly due to the lack of any grass swale areas adjacent to the roadways along with limited drainage infrastructure. Basically, the entire right-of-way area has an impervious surface due to the asphalt roadway, asphalt shoulders, concrete sidewalks, and asphalt access to adjacent private properties. Typically, standing water occurs after rainfall events since the impervious surface prevents any infiltration into the ground surface. Due to parking configuration at the adjacent hotels, a paved surface must remain in place to provide vehicular access to these private properties.

The installation of exfiltration trench system will be required to provide adequate protection to El Mar Drive. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.8 – Proposed Alternative: El Mar Drive (North). The proposed infrastructure includes approximately 1,745 linear feet of 24-inch exfiltration trench with 19 inlets which will be connected to the existing drainage system near El Prado Avenue. The Town should implement these drainage improvements in conjunction with streetscaping and/or landscaping improvements planned for the area. During the design phase of this project, pervious pavement should be investigated as an alternative to limit the underground construction within this area.

4.3.5 EL MAR DRIVE (SOUTH)

Based on our analysis, the stormwater improvements are necessary along El Mar Drive between Commercial Boulevard and Palm Avenue to meet level of service criteria. The existing conditions model identified this section of roadway to be prone to ponding during heavy rainfall events, especially within the southern portion. The flooding issues along El Mar Drive were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The ponding issues within this area is chiefly due to the lack of any grass swale areas adjacent to the roadways along with limited drainage infrastructure. Basically, the entire right-of-way areas has an impervious surface due to the asphalt roadway, asphalt shoulders, concrete sidewalks, and asphalt access to adjacent private properties. Typically, standing water occurs after rainfall events since the impervious surface prevents any infiltration into the ground surface.

The installation of an exfiltration trench system will be required to provide adequate protection to El Mar Drive. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.9 – Proposed Alternative: El Mar Drive (South). The proposed infrastructure includes approximately 2,035 linear feet of 24-inch exfiltration trench with 18 inlets which will be connected to the existing drainage system near Commercial Boulevard. The Town should implement these drainage improvements in conjunction with streetscaping and/or landscaping

improvements planned for the area. During the design phase of this project, pervious pavement should be investigated as an alternative to limit the underground construction within this area.

4.3.6 ALLEYWAYS

Based on our analysis, the stormwater improvements are necessary along the alleyways located to the north and south of Commercial Boulevard to meet level of service criteria. The two alleyways are located between El Mar Drive and Poinciana Street. The existing condition model identified these sections of roadway to be prone to ponding during heavy rainfall events, especially along the north alleyway. The flooding issues along the alleyways were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The ponding issues within this area are chiefly due to the lack of any grass swale areas adjacent to the roadways along with limited drainage infrastructure. Basically, the entire right-of-way area has an impervious surface since the entire right-of-way is paved. Typically, standing water occurs after rainfall events since the impervious surface prevents any infiltration into the ground surface. The ponding is also worsened by the uneven ground surface, which is caused by rutting from the heavy truck traffic.

The installation of an exfiltration trench system will be required to provide adequate protection to the alleyways. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.10 – Proposed Alternative: Alleyways. The proposed infrastructure includes approximately 1,180 linear feet of 15-inch pipe with 7 inlets. The proposed improvements along the north alleyway should be connected to the existing drainage systems for El Prado Drive and Poinciana Drive. There appears to be extensive underground utilities within the alleyways which could limit the installation of the proposed drainage improvements. During the design phase of this project, the existing underground utilities should be investigated further to ensure conflicts do not exis with the proposed drainage system. If utility conflicts exist, pervious pavement and/or pavers should be investigated as an alternative to provide infiltration capacity to the alleyways. Pedestrian improvements for the alleyways were identified as a project within the Town Master Plan so these drainage improvements should be constructed simultaneously with this project.

4.3.7 WEST TRADEWINDS AVENUE

Based on our analysis, the stormwater improvements are necessary along West Tradewinds Avenue between Capri Avenue and Miramar Avenue to meet level of service criteria. Although the existing conditions model did not identify this section of roadway to be prone to ponding during heavy rainfall events, the flooding issues were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The Swale Restoration Program may not resolve all flooding in this location due to the lack of drainage facilities servicing this area and the low ground surface elevation. In addition to the regrading of swale areas, the installation of an exfiltration trench system will be required to handle excess stormwater runoff from the neighborhood. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.11 – Proposed Alternative: West Tradewinds Avenue. The proposed infrastructure includes approximately 455 linear feet of 24-inch exfiltration trench with 4 inlets. The proposed improvement will interconnect the two existing outfalls at Miramar Avenue and Capri Avenue to reduce the ponding in the area.

4.3.8 FLAMINGO AVENUE

Based on our analysis, the stormwater improvements are necessary along Flamingo Avenue to the east of North Ocean Boulevard to meet level of service criteria. Although the existing conditions model did not identify this section of roadway to be prone to ponding during heavy rainfall events, the flooding issues were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The extensive ponding is chiefly the result of stormwater runoff flowing from the adjacent

private properties on the south side into the right–of-way. The flooding within the right-of-way can get as deep as 12-18 inches during heavy rainfall. The existing drainage system is also negatively impacted by sand clogging the existing inlet structures. The installation of an additional exfiltration trench system will be required to handle excess stormwater runoff from the private property. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.12 – Proposed Alternative: Flamingo Avenue. The proposed infrastructure includes approximately 350 linear feet of 24-inch exfiltration trench with 4 inlets. A gravity injection well has been included to handle the excess stormwater caused by adjacent properties. The Town should consider some modification to the adjacent beach access point to prevent the transfer of sand from the beach areas to the new drainage infrastructures.

4.3.9 HIBISCUS AVENUE

Based on our analysis, the stormwater improvements are necessary along Hibiscus Avenue between North Ocean Drive and El Mar Drive to meet level of service criteria. The existing conditions model identified this section of roadway to be prone to ponding during heavy rainfall events, especially at the west end. The flooding issues were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The installation of additional exfiltration trench system will be required to handle stormwater runoff generated by this right-of-way area. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.13 – Proposed Alternative: Hibiscus Avenue. The proposed infrastructure includes approximately 180 linear feet of 24-inch exfiltration trench with 3 inlets, which will be connected to the existing drainage system near El Mar Drive.

4.3.10 DATURA AVENUE

Based on our analysis, the stormwater improvements are necessary along Datura Avenue between North Ocean Drive and El Mar Drive to meet level of service criteria. Although the existing conditions model did not identify this section of roadway to be prone to ponding during heavy rainfall events, the flooding issues were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The installation of additional exfiltration trench system will be required to handle stormwater runoff generated by this right-of-way area. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.14 – Proposed Alternative: Datura Avenue. The proposed infrastructure includes approximately 180 linear feet of 24-inch exfiltration trench with 4 inlets, which will be connected to the existing drainage system near El Mar Drive.

4.3.11 BASIN DRIVE

Based on our analysis, the stormwater improvements are necessary along Basin Drive and East Tradewinds Avenue to meet level of service criteria. Although the existing condition model did not identify this section of roadway to be prone to ponding during heavy rainfall events, the flooding issues were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The Swale Restoration Program may not resolve all flooding in this location due to the lack of drainage facilities servicing this area and the low ground surface elevation. In addition to the regrading of swale areas, the installation of an exfiltration trench system will be required to handle excess stormwater runoff from the neighborhood. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.15 – Proposed Alternative: Basin Drive. The proposed infrastructure includes approximately 520 linear feet of 24-inch exfiltration trench with 6 inlets, which will be connected to the existing drainage system along Basin Drive.

4.3.12 HARBOR DRIVE

Based on our analysis, the stormwater improvements are necessary along Harbor Drive between West Tradewinds Avenue and Sea Grape Drive to meet level of service criteria. The existing condition model identified this section of roadway to be prone to ponding during heavy rainfall events, especially at the west end. The flooding issues were confirmed based on our observations during heavy rainfall along with the historical knowledge of the Town staff. The extensive ponding is chiefly the result of paved shoulders on one side into the right-of-way which prevents infiltration of stormwater runoff. The installation of an additional exfiltration trench system will be required to handle stormwater runoff generated by this right-of-way area. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.16 – Proposed Alternative: Harbor Drive. The proposed infrastructure includes approximately 960 linear feet of 24-inch exfiltration trench with 12 inlets, which will be connected to the existing drainage system on East Tradewinds Avenue.

4.3.13 TERRAMAR DRIVE

In addition to the regrading of swale areas in the area, the stormwater improvements are necessary along Terramar Drive to improve the drainage in the area. The existing conditions model identified portions of this roadway to be prone to ponding during heavy rainfall events. Based on our observations, the isolated ponding is chiefly the result of an existing drainage inlet which was constructed too high and prevents stormwater runoff from entering the drainage system until there is extensive flooding in the area. In order to reduce the ponding in this area, this drainage structure should be modified to either lower the rim elevation of the structure or installed an orifice in the side of structure to bleed down any standing stormwater. Chen and Associates has developed a conceptual layout of the proposed stormwater improvements, which is displayed on Exhibit 4.17 – Proposed Alternative: Terramar Drive. During the design phase of this project, the permit requirements for the existing drainage system will need to be confirmed to ensure the drainage structure was not intentionally constructed at this elevation for regulatory reasons.

Exhibit 4.1
Existing Swale Areas
(North)

Legend

- Recent Drainage Improvements
- Existing Paved Swale
- Existing Grass Swale

0 205 410 820 1,230 1,640 Feet

TOWN OF LAUDERDALE-BY-THE-SEA For the Rest of Your Life FLORIDA

CHEN&ASSOCIATES Civil and Environmental Engineers

Exhibit 4.2
Existing Swale Areas (South)

Legend

- Recent Drainage Improvements
- Existing Paved Swale
- Existing Grass Swale

Ü

0 200 400 800 1,200 1,600 Feet

CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 4.3
Potential Ponding Areas Under Proposed Conditions (North)

Legend

- Town Boundary
- Waterways
- Parcels
- Ponding
- A-1 Boundary
- A-2 Boundary
- E-1 Boundary
- E-2 Boundary
- E-3 Boundary
- E-4 Boundary
- E-5 Boundary
- E-6 Boundary
- E-7 Boundary

Ü

0 150 300 600 900 1,200 Feet

CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 4.4
Potential Ponding Areas Under Proposed Conditions (South)

Legend

- Town Boundary
- Waterways
- Parcels
- Ponding
- L-1 Boundary
- L-2 Boundary
- L-3 Boundary
- L-4 Boundary
- L-5 Boundary
- L-6 Boundary
- L-7 Boundary
- L-8 Boundary
- P-1 Boundary
- P-2 Boundary
- P-3 Boundary
- P-4 Boundary
- P-5 Boundary
- P-6 Boundary
- P-7 Boundary
- U-1 Boundary
- U-2 Boundary
- U-3 Boundary

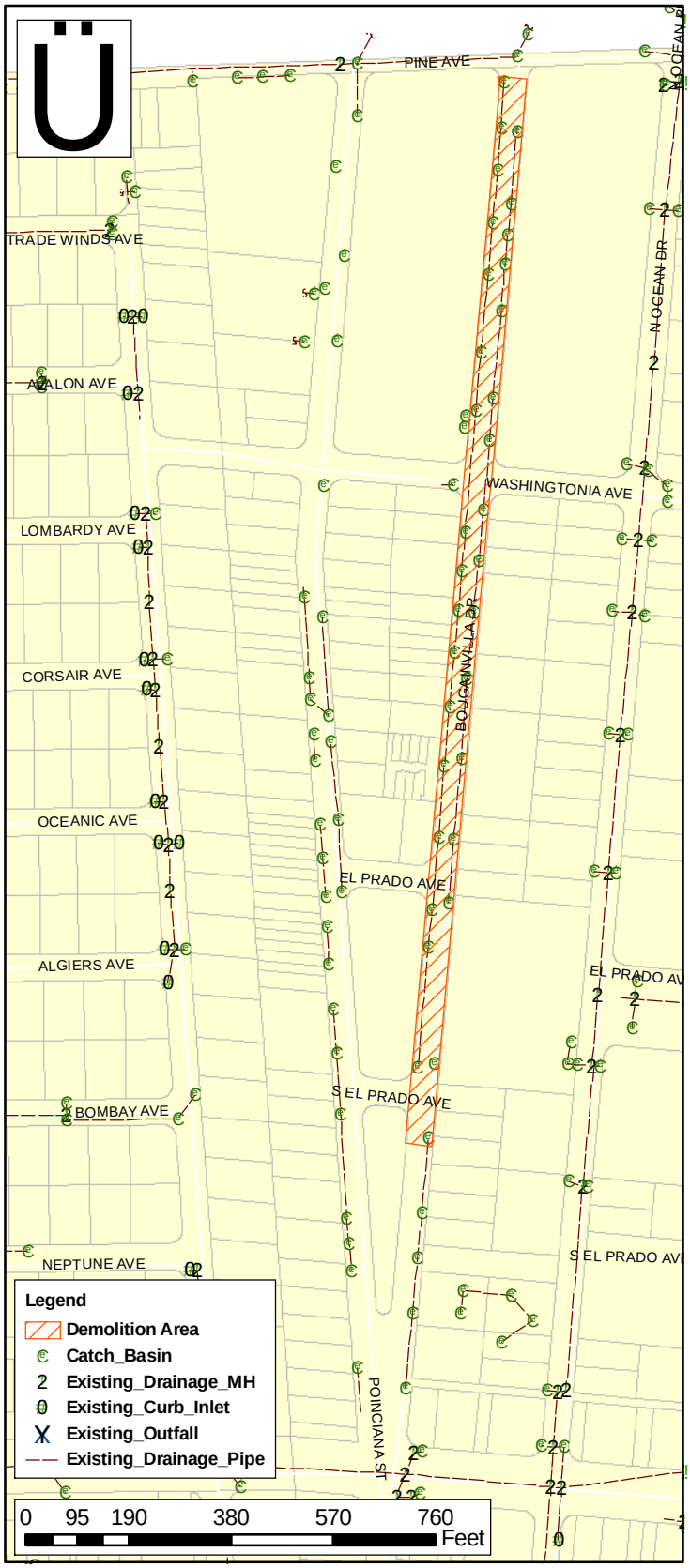
Ü

0 150 300 600 900 1,200 Feet

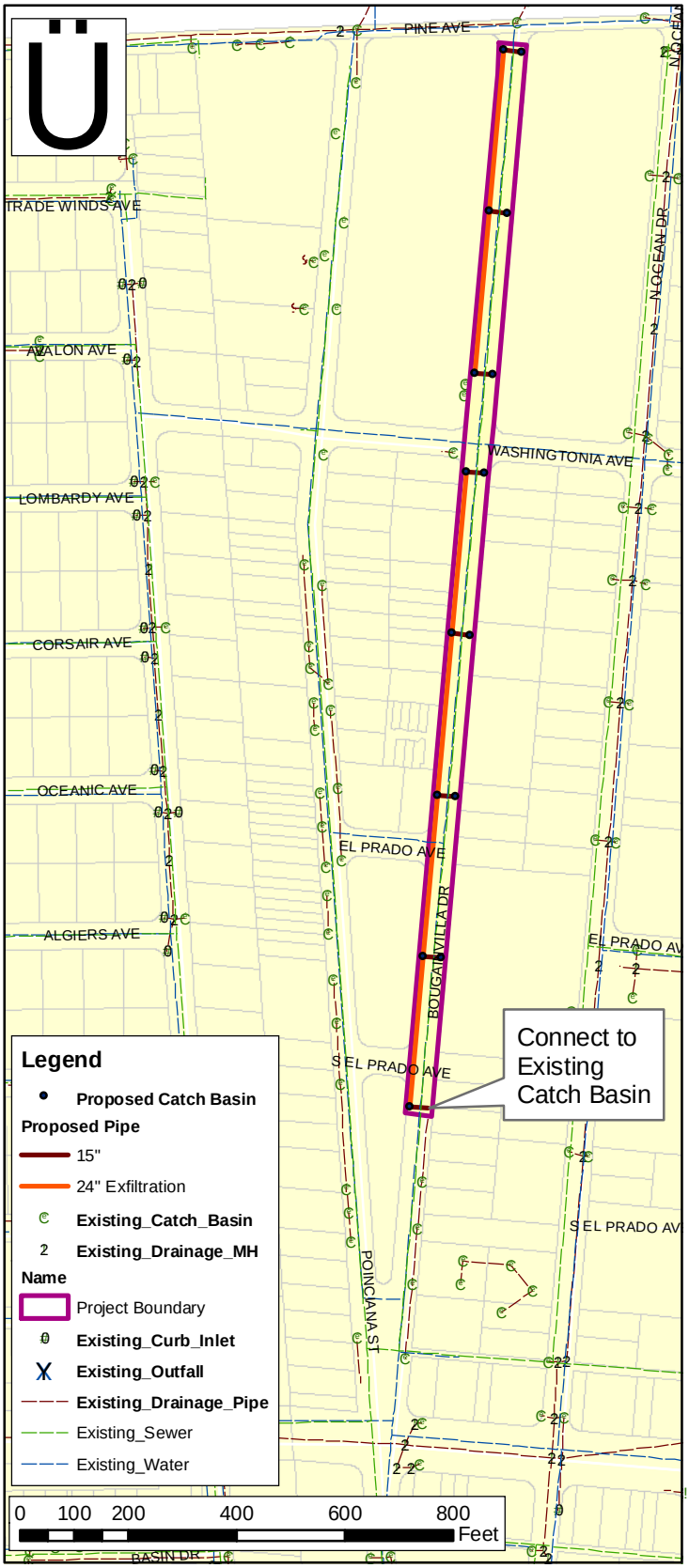
CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 4.5
Proposed Alternative - Bougainvilla Drive

Demolition



Proposed Improvements

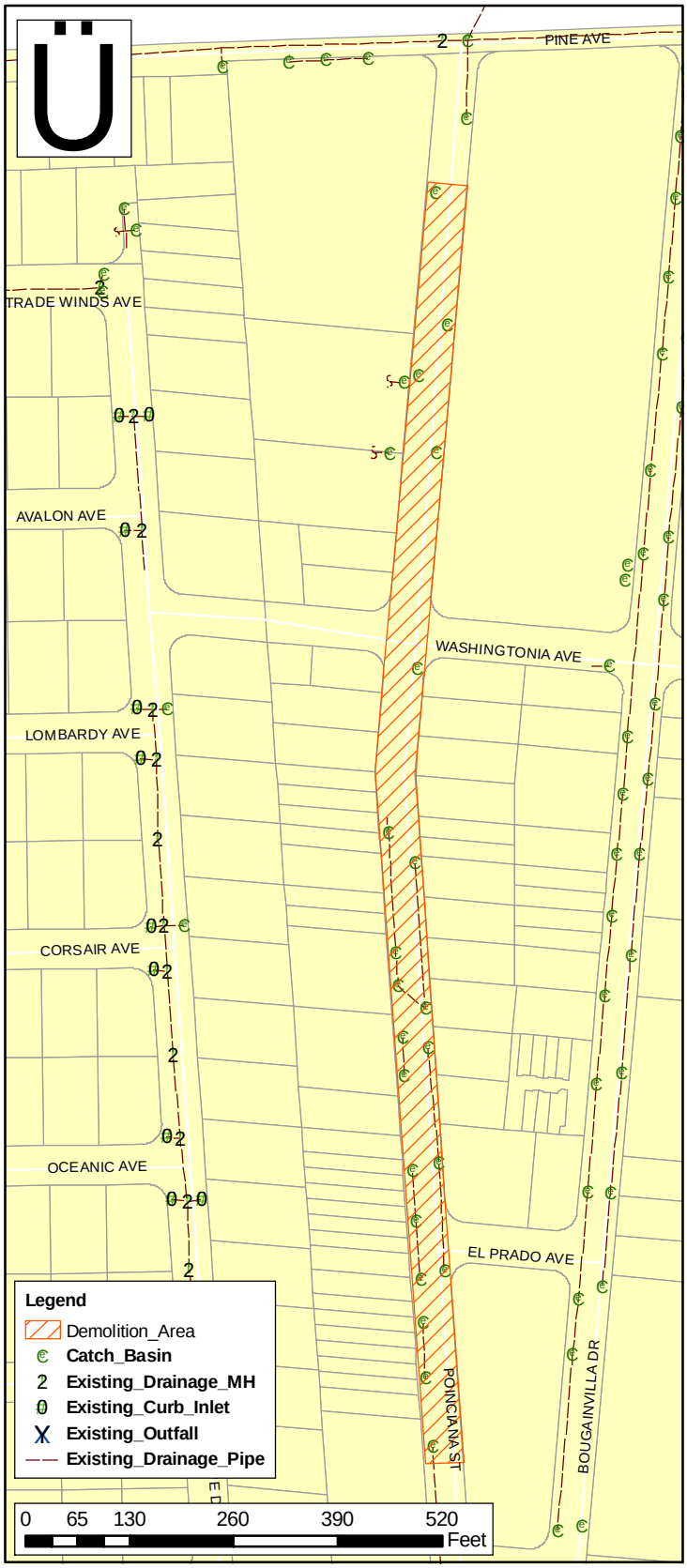


CHEN&ASSOCIATES
Civil and Environmental Engineers

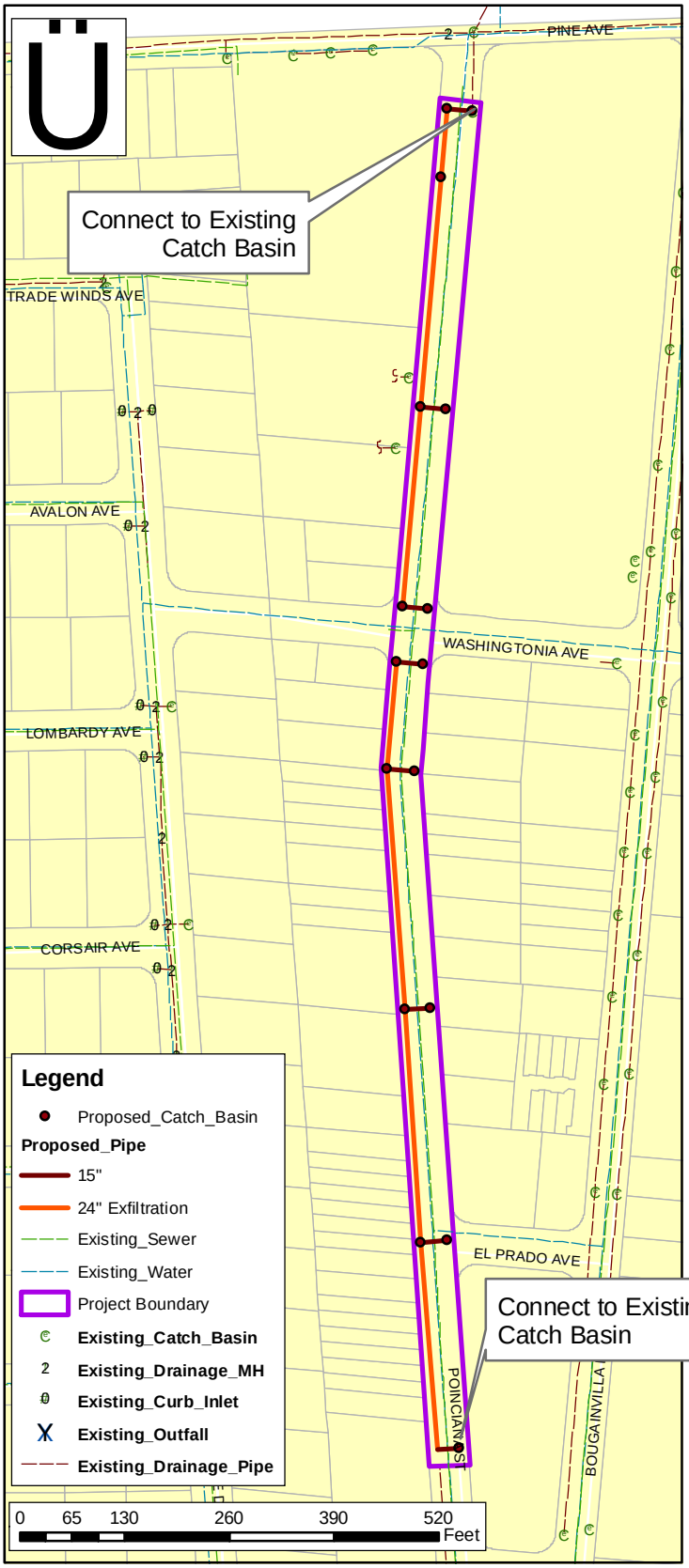
TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

Exhibit 4.6
Proposed Alternative - Poinciana Street

Demolition



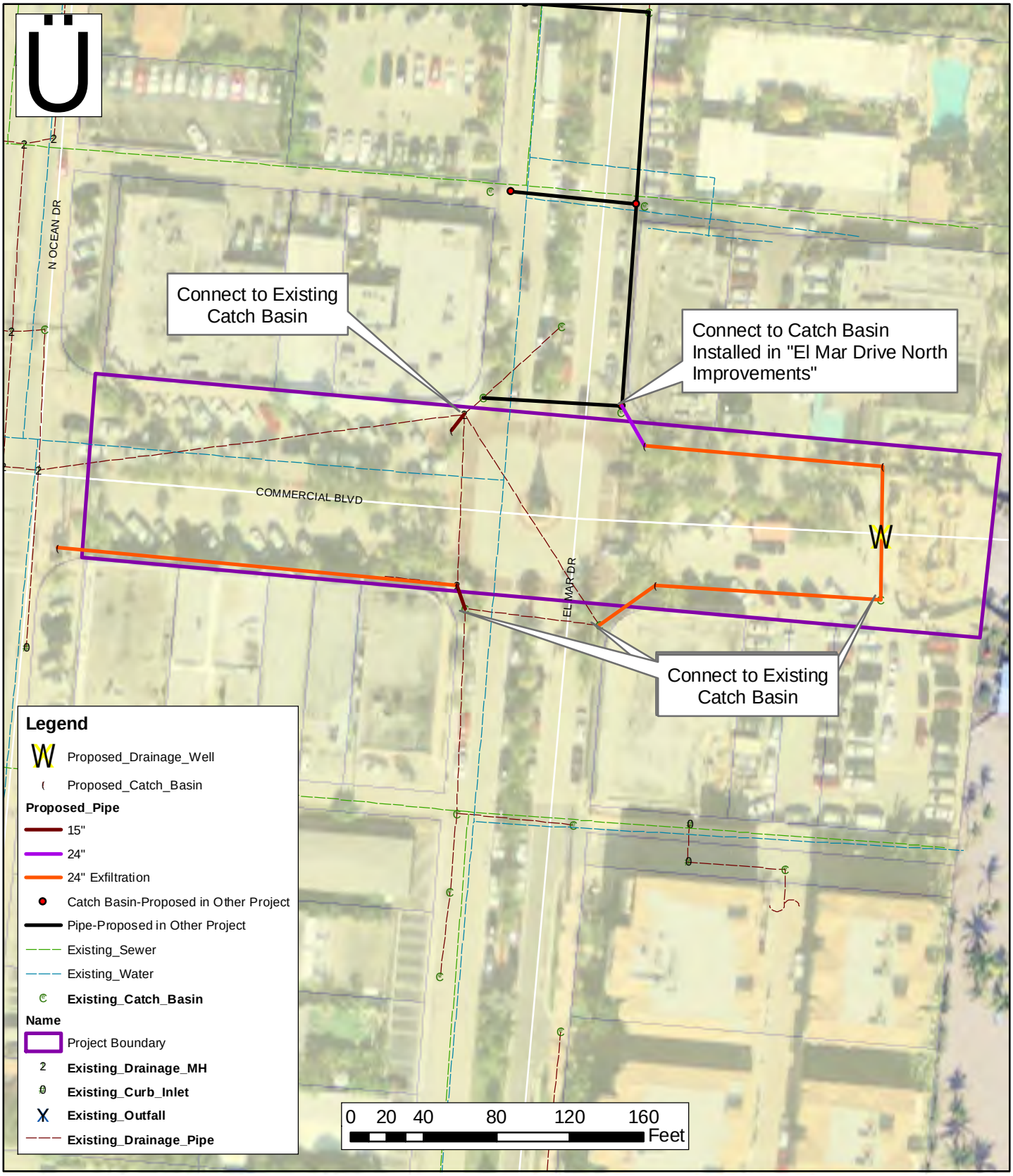
Proposed Improvements



CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

Exhibit 4.7
Proposed Alternative - Pavilion

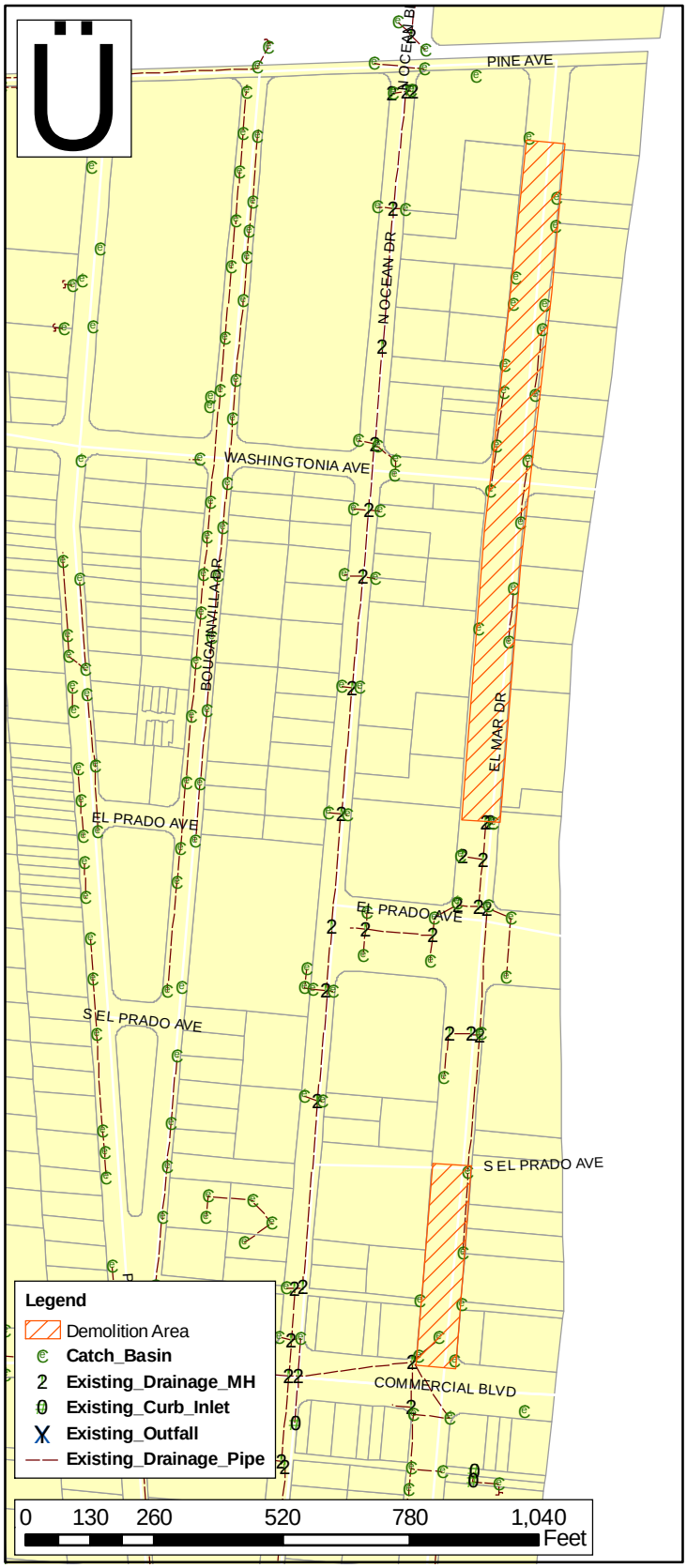


CHEN&ASSOCIATES
Civil and Environmental Engineers

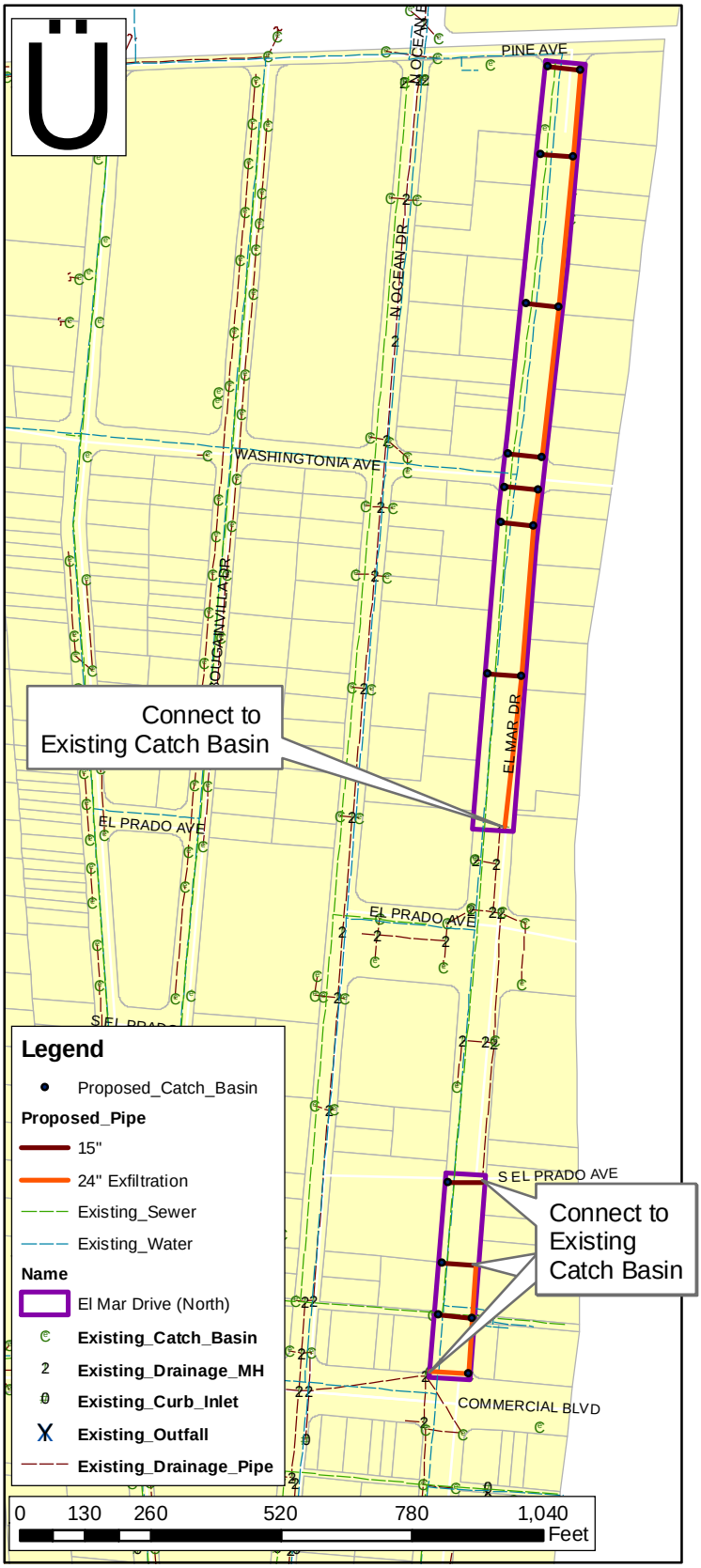
TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

Exhibit 4.8
Proposed Alternative - El Mar Drive (North)

Demolition



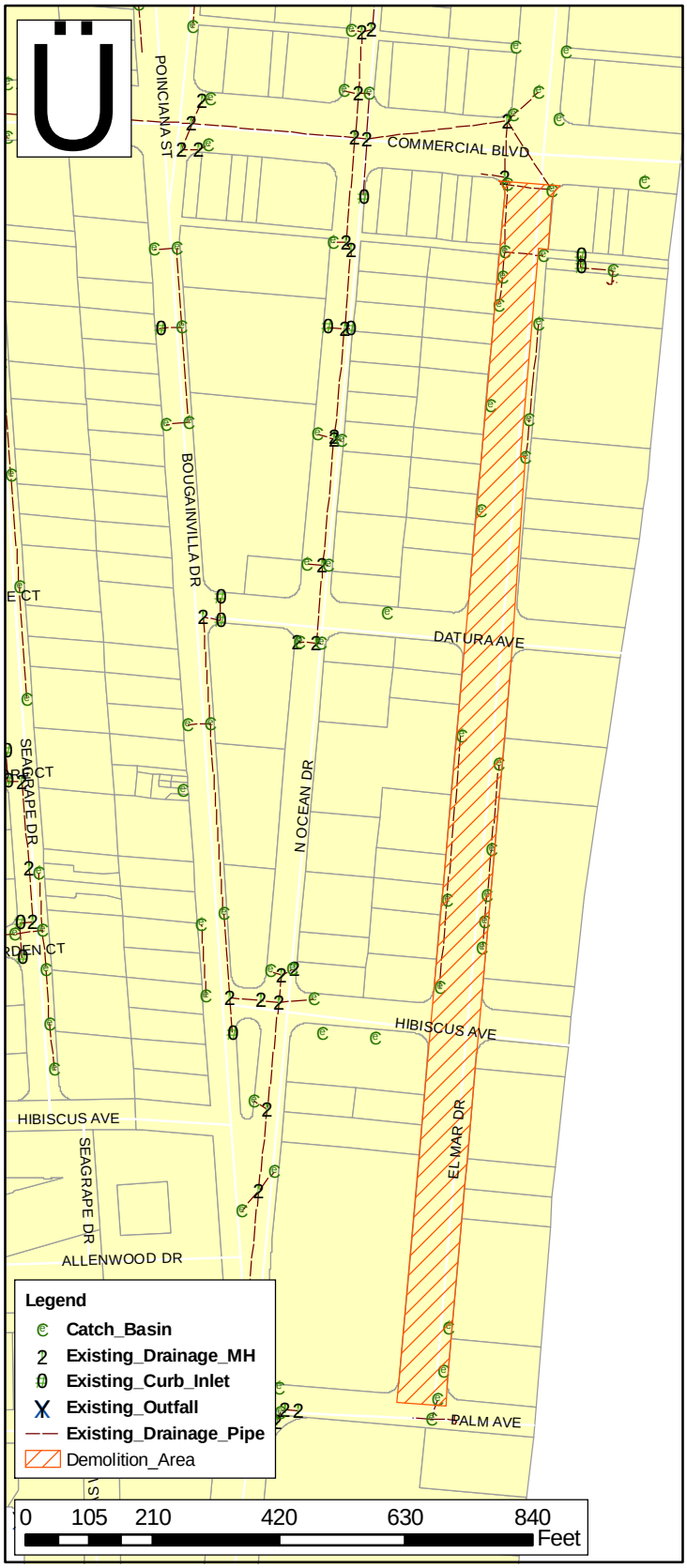
Proposed Improvements



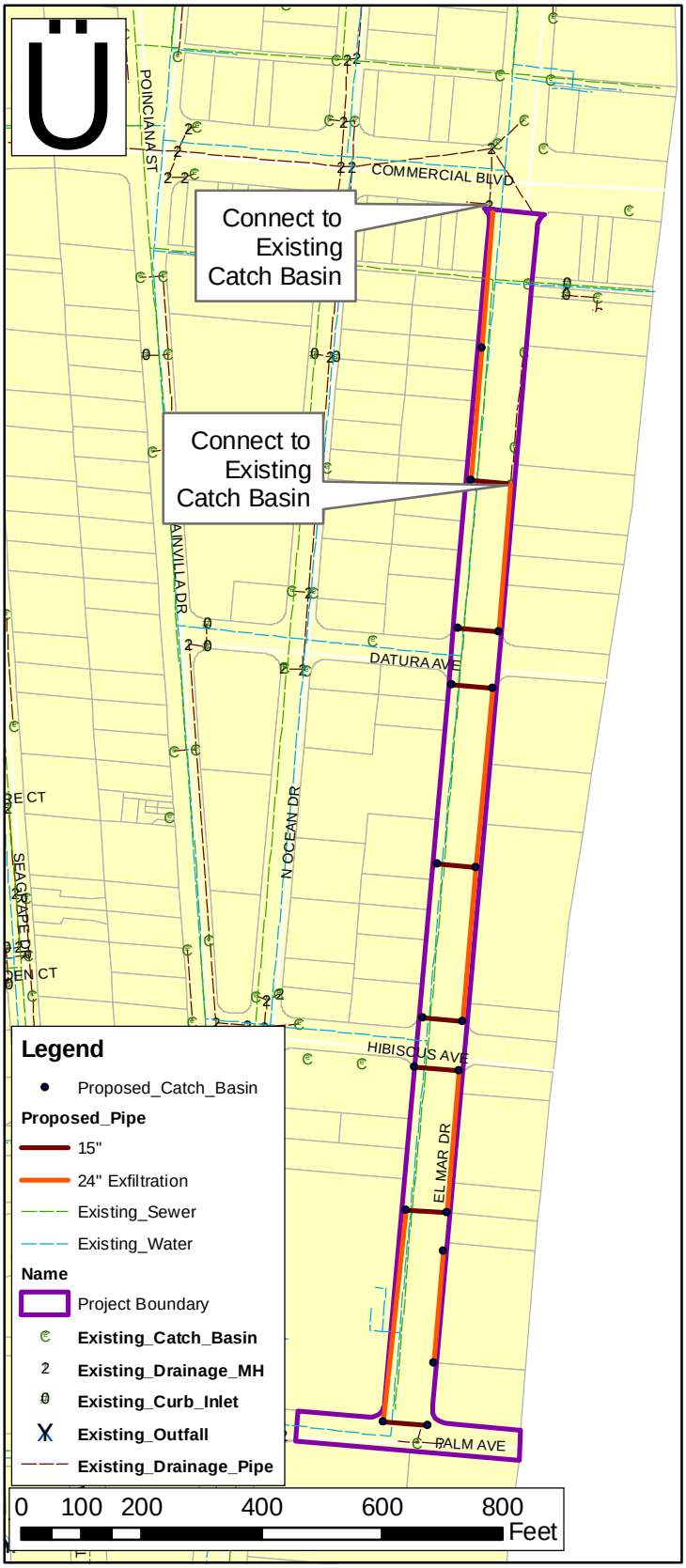
CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 4.9
Proposed Alternative - El Mar Drive (South)

Demolition



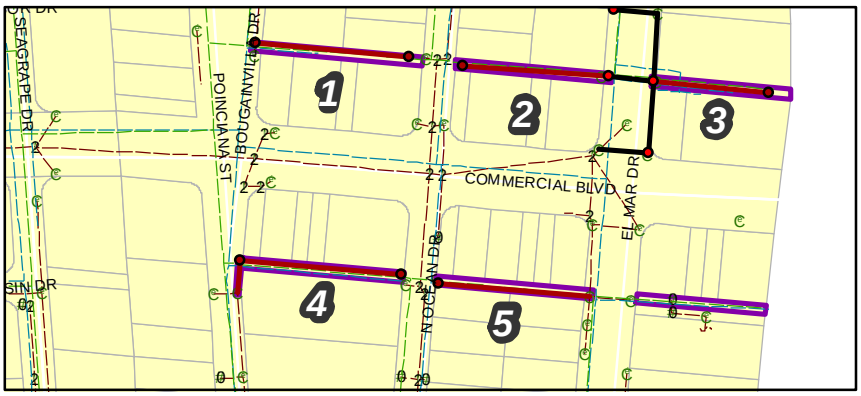
Proposed Improvements



CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

Exhibit 4.10
Proposed Alternative - Alleyways

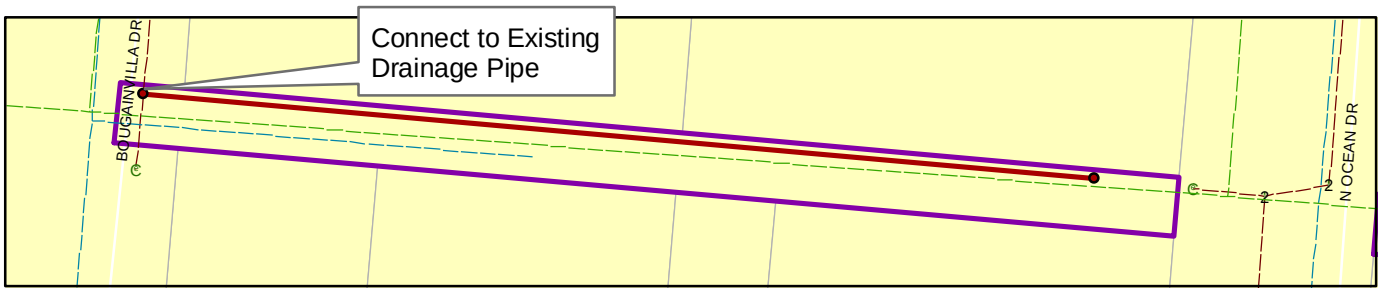


CHEN&ASSOCIATES
Civil and Environmental Engineers

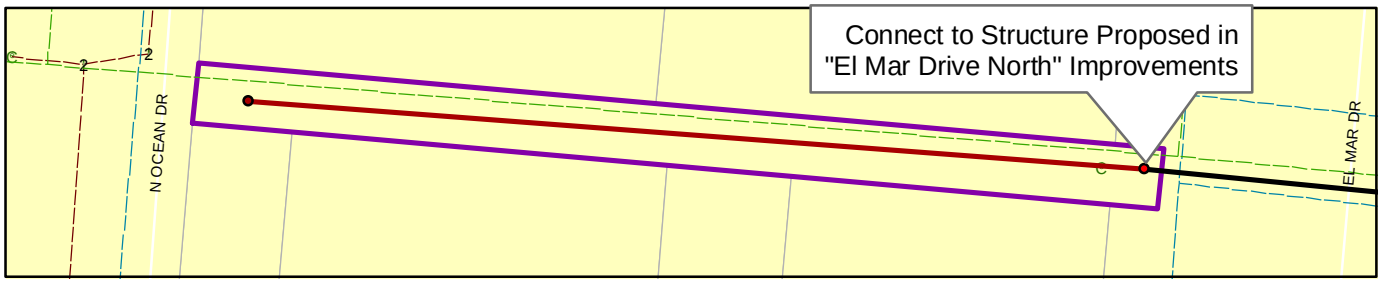
Legend

- Catch Basin-Proposed in Other Project
- Pipe-Proposed in Other Project
- Proposed_Catch_Basin
- **Proposed_Pipe**
  - 15"
  - Existing_Sewer
  - Existing_Water
- **Existing_Catch_Basin**
- **Existing_Drainage_MH**
- **Existing_Curb_Inlet**
- **Existing_Outfall**
- **Existing_Drainage_Pipe**
- Project Boundary

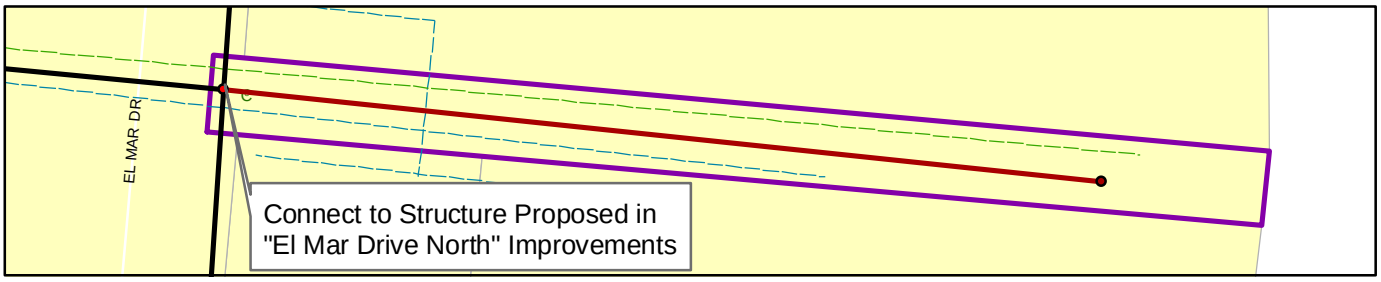
1



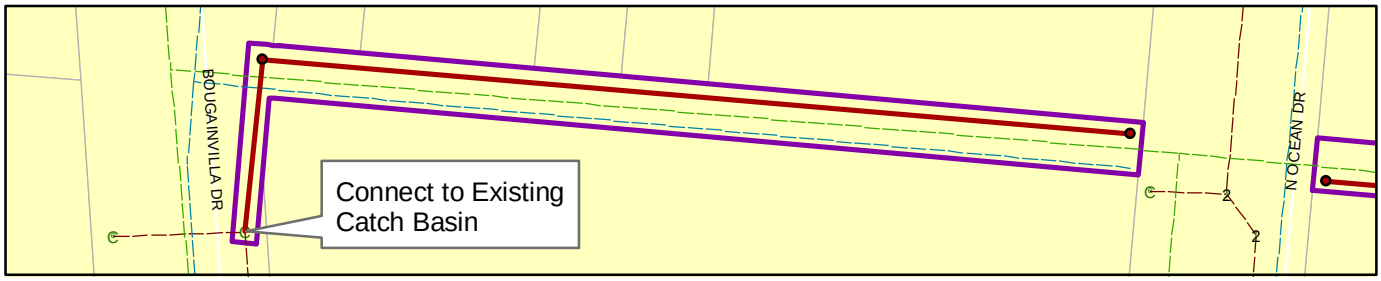
2



3



4



5

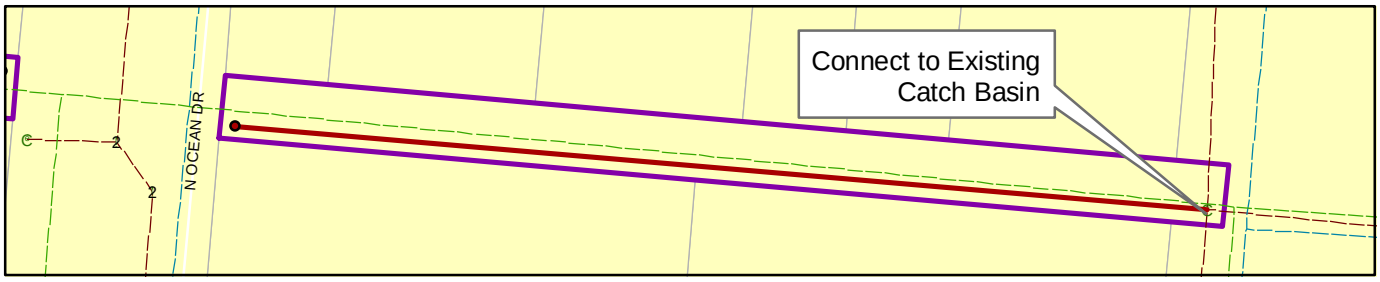
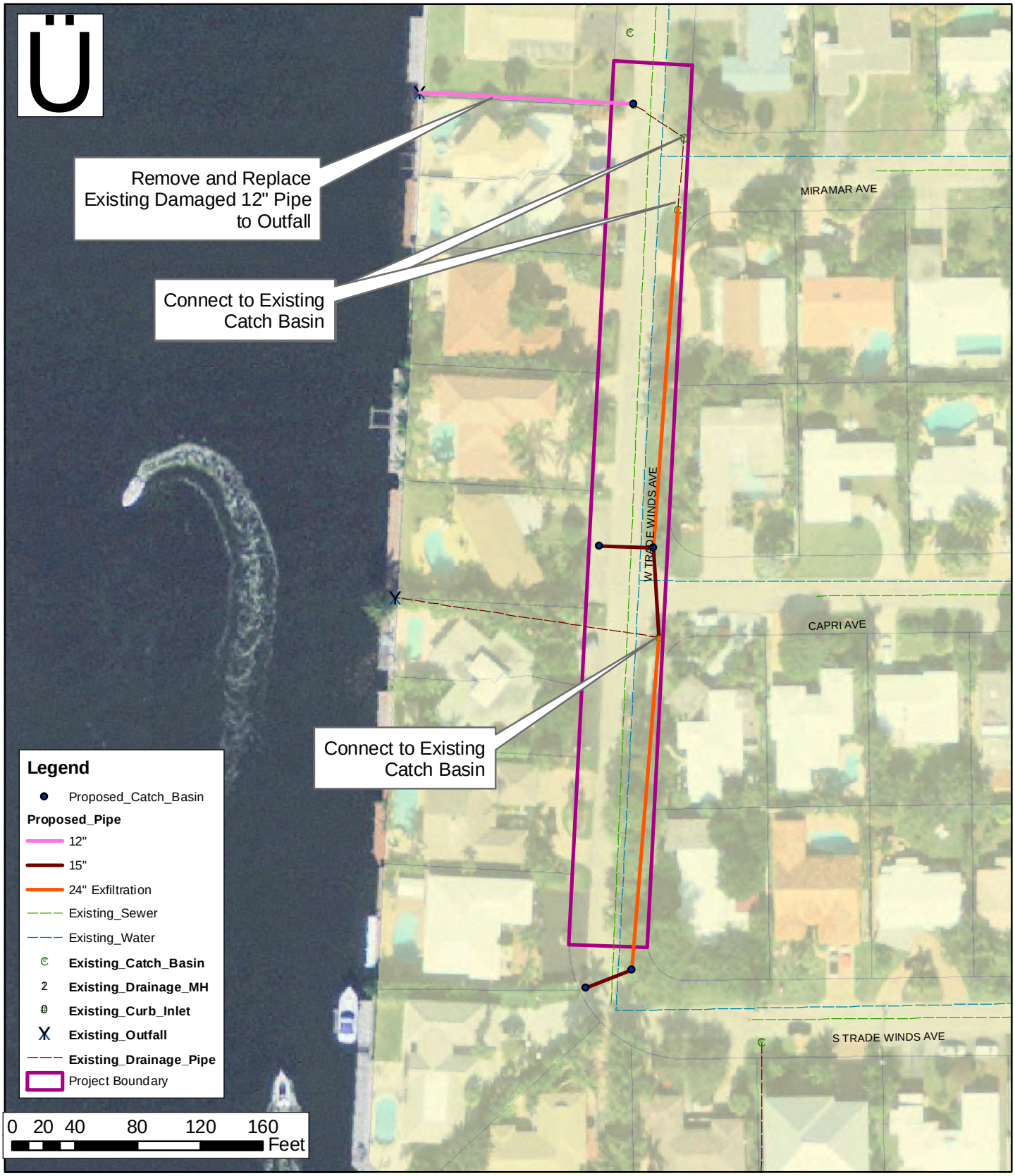


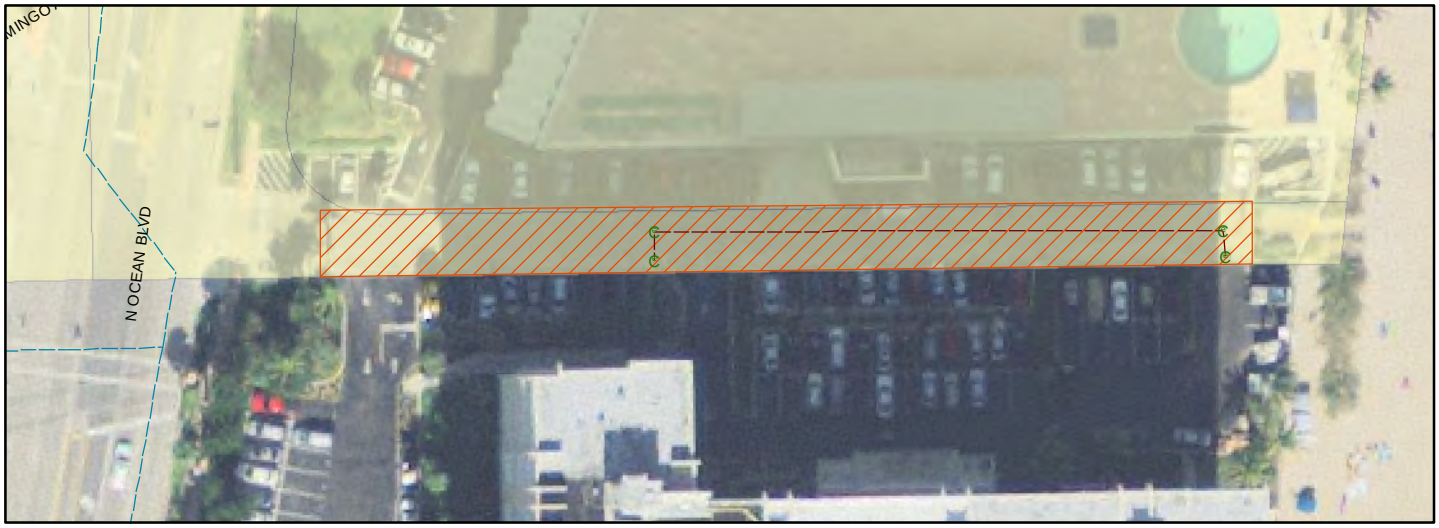
Exhibit 4.11
Proposed Alternative - West Tradewinds Avenue



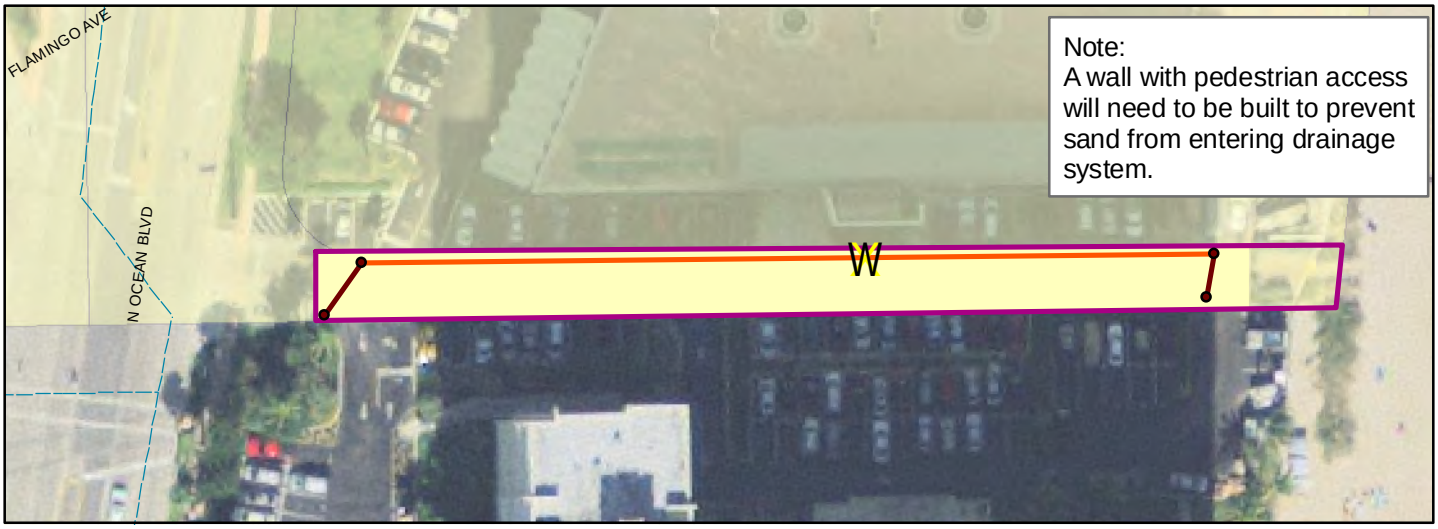
CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 4.12
Proposed Alternative - Flamingo Avenue

Demolition



Proposed Improvements



Legend

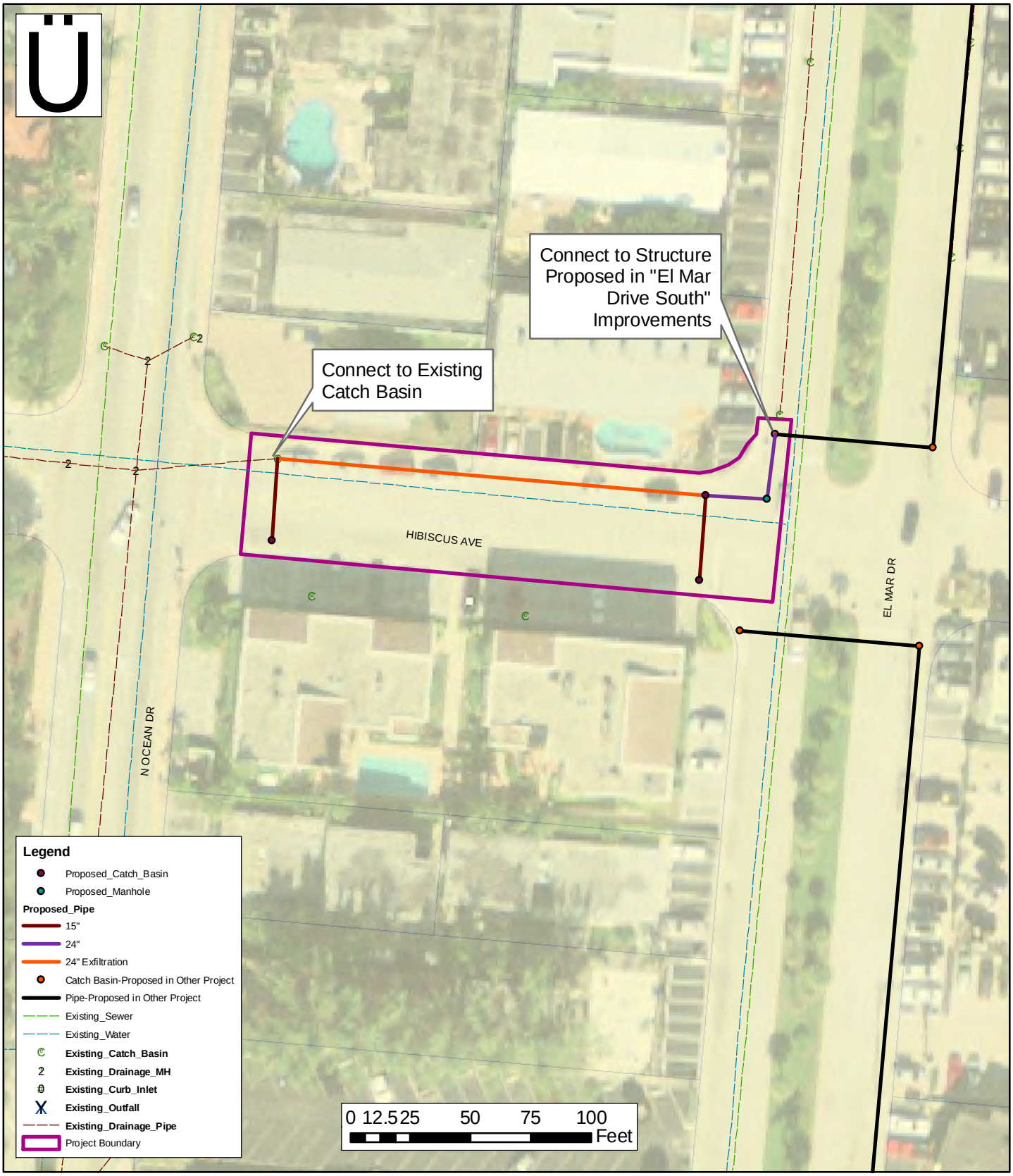
- Proposed_Drainage_Well
- Proposed_Catch_Basin
- 15"
- 24" Exfiltration
- Existing_Sewer
- Existing_Water
- Project Boundary
- Demolition_Area
- Existing_Catch_Basin
- Existing_Drainage_MH
- Existing_Curb_Inlet
- Existing_Outfall
- Existing_Drainage_Pipe

0 15 30 60 90 120 Feet

CHEN&ASSOCIATES Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA For the Rest of Your Life FLORIDA

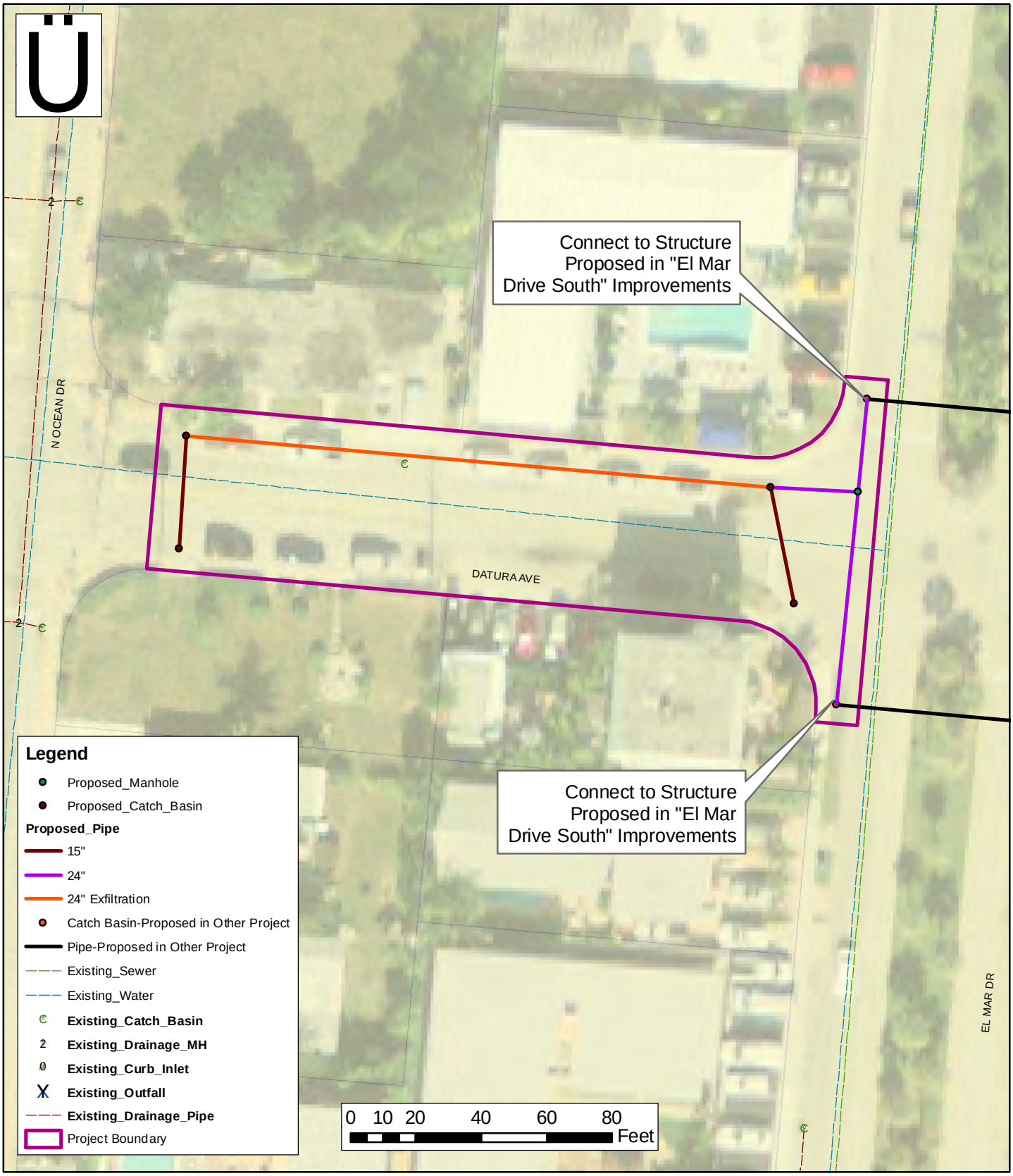
Exhibit 4.13
Proposed Alternative - Hibiscus Avenue



CHEN&ASSOCIATES
Civil and Environmental Engineers

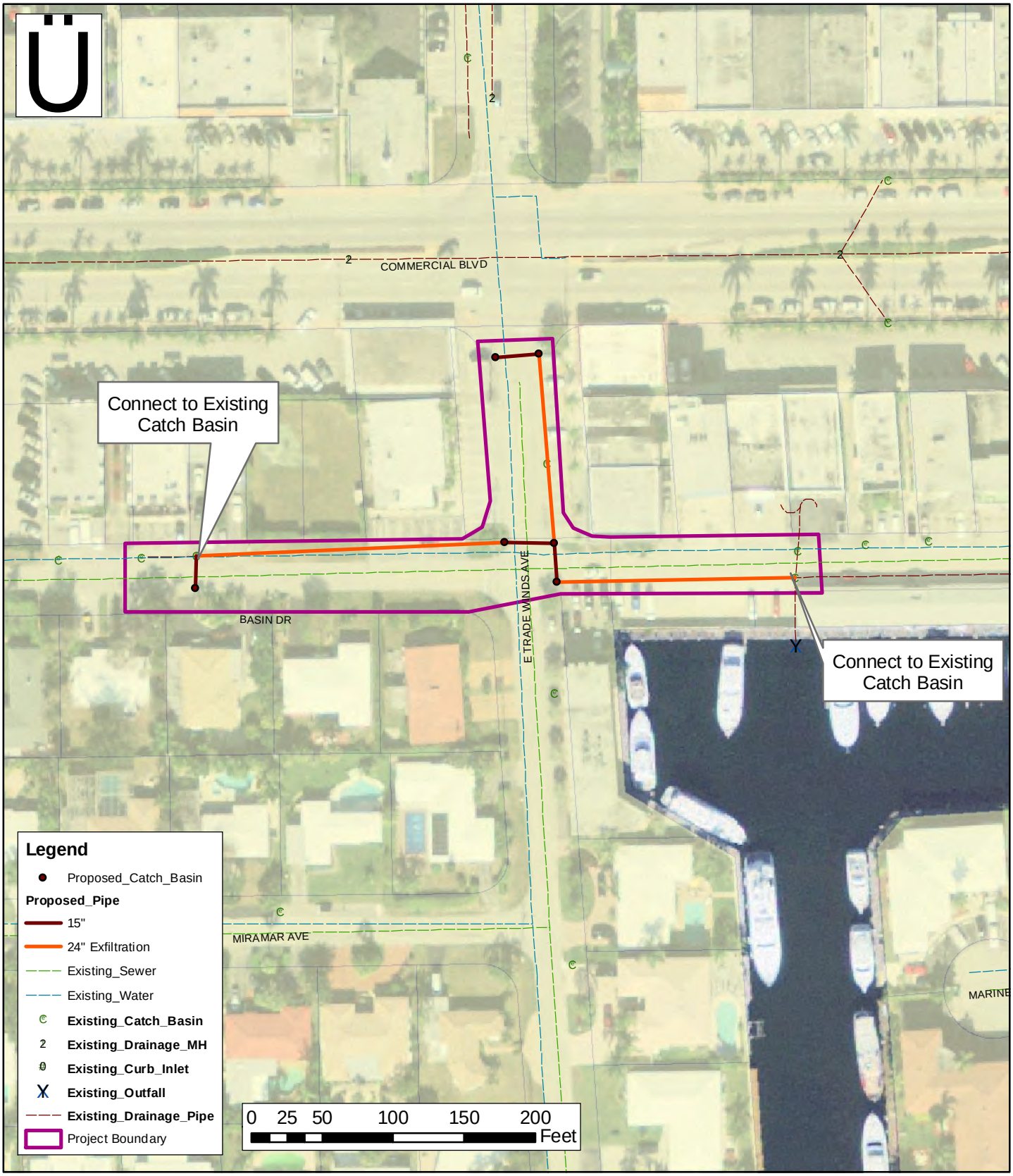
TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

Exhibit 4.14
Proposed Alternative - Datura Avenue



CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 4.15
Proposed Alternative - Basin Drive



CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

SECTION 5 – CONCLUSION

5.1 SUMMARY

Chen and Associates prepared this Stormwater Master Plan for the entire limits for the Town of Lauderdale-By-The-Sea. The purpose of this Stormwater Master Plan was to identify any deficiencies in the existing stormwater management system and to recommend system improvements to meet regulatory level of service criteria. Within the Stormwater Master Plan, Chen and Associates provided recommendations for improvements to the system that will eliminate or reduce the ponding currently encountered within right-of-way areas during or after rainfall events. As defined within the previous section, the recommendations include regional alternatives and local alternatives to address flooding issues within the Town.

5.2 BUDGET LEVEL COST ESTIMATE

A summary of the budget level cost estimate for each recommended alternative is included within the following table below:

Table 5.2.1 – Cost Estimate for Regional Alternatives

Regional Alternative	North	South	Total
Swale Restoration Program	$886,000	$1,248,125	$2,134,125
Outfall Maintenance Program	$10,320	$21,680	$32,000
Pipe Maintenance Program	$64,695	$236,610	$301,305
Pipe Repair and Replacement Program	$544,625	$1,102,400	$1,647,025
Total	**$1,505,640**	**$2,608,815**	**$4,114,455**

Table 5.2.2 – Cost Estimate for Local Alternatives

Local Alternative	Project Cost
Bougainvilla Drive	$1,254,715
Poinciana Street	$1,037,152
Pavilion Area	$588,319
El Mar Drive (North)	$1,439,785
El Mar Drive (South)	$1,596,903
Alleyways (Option 1)	$305,151
Alleyways (Option 2)	$450,450
West Tradewinds Avenue	$234,350
Flamingo Avenue	$318,588
Hibiscus Avenue	$170,940
Datura Avenue	$188,997
Basin Drive	$236,352
Harbor Drive	$548,163
Terramar Avenue	$25,218
Total	**$12,509,534**

5.3 FUNDING SOURCES

The Town must investigate methods of paying for the required capital improvements to the stormwater system as well as ongoing operations and maintenance. There are several different opportunities available for these payments discussed below.

5.3.1 STORMWATER UTILITY FEE (SWUF)

The Town previously had a SWUF in place but removed it. Many municipalities in Florida generate funds for stormwater maintenance and improvements by implementing a SWUF. The SWUF is a source of funds for projects but can also be used as leverage for larger bonds or matching grants needed for large projects. The Town should perform a study to determine the amount of funds that can be generated per year which will help in planning out the implementation of the Stormwater Master Plan. A list of local municipalities with SWUF rates as reported to the Florida Stormwater Association is provided for some background:

Table 5.3.1 – SWUF Rates for Various Municipalities

Municipality	Rate	Impervious Unit Size
Lauderdale by the Sea (previously)	$3.50	4,472 sq.ft.
Lauderdale Lakes	$4.57	2,133 sq.ft.
North Lauderdale	$3.00	2,138 sq.ft.
Oakland Park	$6.00	1,507 sq.ft.
Margate	$3.57	2,328 sq.ft.
Miami Gardens	$4.00	1,548 sq.ft.
Boynton Beach	$5.00	1,937 sq.ft.
Boca Raton	$2.90	2,873 sq.ft.
Hallandale Beach	$2.68	958 sq.ft.
West Palm Beach	$8.48	2,171 sq.ft.

As can be seen, Lauderdale-By-The-Sea had an average rate for a large impervious unit size. In fact, out of 150 municipalities surveyed, only seven had larger unit sizes. This means that Lauderdale-By-The-Sea collected among the lowest fees for stormwater, as a higher unit number equates to less fees from commercial properties and apartment complexes.

5.3.2 GRANT AND LOAN OPPORTUNITIES

There are many grant opportunities available from various agencies at different times of the year. Some are available at varying amount annually, while others may be one-time opportunities, such as federal stimulus monies. The Town must continually monitor different agencies to track and apply for grant opportunities. Depending on the agency and particular program, funds are only available for certain components of the project cycle. Many grants are available only during construction phases, or with limited funding for studies, planning, design and permitting. These grant opportunities arise quickly and have limited windows of opportunity. For example, the Town currently has an application submitted to SFWMD for Harbor Drive Stormwater Improvements. Federal stimulus funds were available only to construction projects ready to dig. Due to the long lead time required for design and permitting, the Town may consider moving forward with design and permitting for certain projects so they are ready in case new monies become available.

Some additional opportunities available through the FDEP are as follows (more information for FDEP funding is available at http://www.dep.state.fl.us/water/waterprojectfunding/index.htm):

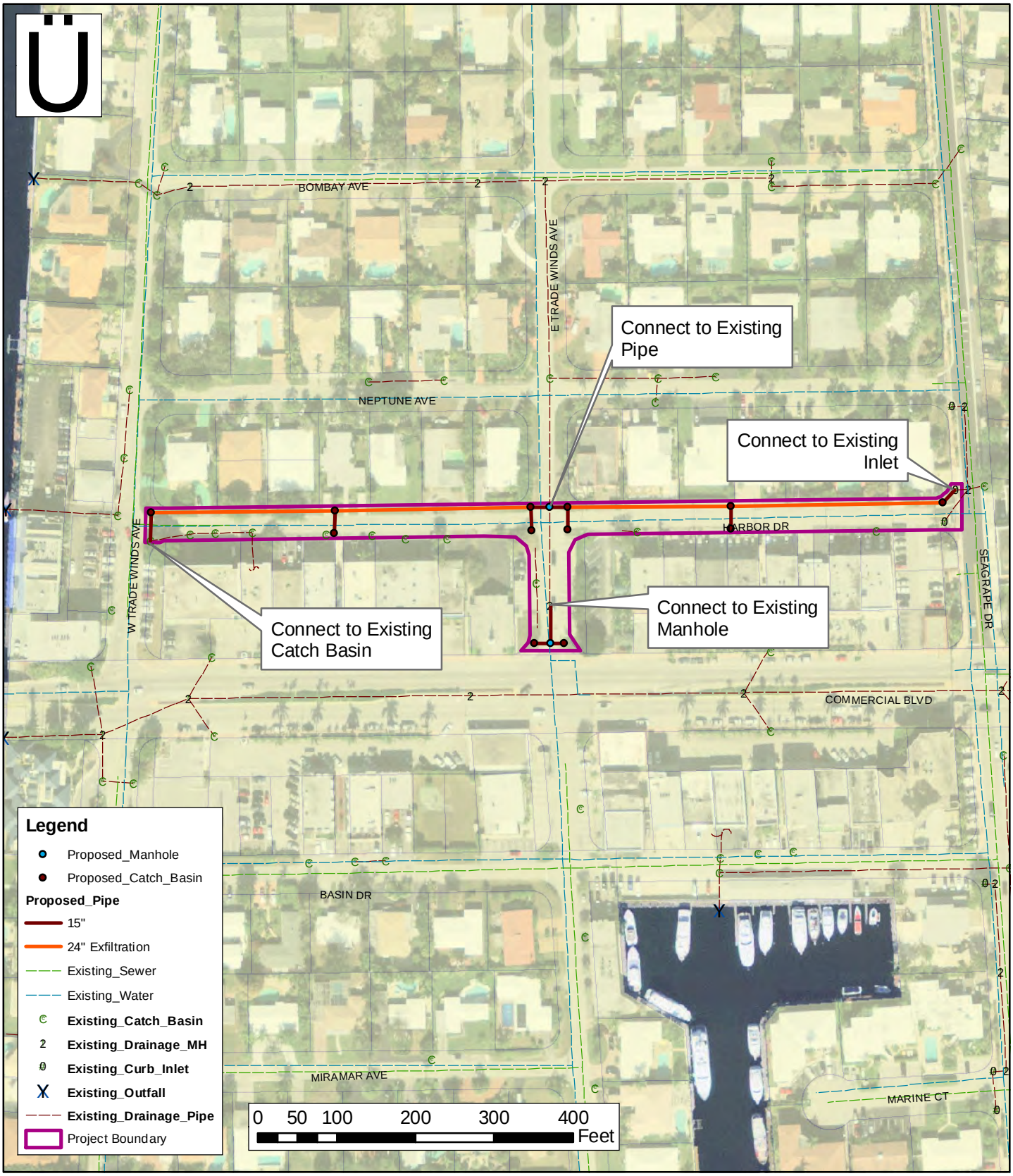
- Clean Water State Revolving Fund (SRF) loan program provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. Loans at significantly discounted interest rates are available to fund both construction and pre-construction (planning, design) activities. Discounted assistance for small communities is available. Interest rates on loans are approximately 40% below market rates. The Clean Water SRF is, by far, Florida's largest financial assistance program for water infrastructure and makes $200-300 million or more available, primarily to local governments, each year. More information is available at www.dep.state.fl.us/water/wff/cwsrf
- Legislative water project appropriations consist of member projects or "Community Budget Issue Requests (CBIR)" for wastewater, stormwater, surface water improvement, and drinking water. This process is implemented and directed by the Florida Legislature during most legislative sessions and is coordinated with FDEP. Local matching funds may be required and are always advisable. The amount of money available each year varies widely and depends exclusively on legislative appropriations. The SFWMD prepares a list of projects in Broward County each year for submittal. This list included the Harbor Drive project in the past. No funds will be available in 2010.
- Federal section 319(h) grants are available for stormwater retrofit projects and stormwater BMPs, which are targeted to certain priority surface watersheds. Local matching funds are required. Approximately $7-8 million is available each year. The Town does not have any recognized affected waterways, but the program should be monitored as updates to the program occur.
- FEMA has assistance opportunities including the Pre-Disaster Mitigation Grant (http://www.fema.gov/government/grant/fma/index.shtm). The application process is lengthy and may not be approved without significant historical documented flood losses.

In conjunction with specific stormwater funding opportunities, the Town can investigate linking stormwater improvements with other grant opportunities. These may include pedestrian enhancement grants, capital improvement project grants, coastal zone management grants, or others. These grants can help fund surface improvements and amenities, which are a major component of stormwater restoration costs.

5.3.3 Financial Planning

At present, with the current economy, many funding sources have limited or no funds. However, it will be important to plan the projects long term and be ready when funding opportunities arise. This may include having projects designed and ready for construction in case grants become available. It will be important to investigate all funding sources for each project and plan a long term program around funding opportunities.

Exhibit 4.16
Proposed Alternative - Harbor Drive



CHEN&ASSOCIATES
Civil and Environmental Engineers

Exhibit 4.17
Proposed Alternative - Terramar Drive

Ü

Legend

- Existing_Catch_Basin
- Existing_Drainage_MH
- Existing_Curb_Inlet
- Existing_Outfall
- Existing_Drainage_Pipe
- Town Boundary

0 95 190 380 570 760 Feet

CHEN&ASSOCIATES
Civil and Environmental Engineers

Appendix 6.1
Plat Maps

Appendix 6.1
Plat Maps

Legend

- Town Boundary
- Parcels

Plats

- 01-Terra Mar-2
- 02-Terra Mar
- 03-Bel - Aire
- 04-Bel - Aire-2
- 05-Ocean Walk
- 06-Golden Shores
- 07-Silver Shores-2
- 08-Silver Shores-SubtractD
- 09-Silver Shores-Unit_A
- 10-Beverly Shores
- 11-Stephen Calders Subdivision
- 12-Lauderdale Surf and Yacht Estates
- 13-Ocean Side-South
- 14-Lauderdale Surf and Yacht Estates-Resubdivisions
- 15-Bainbridge - Condra Subdivision
- Waterways

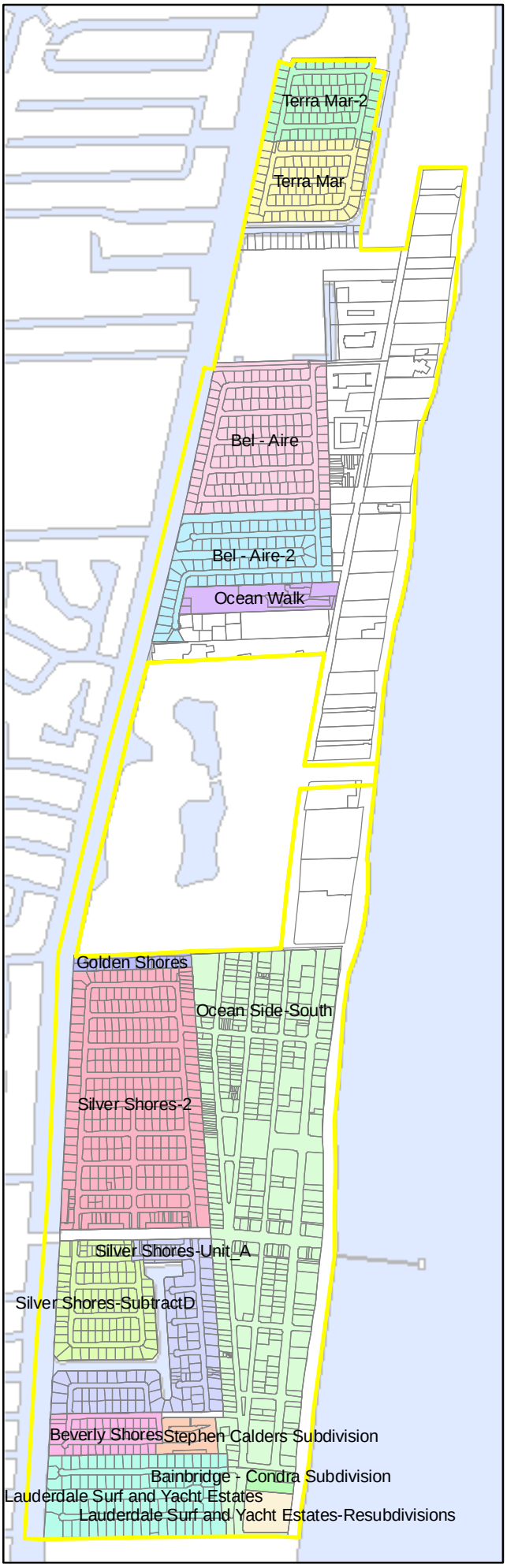
0 475 950 1,900 2,850 3,800 Feet

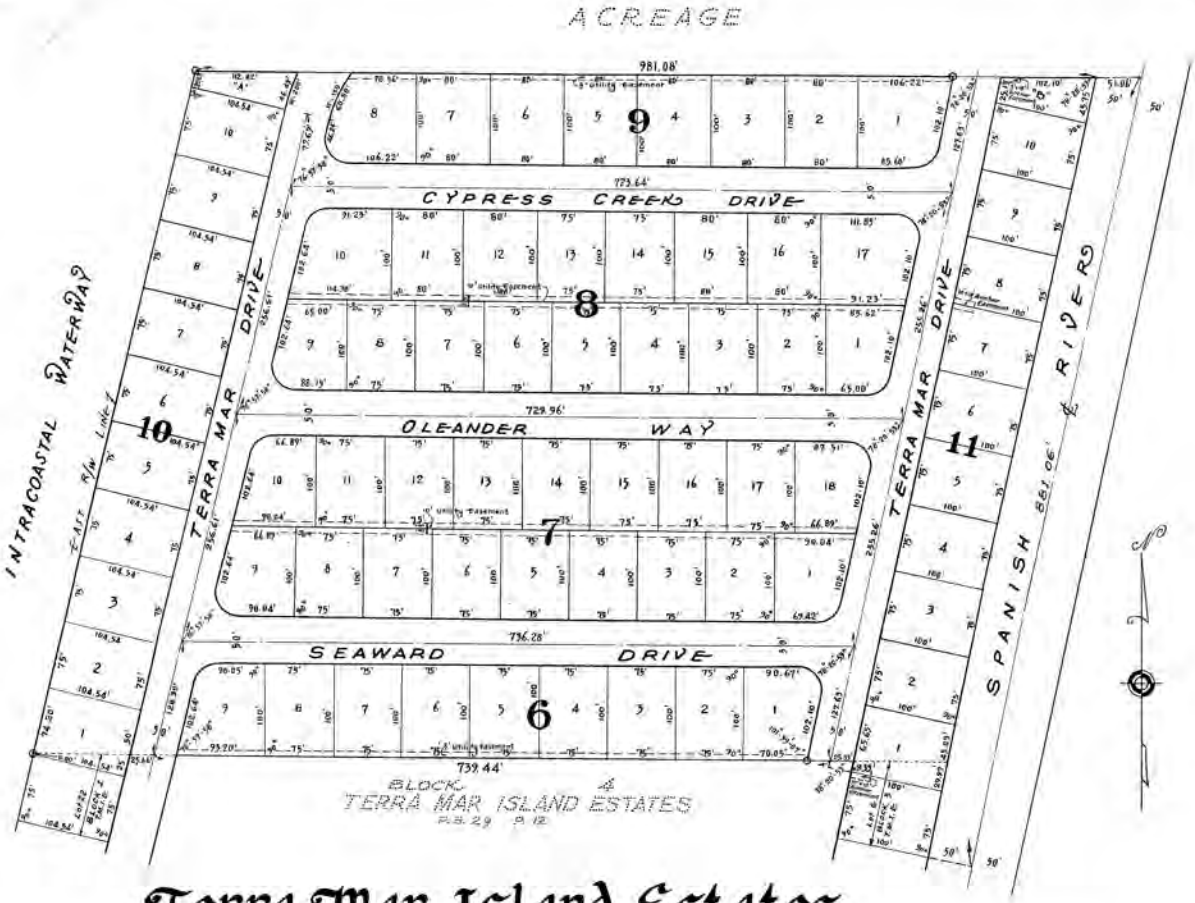
1 inch = 1,393 feet

January 2010

CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA





Terra Mar Island Estates

FIRST ADDITION

SEC. 6, TWP. 49S., RGE. 43E.

BROWARD COUNTY, FLORIDA

SCALE IN FEET 1" = 60'

J. W. McLAUGHLIN - CIVIL ENGINEER
FORT LAUDERDALE - FLORIDA
JANUARY 1953

Note:
⊙ Indicates Permanent Reference Monuments.

DESCRIPTION

Beginning at the Southeasterly corner of LOT 22, BLOCK 1, TERRA MAR ISLAND ESTATES; thence Northwesterly along the Southerly boundary of said LOT 22, a distance of 184.54 feet to the East Right-of-Way line of the Intracoastal Waterway; thence Northeasterly along said Right-of-Way line, a distance of 849.69 feet; thence East, parallel to the North boundary of BLOCK 4, TERRA MAR ISLAND ESTATES a distance of 1052.14 feet to the center line of SPANISH RIVER; thence Southeasterly with an included angle of 78°-28'-55" along said center line a distance of 881.86 feet to an intersection with the extension of the Southerly boundary of LOT 6, BLOCK 5, TERRA MAR ISLAND ESTATES; thence Northwesterly along said extension, a distance of 59 feet to the Southeasterly corner of said LOT 6, BLOCK 5, TERRA MAR ISLAND ESTATES, and continuing along the Southerly boundary of said Lot 6, a distance of 100 feet; thence Northeasterly along the Westerly boundary of said Lot 6, a distance of 82.75 feet to an intersection with the North boundary of said Lot 6; thence West along the North boundary of said Lot 6, and continuing West along the North boundary of BLOCK 4, and continuing West along the North boundary of said LOT 22, BLOCK 1, TERRA MAR ISLAND ESTATES; a distance of 799.63 feet; thence Southwesterly along the Easterly boundary extended and the Easterly boundary of LOT 22, BLOCK 1, TERRA MAR ISLAND ESTATES, a distance of 160 feet to the point of beginning; said plat of TERRA MAR ISLAND ESTATES being recorded in PLAT BOOK 29, Page 12, of the Public Records of BROWARD COUNTY, FLORIDA.

STATE OF FLORIDA }SS
COUNTY OF BROWARD

KNOW ALL MEN BY THESE PRESENTS: That we, the undersigned as officers of BARTELS DEVELOPMENT CO., INC. a Florida Corporation, owners of the lands shown, and included on this Plat have caused said lands to be subdivided and platted as hereon shown. All previous Plats of said lands are hereby voided, annulled, cancelled and superseded by this Plat.

WE, the undersigned, hereby dedicate to the Public for the proper uses thereof, all the thoroughfares shown on this Plat.

IN WITNESS WHEREOF: We, have hereunto set our hands and affixed our seals.

WITNESSES:
Ray M. Osborn
Margaret L. Stamp

Walter E. Bartels (Seal)
BARTELS DEVELOPMENT CO., INC - VICE PRESIDENT
Jessie R. Bartels (Seal)
BARTELS DEVELOPMENT CO., INC - SECRETARY

STATE OF FLORIDA }SS
COUNTY OF BROWARD

I HEREBY CERTIFY: That on this day personally appeared before me, an officer duly authorized to administer oaths and take acknowledgements, WALTER E. BARTELS and JESSIE R. BARTELS, Vice President and Secretary of BARTELS DEVELOPMENT CO., INC. and they acknowledged before me that they executed the foregoing dedication as such officers of said Corporation in the name of said Corporation.

WITNESS: My hand and official seal at Fort Lauderdale, Broward County, Florida, this 8th day of January 1953.

J. W. McLaughlin
NOTARY PUBLIC - STATE OF FLORIDA
My Commission Expires:
Sept 16th 1955

STATE OF FLORIDA }SS
COUNTY OF BROWARD

I HEREBY CERTIFY: That this Plat complies with the provisions of "AN ACT TO REGULATE THE MAKING OF SURVEYS AND FILING FOR RECORD OF MAPS AND PLATS IN THE STATE OF FLORIDA", APPROVED BY THE GOVERNOR, June 11th 1925.

Ted Cabot
CLERK OF THE CIRCUIT COURT
By: Dorothy Adams
DEPUTY CLERK

This instrument filed for Record this 5 day of FEBRUARY 1953 and recorded in Book 31 of Plats at Page 10, RECORD VERIFIED.

Ted Cabot
CLERK OF THE CIRCUIT COURT
By: Dorothy Adams
DEPUTY CLERK

STATE OF FLORIDA }SS
COUNTY OF BROWARD

I HEREBY CERTIFY: That this Plat is a true and correct representation of a Survey made by me and that Permanent Reference Monuments have been set as indicated.

Dated at Fort Lauderdale, Florida, this 8th day of January 1953.

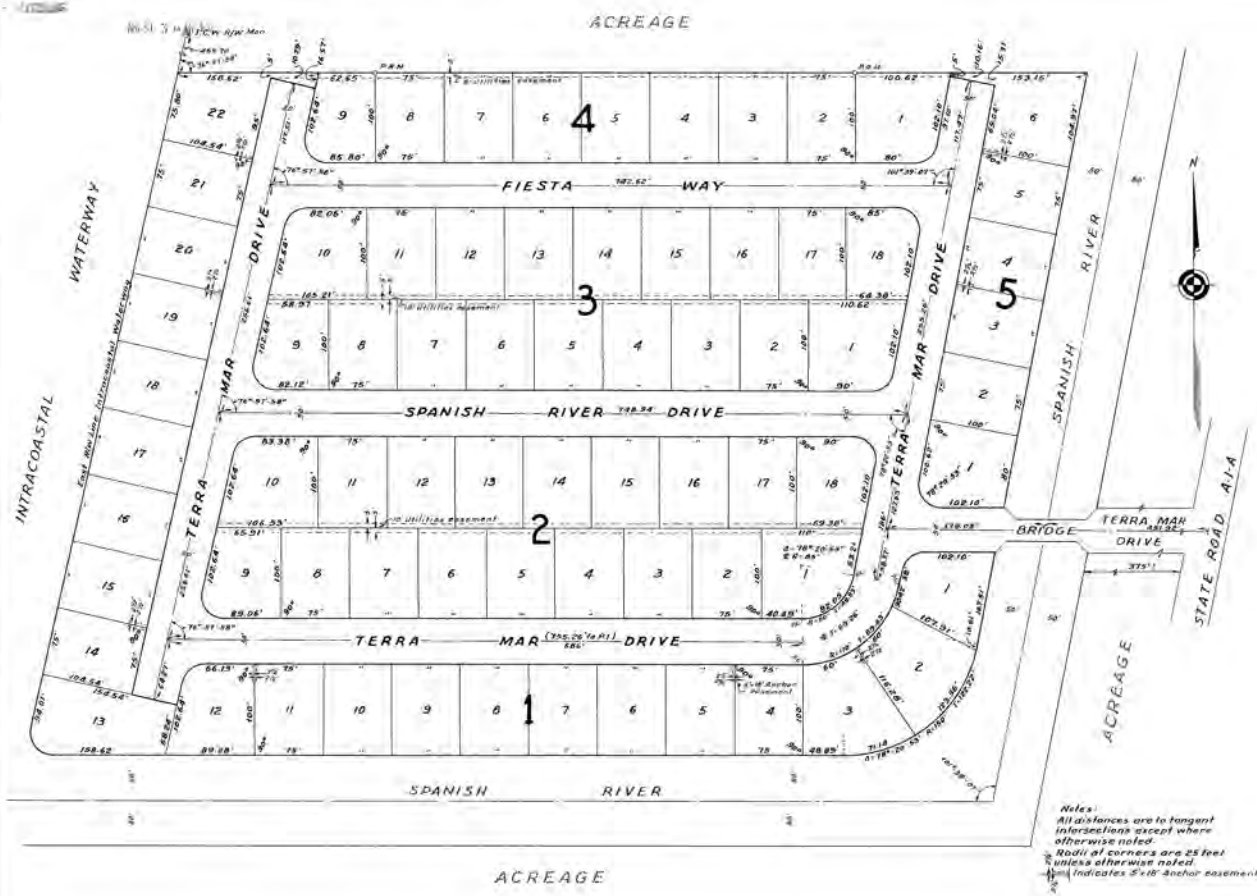
J. W. McLaughlin
REGISTERED ENGINEER No. 1113
REGISTERED LAND SURVEYOR No. 167
STATE OF FLORIDA

We, the undersigned owners and holders of a Mortgage on the above described property, hereby approve and accept this Plat.

Arthur H. Ogle
Ellen K. Ogle

Approved for Record:
COUNTY ENGINEER

Plat 01



Notes:
All distances are to tangent intersections except where otherwise noted.
Radii at corners are 25 feet unless otherwise noted.
Indicates 5'x18' Anchor easement.

TERRA MAR ISLAND ESTATES

SEC. 6, TWP. 49 S., RGE. 43 E.
BROWARD COUNTY · FLORIDA

J. W. McLAUGHLIN — CIVIL ENGINEER
SCALE: 1" = 60' — APRIL 1952

I the undersigned owner and holder of a mortgage on the above described property hereby approve and accept this plat.

Hattie B. Decker
HATTIE B. DECKER AS AN INDIVIDUAL AND AS ADMINISTRIX OF THE ESTATE OF M.O. DECKER, DECEASED.

DESCRIPTION

A PARCEL OF LAND LYING IN THE SOUTHEAST QUARTER (SE¼) OF SECTION 6, TOWNSHIP 49 SOUTH, RANGE 43 EAST, BOUNDED AS FOLLOWS: ON THE NORTH BY A LINE PARALLEL TO AND 550 FEET SOUTH OF, MEASURED AT RIGHT ANGLES TO, THE NORTH LINE OF SAID SOUTHEAST QUARTER (SE¼) OF SECTION 6; ON THE EAST BY A LINE PARALLEL TO AND 443 FEET WEST OF, MEASURED AT RIGHT ANGLES TO, THE CENTER LINE OF STATE ROAD A1-A, AS SAME IS NOW LOCATED AND USED; SAID EAST BOUNDARY BEING ALSO THE CENTER LINE OF A CANAL NOW KNOWN AS SPANISH RIVER; ON THE SOUTH BY A LINE, PARALLEL TO AND 1350 FEET SOUTH OF, MEASURED AT RIGHT ANGLES TO, THE NORTH LINE OF SAID SOUTHEAST QUARTER (SE¼) OF SECTION 6; SAID SOUTH BOUNDARY BEING ALSO THE CENTER LINE OF A CANAL NOW KNOWN AS SPANISH RIVER; ON THE WEST BY THE EAST RIGHT OF WAY LINE OF THE INTRACOASTAL WATERWAY AS SAME IS SHOWN IN PLAT BOOK 17, PAGE 8-C OF THE PUBLIC RECORDS OF BROWARD COUNTY, FLORIDA.

STATE OF FLORIDA } SS
COUNTY OF BROWARD }

KNOW ALL MEN BY THESE PRESENTS, That BARTELS DEVELOPMENT CO., INC. a corporation organized under the laws of the State of Florida, owners of the hereon described lands, has caused to be made this plat for the purpose of subdividing the lands in the manner shown hereon. All streets and avenues are dedicated to the perpetual use of the public in fee simple forever.

IN WITNESS WHEREOF: BARTELS DEVELOPMENT CO., INC. has caused this instrument to be signed by its duly authorized officers and its corporate seal to be affixed this 7th day of April 1952.

WITNESSES
J. W. McLaughlin
E. H. Behlen

BARTELS DEVELOPMENT CO., INC.
By Walter E. Bartels, VICE PRESIDENT
By Jessie R. Bartels, SECRETARY

STATE OF FLORIDA } SS
COUNTY OF BROWARD }

I HEREBY CERTIFY, that on this day personally appeared before me an officer duly authorized to administer oaths and take acknowledgements, WALTER E. BARTELS and JESSIE R. BARTELS, Vice President and Secretary respectively of Bartels Development Co. Inc. and they acknowledged before me that they executed the foregoing dedication as officers of said Bartels Development Co., Inc.

WITNESS my hand and official seal of Fort Lauderdale, County of Broward, State of Florida, this 7th day of April 1952.

J. W. McLaughlin
NOTARY PUBLIC
STATE OF FLORIDA
MY COMMISSION EXPIRES 2/14/55

STATE OF FLORIDA } SS
COUNTY OF BROWARD }

I hereby certify that this plat complies with the provisions of "An Act to Regulate the Making of Surveys and Filing for Record of Maps and Plats in the State of Florida", approved by the Governor, June 11, 1925.

Ted Cabal
CLERK OF THE CIRCUIT COURT
By Dorothy Adams
DEPUTY CLERK

This instrument filed for record this 30 day of APRIL 1952, and recorded in Book 29 of Plats at Page 12, RECORD VERIFIED.

Ted Cabal
CLERK OF THE CIRCUIT COURT
By Dorothy Adams
DEPUTY CLERK

STATE OF FLORIDA } SS
COUNTY OF BROWARD }

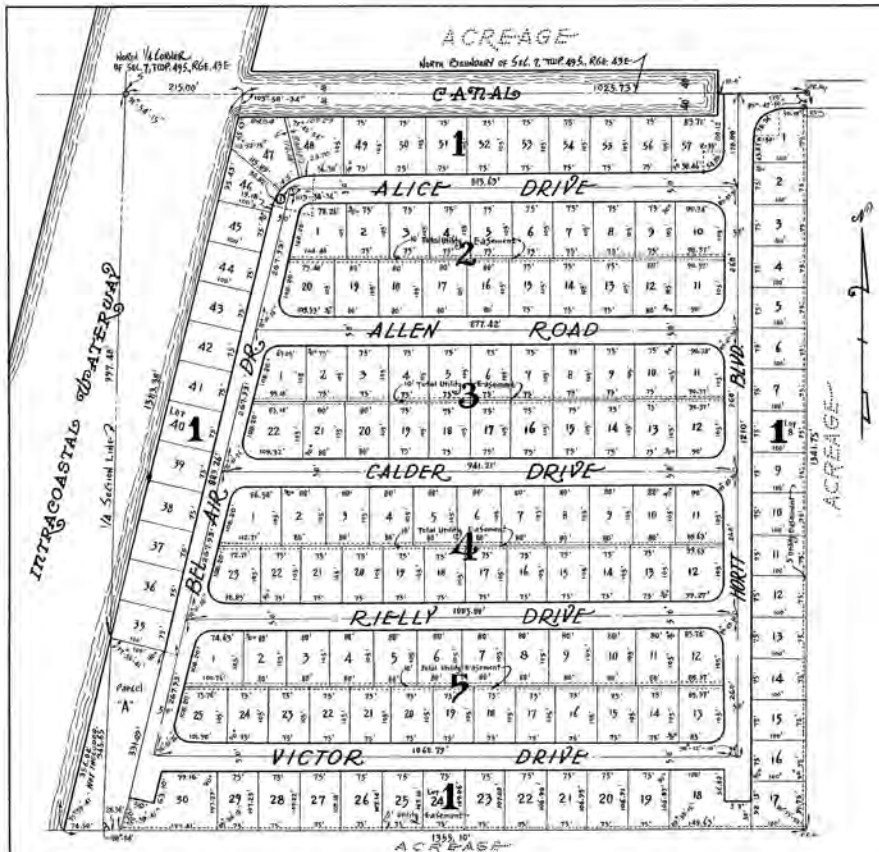
I hereby certify that this plat is a true and correct representation of a survey made by me and that permanent reference monuments have been set as indicated.

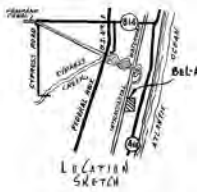
Dated at Fort Lauderdale, Florida, this 28th day of April 1952.

J. W. McLaughlin
REG. ENGINEER No 2313
REG. SURVEYOR No. 167
STATE OF FLORIDA

Approved for record
COUNTY ENGINEER

Plat 02





BELOTTI INC.

"BEL-AIR"

BROWARD COUNTY, FLORIDA

SCALE IN FEET

SECTION 7, TWP 49 S, RGE 43 E.

J. W. McLAUGHLIN - CIVIL ENGINEER
FORT LAUDERDALE - FLORIDA
MAY — 1953

CURVE DATA

Δ =	76°-10'-26"
R =	50'
T =	39.08' 75'
A =	66.34' 99.52'

⊙ indicates Permanent Reference Monuments.
Radii are 25' unless noted.
Distances at Block Corners are shown to Tangent Intersections, unless otherwise noted.

10'x15' Anchor Utility Easement
Standard Utility Easement } as shown.

DESCRIPTION

That Portion Of The NW 1/4 Of The NE 1/4 Lying East Of The EAST Right-of-Way Line Of THE INTRACOASTAL WATERWAY, SECTION 7, TOWNSHIP 49 S, RANGE 43 E, BROWARD COUNTY, FLORIDA.

STATE OF FLORIDA }ss
COUNTY OF BROWARD }

KNOW ALL MEN BY THESE PRESENTS: That we, the undersigned, as officers of BELOTTI INC., a Florida Corporation, owners of the lands shown and included on this PLAT have caused said lands to be subdivided and platted as hereon shown. All previous Plats of said lands are hereby voided, annulled, cancelled and superseded by this Plat.

WE, the undersigned, hereby dedicate to the perpetual use of the Public for the proper uses thereof, all the thoroughfares shown on this Plat.

IN WITNESS WHEREOF: WE have hereunto set our hands and affixed our seals.

WITNESSES:

Peter Foglia — VICE PRESIDENT
Foy Fleming — SECRETARY

STATE OF FLORIDA }ss
COUNTY OF BROWARD }

I HEREBY CERTIFY: That on this day personally appeared before me, an officer duly authorized to administer oaths and take acknowledgements, PETER FOGLIA and FOY FLEMING, Vice President and Secretary, of BELOTTI INC., a Florida Corporation, and they acknowledged before me that they executed the foregoing dedication as such officers of said Corporation, in the name of said Corporation.

WITNESS: My hand and official seal at FORT LAUDERDALE, BROWARD County, Florida, this 19th day of May, 1953.

J. W. McLaughlin
NOTARY PUBLIC - STATE OF FLORIDA
My Commission Expires: Feb. 16th 1955

STATE OF FLORIDA }ss
COUNTY OF BROWARD }

I HEREBY CERTIFY That this Plat complies with the provisions of "AN ACT TO REGULATE THE MAKING OF SURVEYS AND FILING FOR RECORD OF MAPS AND PLATS IN THE STATE OF FLORIDA", approved by the Governor, June 11th, 1925

Ted Cabot
CLERK OF THE CIRCUIT COURT
BY Madeline Stokes
DEPUTY CLERK

This instrument filed for Record this 27 day of May 1953, and recorded in Book 32, of PLATS at PAGE 10, RECORD VERIFIED.

Ted Cabot
CLERK OF THE CIRCUIT COURT
BY Madeline Stokes
DEPUTY CLERK

STATE OF FLORIDA }ss
COUNTY OF BROWARD }

I HEREBY CERTIFY That this Plat of "BEL-AIR" is a true and correct representation of a Survey made by me and that Permanent Reference Monuments have been set as indicated.

Dated at FORT LAUDERDALE, FLORIDA, this 18th day of May, 1953.

J. W. McLaughlin
REGISTERED ENGINEER, No. 1715
REGISTERED LAND SURVEYOR No. 167
STATE OF FLORIDA

As owner and holder of a Mortgage on the hereon described property this Plat is hereby approved. Said Mortgage is recorded in Mortgage Book 434 Page 310, of the Public Records of BROWARD COUNTY, FLORIDA.

BROWARD NATIONAL BANK
CASHIER
VICE PRESIDENT

Approved for Record:
COUNTY ENGINEER

Plat 03

BEL-AIR ISLE

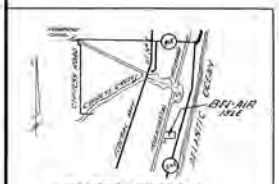
SECTION 7, TOWNSHIP 49 SOUTH, RANGE 43 EAST

BROWARD COUNTY - FLORIDA

SCALE: 1" = 100'

MCLAUGHLIN ENGINEERING CO.
400 N. E. 3RD AVENUE
FORT LAUDERDALE - FLORIDA

JULY 1956



LOCATION SKETCH

MORTGAGE HOLDER'S APPROVAL

We, the undersigned, owners and holders of a MORTGAGE on the hereon described PROPERTY, hereby approve and accept this PLAT.

[illegible]
Bertel S. Jeffs

MORTGAGE HOLDER'S APPROVAL

We, the undersigned, owners and holders of a MORTGAGE on the hereon described PROPERTY, hereby approve and accept this PLAT.

[illegible]
[illegible]

MORTGAGE HOLDER'S APPROVAL

We, the undersigned, owners and holders of a MORTGAGE on the hereon described PROPERTY, hereby approve and accept this PLAT.

SUBURBAN FUNDING CORP.
Oscar A. Gray President
attest: L. E. Brown Secretary

NOTE:

ALL RADII ARE 25' UNLESS OTHERWISE SHOWN.

● INDICATES PERMANENT REFERENCE MONUMENTS.

DISTANCES AT BLOCK CORNERS ARE SHOWN TO TANGENT INTERSECTIONS.

COUNTY ENGINEER'S SIGNATURE

APPROVED FOR RECORD

DESCRIPTION

ALL OF THE N½ OF THE SW¼ OF THE NE¼ AND THAT PART OF THE SE¼ OF THE NW¼ LYING EAST OF THE EAST RIGHT-OF-WAY LINE OF THE INTRACOASTAL WATERWAY, LESS THE SOUTH 172.16 FEET THEREOF, ALL IN SECTION 7, TOWNSHIP 49 SOUTH, RANGE 43 EAST.

DEDICATION

STATE OF FLORIDA
COUNTY OF BROWARD } SS

KNOW ALL MEN BY THESE PRESENTS: That C. H. DODGE, INC., a FLORIDA CORPORATION, owners of the lands shown and described on this PLAT has caused said lands to be surveyed, subdivided and platted as shown and to be known as "BEL-AIR ISLE". All THOROUGHFARES, PUBLIC UTILITY EASEMENTS and CANALS shown on this PLAT are hereby DEDICATED to the perpetual use of the PUBLIC, in fee simple.

IN WITNESS WHEREOF: C. H. DODGE, INC. has caused this DEDICATION to be signed in its name by its PRESIDENT and SECRETARY, this 12th day of July, 1956.

WITNESS:
Marguerite Hoty
Tom Sangolrino

C. H. DODGE, INC.
Peter Foglia (SEAL)
PRESIDENT AND TREASURER
C. H. Dodge (SEAL)
SECRETARY & V.P.

ACKNOWLEDGEMENT

STATE OF FLORIDA
COUNTY OF BROWARD } SS

I HEREBY CERTIFY: That on this day personally appeared before me, an OFFICER duly authorized to administer OATH and take ACKNOWLEDGEMENTS, PETER FOGLIA and C. H. DODGE, President and Secretary of C. H. DODGE, INC., and they acknowledged before me, that they executed the foregoing DEDICATION as such OFFICERS of said CORPORATION, in the name of said CORPORATION.

WITNESS: My HAND and OFFICIAL SEAL at FORT LAUDERDALE, FLORIDA, this 12th day of July, 1956.

My Commission Expires Dec 14-1959 — Tom Sangolrino
NOTARY PUBLIC - STATE OF FLORIDA

CIRCUIT COURT CLERK'S CERTIFICATES

STATE OF FLORIDA
COUNTY OF BROWARD } SS

I HEREBY CERTIFY: That this PLAT complies with the provisions of an "ACT TO REGULATE THE MAKING OF SURVEYS AND FILING FOR RECORD OF MAPS AND PLATS IN THE STATE OF FLORIDA", approved by the Governor, June 11th 1925.

FRANK H. MARKS
CLERK OF THE CIRCUIT COURT
BY [illegible] DEPUTY CLERK

STATE OF FLORIDA
COUNTY OF BROWARD } SS

This INSTRUMENT filed for RECORD, this 17th day of July 1956, and RECORDED in BOOK 40 of PLATS at PAGE 43, RECORD VERIFIED

FRANK H. MARKS
CLERK OF THE CIRCUIT COURT
BY [illegible] DEPUTY CLERK

ENGINEER'S CERTIFICATE

STATE OF FLORIDA
COUNTY OF BROWARD } SS

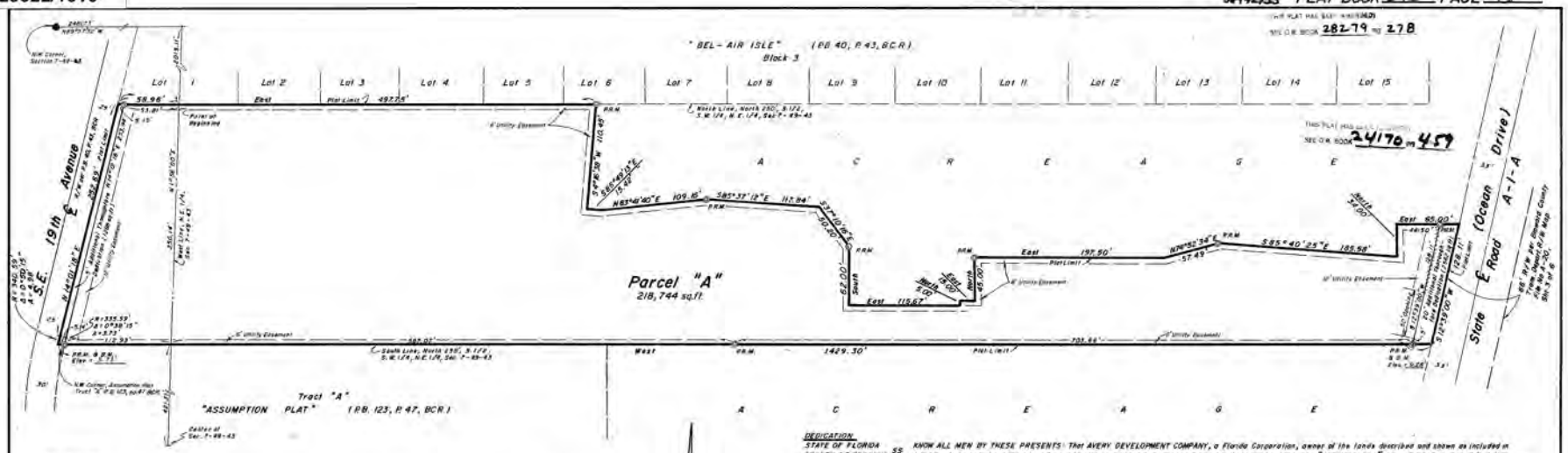
WE hereby certify: That this PLAT of "BEL-AIR ISLE", is a true and correct REPRESENTATION of a SURVEY made by US, and that PERMANENT REFERENCE MONUMENTS have been set as indicated.

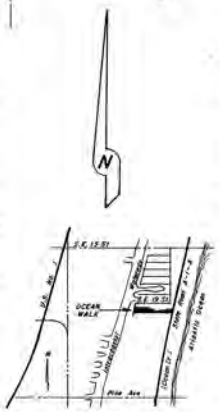
Dated at FORT LAUDERDALE, FLORIDA this 6th day of July, 1956.

MCLAUGHLIN ENGINEERING CO.
BY [illegible] W. McLaughlin
REG. ENGINEER No. 1713 STATE OF FLORIDA — REG. LAND SURVEYOR No. 1167

BROWARD COUNTY, FLORIDA, ZONING DEPARTMENT
APPROVED FOR RECORD
WILLIAM O. WEHLE, DIRECTOR

Plat 04





Location Map - o.t.s.
Sec. 7-49-43

DESCRIPTION

A portion of the North 250.00 feet of the South one-half (S.1/2) of the Southwest one-quarter (S.W.1/4) of the North-east one-quarter (N.E.1/4); and a portion of Government Lot 1, in Section 7, Township 49 South, Range 43 East, TOGETHER WITH: A portion of the North 250.00 feet of Parcel "A", "BEL-AIR ISLE," according to the plat thereof, as recorded in Plat Book 40, Page 43, of the public records of Broward County, Florida, and being all more fully described as follows:

Beginning at the Northeast corner of said Parcel "A"; thence due East along the North line of the said North 250.00 feet of the South one-half (S.1/2) of the Southwest one-quarter (S.W.1/4) of the Northeast one-quarter (N.E.1/4) of said Section 7, a distance of 433.59 feet; thence South 4°16'38" West, a distance of 109.95 feet; thence South 86°49'13" East, a distance of 15.42 feet; thence North 83°41'40" East, a distance of 109.16 feet; thence South 85°52'05" East, a distance of 117.81 feet; thence South 37°10'16" East, a distance of 50.20 feet; thence due South, a distance of 63.00 feet; thence due East, a distance of 115.67 feet; thence due North, a distance of 5.00 feet; thence due East, a distance 15.00 feet; thence due North, a distance of 45.00 feet; thence due East, a distance of 197.50 feet; thence North 74°52'34" East, a distance of 57.49 feet; thence South 85°40'25" East, a distance of 185.58 feet; thence due North, a distance of 34.00 feet; thence due East, a distance of 65.00 feet; thence South 12°39'00" West, along the West right-of-way line of State Road A-1-A (66 foot right-of-way), a distance of 128.11 feet; thence due West, along the South line of the said North 250.00 feet of the South one-half (S.1/2) of the Southwest one-quarter (S.W.1/4) of the Northeast one-quarter (N.E.1/4) of said Section 7, and along the South line of the North 250.00 feet of said Parcel "A", a distance of 1429.30 feet to the point on a curve; thence Northeasterly along the West line of said Parcel "A", and along a curve to the right whose tangent bears North 13°11'03" East, a radius of 340.59 feet and a central angle of 0°50'15", an arc distance of 4.98 feet to a point of tangency; thence North 14°01'18" East, along the West Line of said Parcel "A", a distance of 252.69 feet; thence due East along the North line of said Parcel "A", a distance of 58.96 feet to the Point of Beginning.

NOTICE

There may be additional restrictions that are not recorded on this plat that may be found in the public records of Broward County.

"OCEAN WALK"

A RESUBDIVISION OF A PORTION OF PARCEL "A", "BEL-AIR ISLE," (PB. 40, P. 43, B.C.R.), TOGETHER WITH A PORTION OF THE NORTHEAST ONE-QUARTER (N.E. 1/4) SECTION 7, TOWNSHIP 49 SOUTH, RANGE 43 EAST, BROWARD COUNTY, FLORIDA

0 50 100 200 300
Graphic scale in feet — one inch = fifty feet

DEDICATION

STATE OF FLORIDA
COUNTY OF BROWARD } SS

KNOW ALL MEN BY THESE PRESENTS: That AVERY DEVELOPMENT COMPANY, a Florida Corporation, owner of the lands described and shown as included in this plat, has caused said lands to be subdivided and platted as shown hereon, said plat to be known as "OCEAN WALK," a portion being a resubdivision. The additional thoroughfare is hereby dedicated to the public in fee simple. All easements are hereby dedicated to the public for proper purposes.

IN WITNESS WHEREOF: We hereunto set our hands and affix the corporate seal in the City of Fort Lauderdale, County of Broward, State of Florida, this 14th day of September, 1987

Witness: Florida Wallinger as to both — AVERY DEVELOPMENT COMPANY — James R. Stephens, President

Witness: as to both — Gerald P. Clippinger, Vice-President

ACKNOWLEDGEMENT

STATE OF FLORIDA
COUNTY OF BROWARD } SS

BEFORE ME personally appeared JAMES R. STEPHENS and GERALD P. CLIPPINGER, being the PRESIDENT and VICE-PRESIDENT, respectively of AVERY DEVELOPMENT COMPANY, a Florida Corporation, to me known to be the individuals described in and who executed the foregoing instrument and acknowledged to and before me that they executed said instrument for the purposes herein expressed. WITNESS: My hand and official seal, this 14th day of September, 1987

My commission expires the 20th day of April, 1990 — NOTARY PUBLIC — STATE OF FLORIDA

DEDICATION OF MORTGAGE HOLDER

COMMONWEALTH SAVINGS AND LOAN ASSOCIATION OF FLORIDA, a Florida Savings and Loan Association, owner and holder of a mortgage on this property recorded in O.R. BOOK 14643, PAGE 0928, Broward County Records, does hereby join in the dedication shown hereon. IN WITNESS WHEREOF: I hereunto set my hand and affix the corporate seal in the City of Fort Lauderdale, County of Broward, State of Florida, this 2nd day of Sept, 1987

COMMONWEALTH SAVINGS AND LOAN ASSOCIATION OF FLORIDA

Witnesses: — Officer: Thomas M. Weidenfeld — Title: EXECUTIVE VICE PRES.

ACKNOWLEDGEMENT

STATE OF FLORIDA
COUNTY OF BROWARD } SS

BEFORE ME personally appeared Thomas M. Weidenfeld being the Executive Vice President of COMMONWEALTH SAVINGS AND LOAN ASSOCIATION, a Florida Savings and Loan Association, to me known to be the individual described in and who executed the foregoing instrument and acknowledged to and before me that he executed said instrument for the purposes herein expressed.

WITNESS: My hand and official seal, this 2nd day of September, 1987

My commission expires the 22d day of January, 1988 — NOTARY PUBLIC — STATE OF FLORIDA

BROWARD COUNTY OFFICE OF PLANNING
This plat is approved and accepted for record this 31 day of OCTOBER, 1989 By: Director

BROWARD COUNTY ENGINEERING DIVISION
This plat has been approved and accepted for record
By: Henry H. Cook. Date: 10-31-89, Director of Engineering, Fla. P.E. Reg. No. 12506

BROWARD COUNTY PLANNING COUNCIL
THIS IS TO CERTIFY: That the Broward County Planning Council approved this plat with regard to dedication of Right-of-Way for Trafficways by Resolution duly adopted this 1st day of OCTOBER, 1987 By: this day of, 19

BROWARD COUNTY FINANCE AND ADMINISTRATIVE SERVICES DEPARTMENT - COUNTY RECORDS DIVISION - MINUTES SECTION
THIS IS TO CERTIFY: That this plat complies with the provisions of Chapter 177, FLORIDA STATUTES, and was accepted for record by the Board of County Commissioners on this 1st day of DECEMBER, 1987. L.A. HESTER - COUNTY ADMINISTRATOR By: County By: Chairperson - County Commissioner

BROWARD COUNTY FINANCE AND ADMINISTRATIVE SERVICES DEPARTMENT - COUNTY RECORDS DIVISION - RECORDING SECTION
This plat filed for record this 3rd day of September, 1987, in BOOK 141 of PLATS, at Page 8, record verified.
L.A. HESTER — COUNTY ADMINISTRATOR By: Deputy.

SURVEYOR'S CERTIFICATE

STATE OF FLORIDA
COUNTY OF BROWARD } SS

I HEREBY CERTIFY: That the attached plat, is a true and correct representation of the lands recently surveyed, subdivided and platted under my responsible direction and supervision, that the survey data shown complies with the applicable requirements of Chapter 177, FLORIDA STATUTES, and further that the PERMANENT REFERENCE MONUMENTS (P.R.M.S.) were set in accordance with Section 177.091 of said Chapter 177, on this 14th day of March, 1988. The BENCH MARKS shown are referenced to N.G.S. VERTICAL DATUM and conform to standards for third order work. This plat conforms to all applicable sections of Chapter 21 HH-6, FLORIDA ADMINISTRATIVE CODE.

McLAUGHLIN ENGINEERING CO.
This plat dated at Fort Lauderdale, Florida, this 18th day of August, 1987 By: Robert C. McLaughlin
Registered Land Surveyor No. 3356, State of Florida.

NOTES

⊕ P.R.M. — Indicates Permanent Reference Monument
B.M. Elev. - Indicates Bench Mark Elevation
This plat contains 5.1101 acres
Total Thoroughfare Dedicated By This Plat: 3854 sq.ft.
////////// — Indicates Non-Vehicular Access Line
Bearings are based on an assumed meridian

PLAT RESTRICTION

This plat is restricted to 110 Townhouse/multi-family units. This note is required by Chapter 5, Article IX, Broward County Code of Ordinances, and may be amended by agreement with Broward County.

REFERENCE BENCH MARK

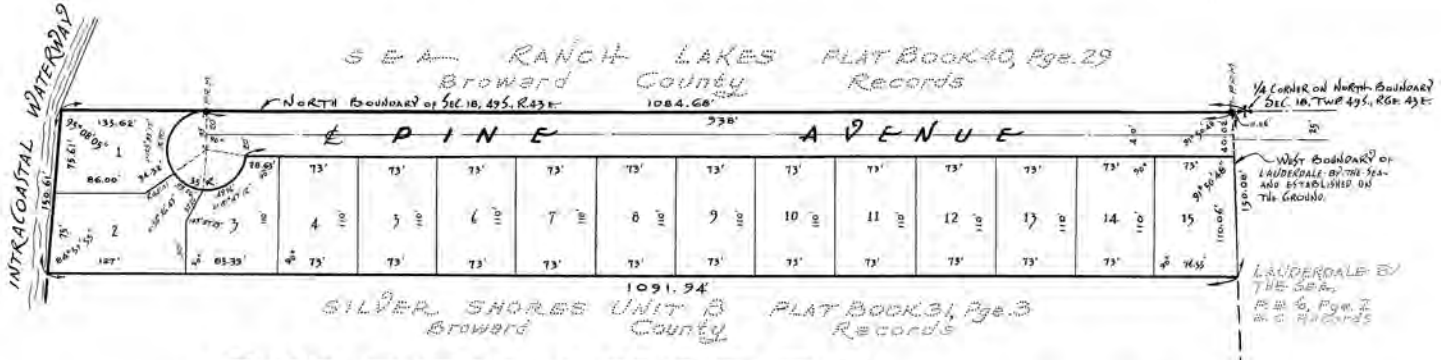
City of Pompano Beach Bench Mark No. 10-R
North Cap on South side of power pole, Mk. 2037, 15' North of S.E. 15 Ct. & 270.5' West of N.E. 21 Ave.
Bench Mark Elevation = 7.039

PREPARED BY: McLAUGHLIN ENGINEERING CO. 400 N.E. 3rd. AVENUE FORT LAUDERDALE FLORIDA 33301

P-6869

37-UP-87

Plat 05



GOLDEN SHORES

SECTION 18, TWP. 49 South, RGE. 43 East

Broward County – FLORIDA

LAUDERDALE BY THE SEA

SCALE IN FEET 1" = 50'

McLAUGHLIN ENGINEERING Co.
400 N. E. 3rd AVENUE
FORT LAUDERDALE – FLORIDA

JULY – 1957

DESCRIPTION

That portion of the North 150 feet of the Northwest One-quarter (NW 1/4) of SECTION 18, TOWNSHIP 49 South, RANGE 43 EAST, Broward County, FLORIDA, lying EAST of the INTRACOASTAL WATERWAY, except the EAST 31.06 feet thereof. Said North 150 feet being Measured at Right Angles to the North Boundary of Said NW 1/4 of SECTION 18.

NOTE

(P.R.M.) INDICATES PERMANENT REFERENCE MONUMENTS.

CLERK OF THE CIRCUIT COURT CERTIFICATES

STATE OF FLORIDA
COUNTY OF BROWARD } SS

I HEREBY CERTIFY: That this PLAT complies with the provisions of an "ACT TO REGULATE THE MAKING OF SURVEYS AND FILING FOR RECORD OF MAPS AND PLATS IN THE STATE OF FLORIDA", approved by the GOVERNOR, June 11th, 1925.

FRANK H. MARKS
CLERK OF THE CIRCUIT COURT

By Madeline Pickhard
DEPUTY CLERK

This INSTRUMENT filed for RECORD this 2nd day of August, 1957, and RECORDED in BOOK 44, of PLATS, at PAGE 37, "RECORD VERIFIED."

FRANK H. MARKS
CLERK OF THE CIRCUIT COURT

By Madeline Pickhard
DEPUTY CLERK

TOWN PLANNING & ZONING BOARD

THIS IS TO CERTIFY that the TOWN PLANNING AND ZONING BOARD of the TOWN of LAUDERDALE BY THE SEA, has approved and accepted this PLAT by RESOLUTION, adopted this 19 day of JULY, 1957.

Walter E. Bartels
CHAIRMAN

TOWN COMMISSION

STATE OF FLORIDA
COUNTY OF BROWARD } SS

THIS IS TO CERTIFY that this PLAT has been approved and accepted for RECORD by the TOWN COMMISSION of the TOWN of LAUDERDALE BY THE SEA, FLORIDA, by ORDINANCE NO. 102 adopted by said TOWN COMMISSION, on the 23 day of July, A.D., 1957.

IN WITNESS WHEREOF the said TOWN COMMISSION have caused these presents to be attested by its CLERK and the CORPORATE SEAL of said TOWN, to be affixed thereto this 27 day of July, A.D., 1957.

Juanita Pendleton
TOWN AUDITOR AND CLERK

COUNTY ENGINEER

APPROVED FOR RECORD: _____ FRANK R. DAVIS, County Engineer

DEDICATION

STATE OF FLORIDA
COUNTY OF BROWARD } SS

KNOW ALL MEN BY THESE PRESENTS: That LAND & GENERAL FINANCE CORPORATION, owner of the lands described and shown as included in this PLAT has caused said lands to be subdivided in the manner shown. PINE AVENUE IS hereby DEDICATED to the perpetual use of the PUBLIC in fee simple. ALL EASEMENTS are DEDICATED to the perpetual use of the PUBLIC for purposes as indicated.

WITNESSES:
Martin O. Egan
Charles E. Dean

LAND & GENERAL FINANCE CORPORATION
J. P. Taravella, PRESIDENT (SEAL)
J. S. Hunt, Jr., SECRETARY (SEAL)

ACKNOWLEDGEMENT

STATE OF FLORIDA
COUNTY OF BROWARD } SS

I HEREBY CERTIFY: That on this day personally appeared before me, an OFFICER duly authorized to administer OATHS and take ACKNOWLEDGEMENTS J. P. TARAVELLA, and J. S. HUNT, Jr. President and Secretary of LAND & GENERAL FINANCE CORPORATION, and they acknowledged before me that they executed the foregoing DEDICATION as such OFFICERS of said CORPORATION, in the name of said CORPORATION.

WITNESS: My HAND and OFFICIAL SEAL at FORT LAUDERDALE in the COUNTY of BROWARD, STATE OF FLORIDA, this 13th day of July, 1957. My Commission Expires October 8, 1960

Robert K. Hofman
NOTARY PUBLIC STATE OF FLORIDA

ENGINEER'S CERTIFICATE

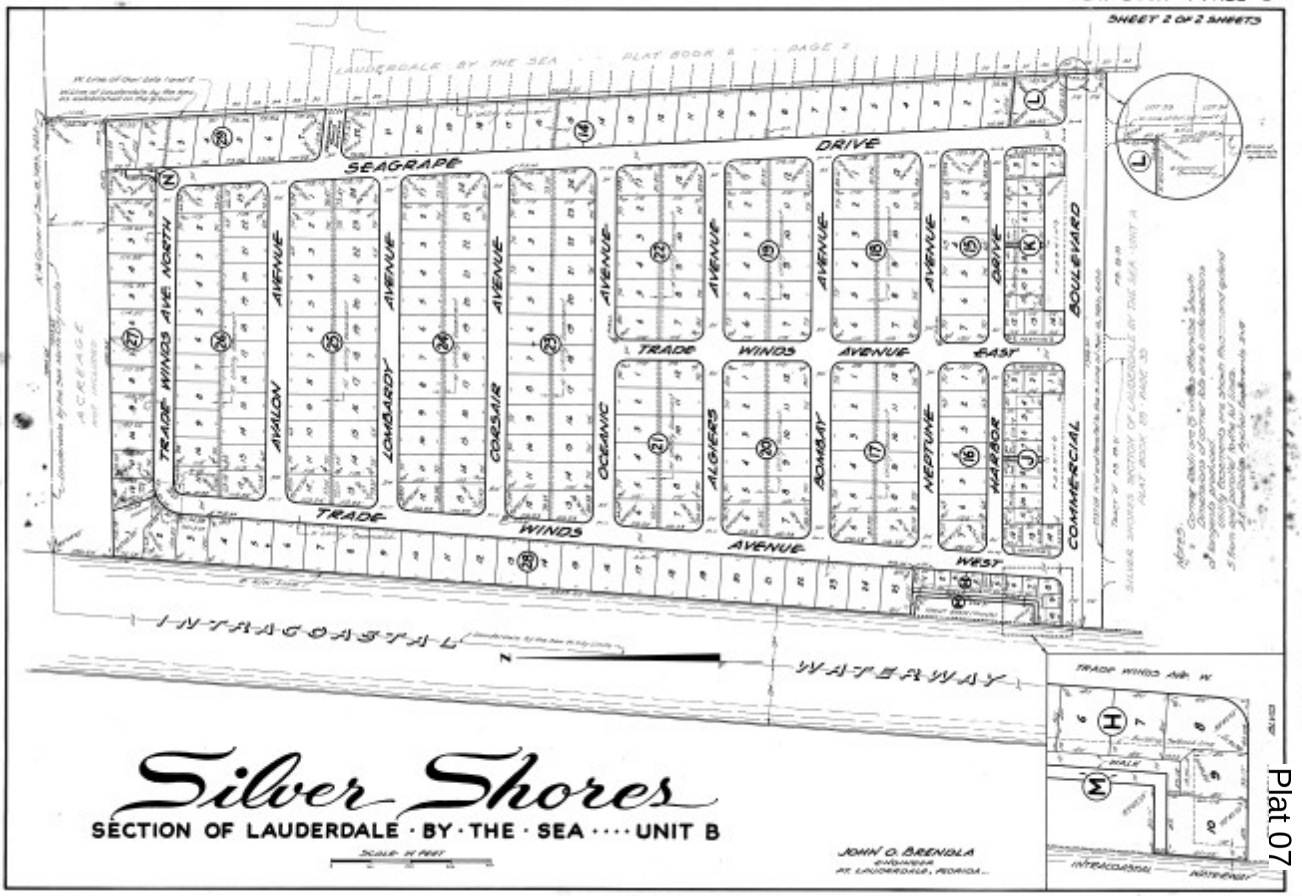
STATE OF FLORIDA
COUNTY OF BROWARD } SS

WE HEREBY CERTIFY: That this PLAT is a true and correct representation of a survey made by us, and that PERMANENT REFERENCE MONUMENTS have been set as indicated.

DATED at FORT LAUDERDALE, FLORIDA this 12th day of July, 1957.

McLAUGHLIN ENGINEERING Co.

J. H. McLaughlin
REG. ENGR. No. 1779 STATE OF FLORIDA — REG. LAND SURVEYOR No. 1167 STATE OF FLORIDA



Silver Shores

SECTION OF LAUDERDALE · BY · THE · SEA · · · · UNIT B

SCALE: 1" = 100 FEET

JOHN O. BRENDLE
ENGINEER
FT. LAUDERDALE, FLORIDA

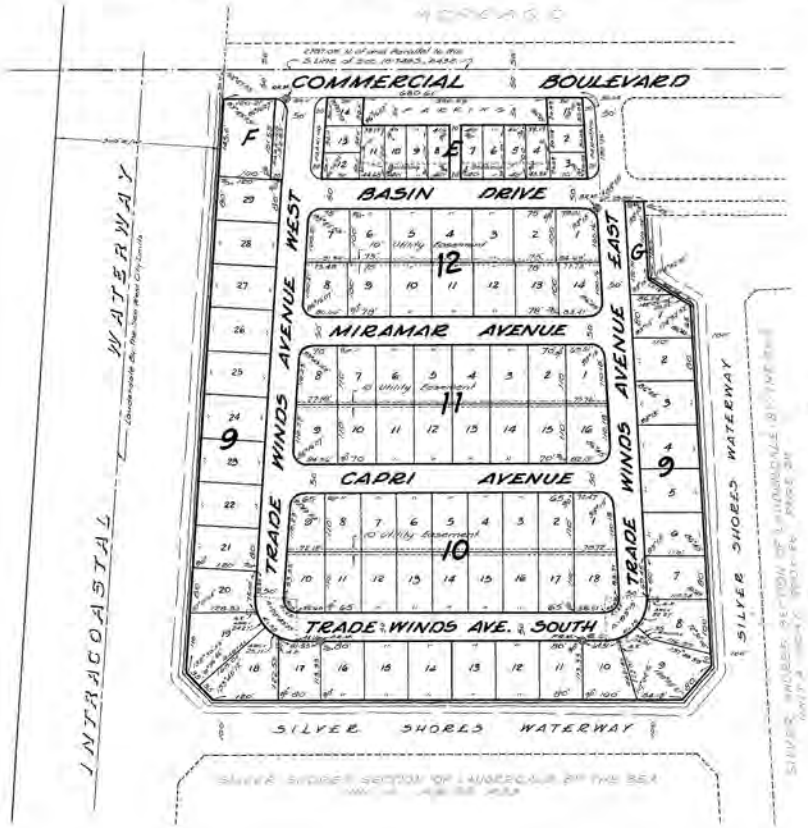
Plat 07

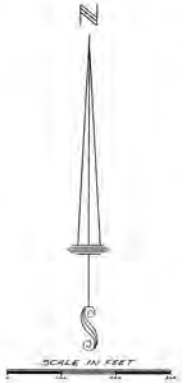
A SUBDIVISION OF TRACT "D" OF Silver Shores

SECTION OF LAUDERDALE · BY · THE · SEA · · · · UNIT A

IN SEC. 18 - TWP. 49 S., RGE. 43 E.

JOHN O. BRENDLA · CIVIL ENGINEER & LAND SURVEYOR · FT. LAUDERDALE, FLORIDA





Scale 1" = 100

NOTES:

Corner radii are 25' unless otherwise shown.

Dimensions of Block corners are to tangent and/or curve intersection.

Utility Easements are shown thus and extend 5' from and parallel to the lot lines.

A.E. indicates Anchor Easements and are 5x18'

DESCRIPTION

Tract "D" of Silver Shores Section of Lauderdale-by-the-Sea Unit A as recorded in Plat Book 28 of Page 39 of the Public Records of Broward County, Florida.

DEDICATION

KNOW ALL MEN BY THESE PRESENTS:

That William S. Edgemon, Trustee, joined by Rebecca H. Edgemon, his wife, has caused the lands as described above to be surveyed, subdivided and platted in the manner as shown hereon and said plat shall be known as "TRACT D OF SILVER SHORES SECTION OF LAUDERDALE-BY-THE-SEA - UNIT A"

The Boulevard, Avenues and Drive as shown on said plat are hereby dedicated to the perpetual use of the public for proper purposes, reserving to themselves the reversion or reversions thereof whenever discontinued by law.

In witness whereof the said William S. Edgemon, Trustee, and Rebecca H. Edgemon his wife, have set their hands and seals this 8th day of April A.D. 1952

Witness Michael Pudney — William S. Edgemon Trustee Seal

Witness Geo. E. Barker — Rebecca H. Edgemon Seal

ACKNOWLEDGEMENT

State of Ohio
County of Hamilton } ss

I hereby certify that on this day personally appeared before me, an officer duly authorized by law to administer oaths and take acknowledgements, William S. Edgemon, as Trustee for the owners, and Rebecca H. Edgemon, his wife, and they acknowledged to me the execution of the foregoing instrument for the purposes therein expressed.

In witness whereof I have hereunto set my hand and seal this 8th day of April A.D. 1952.

My Commission expires Feb 19 1955 — Michael Pudney
Notary Public State of Ohio

SURVEYORS CERTIFICATE

State of Florida
County of Broward } ss

This is to certify that I, John O. Brendla a Land Surveyor duly registered in the State of Florida, have surveyed the property as described hereon and as shown on the attached plat and that permanent reference monuments (P.R.M.) were set as shown and that said survey and plat are accurate and correct to the best of my knowledge and belief.

John O. Brendla
Registered Land Surveyor No. 360
STATE OF FLORIDA

COUNTY ENGINEER

Approved for record this 20 day of May A.D. 1952

R. E. Dunn
County Engineer

TOWN PLANNING AND ZONING BOARD

This is to certify that the Town Planning and Zoning Board of Lauderdale-By-the-Sea has approved and accepted this plat

Date MAY 15TH 1952 — Walter E. Bartels
Chairman

TOWN COMMISSION

This is to certify that the Town Commission of Lauderdale-By-The-Sea has approved and accepted this plat for recording.

Date May 15th 1952 — Carole Haaland
Town Auditor and Clerk

This is to certify that this plat complies with the provisions of chapter 10275 (No. 253) Laws of Florida, and was accepted for record by the Board of Commissioners of Broward County, Florida

Attest Ted Cabot, Clerk of Circuit Court — By Dorothy Adams, Deputy Clerk

This instrument filed for record this 22 day of MAY A.D. 1952 and recorded in Plat Book 29 of Plats of Page 21 Record verified

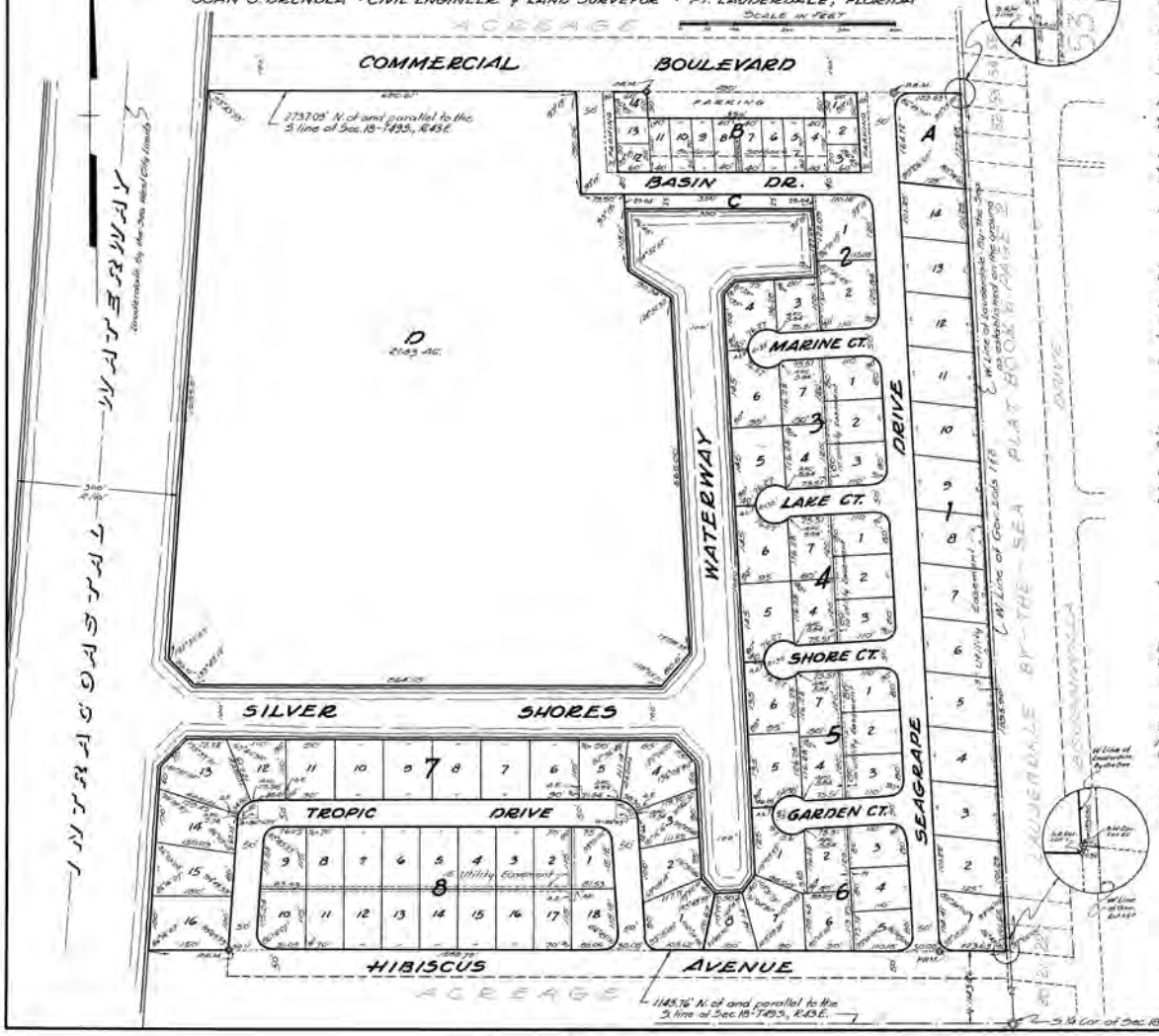
TED CABOT Clerk of Circuit Court BROWARD COUNTY FLORIDA — By Dorothy Adams DEPUTY CLERK

Silver Shores

SECTION OF LAUDERDALE · BY · THE · SEA · · · · UNIT A

IN SEC. 18-TWP. 49S., RGE. 43E.

JOHN O. BRENDLA · CIVIL ENGINEER & LAND SURVEYOR · FT. LAUDERDALE, FLORIDA



DESCRIPTION

All that Part of the south 273.70' feet of the West one half (W ½) of Section 18, Township 49 South, Range 43 East, lying east of the Intracoastal Waterway, known as the Florida East Coast Canal, excepting therefrom the south 1143.76 feet thereof.

DEDICATION

KNOW ALL MEN BY THESE PRESENTS:

That William S. Edgeman, Trustee, joined by Rebecca H. Edgeman, his wife, has caused the lands as described above to be surveyed, subdivided and platted in the manner as shown hereon and said plat shall be known as "SILVER SHORES SECTION OF LAUDERDALE-BY-THE-SEA - UNIT A".

The Boulevard, Street, Avenue, Courts and Drive as shown on said plat are hereby dedicated to the perpetual use of the public for proper purposes, reserving to themselves the reversion or reversions thereof whenever discontinued by law.

In witness whereof the said William S. Edgeman, Trustee, and Rebecca H. Edgeman his wife, have set their hands and seals this 20th day of February A.D. 1952

Witness Ira J. Dutton — William S. Edgeman Trustee Seal

Witness Mildred Pendery — Rebecca H. Edgeman Seal

ACKNOWLEDGEMENT

State of Ohio
County of Hamilton } S.S.

I hereby certify that on this day personally appeared before me, an officer duly authorized by law to administer oaths and take acknowledgements, William S. Edgeman, as Trustee for the owners, and Rebecca H. Edgeman, his wife, and they acknowledged to me the execution of the foregoing instrument for the purposes therein expressed.

In witness whereof I have hereunto set my hand and seal this 20th day of February A.D. 1952

My commission expires Feb. 19, 1955 — Mildred Pendery

Notary Public - Hamilton County, Ohio

SURVEYORS CERTIFICATE

State of Florida
County of Broward } S.S.

This is to certify that I, John O. Brendla a Land Surveyor duly registered in the State of Florida, have surveyed the property as described hereon and as shown on the attached plat and that permanent reference monuments (P.R.M.) were set as shown and that said survey and plat are accurate and correct to the best of my knowledge and belief.

John O. Brendla
Registered Land Surveyor No. 340
STATE OF FLORIDA

COUNTY ENGINEER

Approved for record this 4th day of March A.D. 1952.

County Engineer

TOWN PLANNING AND ZONING BOARD

This is to certify that the Town Planning and Zoning Board of Lauderdale-By-the-Sea has approved and accepted this plat.

Date Feb. 25th 1952 — Raymond C. Bailey
Chairman

TOWN COMMISSION

This is to certify that the Town Commission of Lauderdale-By-the-Sea has approved and accepted this plat for recording.

Date Feb. 25th 1952 — Carolee Hartland
Town Auditor and Clerk

This is to certify that this plat complies with the provisions of chapter 10275 (No. 253) Laws of Florida, and was accepted for record by the Board of Commissioners of Broward County, Florida

Attest Jed Cabot, Clerk of Circuit Court — By Dorothy Adams, Deputy Clerk

This instrument filed for record this 1 day of MARCH A.D. 1952 and recorded in Plat Book 28 of Plats at Page 39. Record verified

TED CABOT Clerk of Circuit Court, BROWARD COUNTY FLORIDA — By Dorothy Adams, DEPUTY CLERK

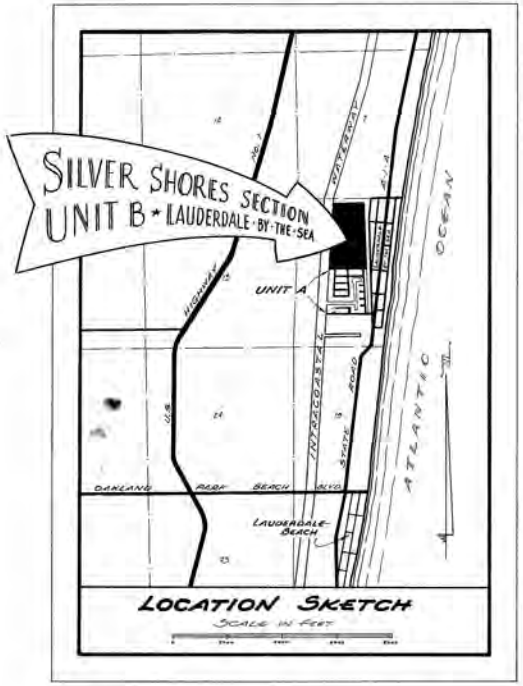
Notes: Corner Radii are 25' unless otherwise shown.
Dimensions of corner lots are to intersections of tangents produced.
A.E. Indicates Anchor Easements 5'x18'

Silver Shores

SECTION OF LAUDERDALE · BY · THE · SEA ···· UNIT B

A SUBDIVISION IN SECTION 18, TOWNSHIP 49 SOUTH, RANGE 43 EAST.....
BROWARD COUNTY, FLORIDA

JOHN O. BRENDLA · CIVIL ENGINEER & LAND SURVEYOR · FT. LAUDERDALE, FLORIDA
Scale: 1"=100'



NOTES:
Corner Radii are 25' unless otherwise shown.
Dimensions of corner lots are to intersections of tangents produced.
Utility Easements are shown thus ==== and extend 5' from and parallel to the lot lines.
A.E. indicates Anchor Easements 5'x18'

DESCRIPTION

All that part of the West one-half (W½) of Section 18, Township 49 South, Range 43 East, lying East of the Intracoastal Waterway, known as the Florida East Coast Canal, excepting therefrom the South 2737.08', and the North 150' thereof.

DEDICATION

KNOW ALL MEN BY THESE PRESENTS:

That William S. Edgemon, Trustee, joined by Rebecca H. Edgemon, his wife, have caused the lands as described above to be surveyed, subdivided and platted in the manner as shown on sheet 2 of 2 sheets and to be known as "SILVER SHORES SECTION OF LAUDERDALE BY THE SEA - UNIT B."

The Boulevard, Avenues and Drives, as shown on said plat are hereby dedicated to the perpetual use of the public for proper purposes, reserving to themselves, their heirs or assigns the reversion or reversions thereof whenever discontinued by law.

In witness whereof the said William S. Edgemon, Trustee, and Rebecca H. Edgemon, his wife, have set their hands and seals this 26 day of December A.D. 1952

Witness Rae L. Edgemon — William S. Edgemon Seal
Witness Mildred Pendery — Seal

ACKNOWLEDGEMENT

State of Ohio
County of Hamilton } ss. I hereby certify that on this day personally appeared before me, an officer duly authorized by law to administer oaths and take acknowledgements, William S. Edgemon, as Trustee for the owners, and Rebecca H. Edgemon, his wife, and they acknowledged to me the execution of the foregoing instrument for the purposes therein expressed.

In witness whereof I have hereunto set my hand and seal this 26 day of December A.D. 1952
My commission expires Feb. 19, 1956

Mildred Pendery
Notary Public, Hamilton County, Ohio

COUNTY ENGINEER

Approved for record this 30 day of January A.D. 1953

County Engineer

SURVEYOR'S CERTIFICATE

State of Florida
County of Broward } ss. This is to certify that I, John O. Brendla, a land surveyor duly registered in the State of Florida, have surveyed the property as described hereon and as shown on sheet 2 of 2 sheets, and have set permanent reference monuments (P.R.M.'s) as shown and that said survey and plat are accurate and correct to the best of my knowledge and belief.

John O. Brendla
Registered Land Surveyor No. 145 State of Florida

TOWN PLANNING & ZONING BOARD

This is to certify that the Town Planning and Zoning Board of the Town of Lauderdale By the Sea has approved and accepted this plat by resolution adopted this 12th day of January A.D. 1953

Walter E. Bartels
Chairman

TOWN COMMISSION

State of Florida
County of Florida } ss. This is to certify that this plat of "SILVER SHORES SECTION OF LAUDERDALE BY THE SEA - UNIT B" has been approved and accepted for record by the Town Commission of the Town of Lauderdale by the Sea, Florida by ordinance No. 62 adopted by said Town Commission on the 12th day of January A.D. 1953.

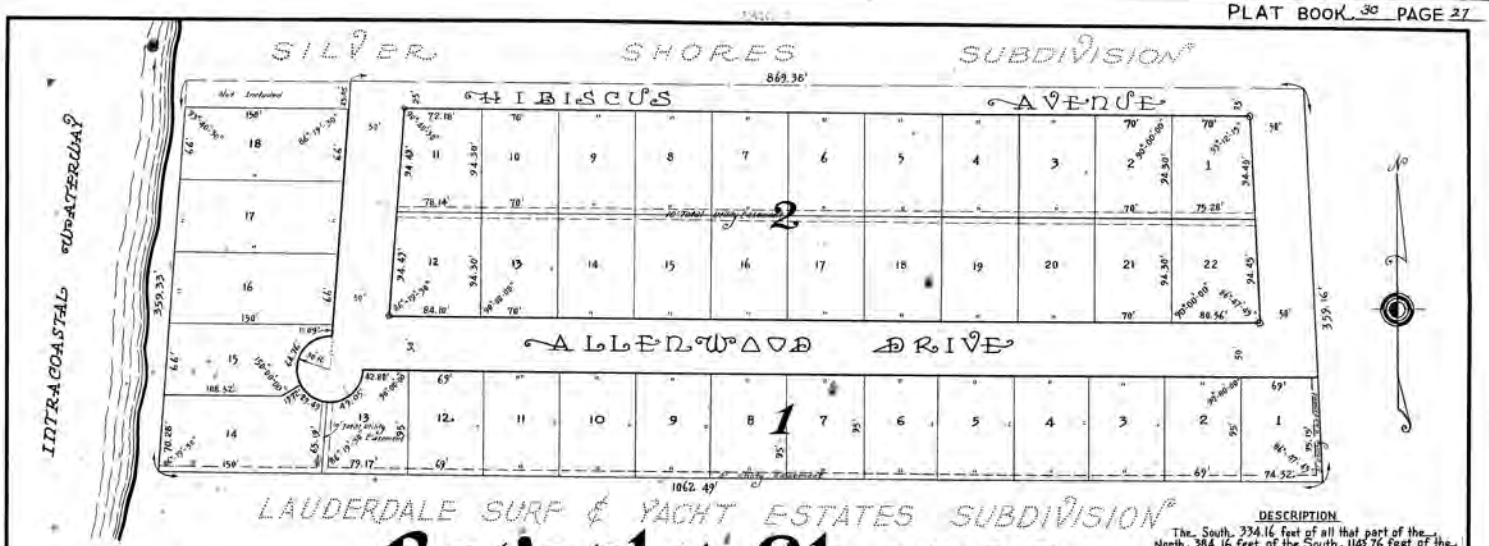
In witness whereof the said Town Commission have caused these presents to be attested by its clerk and the corporate seal of said Town to be affixed thereto this 12th day of January A.D. 1953

Dorothy Rosslund
Town Auditor and Clerk

State of Florida
County of Broward } ss. This is to certify that this plat complies with the provisions of chapter (1275 (No. 253) laws of Florida, and was accepted for record by the Board of Commissioners of Broward County, Florida

Attest Ted Cabot, Clerk of Circuit Court — by Dorothy Adams, Deputy Clerk

This instrument filed for record this 21 day of JANUARY A.D. 1953 and recorded in Plat Book 31 of Plats at Page 3
Record verified.
TED CABOT Clerk of Circuit Court, Broward County, Florida — by Dorothy Adams, Deputy Clerk



Beverly Shores

SUBDIVISION IN SEC. 18, TWP. 49 SOUTH, RGE. 43 E.

J. W. McLAUGHLIN CIVIL ENGINEER
FORT LAUDERDALE, FLORIDA OCTOBER 1952
SCALE: 1" = 50'

DESCRIPTION

The South 334.16 feet of all that part of the North 384.16 feet of the South 1143.76 feet of the SW¼ of Section 18, Township 49 South, Range 43 East, lying East of the right of way of the Intracoastal Waterway; EXCEPTING the East 580 feet of said parcel of land.

STATE OF FLORIDA } ss
COUNTY OF BROWARD

I HEREBY CERTIFY: That this Plat complies with the provisions of "AN ACT TO REGULATE THE MAKING OF SURVEYS AND FILING FOR RECORD OF MAPS AND PLATS IN THE STATE OF FLORIDA", approved by the Governor, this 11th 1925

Ted Cabot
CLERK OF THE CIRCUIT COURT

This instrument Filed for Record this 6 day of NOVEMBER, 1952, and Recorded in Book 30 of Plats at Page 27 RECORD VERIFIED
Ted Cabot
CLERK
by Dorothy Adams
DEPUTY CLERK

STATE OF FLORIDA } ss
COUNTY OF BROWARD

THIS IS TO CERTIFY: That the TOWN PLANNING AND ZONING BOARD of LAUDERDALE BY THE SEA, Florida, approved and accepted this Plat by Resolution adopted this 24 day of OCTOBER, 1952

Walter E. Bartels
CHAIRMAN

STATE OF FLORIDA } ss
COUNTY OF BROWARD

THIS IS TO CERTIFY: That this Plat of "BEVERLY SHORES" has been approved and accepted for Record by the TOWN COMMISSION of the TOWN of LAUDERDALE BY THE SEA, Florida, in and by Ordinance No 64 adopted by said TOWN COMMISSION on the 3rd day of NOVEMBER, 1952

IN WITNESS WHEREOF: The said TOWN COMMISSION has caused these presents to be attested by its TOWN AUDITOR and CLERK and the Corporate Seal of said TOWN to be here affixed this 3rd day of NOVEMBER, 1952

Cecile Vaeland
TOWN AUDITOR AND CLERK

STATE OF FLORIDA }
COUNTY OF BROWARD }

I HEREBY CERTIFY: That this Plat of "BEVERLY SHORES" is a true and correct representation of a Survey made by me, and that Permanent Reference Monuments have been set as indicated

Dated at Fort Lauderdale, Florida, this 27TH day of OCTOBER, 1952

J. W. McLaughlin
REGISTERED ENGINEER No. 1293
REGISTERED LAND SURVEYOR No. 167

Note: ● Indicates Permanent Reference Monuments
Utility Easements 5' Each Side of Lot 18' Total and Shown Thus: ═══

STATE OF FLORIDA } ss
COUNTY OF BROWARD

KNOW ALL MEN BY THESE PRESENTS: That we, the undersigned, as officers of PENN DEVELOPMENT Co., a Florida Corporation, owners of the lands shown and included on this Plat have caused said lands to be subdivided and platted as herein shown. All previous Plats of said lands are hereby vacated, annulled, cancelled and superseded by this Plat.

We, the undersigned, hereby dedicate to the perpetual use of the Public for the proper uses thereof, all the thoroughfares shown on this Plat.

IN WITNESS WHEREOF: We have hereunto set our hands and affixed our seals.

WITNESSES:
Janet A. Nelson
Gloria A. Ramsler

Peter A. Foglia (SEAL)
VICE PRESIDENT
Foy Flemming (SEAL)
SECRETARY
AKA Foy B. Fleming

STATE OF FLORIDA } ss
COUNTY OF BROWARD

I HEREBY CERTIFY: That on this day personally appeared before me, an officer duly authorized to administer oaths and take acknowledgements, PETER A. FOGLIA and FOY FLEMMING, Vice President and Secretary, of PENN DEVELOPMENT CO. and they acknowledged before me that they executed the foregoing dedication as such officers of said Corporation, in the name of said Corporation.

WITNESS: My hand and official Seal at Fort Lauderdale, Broward County, Florida, this 28TH day of OCTOBER, 1952

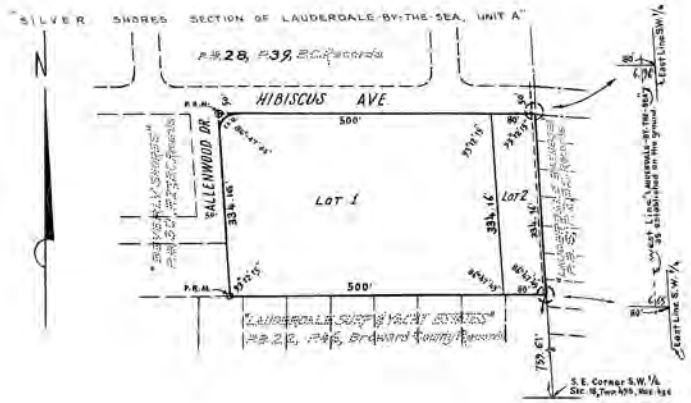
J. W. McLaughlin
NOTARY PUBLIC STATE OF FLORIDA
My Commission Expires
Feb 16th 1955

As owner and holder of a Mortgage dated July 28 1952, and now on Record in Mortgage Book 411 on Page 566, of the Public Record of Broward County, Florida, hereby approve this Plat

Elva May Allen

Approved for Record
[illegible]
County Engineer

Plat 10



"Stephen A. Calder's Subdivision"

SECTION 18, TOWNSHIP 49 S., RANGE 43 E.

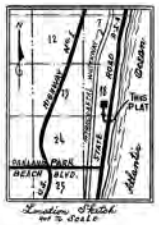
LAUDERDALE BY-THE-SEA,

BROWARD COUNTY, FLORIDA.

SCALE IN FEET 0 25 50 75 100 150 200 300 1" = 100'

APRIL 1964

McLAUGHLIN ENGINEERING CO.
400 N.E. 3RD AVENUE,
FORT LAUDERDALE, FLORIDA



Location Sketch
not to Scale

NOTE

P.R.M. Indicates PERMANENT REFERENCE MONUMENT.
DIMENSIONS ARE TO INTERSECTION OF TANGENTS PRODUCED

DESCRIPTION

The East 580 feet (as measured along the North line) of the North 334.16 feet of the South 1,073.76 feet (as measured along the East line) of the Southwest one-quarter (S.W. 1/4) lying East of Canal Right-of-Way, Section 18, Township 49 South, Range 43 East, Broward County, Florida.

DEDICATION

STATE OF FLORIDA
COUNTY OF BROWARD } SS KNOW ALL MEN BY THESE PRESENTS: That STEPHEN A. CALDER, a single man, Owner of the lands described and shown as included in this PLAT, has caused said lands to be subdivided in the manner shown.

IN WITNESS WHEREOF: I, have hereunto set my HAND and affixed my SEAL in the CITY of FORT LAUDERDALE, COUNTY of BROWARD, STATE of FLORIDA, this 17th day of April, 1964.

Ralph Hess witness
Dennis T. Bauer witness

Stephen A. Calder (SEAL)
STEPHEN A. CALDER

ACKNOWLEDGEMENT

STATE OF FLORIDA
COUNTY OF BROWARD } SS I HEREBY CERTIFY: That on this day personally appeared before me, an officer duly authorized by law, to administer OATHS and take ACKNOWLEDGEMENTS, STEPHEN A. CALDER, a single man, to me well known to be the INDIVIDUAL described in, and who executed the same, freely and voluntarily for the uses and purposes therein expressed.

WITNESS: My HAND and OFFICIAL SEAL at FORT LAUDERDALE, COUNTY of BROWARD, STATE of FLORIDA, this 17th day of April, 1964.

My Commission Expires:
January 27, 1967

Mae Dickerson
NOTARY PUBLIC STATE OF FLORIDA

TOWN PLANNING AND ZONING BOARD

THIS IS TO CERTIFY: That the TOWN PLANNING AND ZONING BOARD of LAUDERDALE-BY-THE-SEA, has approved and accepted this PLAT, by RESOLUTION, adopted this 27th day of April, 1964.

A C Thompson
CHAIRMAN

TOWN COMMISSION

STATE OF FLORIDA
COUNTY OF BROWARD } SS THIS IS TO CERTIFY: That this PLAT has been approved and accepted for RECORD by the TOWN COMMISSION of the TOWN OF LAUDERDALE-BY-THE-SEA, FLORIDA, by ORDINANCE No. 158, adopted by said TOWN COMMISSION, on the 12 day of May, 1964.

IN WITNESS WHEREOF: The said TOWN COMMISSION has caused these PRESENTS to be attested by its CLERK and the CORPORATE SEAL of said TOWN to be affixed thereto, this 18 day of MAY, 1964.

Juanita Pendleton
TOWN AUDITOR AND CLERK

CLERK OF THE CIRCUIT COURT CERTIFICATES

STATE OF FLORIDA
COUNTY OF BROWARD } SS I HEREBY CERTIFY: That this PLAT complies with the provisions of an "ACT TO REGULATE THE MAKING OF SURVEYS AND FILING FOR RECORD OF MAPS AND PLATS, IN THE STATE OF FLORIDA," approved by GOVERNOR, JUNE 11th 1925. This plat accepted for Record by the Board of Commissioners of Broward County, Florida this 4th day of JUNE 1964.

OLA MAY OLDHAM
CLERK OF THE CIRCUIT CLERK

By: Cecil R. Beach
DEPUTY CLERK

This INSTRUMENT Filed for RECORD, this 4th day of June, 1964, and RECORDED in BOOK 59, of PLATS, at PAGE 14, "RECORD VERIFIED".

OLA MAY OLDHAM
CLERK OF THE CIRCUIT CLERK

By: Madeline Parkhurst
DEPUTY CLERK

ENGINEER'S CERTIFICATE

STATE OF FLORIDA
COUNTY OF BROWARD } SS WE HEREBY CERTIFY: That this PLAT is a true and correct representation of a SURVEY made by us, and that PERMANENT REFERENCE MONUMENTS, (P.R.M.) have been set as indicated.

Dated at FORT LAUDERDALE, FLORIDA, this 17th day of April, 1964.

McLAUGHLIN ENGINEERING CO.

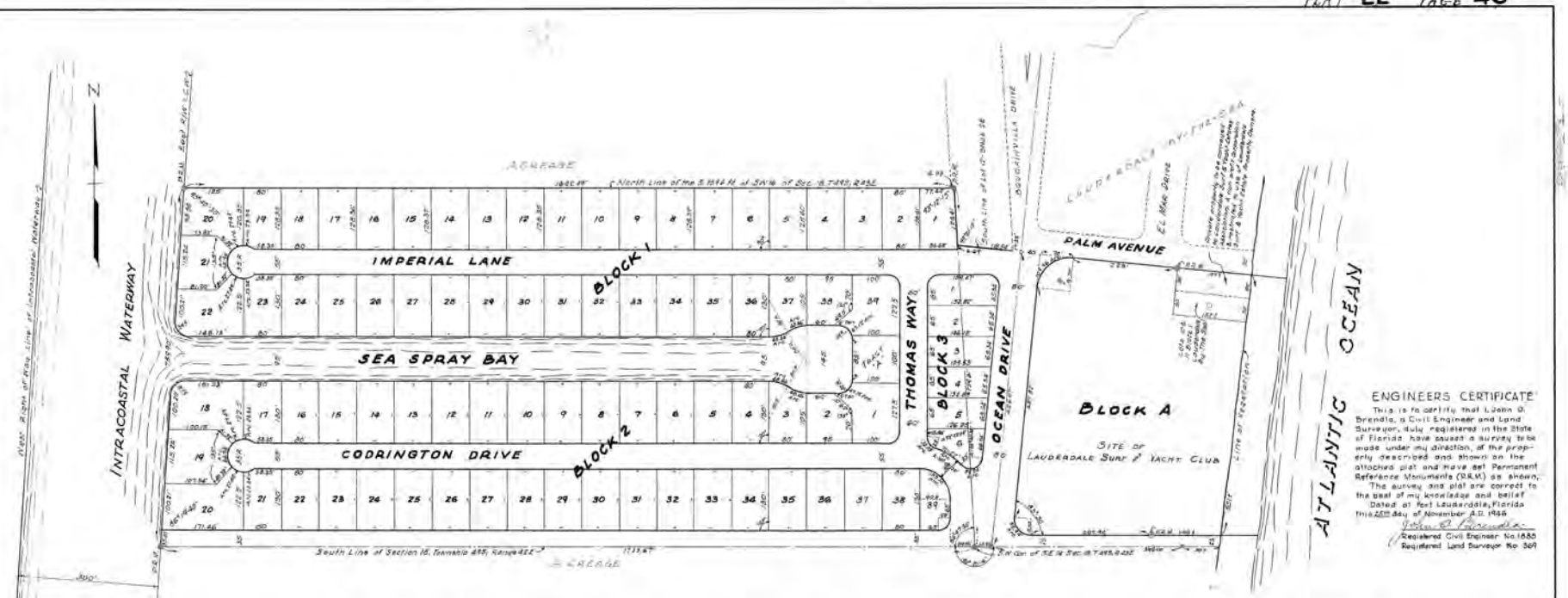
By: J. W. McLaughlin
REG. ENGR. No. 1775, REG. LAND SURVEYOR No. 167
STATE OF FLORIDA

COUNTY ENGINEER'S SIGNATURE

This PLAT is APPROVED and ACCEPTED for RECORD.

S. R. Tomlin Jr.
COUNTY ENGR.

Plat 11



LAUDERDALE SURF & YACHT ESTATES

A SUBDIVISION OF ALL THAT PART OF THE SOUTH 759.6 FEET OF SOUTHWEST ONE FOURTH OF SECTION 18, LYING EAST OF THE CENTERLINE OF THE INTRACOASTAL WATERWAY, ALSO A RESUBDIVISION OF BLOCKS 1 AND 18 AND LOTS 1 TO 11, BOTH INCLUSIVE OF BLOCK 28 OF "LAUDERDALE BY THE SEA", ALL IN TOWNSHIP 49 SOUTH, RANGE 43 EAST

LAUDERDALE SURF & YACHT ESTATES, INC., OWNER AND DEVELOPER

JOHN O. BRENDLA, CIVIL ENGINEER, SURVEYOR

SCALE 1" = 100' FORT LAUDERDALE, FLORIDA NOVEMBER 1946

DESCRIPTION

All that part of the South 759.6 feet of the SW ¼ of Section 18, lying East of the centerline of the Intracoastal Waterway in Section 18 Township 49 South Range 43 East, and also all of Blocks 1, 18 and Lots 1 to 11 both inclusive of Block 28 of "LAUDERDALE BY THE SEA", a subdivision shown and recorded in Plat Book 6 at Page 2 of the Public Records of Broward County, Florida. Also all that portion of El Mar Drive and Ocean Drive of said subdivision of "LAUDERDALE BY THE SEA" which lies south of Palm Avenue.

COUNTY ENGINEERS CERTIFICATE

This instrument was approved for record this 19 day of December A.D. 1946.

H. C. DaVIS
Florida Registry No. 48

STATE OF FLORIDA } S.S.
COUNTY OF BROWARD

Before me, an officer duly authorized to administer oaths and take acknowledgements, this day appeared O.R. Burkart, and Mabel C. Burkart, his wife, known by me to be the persons described in and who executed the foregoing instrument and they acknowledged before me that they executed the same freely and voluntarily for the purposes therein expressed. And I further certify that the said Mabel C. Burkart, wife of said O.R. Burkart, on a private examination taken and made by and before me, separate and apart from her said husband, did acknowledge that she executed this instrument freely and voluntarily and without any compulsion, constraint, apprehension or fear of or from her said husband.

Witness my hand and official seal at Fort Lauderdale, County of Broward, State of Florida this 30 day of November A.D. 1946

My commission expires Dec 3, 1946

Notary Public, State of Florida

KNOW ALL MEN BY THESE PRESENTS:

That the Lauderdale Surf and Yacht Estates, Inc., a Florida Corporation, has caused the land above described and shown on the attached plat to be surveyed, platted and subdivided under the name of Lauderdale Surf and Yacht Estates.

The dedication to the public of those portions of El Mar Drive and Ocean Drive lying south of Palm Avenue as shown on Plat of "LAUDERDALE BY THE SEA", as shown in Plat Book 6 at Page 2, Broward County Records is hereby vacated and revoked and the same are included in and made a part of this plat.

All previous plats of lands covered by this plat are hereby voided, cancelled and annulled as to said lands and are superceded by this plat. All streets, alleys, lanes, avenues, drives and waterways shown hereon are hereby dedicated to the public for proper purposes, reserving to the undersigned corporation, its successors and assigns, the reversion thereof, should the same be discontinued by law.

In Witness Whereof the Lauderdale Surf and Yacht Estates, Inc., has caused these presents to be signed by its President and Secretary and its corporate seal to be affixed by and with the authority of the Board of Directors this 4th day of December, A.D. 1946

Attest: Glenn Friedl Seal.
Secretary.

LAUDERDALE SURF AND YACHT ESTATES, INC.
By: Fay M. Thomas Seal.
President.

STATE OF FLORIDA
COUNTY OF BROWARD } S.S.

I hereby certify that the plat hereon shown conforms with AN ACT TO REGULATE THE MAKING AND FILING FOR RECORD OF MAPS AND PLATS" in the State of Florida, approved by the Governor the 11th day of June, 1925.

Clerk of Circuit Court

STATE OF MICHIGAN
COUNTY OF WAYNE } S.S.

I the undersigned authority do hereby certify that on this 11th day of December A.D. 1946, personally appeared before me Fay M. Thomas, President, and Glenn Friedl, Secretary of the Lauderdale Surf and Yacht Estates, Inc., a corporation under the laws of the State of Florida and that they each acknowledged to me the execution of the foregoing dedication by and with the authority of the Board of Directors of said Corporation, and they also acknowledged that the attached seal is the Seal of said Corporation and was affixed by and with the authority of the Board of Directors.

In witness whereof, I have hereunto set my hand and seal this 19 day of December A.D. 1946.

Notary Public, State of Michigan
My Commission expires October 17th, 1949

KNOW ALL MEN BY THESE PRESENTS:

That O.R. Burkart and Mabel C. Burkart, his wife, owners and holders of that certain mortgage executed by Fay M. Thomas, President and Glenn Friedl, Secretary of Lauderdale Surf & Yacht Estates, Inc., dated October 15, A.D. 1946 and recorded in Mortgage Book 207 at Page 308 of the Public Records of Broward County, Florida, do hereby consent to and join in the making and filing of the attached plat and to the dedication of thoroughfares shown thereon.

In Witness whereof the said O.R. Burkart and Mabel C. Burkart his wife have set their hands and seals of Fort Lauderdale, Broward County, Florida, this 30th day of November A.D. 1946

Witness: O.R. Burkart
Witness: Mabel C. Burkart Seal

STATE OF FLORIDA
COUNTY OF BROWARD } S.S.

This instrument filed for record this 11th day of December A.D. 1946 and recorded in Book 22 of Plats at Page 46 Record Verified

TED CABOT
Clerk of Circuit Court, Broward County, Fla.
by: Dorothy Adams
Deputy Clerk

Plat 12

37696

G-2

LAUDERDALE BY THE SEA

A SUBDIVISION OF
GOVERNMENT LOTS 1 & 2 SEC 18, T. 49 S.R. 43 E.
BROWARD COUNTY, FLA.
FOR

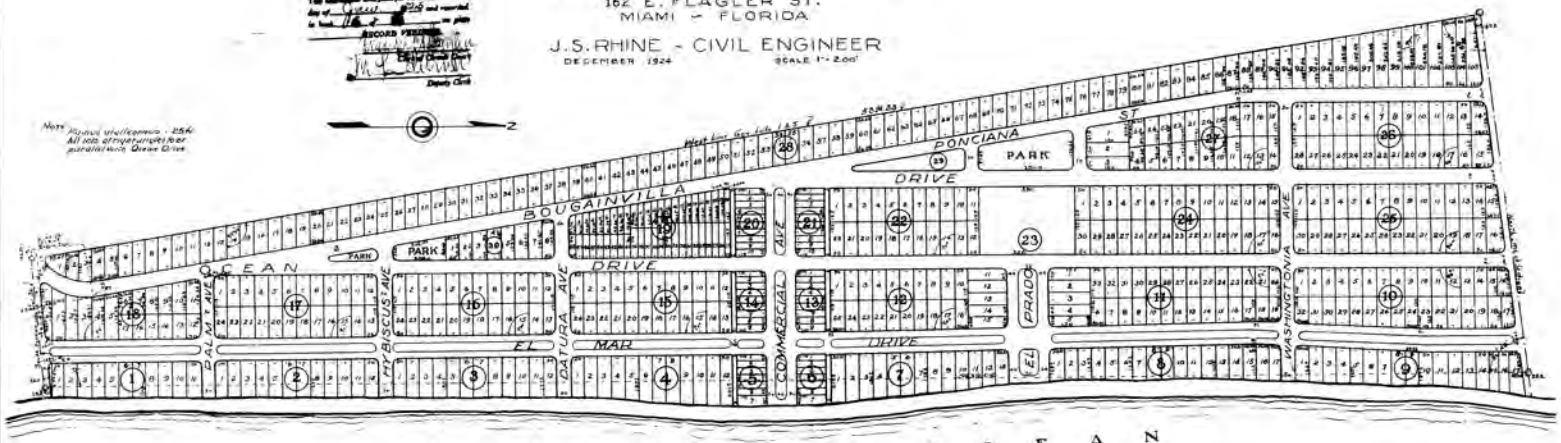
W. F. MORANG & SON INC.

OWNERS AND DEVELOPERS
162 E. FLAGLER ST.
MIAMI - FLORIDA

J. S. RHINE - CIVIL ENGINEER
DECEMBER 1924 SCALE 1" = 200'

37696

STATE OF FLORIDA
COUNTY OF BROWARD
This instrument was filed for record on 12-21 19 24 and recorded in Book 11 of Plats on page 6
RECORD VERIFIED
Clerk of Circuit Court
By Deputy Clerk



KNOW ALL MEN BY THESE PRESENTS: That W. F. Morang & Son, Inc., a Florida Corporation has caused the land above described and shown on the annexed plat, to be surveyed, platted and subdivided, under the name of "Lauderdale by the Sea" and the said Corporation does hereby dedicate a perpetual easement right of way over the streets, parks, highways and alleyways, shown thereon for the use of the public, for all proper purposes; reserving unto itself the revenues thereof, should the same be derived by law; also reserving the right to use the streets, roadways, alleyways and the like as an easement right for furnishing to the lots, lots thereon all necessary water, gas, electricity, gas, telephone, sewer or other utilities, with all necessary rights to erect poles and stretch wires thereon, and also the exclusive right for purpose of placing and maintaining and repairing conduits, cables, and the like underground without the other incidental rights thereunder.

In testimony whereof, W. F. Morang & Son, Inc. has caused these presents to be signed by its President and Secretary and its Corporate seal to be hereto affixed this 1st day of December AD 1924.

Attest
W. F. Morang
Secretary

W. F. MORANG & SON, INC.
By W. F. Morang
President

State of Florida,
County of Broward.

I, the undersigned authority, do hereby certify that on this 3rd day of December, 1924 personally appeared before me, the President and Secretary of the W. F. Morang & Son, Inc., a corporation under the laws of the State of Florida, and that each of them acknowledged to me the execution of the foregoing dedication by and with the authority of the Board of Directors of said Corporation and that, also acknowledge that the attached seal is the Seal of said Corporation and was affixed by and with the authority of said Board of Directors.

In witness whereof, I have hereunto set my hand and seal the day and year first above written.

Notary Public, State of Florida at Large
My commission expires Oct. 12, 1927

This is to certify that I, J. S. Rhine, a registered and licensed Civil Engineer, has surveyed and platted the property herein described and that the same is true, I swearing before.
Signed and sealed this 23rd day of December A.D. 1924

J. S. Rhine
Civil Engineer
Florida Registry No. 1606

STATE OF FLORIDA
COUNTY OF BROWARD

I HEREBY CERTIFY that this is a true and correct copy of a map or plat as the same appears of record in Plat Book 6 of Page 2 of the public record of Broward County Florida.
WITNESS my hand and official seal in the City of Fort Lauderdale, FL this 12 day of Sept A.D. 19 87

S. A. HESTER, County Administrator

COUNTY ADMINISTRATOR
CREATED
BROWARD COUNTY, FLORIDA

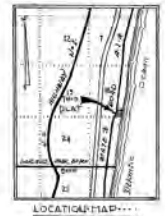
Plat 13

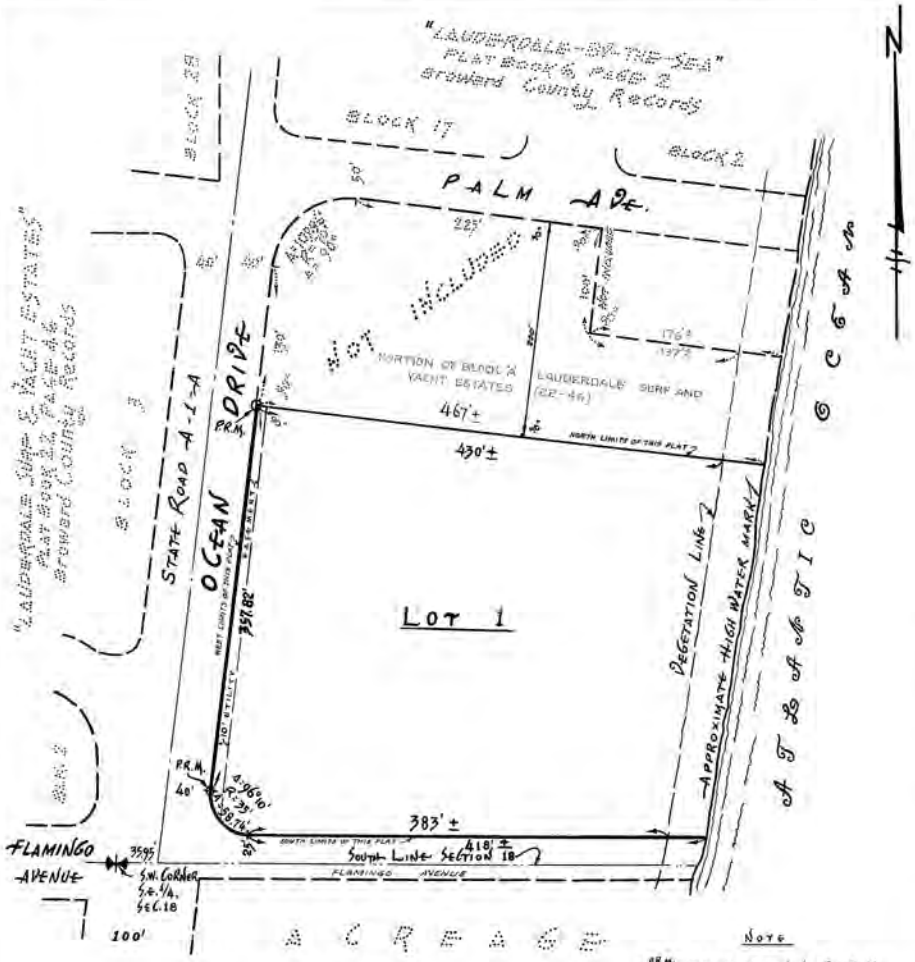
"RESUBDIVISION IN BLOCK "A" LAUDERDALE SURF & YACHT ESTATES"

SECTION 18, TOWNSHIP 49S., RANGE 43E.
LAUDERDALE-BY-THE-SEA
BROWARD COUNTY, FLORIDA

SCALE IN FEET 0 10 20 30 40 50 75 100 150 — 1" = 50'

McLAUGHLIN ENGINEERING CO.
400 N.E. 3RD AVENUE
FORT LAUDERDALE, Florida
APRIL ~ 1960





DESCRIPTION

ALL OF BLOCK "A", "LAUDERDALE SURF AND YACHT ESTATES", ACCORDING TO THE PLAT THEREOF; RECORDED IN PLAT BOOK 22, PAGE 46 OF THE PUBLIC RECORDS OF BROWARD COUNTY, FLORIDA, LESS THE NORTH 200 FEET THEREOF; SAID 200 FEET BEING MEASURED AT RIGHT ANGLES TO THE SOUTH RIGHT-OF-WAY LINE OF PALM AVENUE;
SAID LANDS SITUATE, LYING AND BEING IN BROWARD COUNTY, FLORIDA

DEDICATION

STATE OF FLORIDA, COUNTY OF BROWARD } KNOW ALL MEN BY THESE PRESENTS: That INVESTMENT SECURITIES SUGAR CORPORATION, a PANAMANIAN CORP., authorized to do BUSINESS in the STATE OF FLORIDA; OWNER of the land described and included in this PLAT, has caused said land to be SUBDIVIDED in the manner shown. The AVENUES, DRIVE and PUBLIC WAY, are DEDICATED to the perpetual use of the PUBLIC, in fee simple. All EASEMENTS are DEDICATED to the perpetual use of the PUBLIC, for purposes as indicated. IN WITNESS WHEREOF: INVESTMENT SECURITIES SUGAR CORPORATION, has caused this DEDICATION to be signed in its name by its PRESIDENT and SECRETARY, and its CORPORATE SEAL affixed thereto this 8th day of April, 1960.

INVESTMENT SECURITIES SUGAR CORPORATION
WITNESS: [signature] — [signature] (SEAL) PRESIDENT, H. MILTON LINK
WITNESS: [signature] — [signature] (SEAL) SECRETARY, THOMAS O. BERRYHILL

ACKNOWLEDGEMENT

STATE OF FLORIDA, COUNTY OF BROWARD } SS I HEREBY CERTIFY: That on this day personally appeared before me, an OFFICER duly authorized to administer OATHS and take ACKNOWLEDGEMENTS, H. MILTON LINK and THOMAS O. BERRYHILL, PRESIDENT and SECRETARY of INVESTMENT SECURITIES SUGAR CORPORATION, and they acknowledged before me, that they executed the foregoing DEDICATION as SUCH OFFICERS of said CORPORATION, in the name of said CORPORATION. WITNESS: My HAND and OFFICIAL SEAL at FORT LAUDERDALE, in the COUNTY of BROWARD, STATE of FLORIDA, this 8th day of April, 1960.

My Commission Expires: [illegible] — [signature] NOTARY PUBLIC STATE OF FLORIDA

TOWN PLANNING & ZONING BOARD

THIS IS TO CERTIFY that the TOWN PLANNING and ZONING BOARD of the TOWN OF LAUDERDALE-BY-THE-SEA, has approved and accepted this PLAT by RESOLUTION, adopted this 12th day of APRIL, 1960. [signature] CHAIRMAN

TOWN COMMISSION

STATE OF FLORIDA, COUNTY OF BROWARD } SS THIS IS TO CERTIFY: That this PLAT has been approved and accepted for RECORD by the TOWN COMMISSION of the TOWN OF LAUDERDALE-BY-THE-SEA, FLORIDA, by ORDINANCE No. 126, adopted by said TOWN COMMISSION, on the 12 day of APRIL, 1960.
IN WITNESS WHEREOF: The said TOWN COMMISSION has caused these PRESENTS to be attested by its CLERK and the CORPORATE SEAL of said TOWN, to be affixed thereto this 12 day of APRIL, 1960. [signature] TOWN AUDITOR AND CLERK

CLERK OF CIRCUIT COURT CERTIFICATES

STATE OF FLORIDA, COUNTY OF BROWARD } SS I HEREBY CERTIFY: That this PLAT complies with the provisions of an "ACT TO REGULATE THE MAKING OF SURVEYS AND FILING FOR RECORD OF MAPS AND PLATS IN THE STATE OF FLORIDA", approved by the GOVERNOR, June 11th, 1925. FRANK H. MARKS, CLERK OF THE CIRCUIT COURT — By: [signature] DEPUTY CLERK

This INSTRUMENT filed for RECORD, this 12th day of May, 1960, and RECORDED in BOOK 52, of PLATS, at PAGE 49. "RECORD VERIFIED." FRANK H. MARKS, CLERK OF THE CIRCUIT COURT — By: [signature] DEPUTY CLERK

ENGINEER'S CERTIFICATE

STATE OF FLORIDA, COUNTY OF BROWARD } SS WE HEREBY CERTIFY: That this PLAT is a true and correct representation of a SURVEY made by us, and that PERMANENT REFERENCE MONUMENTS, have been set as indicated. Dated at FORT LAUDERDALE, FLORIDA, this 4th day of April, 1960.
McLAUGHLIN ENGINEERING Co.
By: [signature]
REG. ENGR. No. 1703, REG. LAND SURVEYOR, No. 1675 STATE OF FLORIDA

NOTE
P.R.M. — Indicates PERMANENT REFERENCE MONUMENTS.

LEGEND
10' UTILITY EASEMENT.

COUNTY ENGINEER'S SIGNATURE

This PLAT is APPROVED FOR RECORD:
[signature]
COUNTY ENGINEER

Plat 14

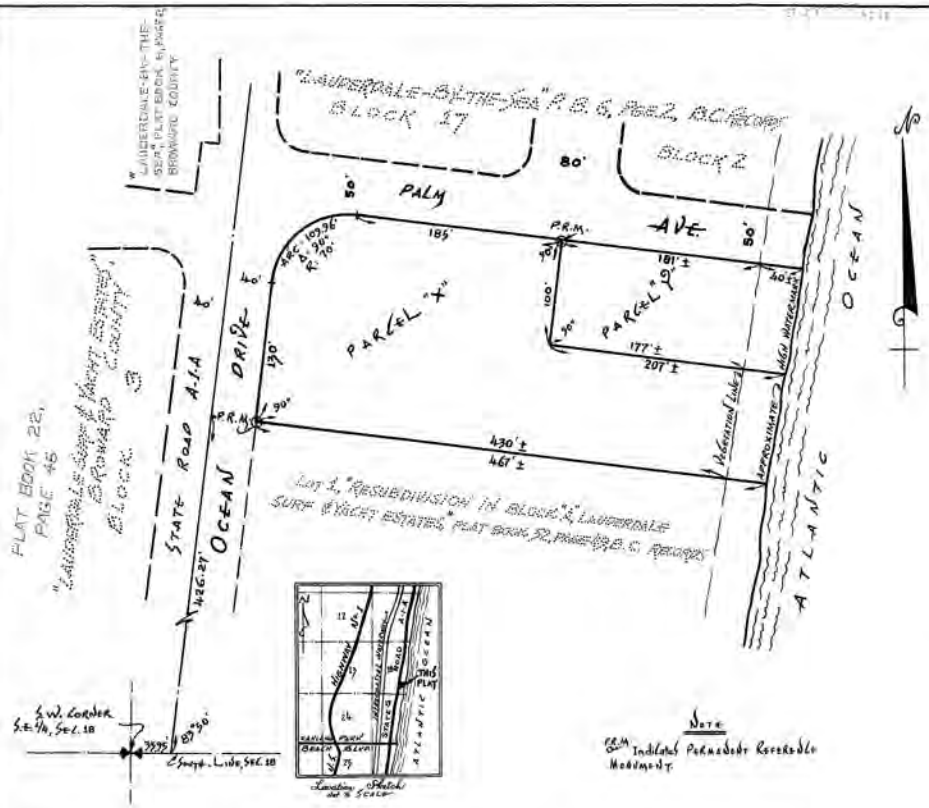
"BAINBRIDGE-CONDRA SUBDIVISION"

a Replat in PARCEL "A", "Lauderdale Surf & Yacht Estates" (22-46) and in BLOCK 1, "Lauderdale-by-the Sea", (6-2).

SECTION 18, TOWNSHIP 49 S., RANGE 43 E.
LAUDERDALE-BY-THE-SEA
Broward County, FLORIDA

SCALE IN FEET 0 10 20 30 40 50 75 100 150 — 1" = 50'
MAY 1962

McLaughlin Engineering Co.
100 N. 3rd Avenue
Fort Lauderdale, Florida



DESCRIPTION

North 200 feet of BLOCK 17, "LAUDERDALE SURF and YACHT ESTATES", according to the PLAT thereof RECORDED in PLAT BOOK 22, PAGE 46, of the PUBLIC RECORDS of BROWARD COUNTY, FLORIDA, and LOTS 10 and 11, BLOCK 1, "LAUDERDALE-BY-THE-SEA", according to the PLAT thereof RECORDED in PLAT BOOK 6, PAGE 2, of the PUBLIC RECORDS of BROWARD COUNTY, FLORIDA.

DEDICATION

STATE OF TENNESSEE
COUNTY OF DAVIDSON } ss

KNOW ALL MEN BY THESE PRESENTS: That BAINBRIDGE-CONDRA COMPANY INC., a FLORIDA Corporation, authorized to do Business in the STATE OF FLORIDA; OWNER of the land described and included in this PLAT, has caused said land to be subdivided in the manner shown. All THOROUGHFARES are DEDICATED to the perpetual use of the PUBLIC, in fee simple.

IN WITNESS WHEREOF: BAINBRIDGE-CONDRA COMPANY INC., has caused this DEDICATION to be signed in its name by its PRESIDENT and SECRETARY, and its CORPORATE SEAL affixed thereto this 31 day of MAY, 1962.

BAINBRIDGE-CONDRA COMPANY INC.

Witness: Philip Magliano — Robert McCondra, President (SEAL)

Witness: W. N. Brannon — Marshe C. Ross, Secretary (SEAL)

ACKNOWLEDGEMENT

STATE OF TENNESSEE
COUNTY OF DAVIDSON } ss

I HEREBY CERTIFY: That on this day personally appeared before me, an officer duly authorized to administer Oaths and take Acknowledgements, Robert McCondra and Marshe C. Ross, PRESIDENT and SECRETARY, of BAINBRIDGE-CONDRA COMPANY INC., and they acknowledged before me, that they executed the foregoing DEDICATION, as such OFFICERS of said CORPORATION, in the name of said CORPORATION.

WITNESS: My HAND and OFFICIAL SEAL at NASHVILLE, COUNTY of DAVIDSON, STATE of TENNESSEE this 31 day of MAY, 1962.

My Commission Expires: 2-15-66 — Frances Nally, Notary Public, State of Tennessee

DEDICATION

STATE OF FLORIDA
COUNTY OF BROWARD } ss

KNOW ALL MEN BY THESE PRESENTS: That LAUDERDALE SURF and YACHT ASSOCIATION, a Non-PROFIT CORPORATION, OWNER of the land described and included in this PLAT, has caused said land to be subdivided in the manner shown. All THOROUGHFARES are DEDICATED to the perpetual use of the PUBLIC, in fee simple.

IN WITNESS WHEREOF: LAUDERDALE SURF and YACHT ASSOCIATION, has caused this DEDICATION to be signed in its name by its PRESIDENT and TREASURER, and its ASSOCIATION SEAL to be affixed thereto this 4th day of JUNE, 1962.

LAUDERDALE SURF and YACHT ASSOCIATION

Witness: Walter E. Fitzpatrick — Roland G. Roberts, President (SEAL)

Witness: Jerry L. Baker — H. F. Stratton, Treasurer (SEAL)

ACKNOWLEDGEMENT

STATE OF FLORIDA
COUNTY OF BROWARD } ss

I HEREBY CERTIFY: That on this day personally appeared before me, an officer duly authorized to administer Oaths and take Acknowledgements, Roland G. Roberts and H. F. Stratton, PRESIDENT and TREASURER, of LAUDERDALE SURF and YACHT ASSOCIATION, and they acknowledged before me, that they executed the foregoing DEDICATION, as such OFFICERS of said ASSOCIATION.

WITNESS: My HAND and OFFICIAL SEAL at FORT LAUDERDALE, COUNTY of BROWARD, STATE of FLORIDA, this 4th day of JUNE, 1962.

My Commission Expires: JUNE 29, 1965 — Jerry L. Baker, Notary Public, State of Florida

TOWN PLANNING & ZONING BOARD

THIS IS TO CERTIFY: That the TOWN PLANNING and ZONING BOARD of the TOWN of LAUDERDALE-BY-THE-SEA, has approved and accepted this PLAT, by RESOLUTION, adopted this ____ day of ____, 1962.

Chairman

COUNTY ENGINEER'S SIGNATURE

This PLAT is APPROVED and ACCEPTED FOR RECORD:

S. R. Davis Jr.
COUNTY ENGINEER

TOWN COMMISSION

STATE OF FLORIDA
COUNTY OF BROWARD } ss

This is to CERTIFY: That this PLAT has been approved and accepted for RECORD by the TOWN COMMISSION of the TOWN of LAUDERDALE-BY-THE-SEA, FLORIDA by ORDINANCE No. 162, adopted by said TOWN COMMISSION on the 22nd day of JUNE, 1962.

IN WITNESS WHEREOF: The said TOWN COMMISSION has caused these PRESENTS to be attested by its CLERK and the CORPORATE SEAL of said TOWN, to be affixed thereto this 26th day of JUNE, 1962.

Juanita Pendelbury
Town Auditor and Clerk

CLERK OF CIRCUIT COURT CERTIFICATES

STATE OF FLORIDA
COUNTY OF BROWARD } ss

I HEREBY CERTIFY: That this PLAT complies with the provisions of an "ACT TO REGULATE THE MAKING OF SURVEYS AND FILING FOR RECORD OF MAPS and PLATS, IN THE STATE OF FLORIDA", approved by the GOVERNOR, June 11th 1925.

FRANK H. MARKS
Clerk of the Circuit Court

BY: Jack R. Wheeler
Deputy Clerk

This INSTRUMENT filed for RECORD, this 29th day of June, 1962, and RECORDED in BOOK 56, of PLATS, at PAGE 15, "RECORD VERIFIED".

FRANK H. MARKS
Clerk of the Circuit Court

BY: Marian Gibbons
Deputy Clerk

ENGINEER'S CERTIFICATE

STATE OF FLORIDA
COUNTY OF BROWARD } ss

WE, HEREBY CERTIFY: That this PLAT is a true and correct representation of a SURVEY made by US, and that PERMANENT REFERENCE MONUMENTS have been set as indicated. Dated at FORT LAUDERDALE, FLORIDA, this 22nd day of June, 1962.

McLaughlin Engineering Co.

BY: D. W. McLaughlin
Reg. Engr. No. 1713, Reg. Land Surveyor No. 167
STATE OF FLORIDA

Plat 15

Appendix 6.2
Areas of Concern

12-008

DATE: 12/17/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Jim Richards
Address Line 1:	259 Commercial Ste-3
Address Line 2:	
Phone:	954-621-7753

Issue:

standing water, not draining.

Action Requested:

Reported during rainstorm

No action needed

09-024

DATE: 9/25/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Andrea Hughes
Address Line 1:	1581 E. Terra Mar Dr.
Address Line 2:	LBTS 33062
Phone:	954-942-7488

Issue:

Water puddles, Drainage problem

Action Requested:

Awaiting Townwide stormwater survey

09-14

DATE: 8 Sep 09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	DORINDA CUOMO
Address Line 1:	26A S TRADEWINDS AVE
Address Line 2:	
Phone:	FAX 954-771-6320

Issue:

STANDING WATER IN FRONT OF RESIDENCE
SEE ATTACHED SURVEY

Action Requested:

RESEARCH & CORR... IF POSSIBLE.

AWAITING TOWNWIDE STORMWATER SURVEY

MUNICIPAL SERVICES

9. How did the following in your most recent contact with Town personnel?

A. Courteousness 1. Excellent 2. Good 3. Fair 4. Poor

B. Knowledge 1. Excellent 2. Good 3. Fair 4. Poor

C. Timely Response 1. Excellent 2. Good 3. Fair 4. Poor

10. Within the past year, if you have made contact with the following Town Departments, how satisfied were you with the service you received?

	Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	No Contact
Police	5	4	3	2	1
Fire	5	4	3	2	1
Fire Rescue	5	4	3	2	1
Code Enforcement	5	4	3	2	1
Building & Permitting	5	4	3	2	1
Municipal Services (Public Works)	5	4	3	2	1
Administration	5	4	3	2	1
Town Hall	5	4	3	2	1

11. What do you see as the biggest challenges facing Town of Lauderdale-By-The-Sea in the next five years? Maintaining it's Small town charm.

12. Do you support the current maximum height limit of 33'0" in Town?

1. Yes 2. No

14. Do you support a bond issue or pay as you go method for future capital improvement projects?

1. Bond Issue 2. Pay As You Go

Other: depends on improvement

15. What suggestions can you provide to the Town for improving the quality of life for its residents? Removing the standing water in front of my house after it rains. (no drainage) 264 S. Tradewinds Ave L-B-T-S

Thank you for taking the time to complete this survey. Please complete only one survey per household and return to Town Hall, 4501 Ocean Drive, fax to 954-776-1857, or simply mail completed survey to: Town of Lauderdale-By-The-Sea (SURVEY), 4501 North Ocean Drive, Lauderdale-By-Sea, Florida 33308-3610.

DO YOU WANT TOWN TOPICS MAILED? Yes ___ No ___ OR ON WEBSITE? Yes ___ No ___

COPY

CURRENT RESIDENT
264 S TRADEWINDS AVE
LAUDERDALE-BY-THE-SEA, FL 33308

Town of Lauderdale-By-The-Sea
4501 North Ocean Drive
Lauderdale-By-The-Sea, FL 33308

Standard
U.S. Postage Paid
Fort Lauderdale, FL
Permit No. 572

09-011

DATE: 9/14/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Chuck Maxwell
Address Line 1:	234 Commercial
Address Line 2:	
Phone:	954-938-0005

Issue:

Drain has been stopped up for months. Behind 234 COMM. In the back of Bldg Flooded

Action Requested:

Repair OR Clean Out Drain.

Awaiting townwide stormwater Survey

09-010

DATE: 9/10/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	PEGGY
Address Line 1:	ARUBA
Address Line 2:	
Phone:	954-803-9114

Issue:

Water in alley coming up to door at ARUBA.

Action Requested:

Spoke with Peggy. She is dis-satisfied. Drainage issue to be put on Agenda

TO: MS

09-005

DATE: 9-8-09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	E. & D. FOX
Address Line 1:	4620 Bougainvilla Dr.
Address Line 2:	
Phone:	

Issue:

Water tap tastes Bad.
Storm Drainage is terrible
↓
Drainage on street, it floods

Action Requested:

Drains cleaned by Tele Vac
~~[illegible]~~ Awaiting townwide stormwater survey

A. Courteousness 1. Excellent 2. Good 3. Fair 4. Poor

B. Knowledge 1. Excellent 2. Good 3. Fair 4. Poor

C. Timely Response 1. Excellent 2. Good 3. Fair 4. Poor

10. Within the past year, if you have made contact with the following Town Departments, how satisfied were you with the service you received?

	Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	No Contact
Police	5	4	3	2	1
Fire	5	4	3	2	1
Fire Rescue	5	4	3	2	1
Code Enforcement	5	4	3	2	1
Building & Permitting	5	4	3	2	1
Municipal Services (Public Works)	5	4	3	2	1
Administration	5	4	3	2	1
Town Hall	5	4	3	2	1

11. What do you see as the biggest challenges facing Town of Lauderdale-By-The-Sea in the next five years? WATER. TAP WATER TASTES BAD. STORM DRAINAGE IS TERRIBLE BEYOND BELIEF.

12. Do you support the current maximum height limit of 33'0" in Town?

1. Yes 2. No

14. Do you support a bond issue or pay as you go method for future capital improvement projects?

1. Bond Issue 2. Pay As You Go

Other: EITHER/OR BOTH.

15. What suggestions can you provide to the Town for improving the quality of life for its residents? PROHIBATE PIT BULL DOGS. CHANGE THE LAW SO THEY CANNOT BE IN THIS TOWN.

Thank you for taking the time to complete this survey. Please complete only one survey per household and return to Town Hall, 4501 Ocean Drive, fax to 954-776-1857, or simply mail completed survey to: Town of Lauderdale-By-The-Sea (SURVEY), 4501 North Ocean Drive, Lauderdale-By-Sea, Florida 33308-3610.

DO YOU WANT TOWN TOPICS MAIL EDITION OR ON WEBSITE? Yes No Yes No

EUPHEMIA FOX
DAVID FOX
4620 BOUGAINVILLA DR
LAUDERDALE BY THE SEA, FL 33308

E.+D. Fox
~~CURRENT RESIDENT~~
4620 BOUGAINVILLA DR
APT 1
LAUDERDALE-BY-THE-SEA, FL 33308

Town of Lauderdale-By-The-Sea
4501 North Ocean Drive
Lauderdale-By-The-Sea, FL 33308

Standard
U.S. Postage Paid
Fort Lauderdale, FL
Permit No. 572

09-004

DATE: 9/4/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Demarco
Address Line 1:	
Address Line 2:	4421 E Tradewinds
Phone:	954-491-6910

Issue:

Flooding on Street

Action Requested:

Check Drains and spoke with resident

9/4/09

To: Don Prince

08-017

DATE: 8/28/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	C. R. Saathoff
Address Line 1:	c/o: Commisioner Clottey
Address Line 2:	1900 SE 19th Street
Phone:	

Issue:

Drainage Problems in LBTS; Particularly in the area at the lower end of 19th Street and 19th Avenue

Action Requested:

Please resolve drainage problems.

Awaiting Townwide Stormwater Survey

Drains cleaned by Tek Vac

Marta Isla

From: Birute Ann Clottey **Sent:** Wed 8/19/2009 8:22 PM
To: Marta Isla
Cc: SAATHOFFCR@aol.com
Subject: Fw: DRAINAGE PROBLEMS TO CONSIDER
Attachments:

Marta,

Please pass this e-mail on to Jeff Bowman and Esther Colon.

Thanks,

Birute Ann Clottey

Sent from my Verizon Wireless BlackBerry

From: SAATHOFFCR@aol.com
Date: Mon, 17 Aug 2009 20:13:54 EDT
To: <RoseannMinnet@lauderdalebythesea-fl.gov>; <JMCINTEE@aol.com>; <Stuartdodd@lauderdalebythesea-fl.gov>; <Biruteannclottey@lauderdalebythesea-fl.gov>; <Jimsilverstone@lauderdalebythesea-fl.gov>
Subject: DRAINAGE PROBLEMS TO CONSIDER

At the last commission meeting there was a discussion regarding drainage problems in LBTS. The neighborhood at the lower end of 19th Street and 19th Avenue has water standing well over a foot deep in the crown of the street when heavy rains combine with a high tide. Water has been up to or into our garage several times. The street becomes impassable to most automobiles and those not knowing the depth of the water drown out and block the street. The water standing problem begins at about 2031 SE 19th Street and stretches to 1941 19th Avenue.

There were several times that we needed a "no wake" zone signs when Waste Management or other large SUV's or small trucks came through.

I am concerned that the standing water could seep into the sewer system and cause a backup of waste into our home. The contractor doing the installation of the sewer lines said that the man covers were sealed and would not allow water to enter the system. I'm not totally convinced!

When setting your priorities – this end of LBTS needs to be included. We need a SOLUTION to this problem!

C.R. Saathoff
1900 SE 19th Street

D8-012

DATE: 8/19/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Guy
Address Line 1:	Aruba
Address Line 2:	1 E. Commercial
Phone:	9/776-0001

Issue:

Drainage in alleyway is backing up water too much. About to enter restaurant.

Action Requested:

Please fix

Tele vac cleaned drains and sucked up water 8/19/09

08-010

DATE: 8/17/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Thomas Slayton
Address Line 1:	4457 Poinciana St.
Address Line 2:	
Phone:	954-304-1482

Issue:

clogged storm Drain located in front of Breakaway Inn in front of swale

Action Requested:

Drain clean by Tele Vac

08-005

~~08-002~~

DATE: 8-10-09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Sea Foam Apts. & Village Grill
Address Line 1:	El Mar Drive
Address Line 2:	4408 & 4406 El Mar Drive
Phone:	954-776-1121

Issue:

Huge amount of flooding on El Mar in front of these 2 properties. Mainly in front of the alley running toward the ocean. This is a very "busy" area with delivery trucks & hand-truck delivery.

Action Requested:

Consider a storm water project or some type of relief.

MUNICIPAL SERVICES

12-008

DATE: 12/17/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Jim Richards
Address Line 1:	259 Commercial Ste-3
Address Line 2:	
Phone:	954-621-7753

Issue:

standing water, not draining.

Action Requested:

Reported during rainstorm

No action needed

09-024

DATE: 9/25/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Andrea Hughes
Address Line 1:	1581 E. Terra Mar Dr.
Address Line 2:	LBTS 33062
Phone:	954-942-7488

Issue:

Water puddles, Drainage problem

Action Requested:

Awaiting Townwide stormwater survey

09-14

DATE: 8 Sep 09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	DORINDA CUOMO
Address Line 1:	26A S TRADEWINDS AVE
Address Line 2:	
Phone:	FAX 954-771-6320

Issue:

STANDING WATER IN FRONT OF RESIDENCE
SEE ATTACHED SURVEY

Action Requested:

RESEARCH & CORR... IF POSSIBLE.

AWAITING TOWNWIDE STORMWATER SURVEY

MUNICIPAL SERVICES

9. How did the following in your most recent contact with Town personnel?

A. Courteousness 1. Excellent 2. Good 3. Fair 4. Poor

B. Knowledge 1. Excellent 2. Good 3. Fair 4. Poor

C. Timely Response 1. Excellent 2. Good 3. Fair 4. Poor

10. Within the past year, if you have made contact with the following Town Departments, how satisfied were you with the service you received?

	Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	No Contact
Police	5	4	3	2	1
Fire	5	4	3	2	1
Fire Rescue	5	4	3	2	1
Code Enforcement	5	4	3	2	1
Building & Permitting	5	4	3	2	1
Municipal Services (Public Works)	5	4	3	2	1
Administration	5	4	3	2	1
Town Hall	5	4	3	2	1

11. What do you see as the biggest challenges facing Town of Lauderdale-By-The-Sea in the next five years? Maintaining it's Small town charm.

12. Do you support the current maximum height limit of 33'0" in Town?

1. Yes 2. No

14. Do you support a bond issue or pay as you go method for future capital improvement projects?

1. Bond Issue 2. Pay As You Go

Other: depends on improvement

15. What suggestions can you provide to the Town for improving the quality of life for its residents? Removing the standing water in front of my house after it rains. (no drainage) 264 S. Tradewinds Ave L-B-T-S

Thank you for taking the time to complete this survey. Please complete only one survey per household and return to Town Hall, 4501 Ocean Drive, fax to 954-776-1857, or simply mail completed survey to: Town of Lauderdale-By-The-Sea (SURVEY), 4501 North Ocean Drive, Lauderdale-By-Sea, Florida 33308-3610.

DO YOU WANT TOWN TOPICS MAILED? Yes ___ No ___ OR ON WEBSITE? Yes ___ No ___

COPY

CURRENT RESIDENT
264 S TRADEWINDS AVE
LAUDERDALE-BY-THE-SEA, FL 33308

Town of Lauderdale-By-The-Sea
4501 North Ocean Drive
Lauderdale-By-The-Sea, FL 33308

Standard
U.S. Postage Paid
Fort Lauderdale, FL
Permit No. 572

09-011

DATE: 9/14/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Chuck Maxwell
Address Line 1:	234 Commercial
Address Line 2:	
Phone:	954-938-0005

Issue:

Drain has been stopped up for months. Behind 234 COMM. In the back of Bldg Flooded

Action Requested:

Repair OR Clean Out Drain.

Awaiting townwide stormwater Survey

09-010

DATE: 9/10/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	PEGGY
Address Line 1:	ARUBA
Address Line 2:	
Phone:	954-803-9114

Issue:

Water in alley coming up to door at ARUBA.

Action Requested:

Spoke with Peggy. She is dis-satisfied. Drainage issue to be put on Agenda

TO: MS

09-005

DATE: 9-8-09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	E. & D. FOX
Address Line 1:	4620 Bougainvilla Dr.
Address Line 2:	
Phone:	

Issue:

Water tap tastes Bad.
Storm Drainage is terrible
↓
Drainage on street, it floods

Action Requested:

Drains cleaned by Tele Vac
~~[illegible]~~ Awaiting townwide stormwater survey

A. Courteousness 1. Excellent 2. Good 3. Fair 4. Poor

B. Knowledge 1. Excellent 2. Good 3. Fair 4. Poor

C. Timely Response 1. Excellent 2. Good 3. Fair 4. Poor

10. Within the past year, if you have made contact with the following Town Departments, how satisfied were you with the service you received?

	Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	No Contact
Police	5	4	3	2	1
Fire	5	4	3	2	1
Fire Rescue	5	4	3	2	1
Code Enforcement	5	4	3	2	1
Building & Permitting	5	4	3	2	1
Municipal Services (Public Works)	5	4	3	2	1
Administration	5	4	3	2	1
Town Hall	5	4	3	2	1

11. What do you see as the biggest challenges facing Town of Lauderdale-By-The-Sea in the next five years? WATER. TAP WATER TASTES BAD. STORM DRAINAGE IS TERRIBLE BEYOND BELIEF.

12. Do you support the current maximum height limit of 33'0" in Town?

1. Yes 2. No

14. Do you support a bond issue or pay as you go method for future capital improvement projects?

1. Bond Issue 2. Pay As You Go

Other: EITHER/OR BOTH.

15. What suggestions can you provide to the Town for improving the quality of life for its residents? PROHIBATE PIT BULL DOGS. CHANGE THE LAW SO THEY CANNOT BE IN THIS TOWN.

Thank you for taking the time to complete this survey. Please complete only one survey per household and return to Town Hall, 4501 Ocean Drive, fax to 954-776-1857, or simply mail completed survey to: Town of Lauderdale-By-The-Sea (SURVEY), 4501 North Ocean Drive, Lauderdale-By-Sea, Florida 33308-3610.

DO YOU WANT TOWN TOPICS MAIL EDITION OR ON WEBSITE? Yes No Yes No

EUPHEMIA FOX
DAVID FOX
4620 BOUGAINVILLA DR
LAUDERDALE BY THE SEA, FL 33308

E.+D. Fox
~~CURRENT RESIDENT~~
4620 BOUGAINVILLA DR
APT 1
LAUDERDALE-BY-THE-SEA, FL 33308

Town of Lauderdale-By-The-Sea
4501 North Ocean Drive
Lauderdale-By-The-Sea, FL 33308

Standard
U.S. Postage Paid
Fort Lauderdale, FL
Permit No. 572

09-004

DATE: 9/4/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Demarco
Address Line 1:	
Address Line 2:	4421 E Tradewinds
Phone:	954-491-6910

Issue:

Flooding on Street

Action Requested:

Check Drains and spoke with resident

9/4/09

To: Don Prince

08-017

DATE: 8/28/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	C. R. Saathoff
Address Line 1:	c/o: Commisioner Clottey
Address Line 2:	1900 SE 19th Street
Phone:	

Issue:

Drainage Problems in LBTS; Particularly in the area at the lower end of 19th Street and 19th Avenue

Action Requested:

Please resolve drainage problems.

Awaiting Townwide Stormwater Survey

Drains cleaned by Tek Vac

Marta Isla

From: Birute Ann Clottey **Sent:** Wed 8/19/2009 8:22 PM
To: Marta Isla
Cc: SAATHOFFCR@aol.com
Subject: Fw: DRAINAGE PROBLEMS TO CONSIDER
Attachments:

Marta,

Please pass this e-mail on to Jeff Bowman and Esther Colon.

Thanks,

Birute Ann Clottey

Sent from my Verizon Wireless BlackBerry

From: SAATHOFFCR@aol.com
Date: Mon, 17 Aug 2009 20:13:54 EDT
To: <RoseannMinnet@lauderdalebythesea-fl.gov>; <JMCINTEE@aol.com>; <Stuartdodd@lauderdalebythesea-fl.gov>; <Biruteannclottey@lauderdalebythesea-fl.gov>; <Jimsilverstone@lauderdalebythesea-fl.gov>
Subject: DRAINAGE PROBLEMS TO CONSIDER

At the last commission meeting there was a discussion regarding drainage problems in LBTS. The neighborhood at the lower end of 19th Street and 19th Avenue has water standing well over a foot deep in the crown of the street when heavy rains combine with a high tide. Water has been up to or into our garage several times. The street becomes impassable to most automobiles and those not knowing the depth of the water drown out and block the street. The water standing problem begins at about 2031 SE 19th Street and stretches to 1941 19th Avenue.

There were several times that we needed a "no wake" zone signs when Waste Management or other large SUV's or small trucks came through.

I am concerned that the standing water could seep into the sewer system and cause a backup of waste into our home. The contractor doing the installation of the sewer lines said that the man covers were sealed and would not allow water to enter the system. I'm not totally convinced!

When setting your priorities – this end of LBTS needs to be included. We need a SOLUTION to this problem!

C.R. Saathoff
1900 SE 19th Street

D8-012

DATE: 8/19/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Guy
Address Line 1:	Aruba
Address Line 2:	1 E. Commercial
Phone:	9/776-0001

Issue:

Drainage in alleyway is backing up water too much. About to enter restaurant.

Action Requested:

Please fix

Tele vac cleaned drains and sucked up water 8/19/09

08-010

DATE: 8/17/09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Thomas Slayton
Address Line 1:	4457 Poinciana St.
Address Line 2:	
Phone:	954-304-1482

Issue:

clogged storm Drain located in front of Breakaway Inn in front of swale

Action Requested:

Drain clean by Tele Vac

08-005

~~08-002~~

DATE: 8-10-09

TOWN OF LAUDERDALE-BY-THE-SEA
4501 Ocean Drive
Lauderdale-By-The-Sea, FL 33308-3601
Phone: 954-776-0576 Fax: 954-776-0578

CITIZEN CONTACT CENTER FORM

Citizen Name:	Sea Foam Apts. & Village Grill
Address Line 1:	El Mar Drive
Address Line 2:	4408 & 4406 El Mar Drive
Phone:	954-776-1121

Issue:

Huge amount of flooding on El Mar in front of these 2 properties. Mainly in front of the alley running toward the ocean. This is a very "busy" area with delivery trucks & hand-truck delivery.

Action Requested:

Consider a storm water project or some type of relief.

MUNICIPAL SERVICES

Appendix 6.3
Outfall Inventory

CHEN&ASSOCIATES
Civil and Environmental Engineers

Appendix 6.3:
Outfall Inventory

Date: 12/30/2009
Time: 11:00 AM

Legend: IE-WL = Distance from pipe invert to water level
(will be negative if water level is above pipe invert)
RIM-TOP = Distance from top of pipe to top of headwall

Outfall #	Diameter (in)	Material	IE-WL	RIM-TOP	Notes
1	10	CMP	?	?	
2	12	RCP	1'	2'	Approximately 50% of pipe obstructed by barnacles
3	24	HDPE	?	?	
4	8	PVC	1'	2'	Approximately 50% of pipe obstructed by barnacles
5	15	HDPE	0	3'	
6	10	CMP	3'	2'	
7	15	?	2'	2'	
8	10	DIP	2'	2'	
9	10	RCP	1.5'	1'	Good condition
10	12	RCP	1.5'	1'	Good condition
11	15	CMP	2.5'	1.5'	Pipe sticks out about 3' from headwall, it is angled upwards
12	15	CMP	4'	0.5'	
13	8	PVC	4'	1'	Private outfall
14	15	CMP	0	4'	
15	8	CMP	1'	2'	
16	8	HDPE	1'	2'	Good condition
17	8	HDPE	?	?	Private outfall
18	18	RCP	2'	1'	Needs to be cleaned
19	15	CMP	2'	3'	
20	30	RCP	(-)7"	24"	Water discharge is heavily polluted with debris, outfall has heavy barnacle growth
21	6	PVC	2'	3'	
22	12	DIP	0	4'	Approximately 80% of pipe is blocked by barnacles
23	10	DIP	6"	3'	Pipe is lined
24	10	DIP	6"	3'	Pipe is lined
25	24	HDPE	4"	4'	Barnacles obstructing approximately 10% of pipe, pipe is HDPE on the outside (cracked) and lined with metal pipe.
26	10	RCP	1.5'	2'	Needs to be cleaned
27	10	PVC	2.5'	1.5'	Looks to be fairly new, water discharging from this outfall is heavily polluted with debris
28	8	PVC	?	?	Good condition, invert is above water level
29	10	RCP	1'	3'	Heavy barnacle growth
30	8	PVC	1'	4'	Heavy barnacle growth, needs to be cleaned
31	24	RCP	6"	2'	
32	15	RCP	1.5'	2'	Clean, good condition
33	15	RCP	1.5'	2'	Clean, good condition

Appendix 6.3:
Outfall Inventory

Outfall #	Diameter (in)	Material	IE-WL	RIM-TOP	Notes
34	15	RCP	2"	3'	Heavy barnacle growth
35	15	RCP	2"	3'	Clean, good condition
36	15	RCP	2"	3'	Heavy barnacle growth, 4" PVC yard drain right next to it
37	15	RCP	(-)6"	42"	Barnacle growth, small sinkhole over pipe
38	15	RCP	(-)8"	36"	Sinkhole over pipe, sleeved with PVC, cleaned by Tele-Vac around 12 years ago, still needs repairs, has heavy barnacle growth.
39	8	PVC	12"	3'	Approximately 25% of pipe is blocked by barnacles
40	12	CMP			Not accessible, blocked by boats
41	12	PVC or CMP	24"	12"	Polluted water (with sediments) is discharging into intracoastal.
42	10	PVC	12"	28"	
43	8	PVC	apprx. 2'	24"	Appears relatively new, good condition, some barnacle growth
44	12	PVC	3'	?	
45	12	PVC	3'	?	
46	12	DIP	apprx. 2.5'	12"	Approximately 25% of pipe is filled with concrete
47					Not accessible, blocked by boats
48	12	PVC	3'	?	
49	12	RCP	2'	22"	New and clean, good condition
50	12	CMP	2'	22"	Old, but in fair condition
51	18	CMP	(-)1'	3'	Approximately 75% of pipe blocked by barnacle growth
52	8	?	3'	20"	Has been cleaned and grouted by TeleVac in the past

Appendix 6.4
Pipe Television Reports

Appendix 6.4: Pipe Condition

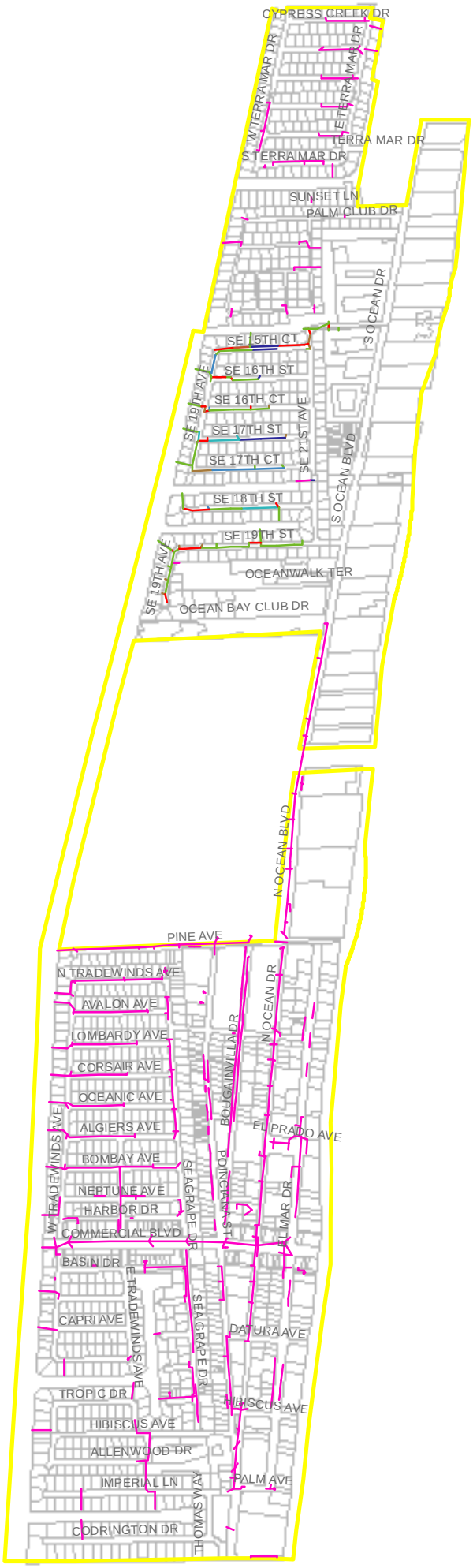
Legend

Drainage_Pipe Condition

- Unknown
- Good Condition
- Abandoned
- Collapsed
- Cracked
- Hole
- Obstructed
- Plugged
- Roots
- Sag
- Tapped
- Town Boundary
- Parcels

Ü

0 395 790 1,580 2,370 3,160 Feet



CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

TELESPECTION DAILY REPORT

DATE: 12/14/09 OPERATOR: Billy

LIFTSTATION # Drainage ~~TAPE #~~ DVD# 1-118

ADDRESS	MH #	TO	MH #	FOOTAGE	INFIL G.P.D.	INFLOW G.P.D.	CRACKS	DIG-UPS
2036 SE 16 Ct	73	→	72	12				
2036 " "	73	→	75	162				
2012 " "	75	→	74	25				
2012 " "	75	→	76	149				
1972 " "	76	→	81	197				
1930 " "	81	→	79	29				
1930 " "	81	→	80	49				
1930 " "	80	→	78	45				
1937 SE 19th Ave	78	→	77	22				
1635 " "	77	→	OUTFALL 6	106				
2012 SE 15th CT	58	→	56	217				
2012 SE 15th Ct	58	→	61	286				
TOTALS								

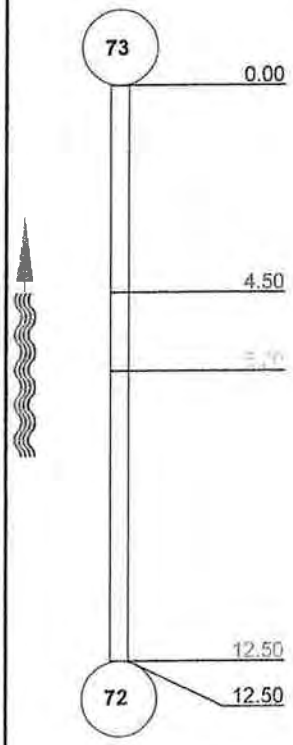
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		5
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2036 SE 16TH CT	Use of Sewer		Upstream MH	73
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	72
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	12.50 ft	Section Length	12.50 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:50 Position	Observation	Photo	Grade
0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
4.50	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES		S 2
5.70	Crack Multiple, Begin 7 to 12 o'clock, within 8 inches of joint: YES		S 2
12.50	Collapse Pipe Sewer, 70 %. REMARK: PIPE CRUSHED		S 5
12.50	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5131	0000	10	0	10	3.33	0	3.33

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			**Billy**		**6**
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				**Jetting**	

Street123	**2036 SE 16TH CT**	Use of Sewer		Upstream MH	**73**
City	**LAUDERDALE BY THE SEA**	Drainage Area		Dowstream MH	**75**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**159.60 ft**	Section Length	**162.00 ft**

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	**18 inch**
Year Rehabilitated		Material	**Plastic/Steel Composite**
Tape / Media No.	**1-118**	Lining Method	

Add. Information :

1:400	Position	Observation	Photo	Grade
73	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
75	159.60	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		7
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2012 SE 16TH CT	Use of Sewer		Upstream MH	75
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	74
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	22.90 ft	Section Length	25.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:75	Position	Observation	Photo	Grade
75	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	4.30	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES		S 2
	8.90	Water Level, Sag in pipe, 30 %of cross sectional area, REMARK: SEVERE SAG		M 2
	12.60	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES		S 2
	22.90	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
74				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	2100	4	2	6	2	2	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		8
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2012 SE 16TH CT	Use of Sewer		Upstream MH	75
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	76
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	147.10 ft	Section Length	149.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:375	Position	Observation	Photo	Grade
75	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
76	147.10	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		9
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1972 SE 16TH CT	Use of Sewer		Upstream MH	76
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	81
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	195.80 ft	Section Length	197.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:475	Position	Observation	Photo	Grade
76	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
81	195.80	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		10
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1930 SE 16TH CT	Use of Sewer		Upstream MH	81
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	79
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	27.70 ft	Section Length	29.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:75	Position	Observation	Photo	Grade
81	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	3.00	[illegible]		[illegible]
	11.70	Water Level, Sag in pipe, 70 %of cross sectional area, REMARK: SEVERE SAG STARTS		M 4
	22.50	Water Level, Sag in pipe. 70 %of cross sectional area. REMARK: SAG STOPS		M 4
79	27.70	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3100	4200	3	8	11	3	4	3.67

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		11
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1930 SE 16TH CT	Use of Sewer		Upstream MH	81
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	80
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	47.50 ft	Section Length	49.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:125	Position	Observation	Photo	Grade
81	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	47.50	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
80				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3100	0000	3	0	3	3	0	3

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		12
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1930 SE 16TH CT	Use of Sewer		Upstream MH	80
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	78
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	41.40 ft	Section Length	45.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:125 Position	Observation	Photo	Grade
80			
1.40	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
14.50	Collapse Pipe Sewer, 60 %, REMARK: CRUSHED PIPE		S 5
25.10	Water Level, Sag in pipe, 30 %of cross sectional area, REMARK: SAG STARTS		M 2
42.80	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
78			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	2100	5	2	7	5	2	3.5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			**Billy**		**13**
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				**Jetting**	

Street123	**1937 SE 19TH AVE**	Use of Sewer		Upstream MH	**77**
City	**LAUDERDALE BY THE SEA**	Drainage Area		Dowstream MH	**78**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**19.10 ft**	Section Length	**22.00 ft**

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	**15 inch**
Year Rehabilitated		Material	**Plastic/Steel Composite**
Tape / Media No.	**1-118**	Lining Method	

Add. Information :

1:50	Position	Observation	Photo	Grade
77	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	7.20	Crack Longitudinal, at 09 o'clock, within 8 inches of joint: YES		S 2
	18.00	Crack Spiral, from 09 to 03 o'clock, within 8 inches of joint: YES		S 2
	19.10	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

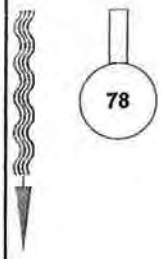
City : LAUDERDALE BY THE SEA

CDLAB LTD
Irisweg 12
City : 3280 Murten
Tel: +41 26 672 37 37
Fax: +41 26 672 37 38
Email:

Inspection Report / Inspection: 1

Date :	Job number :	Weather :	Operator : **Billy**	Counter : **13**	Section name :
Present :	Vehicle :	Camera :	Preset :	Cleaned : **Jetting**	Rate :

1:50	Position	Observation	Photo	Rate



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	0000	4	0	4	2	0	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		14
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1635 SE 19TH AVE	Use of Sewer		Upstream MH	77
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	OUTFALL 6
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	106.80 ft	Section Length	106.80 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	15 inch
Year Rehabilitated		Material	Not Known
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:275	Position	Observation	Photo	Grade
77	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
OUTFALL 6	106.80	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		15
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2012 SE15TH CT	Use of Sewer		Upstream MH	58
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	56
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	215.10 ft	Section Length	217.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:525	Position	Observation	Photo	Grade
58	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	60.90	Roots Fine Joint, at 10 o'clock, within 8 inches of joint: YES	M 2	
56	215.10	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	2100	0	2	2	0	2	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/14/2009			Billy		16
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2012 SE 15TH CT	Use of Sewer		Upstream MH	58
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	61
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	284.10 ft	Section Length	286.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:700	Position	Observation	Photo	Grade
58	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
61	284.10	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

TELESPECTION DAILY REPORT

DATE: 12/15/09 OPERATOR: Billy

LIFTSTATION # Drainage [redacted] DVD# 1-118

DDRESS	MH #	TO	MH #	FOOTAGE	INFIL G.P.D.	INFLOW G.P.D.	CRACKS	DIG-UPS
1572 SE 15th Ct	61	→	62	38				
1572 SE 15th Ct	62	→	64	162				
2012 SE 16th St	71	→	70	33				
" "	71	→	69	223				
1960 SE 16th St	69	→	68	25				
1961 " "	68	→	67	51				
" "	67	→	65	X				
1584 SE 19th Ave	65	→	66	X				
"	65	→	63	X				
1585 SE 19th Ave	63	→	64	X				
"	63	→	outfall 5	X				
TALS 532								

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/15/2009			BILLY		1
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1572 SE 15TH CT	Use of Sewer		Upstream MH	61
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	62
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	36.30 ft	Section Length	38.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:100	Position	Observation	Photo	Grade
61	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
62	36.30	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/15/2009			BILLY		2
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1572 SE 15TH CT	Use of Sewer		Upstream MH	62
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	64
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	160.10 ft	Section Length	162.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	15 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:400	Position	Observation	Photo	Grade
62	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	40.10	Water Level, Sag in pipe, 20 %of cross sectional area, REMARK: SAG IN PIPE	M 1	
	59.80	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STOPS	M 2	
64	160.10	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	3121	0	5	5	0	2.5	2.5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/15/2009			BILLY		4
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2012 SE 16TH ST	Use of Sewer		Upstream MH	71
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	69
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	221.30 ft	Section Length	223.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:550 Position	Observation	Photo	Grade
71 0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
52.90	Roots Fine Joint, at 12 o'clock, within 8 inches of joint: YES	M 2	
153.70	Roots Fine Joint, at 12 o'clock, within 8 inches of joint: YES	M 2	
221.30 69	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	2200	0	4	4	0	2	2

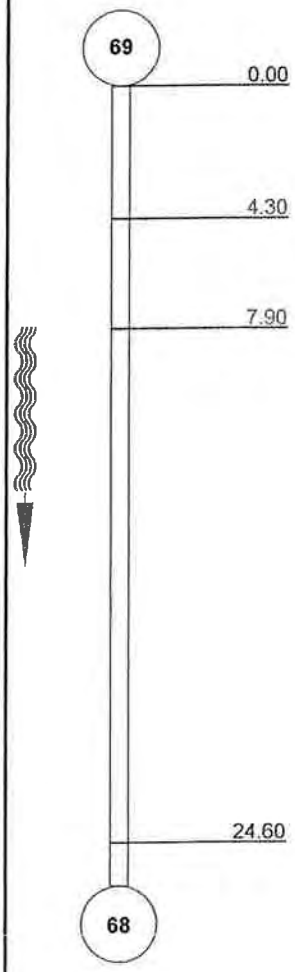
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/15/2009			BILLY		5
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1960 SE 16TH ST	Use of Sewer		Upstream MH	69
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	68
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	24.60 ft	Section Length	26.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:75 Position	Observation	Photo	Grade
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
4.30	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES		S 2
7.90	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES		S 2
24.60	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	0000	4	0	4	2	0	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/15/2009			BILLY		6
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1961 SE 16TH ST	Use of Sewer		Upstream MH	68
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	67
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	49.00 ft	Section Length	51.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:125	Position	Observation	Photo	Grade
68	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	49.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
67				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

TELESPECTION DAILY REPORT

DATE: 12/31/09 OPERATOR: Billy

LIFTSTATION # None DVD# 1-115

DRESS	MH #	TO	MH #	FOOTAGE	INFIL G.P.D.	INFLOW G.P.D.	CRACKS	DIG-UPS
2048 SW 17th St	92	→	91	11				
2048 " "	92	→	90	204				
1972 " "	89	→	90	183				
	89	→	88	22				
1936 SW 17th St	87	→	89	270				
936 SW 17th St	87	→	86	28				
1717 SW 17th St	85	→	87	74				
"	85	→	83	75				
TALS 877								

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/15/2009			BILLY		7
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2048 SW 17TH ST	Use of Sewer		Upstream MH	92
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	91
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	11.60 ft	Section Length	11.60 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:50	Position	Observation	Photo	Grade
92	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	11.60	Collapse Pipe Sewer 75 %, REMARK: CRUSHED PIPE	S 5	
91	11.60	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	0000	5	0	5	5	0	5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/31/2009			BILLY		8
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2048 SW 17TH ST	Use of Sewer		Upstream MH	92
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	90
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	202.10 ft	Section Length	204.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 Inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:500	Position	Observation	Photo	Grade
92	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	121.30	Roots Fine Joint, at 09 o'clock, within 8 inches of joint: YES	M 2	
	139.10	Camera Underwater, REMARK: DUE TO SAG 132'-139'	M 4	
	[illegible]	[illegible] REMARK: SAG IN LINE	[illegible]	
90	202.10	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	4131	0	9	9	0	3	3

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/31/2009			BILLY		9
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1972 SW 17TH ST	Use of Sewer		Upstream MH	89
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	90
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	191.20 ft	Section Length	193.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:475 Position	Observation	Photo	Grade
89			
0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
5.10	Roots Fine Joint, from 03 to 09 o'clock, within 8 inches of joint: YES		M 2
86.30	Roots Fine Joint, at 12 o'clock, within 8 inches of joint: YES		M 2
90.10	Roots Fine Joint, at 02 o'clock, within 8 inches of joint: YES		M 2
191.20	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
90			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	2300	0	6	6	0	2	2

Inspection Report / Inspection: 1

Date	P/O. No	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/31/2009			BILLY		10
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1972 SW 17TH ST	Use of Sewer		Upstream MH	89
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	88
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	21.60 ft	Section Length	23.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:75	Position	Observation	Photo	Grade
89	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	5.50	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES		S 2
	[illegible]	[illegible]		[illegible]
	19.60	Infiltration Gusher, at 08 o'clock, within 8 inches of joint: YES, REMARK: HOLE IN PIPE		M 5
	21.60	Upstream Manhole, Survey Ends, REMARK: CONCRETE IN PIPE		
88				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3121	5100	5	5	10	2.5	5	3.33

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/31/2009			BILLY		11
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1936 SW 17TH ST	Use of Sewer		Upstream MH	87
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	89
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	267.90 ft	Section Length	270.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:650	Position	Observation	Photo	Grade
87	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	81.80	Infiltration Gusher, at 06 o'clock, within 8 inches of joint: YES	M 5	
89	267.90	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	5100	0	5	5	0	5	5

Inspection Report / Inspection: 1

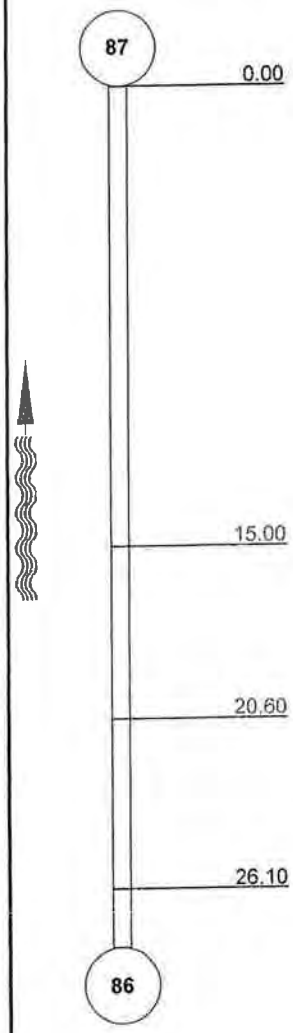
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/31/2009			BILLY		12
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1936 SW 17TH ST	Use of Sewer		Upstream MH	87
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	86
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	26.10 ft	Section Length	28.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	15 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:75 Position	Observation	Photo	Grade
0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
15.00	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES		S 2
20.60	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES		S 2
26.10	Upstream Manhole, Survey Ends, REMARK: END OF LINE		



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	0000	4	0	4	2	0	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
12/31/2009			BILLY		14
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1712 SW 17TH ST	Use of Sewer		Upstream MH	85
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	83
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	73.50 ft	Section Length	75.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:200 Position	Observation	Photo	Grade
85			
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
12.50	Water Level, Sag in pipe, 55 %of cross sectional area, REMARK: SAG STARTS	M 4	
19.70	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STOPS	M 2	
73.50	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
83			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	4121	0	6	6	0	3	3

TELESPECTION DAILY REPORT

DATE: 11/04/2010 OPERATOR: Billy

LIFTSTATION # Drainage DVD# 1-118

DRESS	MH #	TO	MH #	FOOTAGE	INFIL G.P.D.	INFLOW G.P.D.	CRACKS	DIG-UPS
2040 SE 18th st	105	→	103	35	1000 gpd	—	yes	Seal
2040 SE 18th st	105	→	104	35	500 gpd	—	—	Seal
2030 SE 18th st	104	→	106	278	500 gpd	—	yes	Seal
1960 SE 18th st	107	→	106	93	—	—	—	—
1960 SE 18th st	107	→	109	~~184~~ 181	—	—	—	—
1936 SE 18th st	109	→	108	32	—	—	yes	—
1936 SE 18th st	109	→	110	152	—	—	yes	—
1900 SE 18th st	111	→	110	76	—	—	yes	—
1900 SE 18th st	111	→	OUTFALL 10	120	—	—	—	— #1000
2048 SE 17th ct	94	→	93	15	—	—	—	—
2048 SE 17th ct	94	→	96	252	—	—	—	—
2048 SE 17th ct	93	→	94	2.50	—	—	—	—
1998 SE 17th ct	96	→	95	12	—	—	—	—
1998 SE 17th ct	96	→	97	370	—	—	—	—
912 SE 17th ct	97	→	100	168	—	—	yes	—
TALS 1821.5								

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		1
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2040 SE 18TH ST	Use of Sewer		Upstream MH	103
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	105
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	32.10 ft	Section Length	35.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:100	Position	Observation	Photo	Grade
103	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	13.80	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: INFILTRATION		S 2
	16.30	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: INFILTRATION		S 2
	30.60	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STOPS		M 2
	32.10	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
105				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	3121	4	5	9	2	2.5	2.25

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		2
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2040 SE 18TH ST	Use of Sewer		Upstream MH	105
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	104
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	33.20 ft	Section Length	35.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Other PVC
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:100	Position	Observation	Photo	Grade
105	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	13.70	Infiltration Gusher at 08 o'clock, within 8 inches of joint: YES	M 5	
	33.20	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
104				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	5100	0	5	5	0	5	5

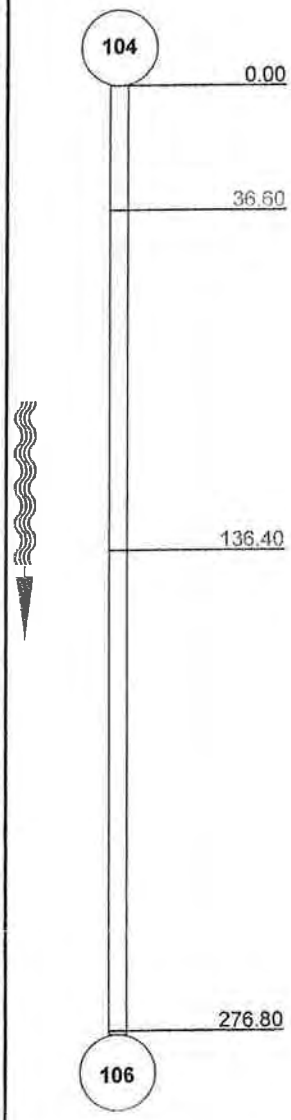
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		3
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2030 SE 18TH ST	Use of Sewer		Upstream MH	104
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	106
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	276.80 ft	Section Length	278.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia /Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:675 Position	Observation	Photo	Grade
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
36.60	Infiltration Runner, at 04 o'clock, within 8 inches of joint: YES, REMARK: APPROX 500 GPD	M 4	
136.40	Crack Longitudinal, at 03 o'clock, within 8 inches of joint: NO	S 2	
276.80	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	4100	2	4	6	2	4	3

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		4
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1960 SE 18TH ST	Use of Sewer		Upstream MH	107
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	106
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	91.70 ft	Section Length	93.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:225	Position	Observation	Photo	Grade
107	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
106	91.70	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		5
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1960 SE 18TH ST	Use of Sewer		Upstream MH	107
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	109
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	178.80 ft	Section Length	181.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:450	Position	Observation	Photo	Grade
107	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
109	178.80	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		6
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1936 SE 18TH ST	Use of Sewer		Upstream MH	109
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	108
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	30.00 ft	Section Length	32.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:75	Position	Observation	Photo	Grade
109	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	16.40	Crack Spiral, from 07 to 02 o'clock, within 8 inches of joint: YES		S 2
	21.50	Crack Longitudinal, at 09 o'clock, within 8 inches of joint: YES NO INFILTRATION		S 2
	24.00	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STOPS		M 2
	30.00	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

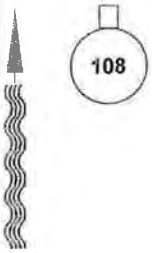
City : LAUDERDALE BY THE SEA

CDLAB LTD
Irisweg 12
City : 3280 Murten
Tel: +41 26 672 37 37
Fax: +41 26 672 37 38
Email:

Inspection Report / Inspection: 1

Date :	Job number :	Weather :	Operator : BILLY	Counter : 6	Section name :
Present :	Vehicle :	Camera :	Preset :	Cleaned : Jetting	Rate :

1:75	Position	Observation	Photo	Rate



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	3121	4	5	9	2	2.5	2.25

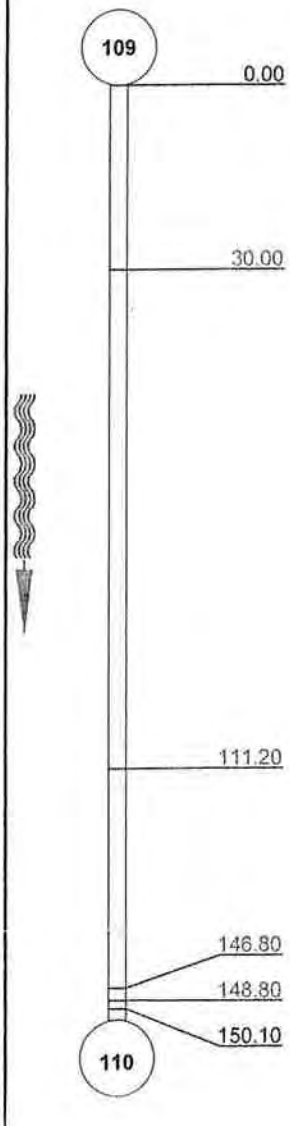
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		7
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1936 SE 18TH ST	Use of Sewer		Upstream MH	109
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	110
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	150.10 ft	Section Length	152.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:375 Position	Observation	Photo	Grade
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
30.00	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
111.20	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
146.80	Crack Spiral, from 07 to 05 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
148.80	Crack Spiral, from 07 to 05 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
150.10	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2400	0000	8	0	8	2	0	2

Inspection Report / Inspection: 1

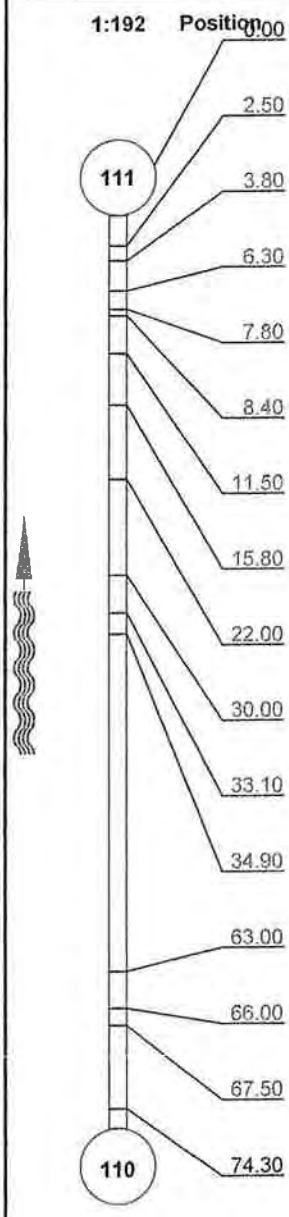
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		8
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1900 SE 18TH ST	Use of Sewer		Upstream MH	111
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	110
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	74.30 ft	Section Length	76.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:192



Position	Observation	Photo	Grade
0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
2.50	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
3.80	Crack Spiral, from 12 to 11 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
6.30	Crack Spiral, from 12 to 11 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
7.80	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: INFILTRATION APPROX 100 GPD		S 2
8.40	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STARTS		M 2
11.50	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
15.80	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
22.00	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
30.00	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
33.10	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
34.90	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
63.00	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STARTS		M 2
66.00	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
67.50	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: NO, REMARK: NO INFILTRATION		S 2
74.30	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2A00	2200	24	4	28	2	2	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		9
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1900 SE 18TH ST	Use of Sewer		Upstream MH	111
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	OUTFALL 10
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	120.70 ft	Section Length	120.70 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Other
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:304	Position	Observation	Photo	Grade
111	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
OUTFALL 10	120.70	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		10
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2048 SE 17TH CT	Use of Sewer		Upstream MH	94
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	93
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	15.30 ft	Section Length	15.30 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:48	Position	Observation	Photo	Grade
94	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
93	15.30	Upstream Manhole, Survey Ends, REMARK: END OF LINE PIPE REDUCES TO 8"		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

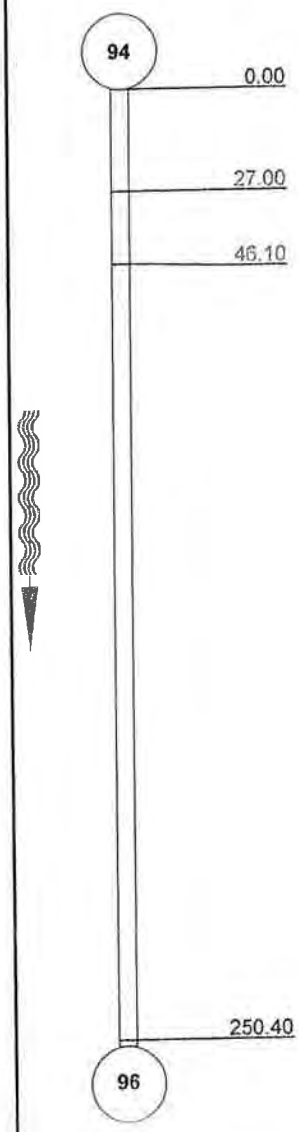
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		11
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2048 SE 17TH CT	Use of Sewer		Upstream MH	94
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	96
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	250.40 ft	Section Length	252.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Other
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:608 Position	Observation	Photo	Grade
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
27.00	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STARTS		M 2
46.10	Water Level, Sag in pipe, 20 %of cross sectional area, REMARK: SAG STOPS		M 2
250.40	Downstream Manhole, Survey Ends, REMARK: END OF LINE		



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	2200	0	4	4	0	2	2

Inspection Report / Inspection: 1

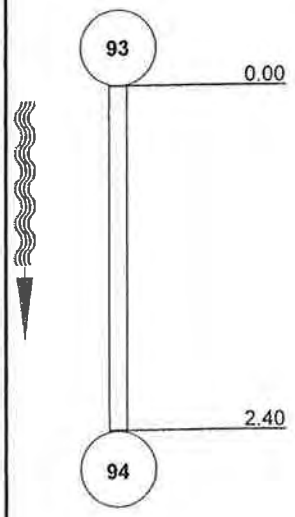
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		12
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2049 SE 17TH CT	Use of Sewer		Upstream MH	93
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	94
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	2.40 ft	Section Length	2.40 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height :	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:16	Position	Observation	Photo	Grade
	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	2.40	Downstream Manhole, Survey Ends, REMARK: END OF LINE		



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

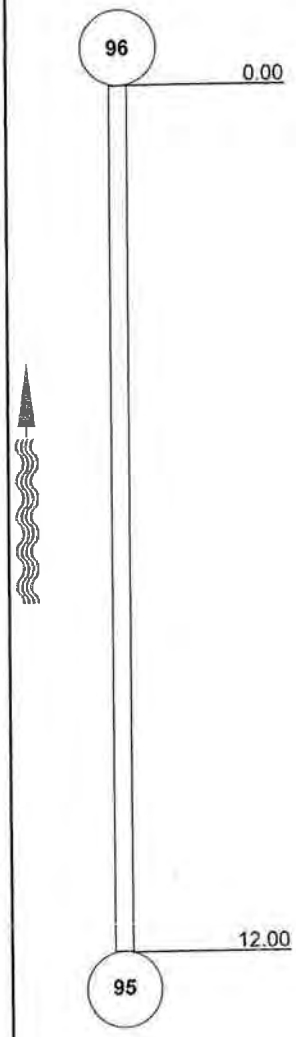
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		13
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1998 SE 17TH CT	Use of Sewer		Upstream MH	96
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	95
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	12.00 ft	Section Length	12.00 ft

Purpose of Survey		Joint Length	
Year Laid:		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:32	Position	Observation	Photo	Grade
	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	12.00	Upstream Manhole, Survey Ends, REMARK: END OF LINE		



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		14
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1998 SE 17TH CT	Use of Sewer		Upstream MH	96
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	97
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	368.00 ft	Section Length	370.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Other
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:896	Position	Observation	Photo	Grade
96	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	155.10	Water Level, Sag in pipe, 20 %of cross sectional area, REMARK: SAG STARTS		M 2
	161.50	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STOPS		M 2
	217.10	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STARTS		M 2
	223.40	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STOPS		M 2
	368.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
97				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	2400	0	8	8	0	2	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/4/2010			BILLY		15
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1912 SE 17TH CT	Use of Sewer		Upstream MH	100
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	97
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	166.00 ft	Section Length	168.00 ft

Purpose of Survey		Joint Length	
Year Laid :		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:400	Position	Observation	Photo	Grade
100	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	93.00	Collapse Pipe Sewer, 40 %		S 5
	95.80	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STARTS		M 2
	103.10	Water Level, Sag in pipe, 10 %of cross sectional area, REMARK: SAG STOPS		M 2
	166.00	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

City : LAUDERDALE BY THE SEA

CDLAB LTD
Irisweg 12
City : 3280 Murten
Tel: +41 26 672 37 37
Fax: +41 26 672 37 38
Email:

Inspection Report / Inspection: 1

Date :	Job number :	Weather :	Operator : BILLY	Counter : 15	Section name :
Present :	Vehicle :	Camera :	Preset :	Cleaned : Jetting	Rate :

1:400 **Position** **Observation** **Photo** **Rate**

97

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	2200	5	4	9	5	2	3

TELESPECTION DAILY REPORT

DATE: 11/05/10 OPERATOR: Billy

LIFTSTATION # Drainage [redacted] DVD# 1-118

DRESS	MH #	TO	MH #	FOOTAGE	INFIL G.P.D.	INFLOW G.P.D.	CRACKS	DIG-UPS
1937 SE 15th ct	60	→	59	159	—	—	yes	—
1961 SE 15th ct.	59	→	57	144	—	—	—	—
1985 SE 15th ct	57	→	55	246	—	—	—	—
TALS 549								

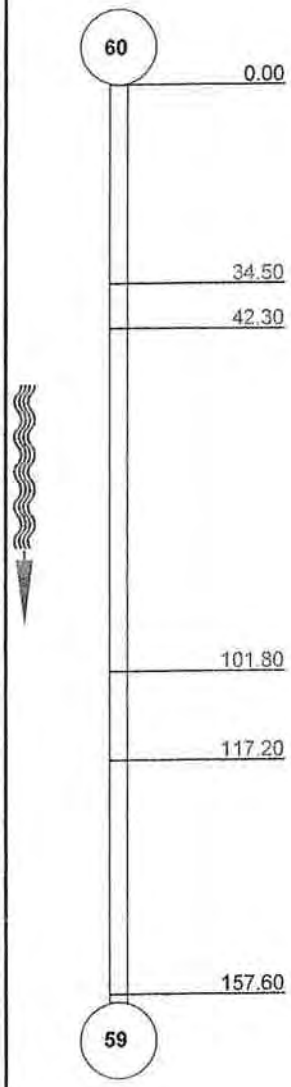
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/5/2010			BILLY		1
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1937 SE 15TH CT	Use of Sewer		Upstream MH	60
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	59
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	157.60 ft	Section Length	159.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:400 Position	Observation	Photo	Grade
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
34.50	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
42.30	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STARTS		M 2
101.80	Crack Longitudinal, at 03 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
117.20	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STOPS		M 2
157.60	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	2200	4	4	8	2	2	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/5/2010			**BILLY**		**2**
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				**Jetting**	

Street123	**1961 SE 15TH CT**	Use of Sewer		Upstream MH	**59**
City	**LAUDERDALE BY THE SEA**	Drainage Area		Dowstream MH	**57**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**142.20 ft**	Section Length	**144.00 ft**

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	**12 inch** :
Year Rehabilitated		Material	**Plastic/Steel Composite**
Tape / Media No.	**1-118**	Lining Method	

Add. Information :

1:352	Position	Observation	Photo	Grade
59	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	9.20	Obstacles Pipe Material, 10 %of cross sectional area, at 06 o'clock, REMARK: 2.5 INCHES OF CONCRETE 9' LONG FROM CATCH BASIN 59	M 2	
	142.20	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
57				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/5/2010			BILLY		3
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1985 SE 15TH CT	Use of Sewer		Upstream MH	57
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	55
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	244.10 ft	Section Length	244.10 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:592 Position	Observation	Photo	Grade
57 0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
55.90	Roots Fine Joint, at 12 o'clock, within 8 inches of joint: NO	M 2	
63.00	Roots Fine Joint, at 12 o'clock, within 8 inches of joint: NO	M 2	
244.10 55	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	2200	0	4	4	0	2	2

Lauderdale By The Sea — Drainage

TELESPECTION DAILY REPORT

DATE 1/7/2010 OPERATOR: ShawnB

LIFTSTATION # _____ TAPE # ONE-S

ADDRESS	CB ~~MH #~~	TO	CB ~~MH #~~	FOOTAGE	INFIL	INFLOW	CRACKS	DIG-UPS
SE 19 St 2051	137		138	76'	1.000		3	12"
2051	137		136	26'	Squashed Pipe			12"
2051	137		135	127'		good condition		18"
1940	135		134	29'	Squashed Pipe			12"
1931	133		135	121'			1	18"
1931	133		132	28'			1	12"
1931	133		130	41'			1	18"
1921	130		131	21'	Brick Plug			15"
1921	130		129	87'		good condition		18"
2050	113		112	29'			1	12"
2050	113		114	65'		good condition		18"
2040	114		115	158'		good condition		18"
2030	115		117	130'		good condition		18"
2021	116		117	4'	crushed Pipe			12"
TOTALS				942'				

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

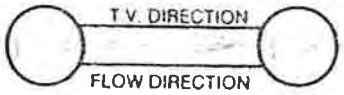
SETUP # 1

TELESPECTION AND TELEGROUT REPORT

CITY: _____

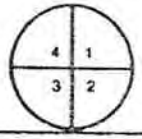
STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____



DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: _____

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

JOB FOREMAN: _____

INSPECTOR: _____

T.V. INSPECTION							GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO.	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

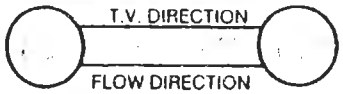
SETUP # 3

TELESPECTION AND TELEGROUT REPORT

CITY: [illegible]

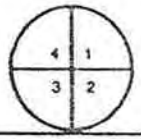
STREET: [illegible]

ADDRESS [illegible]



UP MH # [illegible] DOWN MH # [illegible]

MH DEPTH [illegible] MH DEPTH [illegible]



DATE: 1/2/99

TIME: [illegible]

WEATHER: [illegible]

COUNTER START: [illegible]

COUNTER STOP: [illegible]

VIDEO TAPE # : [illegible]

JOB FOREMAN: [illegible]

INSPECTOR: [illegible]

PIPE DIAMETER: [illegible]

JOINT LENGTH: [illegible]

PIPE MATERIAL: [illegible]

SURFACE MAT'L.: [illegible]

TOTAL PIPE LENGTH: [illegible]

TYPE OF INSP.: [illegible]

T.V. INSPECTION								GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS
[illegible]							[illegible]			
[illegible]							[illegible]		[illegible]	[illegible]
[illegible]							[illegible]			
[illegible]							[illegible]			
[illegible]							[illegible]	—	—	[illegible]
[illegible]							[illegible]			
[illegible]							[illegible]			

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

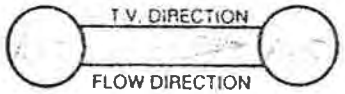
SETUP # _____

TELESPECTION AND TELEGROUT REPORT

CITY: _____

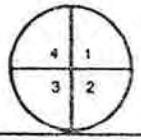
STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____



DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

JOB FOREMAN: _____

INSPECTOR: _____

PIPE DIAMETER: _____

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

T.V. INSPECTION								GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO.	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

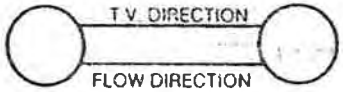
SETUP # 4

TELESPECTION AND TELEGROUT REPORT

CITY: _____

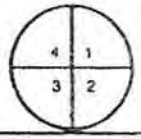
STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____



DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: _____

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

JOB FOREMAN: _____

INSPECTOR: _____

T.V. INSPECTION								GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

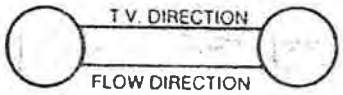
SETUP # 5

TELESPECTION AND TELEGROUT REPORT

CITY: _____

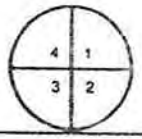
STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____



DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: _____

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

JOB FOREMAN: _____

INSPECTOR: _____

T.V. INSPECTION								GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

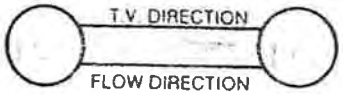
SETUP # _____

TELESPECTION AND TELEGROUT REPORT

CITY: _____

STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____

DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: _____

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

JOB FOREMAN: _____

INSPECTOR: _____

T.V. INSPECTION							GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

TELESPECTION AND TELEGROUT REPORT

SETUP # 2

CITY: _____

STREET: _____

ADDRESS _____

T.V. DIRECTION

FLOW DIRECTION

UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____

4 1
3 2

DATE: 11/7/12

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: 18"

JOINT LENGTH: 8

PIPE MATERIAL: HDPE

SURFACE MAT'L.: Earth

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: Camera

JOB FOREMAN: _____

INSPECTOR: _____

T.V. INSPECTION							GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

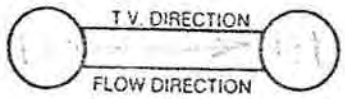
TELESPECTION AND TELEGROUT REPORT

SETUP # 8

CITY: [illegible]

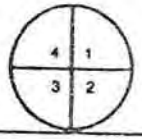
STREET: [illegible]

ADDRESS [illegible]



UP MH # _____ DOWN MH # [illegible]

MH DEPTH _____ MH DEPTH _____



DATE: 1/7/10

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : [illegible]

PIPE DIAMETER: 10

JOINT LENGTH: [illegible]

PIPE MATERIAL: [illegible]

SURFACE MAT'L.: [illegible]

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: [illegible]

JOB FOREMAN: [illegible]

INSPECTOR: _____

T.V. INSPECTION								GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO.	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS
[illegible]							[illegible]			
							Back Flow			

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

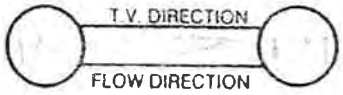
SETUP # 9

TELESPECTION AND TELEGROUT REPORT

CITY: [illegible]

STREET: [illegible]

ADDRESS [illegible]



UP MH # _____ DOWN MH # [illegible]

MH DEPTH _____ MH DEPTH _____

DATE: 11/5/10

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : [illegible]

PIPE DIAMETER: 18"

JOINT LENGTH: 8'

PIPE MATERIAL: H.D.P.E.

SURFACE MAT'L.: [illegible]

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: [illegible]

JOB FOREMAN: [illegible]

INSPECTOR: _____

T.V. INSPECTION								GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO.	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS
							[illegible]			
127										
							[illegible]			
										[illegible]

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

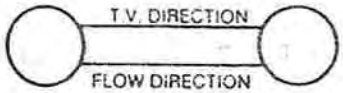
SETUP # 10

TELESPECTION AND TELEGROUT REPORT

CITY: _____

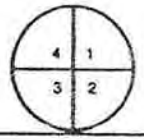
STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____



DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: _____

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

JOB FOREMAN: _____

INSPECTOR: _____

T.V. INSPECTION							GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

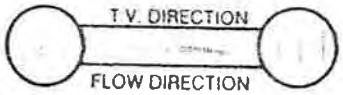
TELESPECTION AND TELEGROUT REPORT

SETUP # _____

CITY: _____

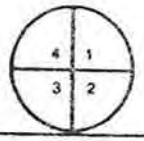
STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____



DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: _____

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

JOB FOREMAN: _____

INSPECTOR: _____

T.V. INSPECTION							GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO.	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

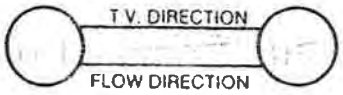
SETUP # 12

TELESPECTION AND TELEGROUT REPORT

CITY: _____

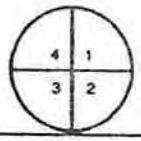
STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____



DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: _____

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

JOB FOREMAN: _____

INSPECTOR: _____

T.V. INSPECTION								GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

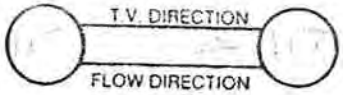
TELESPECTION AND TELEGROUT REPORT

SETUP # 12

CITY: _____

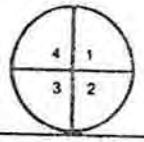
STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____



DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: 12

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

JOB FOREMAN: _____

INSPECTOR: _____

T.V. INSPECTION								GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO.	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELEVAC SOUTH, INC.

221 N.E. 13TH STREET • POMPANO BEACH, FL 33060 • (954) 782-6997

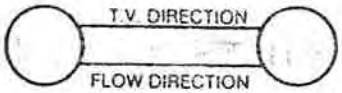
SETUP # 14

TELESPECTION AND TELEGROUT REPORT

CITY: _____

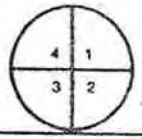
STREET: _____

ADDRESS _____



UP MH # _____ DOWN MH # _____

MH DEPTH _____ MH DEPTH _____



DATE: _____

TIME: _____

WEATHER: _____

COUNTER START: _____

COUNTER STOP: _____

VIDEO TAPE # : _____

PIPE DIAMETER: _____

JOINT LENGTH: _____

PIPE MATERIAL: _____

SURFACE MAT'L.: _____

TOTAL PIPE LENGTH: _____

TYPE OF INSP.: _____

JOB FOREMAN: _____

INSPECTOR. _____

T.V. INSPECTION								GROUTING		
DISTANCE READING	QUADRANT 1	2	3	4	DATE INSPECTED	PHOTO NO.	CONDITION OF PIPE	DATE REPAIRED	CHEMICAL USED	REMARKS

TELESPECTION DAILY REPORT

DATE: 1/11/2010 OPERATOR: Billy

LIFTSTATION # Drainage DVD# 1-118

DRESS	MH #	TO	MH #	FOOTAGE	INFIL G.P.D.	INFLOW G.P.D.	CRACKS	DIG-UPS
1925 SE 17th St	86	→	87	27	—	—	yes	—
1712 SE 17th St.	85	→	87	75	500 gpd	—	yes	—
" "	85	→	83	74	—	—	yes	—
1712 SE 17th Ave	84	→	99	208	—	—	—	—
1737 SE 19th Ave	99	→	98	5	—	—	—	—
" "	98	→	99	10	—	—	—	—
1737 SE 19th Ave	98	→	outfall 8	103	—	—	—	—
1673 SE 19th Ave	82	→	83	27	—	—	yes	—
1673 " "	82	→	outfall 7	106	—	—	—	—
1761 SE 21st Ave	101	→	outfall 9	115	—	Illegal	Tap	1000 gpd
1961 SE 16th St	67	→	65	109	500 gpd	—	yes	—
1900 SE 19th Ave	66	→	65	30	—	—	yes	—
1585 SE 19th Ave	65	→	63	47	—	—	yes	—
1585 SE 19th Ave	64	→	63	21	—	—	—	—
1585 SE 19th Ave	63	→	outfall 5	115	—	—	—	—
TALS	1072							

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		1
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1925 SE 17TH ST	Use of Sewer		Upstream MH	86
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	87
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	25.00 ft	Section Length	27.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:75	Position	Observation	Photo	Grade
86	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	7.20	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	25.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
87				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	0000	2	0	2	2	0	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		2
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1712 SE 17TH ST	Use of Sewer		Upstream MH	87
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	85
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	73.00 ft	Section Length	75.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:200	Position	Observation	Photo	Grade
87	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	16.80	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: 500 GPD		S 2
	36.50	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	40.70	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	46.00	Crack Spiral, from 03 to 08 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	56.90	Crack Longitudinal, at 09 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	73.00	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
85				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2500	0000	10	0	10	2	0	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		3
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1712 SE 17TH ST	Use of Sewer		Upstream MH	85
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	83
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	72.70 ft	Section Length	74.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:175 Position	Observation	Photo	Grade
85 0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
11.80	Water Level, Sag in pipe, 10 %of cross sectional area, REMARK: SAG STARTS		M 2
14.20	Collapse Pipe Sewer, 40 %, REMARK: NO INFILTRATION		S 5
16.60	Broken Void Visible, at 12 o'clock within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 5
18.40	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STOPS		M 2
46.20	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
72.70	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

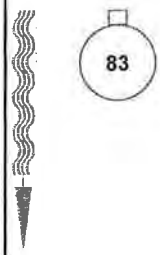
City : LAUDERDALE BY THE SEA

CDLAB LTD
Irisweg 12
City : 3280 Murten
Tel: +41 26 672 37 37
Fax: +41 26 672 37 38
Email:

Inspection Report / Inspection: 1

Date :	Job number :	Weather :	Operator : BILLY	Counter : 3	Section name :
Present :	Vehicle :	Camera :	Preset :	Cleaned : Jetting	Rate :

1:175	Position	Observation	Photo	Rate



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5231	2200	15	4	19	3.75	2	3.17

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		4
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1712 SE 19TH AVE	Use of Sewer		Upstream MH	84
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	99
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	206.80 ft	Section Length	208.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:500	Position	Observation	Photo	Grade
84	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
99	206.80	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		5
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1737 SE 19TH AVE	Use of Sewer		Upstream MH	99
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	98
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	4.90 ft	Section Length	5.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:25	Position	Observation	Photo	Grade
99	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
98	4.90	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		7
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1913 SE 19TH AVE	Use of Sewer		Upstream MH	99
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	98
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	10.00 ft	Section Length	10.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:25	Position	Observation	Photo	Grade
99	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
98	10.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		6
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1737 SE 19TH AVE	Use of Sewer		Upstream MH	98
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	OUTFALL 8
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	103.00 ft	Section Length	103.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	24 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No	1-118	Lining Method	

Add. Information :

1:250	Position	Observation	Photo	Grade
98	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
OUTFALL 8	103.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

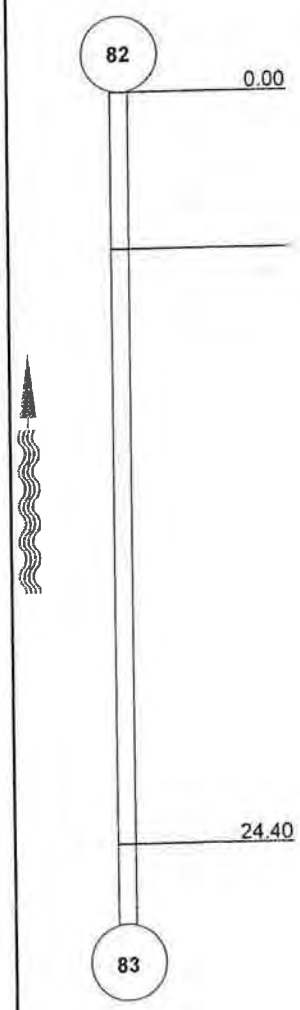
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		8
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1673 SE 19TH AVE	Use of Sewer		Upstream MH	82
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	83
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	24 40 ft	Section Length	27.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:75	Position	Observation	Photo	Grade
	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	24.40	Upstream Manhole, Survey Ends, REMARK: END OF LINE		



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3100	0000	3	0	3	3	0	3

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		9
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1673 SE 19TH AVE	Use of Sewer		Upstream MH	82
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	0UTFALL 7
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	106.20 ft	Section Length	106.20 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Corrugated Metal Pipe
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:275	Position	Observation	Photo	Grade
82	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
0UTFALL 7	106.20	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		10
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1761 SE 21ST AVE	Use of Sewer		Upstream MH	101
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	OUT FALL 9
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	115.00 ft	Section Length	115.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Other
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:288	Position	Observation	Photo	Grade
101	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	111.10	Tap Break-In Intruding, at 12 o'clock, 2", 2", within 8 inches of joint: YES, REMARK: INFILTRATION 1000 GPD	M 2	
OUT FALL 9	115.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	2100	0	2	2	0	2	2

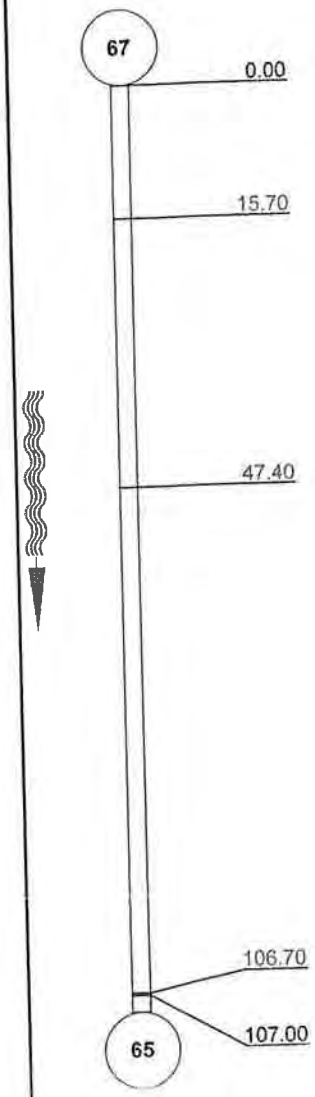
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		11
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1961 SE 16TH ST	Use of Sewer		Upstream MH	67
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	65
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	107.00 ft	Section Length	109.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:272 Position	Observation	Photo	Grade
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
15.70	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
47.40	Crack Longitudinal, at 03 o'clock, within 8 inches of joint: YES, REMARK: INFILTRATION APPROX 500GPD		S 2
106.70	Crack Spiral, from 07 to 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
107.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2300	0000	6	0	6	2	0	2

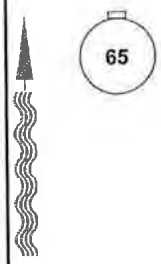
City : LAUDERDALE BY THE SEA

CDLAB LTD
Irisweg 12
City : 3280 Murten
Tel: +41 26 672 37 37
Fax: +41 26 672 37 38
Email:

Inspection Report / Inspection: 1

Date :	Job number :	Weather :	Operator : BILLY	Counter : 13	Section name :
Present :	Vehicle :	Camera :	Preset :	Cleaned : Jetting	Rate :

1:112	Position	Observation	Photo	Rate



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3122	2200	7	4	11	2.33	2	2.2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		14
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1585 SE 19TH AVE	Use of Sewer		Upstream MH	63
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	64
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	19.50 ft	Section Length	21.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:48	Position	Observation	Photo	Grade
63	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	3.40	Water Level, Sag in pipe, 5 %of cross sectional area, REMARK: SAG STARTS	M 2	
	14.60	Water Level, Sag in pipe, 10 %of cross sectional area, REMARK: SAG STOPS	M 2	
	19.50	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/11/2010			BILLY		15
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1585 SE 19TH AVE	Use of Sewer		Upstream MH	63
City	LAUDERDALE BY TYHE SEA	Drainage Area		Dowstream MH	OUTFALL 5
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	115.00 ft	Section Length	115.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	15 inch
Year Rehabilitated		Material	Other
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:288	Position	Observation	Photo	Grade
63	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
OUTFALL 5	115.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

LBTG

TELESPECTION DAILY REPORT

DATE: 1/12/2010 OPERATOR: Billy

LIFTSTATION # Drainage DVD# 1-118

ADDRESS	MH #	TO	MH #	FOOTAGE	INFIL G.P.D.	INFLOW G.P.D.	CRACKS	DIG-UPS
2011 SE 19Th St	116	→	117	2 Feet in pipe crushed 75%				
" "	116	→	118	98	500 GPD	—	yes	—
" "	116	→	OUTFALL "	109	—	—	—	—
1970 SE 19Th St	119	→	118	8 Feet in Pipe crushed 75%				
1970 SE 19Th St	119	→	120	156	500 GPD	—	yes	—
1940 SE 19Th St	122	→	121	20	—	—	yes	—
" "	122	→	120	121	—	—	—	—
" "	122	→	124	131	—	—	—	—
TOTALS 645								

Inspection Report / Inspection: 1

Date	P/O, No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/12/2010			BILLY		1
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2011 SE 19TH ST	Use of Sewer		Upstream MH	116
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	117
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	2.20 ft	Section Length	2.20 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:25	Position	Observation	Photo	Grade
116	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	2.20	Collapse Pipe Sewer, 75 %, REMARK: CRUSHED PIPE		S 5
117	2.20	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

Baffle on Basin 117
Unable To Do from other side

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	0000	5	0	5	5	0	5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/12/2010			BILLY		2
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2011 SE 19TH ST	Use of Sewer		Upstream MH	116
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	118
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	96.70 ft	Section Length	98.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height :	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:240	Position	Observation	Photo	Grade
116	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	85.90	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: INFIL APPROX 500GPD		S 2
118	96.70	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	0000	2	0	2	2	0	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/12/2010			BILLY		7
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1940 SE 19TH ST	Use of Sewer		Upstream MH	122
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	120
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	119.50 ft	Section Length	121.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:288	Position	Observation	Photo	Grade
122	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	119.50	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

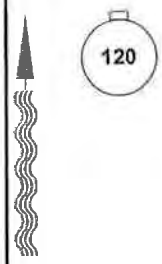
City : LAUDERDALE BY THE SEA

CDLAB LTD
Irisweg 12
City : 3280 Murten
Tel: +41 26 672 37 37
Fax: +41 26 672 37 38
Email:

Inspection Report / Inspection: 1

Date :	Job number :	Weather :	Operator : BILLY	Counter : 7	Section name :
Present :	Vehicle :	Camera :	Preset :	Cleaned : Jetting	Rate :

1:288	Position	Observation	Photo	Rate



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/12/2010			BILLY		8
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1940 SE 19TH ST	Use of Sewer		Upstream MH	122
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	124
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	129.20 ft	Section Length	131.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:320	Position	Observation	Photo	Grade
122	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
124	129.20	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

TELESPECTION DAILY REPORT

DATE: 11/15/10 OPERATOR: Billy

LIFTSTATION # Drainage DVD# 1-118

DRESS	MH #	TO	MH #	FOOTAGE	INFIL G.P.D.	INFLOW G.P.D.	CRACKS	DIG-UPS
1920 SE 19th st	124	→	123	30	—	—	yes	—
1920 SE 19th st.	124	→	125	140	100 GPD	—	yes	—
1900 SE 19th st	127	→	125	40	—	—	yes	—
1900 SE 19th st	127	→	126	6	Cracks and crushed pipe			
1900 SE 19th st	127	→	129	45	—	—	—	—
1907 SE 19th st	126	→	127	3	Crushed pipe 75%			
TALS 264								

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/15/2010			BILLY		1
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1920 SE 19TH ST	Use of Sewer		Upstream MH	124
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	123
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	29.10 ft	Section Length	30.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia /Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:75	Position	Observation	Photo	Grade
124	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	14.40	Collapse Pipe Sewer, 55 %, REMARK: NO INFILTRATION		S 5
	16.90	Crack Longitudinal, at 02 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	29.10	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
123				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5121	0000	7	0	7	3.5	0	3.5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/15/2010			BILLY		2
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1920 SE 19TH ST	Use of Sewer		Upstream MH	124
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	125
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	138.80 ft	Section Length	140.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:336	Position	Observation	Photo	Grade
124	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	39.50	Crack Longitudinal, at 03 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	99.80	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: INFIL APPROX 100 GPD		S 2
	[illegible]	[illegible]		[illegible]
125	138.80	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2211	0000	5	0	5	1.67	0	1.67

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/15/2010			BILLY		3
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1900 SE 19TH ST	Use of Sewer		Upstream MH	127
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	125
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	38.40 ft	Section Length	40.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:96	Position	Observation	Photo	Grade
127	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	34.80	Crack Longitudinal, at 09 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	38.40	Upstream Manhole, Survey Ends, REMARK: CENTER OF MANHOLE		
125				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	0000	2	0	2	2	0	2

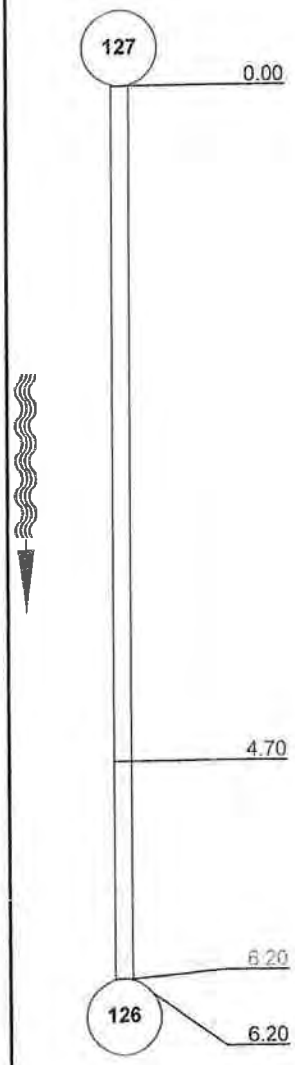
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/15/2010			BILLY		4
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1900 SE 19TH ST	Use of Sewer		Upstream MH	127
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	126
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	6.20 ft	Section Length	6.20 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:16 Position	Observation	Photo	Grade
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
4.70	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
6.20	Collapse Pipe Sewer, 60 %, REMARK: CRUSHED PIPE		S 5
6.20	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5121	0000	7	0	7	3.5	0	3.5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/15/2010			BILLY		5
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1900 SE 19TH ST	Use of Sewer		Upstream MH	127
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	129
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	43.50 ft	Section Length	45.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:112	Position	Observation	Photo	Grade
127	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	43.50	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
129				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

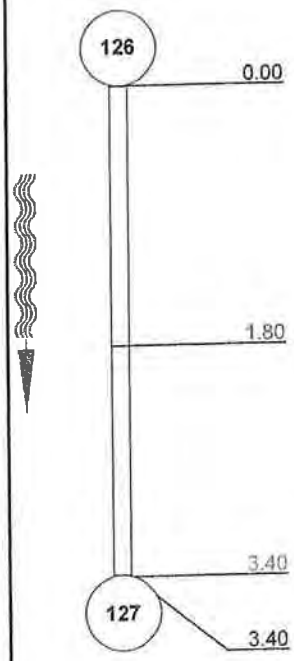
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/15/2010			BILLY		6
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1907 SE 19TH ST	Use of Sewer		Upstream MH	126
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	127
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	3.40 ft	Section Length	3.40 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:16 Position	Observation	Photo	Grade
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
1.80	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
3.40	Collapse Pipe Sewer, 70 %, REMARK: PIPE CRUSHED 75 % UNPASSABLE		S 5
3.40	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5121	0000	7	0	7	3.5	0	3.5

TELESPECTION DAILY REPORT

DATE: 11/19/2010 OPERATOR: Billy

LIFTSTATION # Drainage DVD # 1-118

ADDRESS	MH#	TO	MH#	FOOTAGE	INFIL G.P.D.	INFLOW G.P.D.	~~VCP~~ Cracks	~~PVC~~	DIG UPS
1560 SE 15 St	48	→	49	35	—	—	yes		—
1560 SE 15 St	48	→	OUTFall 4	6	—	—	—		—
2073 SE 15th Ct	51	→	55	55	Severe Break unpassable				
2049 " "	55	→	51	162	Heavy sand In fil		yes		—
1560 SE 21st Ave	53	→	52	32	—	—	—		—
1560 " "	53	→	54	16	Crushed 100% 16'				
1560 SE 21st Ave	54	→	53	2	Crushed 100% 2'				
1560 " "	54	→	51	35	—	—	yes		—
1560 " SE 21st Ave	54	→	151	41	feet crushed pipe 90%				
2100 SE 15th St	151	→	54	43	feet crushed pipe 75%				
2100 SE 15th St	151	→	50	29	—	—	yes		—
1901 SE 19th St	128	→	129	30	—	—	yes		—
1901 SE 19th St	128	→	OUTFall 12	Under water					
2030 SE 18th St	105	→	OUTFall 105A	110	—	—	—		—
1761 SE 21st Ave	101	→	102	25	—	—	yes		—
TOTALS 621									

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		7
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 15TH ST	Use of Sewer		Upstream MH	48
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	49
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	33.80 ft	Section Length	35.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Concrete Segments (bolted)
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:96	Position	Observation	Photo	Grade
48	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	29.10	Crack Longitudinal, at 04 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	33.80	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
49				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	3100	2	3	5	2	3	2.5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		8
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 15TH ST	Use of Sewer		Upstream MH	48
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	OUTFALL 4
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	5.90 ft	Section Length	6.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Concrete Segments (bolted)
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:16	Position	Observation	Photo	Grade
48	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
OUTFALL 4	5.90	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		9
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2073 SE 15TH CT	Use of Sewer		Upstream MH	51
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	55
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	55.30 ft	Section Length	55.30 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:144	Position	Observation	Photo	Grade
51	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	54.30	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: HEAVY SAND INFILTRATION		S 2
55	55.30	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	0000	4	0	4	2	0	2

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		10
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2049 SE 15TH CT	Use of Sewer		Upstream MH	55
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	51
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	162.30 ft	Section Length	162.30 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:400	Position	Observation	Photo	Grade
55	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	62.00	Crack Longitudinal, at 02 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	105.30	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	134.50	Crack Longitudinal, at 08 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	146.00	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
51	162.30	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3224	0000	14	0	14	2.33	0	2.33

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		11
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 21ST AVE	Use of Sewer		Upstream MH	53
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	52
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	30.40 ft	Section Length	32.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Cast Iron
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:80	Position	Observation	Photo	Grade
53	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	30.40	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
52				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		13
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 21ST AVE	Use of Sewer		Upstream MH	54
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	53
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	2.00 ft	Section Length	2.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:16	Position	Observation	Photo	Grade
54	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	2.00	Collapse Pipe Sewer, 100 %, REMARK: CRUSHED 100 % NO INFILTRATION		S 5
53	2.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	0000	5	0	5	5	0	5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		14
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 21ST AVE	Use of Sewer		Upstream MH	51
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	54
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	33.50 ft	Section Length	35.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:96	Position	Observation	Photo	Grade
51	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	5.40	Crack Longitudinal, at 09 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	33.50	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
54				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2111	0000	3	0	3	1.5	0	1.5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		15
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 21ST AVE	Use of Sewer		Upstream MH	54
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	151
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	41.50 ft	Section Length	41.50 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:112	Position	Observation	Photo	Grade
54	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	39.40	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
151	41.50	Collapse Pipe Sewer. 90 %, REMARK: CRUSHED PIPE 90 %		S 5
	41.50	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5121	0000	7	0	7	3.5	0	3.5

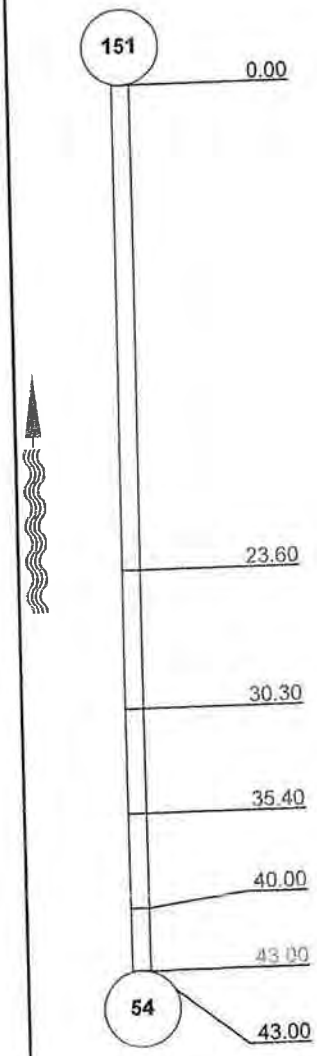
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		16
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2100 SE 15TH ST	Use of Sewer		Upstream MH	151
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	54
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	43.00 ft	Section Length	43.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:112 Position	Observation	Photo	Grade
0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
23.60	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: NO, REMARK: NO INFILTRATION		S 2
30.30	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
35.40	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: CRACK STARTS		S 2
40.00	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: CRACK STOPS		S 2
43.00	Collapse Pipe Sewer, 75 %, REMARK: CRUSHED PIPE		S 5
43.00	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5124	0000	13	0	13	2.6	0	2.6

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		17
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2100 SE 15TH ST	Use of Sewer		Upstream MH	151
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	50
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	27.00 ft	Section Length	29.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Concrete Segments (bolted)
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:80	Position	Observation	Photo	Grade
151	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	4.60	Crack Longitudinal, at 03 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	27.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
50				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	0000	2	0	2	2	0	2

Inspection Report / Inspection: 1

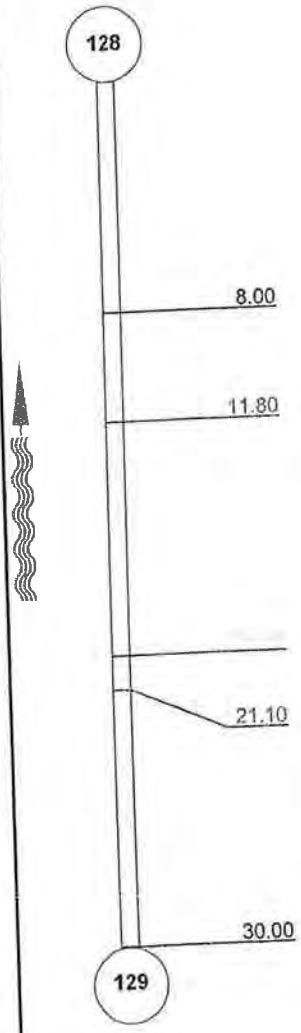
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		18
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1901 SE 19TH ST	Use of Sewer		Upstream MH	128
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	129
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	22.00 ft	Section Length	30.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height :	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:80	Position	Observation	Photo	Grade
	8.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	11.80	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO NIFILTRATION		S 2
	21.10	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	30.00	Upstream Manhole, Survey Ends, REMARK: END OF LINE		



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3122	0000	7	0	7	2.33	0	2.33

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		19
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2030 SE 18TH ST	Use of Sewer		Upstream MH	105
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	OUTFALL 105A
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	110.00 ft	Section Length	110.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	8 inch
Year Rehabilitated		Material	Polyvinyl Chloride
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:272	Position	Observation	Photo	Grade
105	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
OUTFALL 105A	110.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

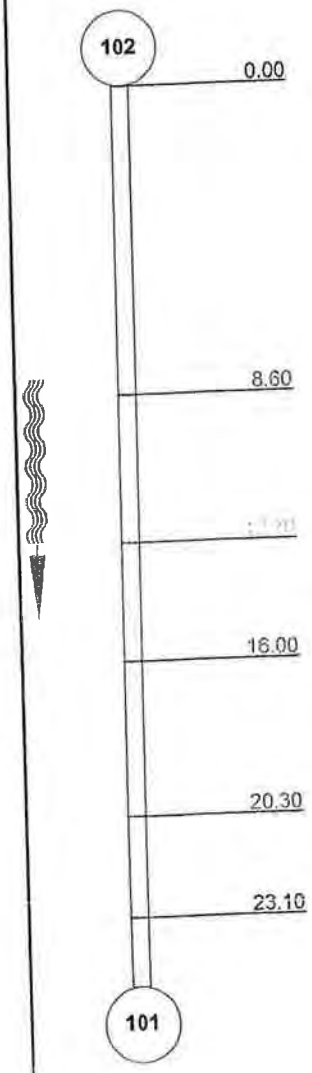
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		20
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1761 SE 21ST AVE	Use of Sewer		Upstream MH	102
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	101
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	23.10 ft	Section Length	25.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	10 inch
Year Rehabilitated		Material	Concrete Segments (bolted)
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:64 Position	Observation	Photo	Grade
0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
8.60	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
[illegible]	[illegible]		[illegible]
16.00	Joint Offset Large, REMARK: NO INFILTRATION		S 2
20.30	Roots Fine Joint, at 04 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		M 2
23.10	Upstream Manhole, Survey Ends, REMARK: END OF LINE		



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2211	2100	5	2	7	1.67	2	1.75

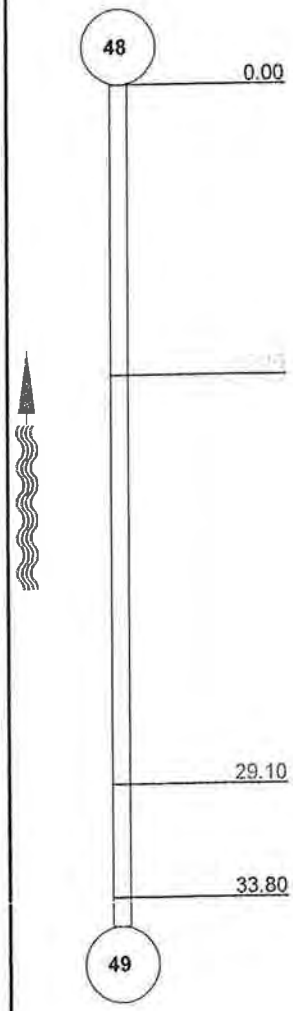
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		7
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 15TH ST	Use of Sewer		Upstream MH	48
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	49
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	33.80 ft	Section Length	35.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Concrete Segments (bolted)
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:96 Position	Observation	Photo	Grade
0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
29.10	Crack Longitudinal, at 04 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
33.80	Upstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	3100	2	3	5	2	3	2.5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		8
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 15TH ST	Use of Sewer		Upstream MH	48
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	OUTFALL 4
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	5.90 ft	Section Length	6.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	18 inch
Year Rehabilitated		Material	Concrete Segments (bolted)
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:16	Position	Observation	Photo	Grade
48	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
OUTFALL 4	5.90	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		9
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2073 SE 15TH CT	Use of Sewer		Upstream MH	51
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	55
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	55.30 ft	Section Length	55.30 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:144	Position	Observation	Photo	Grade
51	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	54.30	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: HEAVY SAND INFILTRATION		S 2
55	55.30	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	0000	4	0	4	2	0	2

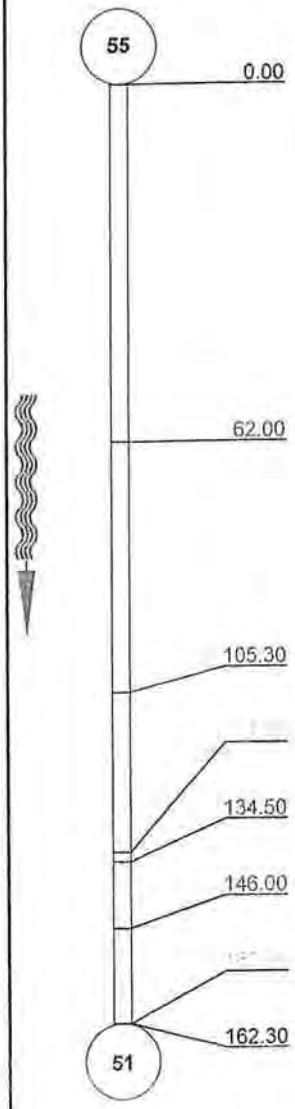
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		10
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2049 SE 15TH CT	Use of Sewer		Upstream MH	55
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	51
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	162.30 ft	Section Length	162.30 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :



1:400 Position	Observation	Photo	Grade
0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
62.00	Crack Longitudinal, at 02 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
105.30	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
[illegible]	[illegible]		[illegible]
134.50	Crack Longitudinal, at 08 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
146.00	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
[illegible]	[illegible]		
162.30	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3224	0000	14	0	14	2.33	0	2.33

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		11
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 21ST AVE	Use of Sewer		Upstream MH	53
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	52
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	30.40 ft	Section Length	32.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Cast Iron
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:80	Position	Observation	Photo	Grade
53	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	30.40	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
52				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

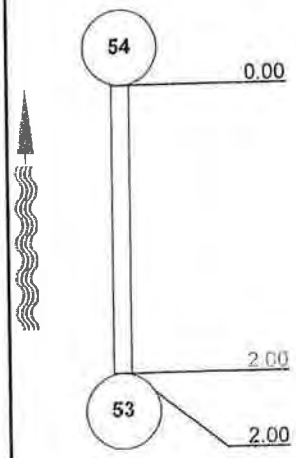
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		13
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 21ST AVE	Use of Sewer		Upstream MH	54
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	53
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	2.00 ft	Section Length	2.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:16	Position	Observation	Photo	Grade
	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	2.00	Collapse Pipe Sewer, 100 %, REMARK: CRUSHED 100 % NO INFILTRATION	S 5	
	2.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	0000	5	0	5	5	0	5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		14
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 21ST AVE	Use of Sewer		Upstream MH	51
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	54
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	33.50 ft	Section Length	35.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:96	Position	Observation	Photo	Grade
51	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	5.40	Crack Longitudinal, at 09 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	33.50	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
54				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2111	0000	3	0	3	1.5	0	1.5

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		15
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1560 SE 21ST AVE	Use of Sewer		Upstream MH	54
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	151
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	41.50 ft	Section Length	41.50 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:112	Position	Observation	Photo	Grade
54	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	39.40	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
151	41.50	Collapse Pipe Sewer, 90 % REMARK: CRUSHED PIPE 90 %		S 5
	41.50	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5124121	0000	7	0	7	3.5	0	3.5

Inspection Report / Inspection: 1

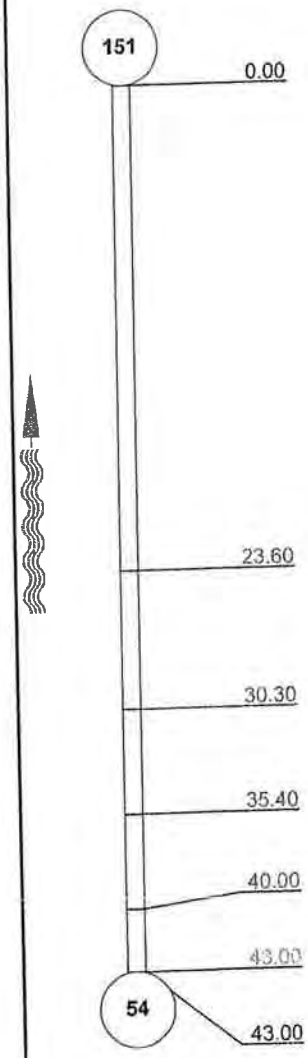
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		16
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2100 SE 15TH ST	Use of Sewer		Upstream MH	151
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	54
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	43.00 ft	Section Length	43.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:112 Position	Observation	Photo	Grade
0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
23.60	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: NO, REMARK: NO INFILTRATION		S 2
30.30	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
35.40	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: CRACK STARTS		S 2
40.00	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: CRACK STOPS		S 2
43.00	Collapse Pipe Sewer, 75 %, REMARK: CRUSHED PIPE		S 5
43.00	Upstream Manhole, Survey Ends, REMARK: END OF LINE		



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5124	0000	13	0	13	2.6	0	2.6

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		17
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2100 SE 15TH ST	Use of Sewer		Upstream MH	151
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	50
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	27.00 ft	Section Length	29.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Concrete Segments (bolted)
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:80	Position	Observation	Photo	Grade
151	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	4.60	Crack Longitudinal, at 03 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	27.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		
50				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	0000	2	0	2	2	0	2

Inspection Report / Inspection: 1

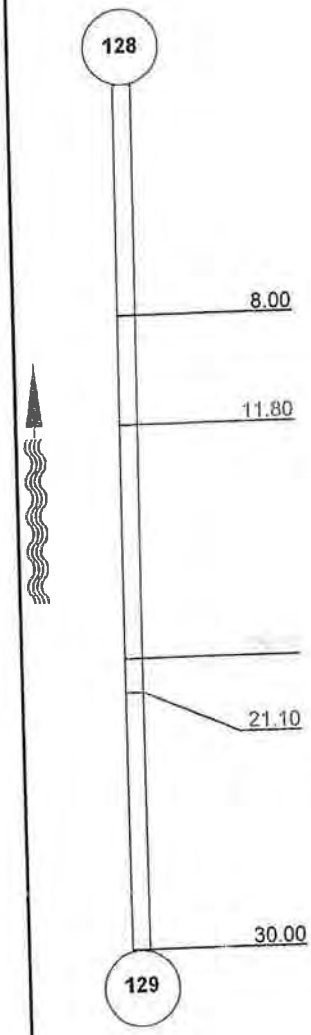
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		18
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1901 SE 19TH ST	Use of Sewer		Upstream MH	128
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	129
Loc. details		Flow Control		Dir. of Survey	Upstream
Location Code		Length surveyed	22.00 ft	Section Length	30.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	12 inch
Year Rehabilitated		Material	Plastic/Steel Composite
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:80	Position	Observation	Photo	Grade
	8.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	11.80	Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES, REMARK: NO NIFILTRATION		S 2
	21.10	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	30.00	Upstream Manhole, Survey Ends, REMARK: END OF LINE		



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3122	0000	7	0	7	2.33	0	2.33

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		19
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	2030 SE 18TH ST	Use of Sewer		Upstream MH	105
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	OUTFALL 105A
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	110.00 ft	Section Length	110.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	8 inch
Year Rehabilitated		Material	Polyvinyl Chloride
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:272	Position	Observation	Photo	Grade
105	0.00	Downstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
OUTFALL 105A	110.00	Downstream Manhole, Survey Ends, REMARK: END OF LINE		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0	0	0	0	0	0

Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/19/2010			BILLY		20
Certificate No.	**Survey Customer**	**System Owner**	**Date Cleaned**	**Pre-Cleaning**	**Sewer Category**
11247				Jetting	

Street123	1761 SE 21ST AVE	Use of Sewer		Upstream MH	102
City	LAUDERDALE BY THE SEA	Drainage Area		Dowstream MH	101
Loc. details		Flow Control		Dir. of Survey	Downstream
Location Code		Length surveyed	23.10 ft	Section Length	25.00 ft

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	10 inch
Year Rehabilitated		Material	Concrete Segments (bolted)
Tape / Media No.	1-118	Lining Method	

Add. Information :

1:64	Position	Observation	Photo	Grade
102	0.00	Upstream Manhole, Survey Begins, REMARK: BEGINING OF PIPE		
	8.60	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		S 2
	16.00	Joint Offset Large, REMARK: NO INFILTRATION		S 2
	20.30	Roots Fine Joint, at 04 o'clock, within 8 inches of joint: YES, REMARK: NO INFILTRATION		M 2
	23.10	Upstream Manhole, Survey Ends, REMARK: END OF LINE		
101				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2211	2100	5	2	7	1.67	2	1.75

Appendix 6.5
Stage-Area Data

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
A1	1.17	0.0000	374.9258
	1.50	0.0005	331.4392
	2.00	0.0204	265.5784
	2.50	0.6040	201.2070
	3.00	1.6969	141.9915
	3.50	3.2423	90.7282
	4.00	5.2362	50.1797
	4.50	7.2895	21.8051
	5.00	9.3991	5.7963
	5.50	10.7296	0.9765
	6.00	10.9051	0.1868
	6.50	10.9766	0.0086
	7.00	10.9816	0.0000
	7.08	10.9816	0.0000
A2	1.69	0.0000	380.9376
	2.00	0.0003	336.9292
	2.50	0.0632	266.0495
	3.00	0.3683	196.1894
	3.50	1.9653	131.2711
	4.00	4.5540	79.6218
	4.50	7.1321	44.2578
	5.00	8.8810	21.5971
	5.50	10.2086	7.8666
	6.00	11.2854	1.5848
	6.50	11.7650	0.1609
	7.00	11.8250	0.0084
	7.50	11.8303	0.0000
	7.57	11.8303	0.0000
B1	0.64	0.0000	67.6950
	1.00	0.0007	59.3745
	1.50	0.0039	47.8291
	2.00	0.0094	36.3109
	2.50	0.0512	24.8745
	3.00	0.3173	14.2740
	3.50	0.9363	6.4212
	4.00	1.4238	2.0141
	4.50	1.8205	0.2500
	5.00	1.9175	0.0320
	5.50	1.9244	0.0060
	6.00	1.9260	0.0003
	6.32	1.9263	0.0000
C1	0.12	0.0000	263.3272
	0.50	0.0010	234.2372
	1.00	0.0046	195.9743
	1.50	0.0125	157.7448
	2.00	0.0255	119.5778
	2.50	0.2065	81.6749
	3.00	1.3569	47.7683
	3.50	2.7181	21.6903
	4.00	4.8357	5.5808
	4.50	6.1063	1.2576
	5.00	6.3420	0.6027
	5.50	6.3546	0.4273
	6.00	6.3601	0.2935
	6.50	6.3650	0.1910
	7.00	6.3692	0.1156
	7.50	6.3726	0.0629
	8.00	6.3753	0.0286
	8.50	6.3774	0.0086
	9.00	6.3792	0.0008
	9.40	6.3797	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
C2	1.18	0.0000	300.3873
	1.50	0.0004	269.4698
	2.00	0.0034	221.1687
	2.50	0.3857	173.5982
	3.00	1.2012	129.8759
	3.50	2.3694	92.1116
	4.00	3.9009	62.4690
	4.50	5.4960	42.6865
	5.00	6.4156	30.4820
	5.50	6.7341	21.7480
	6.00	7.0109	14.7255
	6.50	7.1666	8.9733
	7.00	7.3527	4.1287
	7.50	7.7121	1.0124
	8.00	8.0130	0.0923
	8.50	8.0483	0.0033
	8.82	8.0515	0.0000
E1	1.35	0.0000	168.8600
	1.50	0.0006	161.3394
	2.00	0.0155	136.3129
	2.50	0.0445	111.4063
	3.00	0.1024	86.7527
	3.50	0.3431	62.8500
	4.00	0.7878	41.1788
	4.50	1.6432	23.1618
	5.00	2.5220	10.5882
	5.50	3.4354	3.5250
	6.00	3.9397	0.6259
	6.50	4.1599	0.0274
	7.00	4.1778	0.0005
	7.22	4.1783	0.0000
E2	1.37	0.0000	229.1564
	1.50	0.0001	222.4391
	2.00	0.0012	196.6062
	2.50	0.0038	170.7846
	3.00	0.0112	144.9864
	3.50	0.0775	119.3514
	4.00	0.4683	94.9636
	4.50	0.9914	73.4219
	5.00	1.6312	55.4904
	5.50	2.1412	40.9848
	6.00	2.5849	29.3648
	6.50	2.9685	20.2729
	7.00	3.2644	13.1649
	7.50	3.4741	7.5604
	8.00	3.7398	3.3031
	8.50	4.0660	0.8904
	9.00	4.2541	0.0892
	9.50	4.3050	0.0017
	9.96	4.3060	0.0000
E3	3.33	0.0000	184.6043
	3.50	0.0005	175.4866
	4.00	0.1226	148.8901
	4.50	0.3719	123.5496
	5.00	0.6947	99.9103
	5.50	1.0722	78.2258
	6.00	1.7572	59.7888
	6.50	2.4012	45.4701
	7.00	2.9795	34.9462
	7.50	3.2179	26.8291
	8.00	3.4258	19.9794
	8.50	3.5867	14.1917
	9.00	3.7997	9.5796
	9.50	3.9940	6.1562
	10.00	4.1388	3.7838
	10.50	4.2421	2.0805
	11.00	4.3283	1.0126
	11.50	4.3934	0.3522
	12.00	4.4459	0.0740
	12.50	4.4670	0.0030
	12.90	4.4696	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
E4	1.43	0.0000	302.1039
	1.50	0.0000	298.0028
	2.00	0.0006	268.7105
	2.50	0.0022	239.4246
	3.00	0.0088	210.1553
	3.50	0.1520	181.1767
	4.00	0.5750	154.0147
	4.50	1.0799	129.6245
	5.00	1.6293	108.4024
	5.50	2.2729	90.7472
	6.00	2.7303	76.6130
	6.50	3.2537	65.1359
	7.00	3.6620	56.8447
	7.50	3.7914	49.9783
	8.00	3.8526	43.6291
	8.50	3.8931	37.5849
	9.00	3.9339	31.7605
	9.50	3.9978	26.2560
	10.00	4.0840	21.1941
	10.50	4.1614	16.6809
	11.00	4.2163	12.5126
	11.50	4.2795	8.6967
	12.00	4.3714	5.3469
	12.50	4.5158	2.6744
	13.00	4.6952	0.9615
	13.50	4.8152	0.2584
	14.00	4.8684	0.0380
	14.50	4.8814	0.0008
	14.82	4.8823	0.0000
E5	0.40	0.0000	317.2405
	0.50	0.0001	310.9562
	1.00	0.0030	279.5411
	1.50	0.0105	248.1586
	2.00	0.0193	216.8256
	2.50	0.0291	185.5487
	3.00	0.0390	154.3308
	3.50	0.0830	123.2295
	4.00	0.3010	92.8617
	4.50	0.7223	64.3422
	5.00	1.7335	39.9533
	5.50	2.9237	22.5519
	6.00	3.8637	11.6545
	6.50	4.5716	5.7932
	7.00	4.8346	2.7621
	7.50	5.0240	0.9012
	8.00	5.1854	0.1337
	8.50	5.2323	0.0115
	9.00	5.2368	0.0002
	9.17	5.2370	0.0000
E6	1.91	0.0000	246.4870
	2.00	0.0001	240.7151
	2.50	0.0228	208.6975
	3.00	0.0934	176.9779
	3.50	0.2085	145.7663
	4.00	0.3822	115.3952
	4.50	0.9633	87.0996
	5.00	1.7222	63.1326
	5.50	2.3690	43.3129
	6.00	3.2442	27.8954
	6.50	3.9991	17.8602
	7.00	4.2904	10.7634
	7.50	4.6579	5.4034
	8.00	4.9381	2.2474
	8.50	5.1718	0.5302
	9.00	5.3279	0.0167
	9.40	5.3443	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
E7	1.48	0.0000	280.2208
	1.50	0.0000	278.5595
	2.00	0.0009	237.0298
	2.50	0.0464	195.5713
	3.00	0.5709	155.4870
	3.50	1.6232	120.3416
	4.00	2.6963	91.7832
	4.50	3.6670	69.5462
	5.00	4.4883	52.4268
	5.50	4.8332	39.1366
	6.00	5.0201	27.1672
	6.50	5.3692	16.6986
	7.00	5.7876	8.5563
	7.50	6.2220	3.0158
	8.00	6.7456	0.3229
	8.50	6.9179	0.0052
	9.00	6.9218	0.0000
	9.40	6.9219	0.0000
G	0.70	0.0000	480.3242
	1.00	0.0001	452.1791
	1.50	0.0008	405.2727
	2.00	0.0098	358.3881
	2.50	0.0473	311.6307
	3.00	0.1626	265.2781
	3.50	0.4317	220.1265
	4.00	0.8667	177.0483
	4.50	1.3418	136.7641
	5.00	2.1856	100.1831
	5.50	3.2671	69.6406
	6.00	4.2883	45.4733
	6.50	4.9387	26.4685
	7.00	5.8847	11.6372
	7.50	6.9581	3.3787
	8.00	7.6187	0.4395
	8.50	7.8096	0.0133
	9.00	7.8181	0.0000
H	2.88	0.0000	290.7545
	3.00	0.0001	279.2327
	3.50	0.0028	231.2315
	4.00	0.0261	183.2848
	4.50	0.4317	136.3373
	5.00	1.4112	93.5374
	5.50	3.1338	58.9572
	6.00	4.2700	33.4708
	6.50	5.6796	15.1723
	7.00	6.8594	4.8880
	7.50	7.6775	0.7584
	8.00	7.9851	0.0475
	8.50	7.9993	0.0038
	8.98	8.0013	0.0000
I	-0.18	0.0000	444.4966
	0.00	0.0000	431.4415
	0.50	0.0002	395.1780
	1.00	0.0015	358.9180
	1.50	0.0049	322.6714
	2.00	0.0112	286.4540
	2.50	0.0205	250.2830
	3.00	0.0335	214.1766
	3.50	0.1068	178.2834
	4.00	0.2854	143.1101
	4.50	0.6046	109.4264
	5.00	1.4663	78.7346
	5.50	2.9577	56.0311
	6.00	3.4939	39.4327
	6.50	3.9353	25.3411
	7.00	4.5443	14.5220
	7.50	5.0905	7.3068
	8.00	5.4001	2.5256
	8.50	5.9335	0.1458
	9.00	6.0430	0.0015
	9.50	6.0440	0.0000
	9.52	6.0440	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
L-1	1.99	0.0000	170.5757
	2.00	0.0000	169.8277
	2.50	0.0028	132.4287
	3.00	0.0905	95.1929
	3.50	0.7827	59.9849
	4.00	2.2908	31.7831
	4.50	3.8844	12.7733
	5.00	5.3275	3.1231
	5.50	6.0919	0.4159
	6.00	6.2148	0.0462
	6.50	6.2326	0.0011
	7.00	6.2338	0.0000
L-2	1.56	0.0000	147.2369
	2.00	0.0005	122.8606
	2.50	0.0090	95.1746
	3.00	0.2495	68.0154
	3.50	0.7722	43.1882
	4.00	1.6573	22.4875
	4.50	2.9507	8.5948
	5.00	4.0356	2.0393
	5.50	4.5090	0.3464
	6.00	4.6011	0.0725
	6.50	4.6114	0.0124
	7.00	4.6169	0.0000
	7.18	4.6169	0.0000
L-3	2.08	0.0000	120.6930
	2.50	0.0119	96.7909
	3.00	0.0892	68.4536
	3.50	0.8072	42.3430
	4.00	1.7566	21.2521
	4.50	3.4371	8.2314
	5.00	4.2472	3.3004
	5.50	4.5472	1.3809
	6.00	4.6387	0.4299
	6.50	4.7386	0.0853
	7.00	4.7471	0.0328
	7.50	4.7509	0.0089
	8.00	4.7527	0.0009
	8.44	4.7533	0.0000
L-4	2.34	0.0000	107.4167
	2.50	0.0002	98.3822
	3.00	0.0198	70.1767
	3.50	0.5529	43.2320
	4.00	1.6792	21.6541
	4.50	3.1782	8.0775
	5.00	4.1377	2.1194
	5.50	4.5800	0.3276
	6.00	4.6937	0.0450
	6.50	4.7033	0.0098
	7.00	4.7048	0.0018
	7.50	4.7055	0.0000
	7.62	4.7055	0.0000
L-5	2.08	0.0000	122.9642
	2.50	0.0025	98.6812
	3.00	0.1006	69.9484
	3.50	0.6905	43.1817
	4.00	1.5817	20.9502
	4.50	3.2485	6.2275
	5.00	4.5012	0.9922
	5.50	4.7788	0.1619
	6.00	4.8097	0.0385
	6.50	4.8158	0.0069
	7.00	4.8186	0.0000
	7.06	4.8187	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
L-6	1.97	0.0000	140.7205
	2.00	0.0000	138.8256
	2.50	0.0015	107.2470
	3.00	0.1544	75.9046
	3.50	1.0076	47.3798
	4.00	2.1832	25.1956
	4.50	3.5873	10.8947
	5.00	4.5473	3.9848
	5.50	4.9712	1.1783
	6.00	5.2004	0.1819
	6.50	5.2555	0.0094
	6.81	5.2635	0.0000
L-7	2.47	0.0000	128.1285
	2.50	0.0000	126.1184
	3.00	0.0375	92.6522
	3.50	0.5102	60.6131
	4.00	1.5878	33.2000
	4.50	3.1093	13.4722
	5.00	4.7530	3.7277
	5.50	5.3298	0.9416
	6.00	5.5398	0.0783
	6.50	5.5822	0.0019
	6.88	5.5836	0.0000
L-8	0.60	0.0000	637.4173
	1.00	0.0002	574.8172
	1.50	0.0015	496.5699
	2.00	0.0113	418.3530
	2.50	0.0327	340.2285
	3.00	0.1243	262.3445
	3.50	0.6902	186.2074
	4.00	2.4304	116.5253
	4.50	5.4102	61.3086
	5.00	8.9970	26.4427
	5.50	11.2932	10.6665
	6.00	12.2485	2.9560
	6.50	12.8937	0.2866
	7.00	13.0341	0.0242
	7.50	13.0405	0.0027
	8.00	13.0417	0.0000
	8.14	13.0418	0.0000
M	3.31	0.0000	1567.8739
	3.50	0.0024	1501.0296
	4.00	0.0476	1325.2319
	4.50	0.1402	1149.8716
	5.00	0.3712	975.4522
	5.50	0.5759	802.3520
	6.00	0.8593	630.5970
	6.50	1.8969	462.3154
	7.00	5.6260	307.0393
	7.50	12.2810	183.7286
	8.00	18.5651	101.4194
	8.50	23.2446	51.6164
	9.00	26.0594	24.3985
	9.50	27.6818	10.1762
	10.00	28.5732	2.9722
	10.50	29.1289	0.5550
	11.00	29.3068	0.0111
	11.33	29.3186	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
N	7.09	0.0000	525.1029
	7.50	0.0005	459.1527
	8.00	0.0027	378.7328
	8.50	0.0615	298.4145
	9.00	0.4284	219.2480
	9.50	1.6124	144.0793
	10.00	5.3780	83.5373
	10.50	7.8377	43.3230
	11.00	10.4311	17.3280
	11.50	12.5195	6.8974
	12.00	13.0053	3.3746
	12.50	13.2009	1.6548
	13.00	13.3362	0.8707
	13.50	13.3552	0.5189
	14.00	13.3709	0.2706
	14.50	13.3839	0.1087
	15.00	13.3947	0.0169
	15.44	13.4047	0.0000
O	5.68	0.0000	520.2337
	6.00	0.0003	478.1801
	6.50	0.0099	412.4867
	7.00	0.0406	346.9236
	7.50	0.0874	281.5837
	8.00	0.2805	216.8563
	8.50	0.8090	154.1988
	9.00	2.6057	98.3755
	9.50	5.1280	55.0066
	10.00	7.6605	28.4431
	10.50	8.8941	12.7938
	11.00	10.0560	3.8744
	11.50	10.6616	0.7108
	12.00	10.9414	0.0173
	12.50	10.9515	0.0001
	12.71	10.9516	0.0000
P-1	0.66	0.0000	226.8253
	1.00	0.0001	209.0202
	1.50	0.0014	182.8399
	2.00	0.0050	156.6724
	2.50	0.0157	130.5465
	3.00	0.0384	104.5177
	3.50	0.0848	78.6731
	4.00	0.5156	53.9377
	4.50	1.3378	33.1942
	5.00	2.5525	18.4278
	5.50	3.4891	10.8334
	6.00	3.8626	6.8927
	6.50	4.0065	4.3889
	7.00	4.1054	2.5404
	7.50	4.1902	1.2881
	8.00	4.2481	0.3989
	8.50	4.3522	0.0181
	9.00	4.3634	0.0012
	9.50	4.3640	0.0000
P-2	1.72	0.0000	153.4285
	2.00	0.0001	142.1291
	2.50	0.0002	121.9522
	3.00	0.0019	101.7779
	3.50	0.0156	81.6456
	4.00	0.1933	61.9251
	4.50	0.6184	44.0551
	5.00	1.3938	29.7195
	5.50	2.0793	20.0761
	6.00	2.4552	13.5973
	6.50	2.7106	9.0453
	7.00	2.8199	5.4728
	7.50	2.9407	2.5442
	8.00	3.1486	0.5656
	8.50	3.3487	0.0194
	8.91	3.3629	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
P-3	2.60	0.0000	240.4032
	3.00	0.0003	205.7730
	3.50	0.0066	162.4947
	4.00	0.3732	119.9210
	4.50	1.3578	81.4950
	5.00	3.0599	51.1593
	5.50	4.8035	31.9330
	6.00	5.6603	20.3476
	6.50	6.0630	12.3571
	7.00	6.3688	6.3751
	7.50	6.6720	2.0991
	8.00	7.1055	0.3906
	8.50	7.1943	0.0754
	9.00	7.2107	0.0185
	9.50	7.2134	0.0029
	10.00	7.2147	0.0000
P-4	1.03	0.0000	114.4550
	1.50	0.0024	99.9795
	2.00	0.0144	84.6229
	2.50	0.0341	69.3588
	3.00	0.0705	54.2602
	3.50	0.1257	39.4240
	4.00	0.4254	25.5735
	4.50	0.8916	13.9944
	5.00	1.5699	5.9137
	5.50	2.1602	1.7255
	6.00	2.4528	0.2371
	6.50	2.5611	0.0076
	6.77	2.5673	0.0000
P-5	2.26	0.0000	271.8219
	2.50	0.0008	255.0598
	3.00	0.0112	220.1673
	3.50	0.0537	185.4200
	4.00	0.1121	150.9738
	4.50	0.3681	117.3054
	5.00	0.8733	86.1168
	5.50	1.5716	58.4742
	6.00	2.4050	35.2407
	6.50	3.2900	17.3748
	7.00	4.3263	5.1465
	7.50	5.6032	0.2926
	8.00	5.8187	0.0014
	8.22	5.8204	0.0000
P-6	2.64	0.0000	143.8627
	3.00	0.0208	116.8016
	3.50	0.5776	80.4844
	4.00	1.9976	50.0886
	4.50	3.7147	29.5631
	5.00	4.6983	17.4222
	5.50	5.2723	9.9678
	6.00	5.6318	5.0282
	6.50	5.8885	2.0474
	7.00	6.1113	0.3970
	7.50	6.2654	0.0023
	7.73	6.2680	0.0000
P-7	1.60	0.0000	129.9811
	2.00	0.0122	104.7089
	2.50	0.1806	73.5265
	3.00	0.8987	44.7922
	3.50	2.2153	22.3822
	4.00	3.6844	8.3640
	4.50	4.7579	2.5634
	5.00	5.1225	0.8421
	5.50	5.1948	0.2438
	6.00	5.2578	0.0170
	6.50	5.2678	0.0000
	6.52	5.2679	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
Q	4.20	0.0000	673.3723
	4.50	0.0001	621.3283
	5.00	0.0018	534.5903
	5.50	0.0551	447.9783
	6.00	0.2215	361.9834
	6.50	0.5699	277.4241
	7.00	2.0502	197.6244
	7.50	4.9748	131.8685
	8.00	7.2987	82.2276
	8.50	9.2647	45.3750
	9.00	11.2832	20.0592
	9.50	13.0258	6.6404
	10.00	14.0240	1.1049
	10.50	14.4117	0.1507
	11.00	14.4491	0.0205
	11.50	14.4559	0.0011
	11.84	14.4567	0.0000
R	-4.97	0.0000	1235.8212
	-4.50	0.0003	1191.7487
	-4.00	0.0014	1144.8673
	-3.50	0.0032	1097.9946
	-3.00	0.0058	1051.1352
	-2.50	0.0092	1004.2935
	-2.00	0.0132	957.4740
	-1.50	0.0181	910.6814
	-1.00	0.0237	863.9200
	-0.50	0.0300	817.1943
	0.00	0.0371	770.5090
	0.50	0.0449	723.8684
	1.00	0.0535	677.2772
	1.50	0.0629	630.7397
	2.00	0.0730	584.2605
	2.50	0.0838	537.8442
	3.00	0.0954	491.4952
	3.50	0.1078	445.2180
	4.00	0.1539	399.0638
	4.50	0.3048	353.5323
	5.00	0.4778	308.9948
	5.50	0.6569	265.5104
	6.00	0.9801	223.3018
	6.50	1.5917	184.1963
	7.00	2.3001	148.9056
	7.50	2.5980	116.8373
	8.00	3.1705	86.9571
	8.50	4.2167	62.2149
	9.00	5.2244	43.7226
	9.50	5.8022	30.0854
	10.00	6.3229	19.5321
	10.50	6.9492	12.4221
	11.00	7.3101	8.4368
	11.50	7.5378	6.2024
	12.00	7.5973	4.7412
	12.50	7.6369	3.5621
	13.00	7.6695	2.5977
	13.50	7.6984	1.8164
	14.00	7.7242	1.1991
	14.50	7.7476	0.7295
	15.00	7.7680	0.3920
	15.50	7.7850	0.1664
	16.00	7.7985	0.0323
	16.47	7.8144	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
S	6.69	0.0000	451.4568
	7.00	0.0010	407.4158
	7.50	0.0078	336.4021
	8.00	0.0718	265.5491
	8.50	0.4302	195.8697
	9.00	1.4271	129.5122
	9.50	3.5957	73.4036
	10.00	6.5570	32.0218
	10.50	9.5968	9.5728
	11.00	11.1872	1.8220
	11.50	11.7750	0.1189
	12.00	11.8361	0.0044
	12.38	11.8393	0.0000
T	4.97	0.0000	518.3768
	5.00	0.0000	515.0806
	5.50	0.0505	460.2636
	6.00	0.0794	405.7139
	6.50	0.1171	351.3624
	7.00	0.1774	297.2990
	7.50	0.2732	243.6895
	8.00	0.4641	190.8657
	8.50	0.8902	139.8478
	9.00	1.8455	92.8695
	9.50	3.3218	53.0354
	10.00	5.9021	25.1604
	10.50	7.6254	11.6515
	11.00	8.3447	4.9969
	11.50	8.7294	1.2891
	12.00	9.1000	0.1411
	12.50	9.1504	0.0124
	13.00	9.1560	0.0000
	13.07	9.1561	0.0000
U-1	2.17	0.0000	69.9927
	2.50	0.0011	57.6540
	3.00	0.2032	39.3158
	3.50	0.6103	22.9545
	4.00	1.5278	10.2961
	4.50	2.3905	3.4398
	5.00	2.9040	0.8379
	5.50	3.0794	0.2569
	6.00	3.0983	0.1000
	6.50	3.1088	0.0280
	7.00	3.1144	0.0032
	7.44	3.1161	0.0000
U-2	2.42	0.0000	216.4040
	2.50	0.0000	212.6341
	3.00	0.0019	189.0758
	3.50	0.0807	165.6660
	4.00	0.4691	143.6822
	4.50	0.8335	124.0103
	5.00	1.2978	106.7574
	5.50	1.4430	91.5280
	6.00	1.5245	76.8728
	6.50	1.6119	62.7104
	7.00	1.7513	49.2309
	7.50	1.8947	36.5843
	8.00	2.0365	24.8101
	8.50	2.3795	14.2840
	9.00	2.9380	6.6606
	9.50	3.4202	2.2432
	10.00	3.7876	0.4548
	10.50	3.9104	0.1070
	11.00	3.9193	0.0384
	11.50	3.9242	0.0083
	12.00	3.9267	0.0003
	12.25	3.9270	0.0000

Appendix 6.5
Stage Area Data

SubBasin	Plane Height (ft)	Total Area Below Plane (Ac)	Volume (Ac-in)
U-3	1.43	0.0000	413.4844
	1.50	0.0000	406.8763
	2.00	0.0013	359.6781
	2.50	0.0139	312.5045
	3.00	0.2329	265.8814
	3.50	-14.2899	221.8430
	4.00	2.2855	184.1659
	4.50	3.8466	155.3524
	5.00	4.5481	133.7533
	5.50	4.8673	114.9124
	6.00	5.0415	97.4808
	6.50	5.1987	81.0120
	7.00	5.2953	65.3061
	7.50	5.4240	50.2497
	8.00	5.5974	36.0649
	8.50	5.8353	23.1469
	9.00	6.2218	11.8582
	9.50	6.9619	4.1661
	10.00	7.5965	0.7128
	10.50	7.8415	0.0234
	10.88	7.8668	0.0000
V	4.63	0.0000	471.4433
	5.00	0.0036	440.4694
	5.50	0.0263	398.6731
	6.00	0.1957	357.3853
	6.50	0.3537	317.2080
	7.00	0.5169	277.9075
	7.50	0.7179	239.7570
	8.00	1.0105	202.9354
	8.50	1.5687	168.7068
	9.00	2.1630	137.9223
	9.50	3.1440	111.8182
	10.00	3.9729	91.4678
	10.50	4.6609	75.5642
	11.00	5.2999	63.6083
	11.50	5.6334	54.7737
	12.00	5.7627	47.0941
	12.50	5.8843	40.1916
	13.00	5.9891	33.9535
	13.50	6.0908	28.3232
	14.00	6.1937	23.3188
	14.50	6.3124	18.9726
	15.00	6.3856	15.2277
	15.50	6.4364	11.8314
	16.00	6.4854	8.7335
	16.50	6.5335	5.9269
	17.00	6.5806	3.4059
	17.50	6.6358	1.1684
	18.00	6.9482	0.0313
	18.50	6.9772	0.0000
	18.64	6.9773	0.0000

Appendix 6.6
Hydrologic Parameters

Appendix 6.6
Hydrologic Parameters

Basin	SubBasin	Total Area (Ac)	Curve Number	DCIA	TOC	Pervious Area within ROW (Ac)	ROW Area (Ac)	ROW Volume (Ac-In)	Impervious Volume (Ac-In)	Existing Water Quality Volume-Pervious (Ac-In)	Water Quality Volume Needed (Ac-In)
A	A1	10.98	74	58.68%	56.61	1.28	4.17	4.17	7.24	1.92	5.32
	A2	11.83	74	57.26%	38.68	1.38	4.15	4.15	6.94	2.06	4.88
B	B1	1.93	73	59.40%	59.14	0.22	-	-	-	0.34	-
C	C1	6.38	71	61.96%	59.00	0.74	1.58	1.58	2.11	1.11	0.99
	C2	8.05	71	65.19%	68.29	0.94	2.17	2.17	3.08	1.41	1.68
E	E1	4.18	75	60.88%	36.74	0.49	1.43	1.43	2.36	0.73	1.63
	E2	4.31	75	51.96%	19.34	0.50	1.65	1.65	2.87	0.75	2.12
	E3	4.47	75	55.84%	15.13	0.52	1.67	1.67	2.87	0.78	2.09
	E4	4.88	75	51.48%	17.44	0.57	1.71	1.71	2.85	0.85	2.00
	E5	5.24	75	58.84%	32.99	0.61	1.69	1.69	2.69	0.91	1.78
	E6	5.34	75	61.24%	22.20	0.62	1.67	1.67	2.61	0.93	1.68
	E7	6.92	75	54.49%	29.51	0.81	2.27	2.27	3.66	1.21	2.45
G	G1	7.82	94	55.16%	53.16	0.91	-	-	-	1.36	-
H	H1	8.00	92	67.08%	66.73	-	-	-	-	-	-
I	I1	6.04	92	61.53%	53.26	-	-	-	-	-	-
L	L1	6.23	80	61.72%	66.43	0.73	2.16	2.16	3.59	1.09	2.51
	L2	4.62	79	50.74%	34.48	0.54	1.64	1.64	2.75	0.81	1.94
	L3	4.74	79	58.67%	31.45	0.55	1.65	1.65	2.76	0.83	1.93
	L4	4.71	79	58.13%	32.30	0.55	1.66	1.66	2.79	0.82	1.97
	L5	4.82	79	57.25%	28.58	0.56	1.79	1.79	3.08	0.84	2.23
	L6	5.26	79	69.31%	39.40	0.61	1.96	1.96	3.38	0.92	2.46
	L7	5.58	79	56.58%	44.36	0.65	2.09	2.09	3.59	0.97	2.62
	L8	13.04	79	69.82%	44.24	1.52	3.53	3.53	5.03	2.28	2.76
M	M1	29.32	90	80.00%	29.09	1.12	6.64	6.64	13.79	1.69	12.10
N	N1	13.40	94	85.75%	31.94	0.60	4.65	4.65	10.14	0.90	9.24
O	O1	10.95	89	70.09%	35.24	1.13	3.36	3.36	5.57	1.69	3.88
P	P1	4.36	84	78.10%	24.39	0.32	1.35	1.35	2.59	0.47	2.11
	P2	3.36	70	49.75%	50.95	0.39	1.16	1.16	1.92	0.59	1.33
	P3	7.21	70	58.43%	88.77	0.84	2.42	2.42	3.96	1.26	2.70
	P4	2.57	84	89.51%	9.25	0.30	0.59	0.59	0.73	0.45	0.28
	P5	5.82	78	55.21%	28.46	0.68	2.11	2.11	3.57	1.02	2.55
	P6	6.27	76	53.43%	30.93	0.73	2.33	2.33	4.00	1.09	2.91
	P7	5.27	76	50.56%	42.63	0.61	1.70	1.70	2.71	0.92	1.79
Q	Q1	14.46	87	85.20%	32.82	0.12	4.39	4.39	10.67	0.19	10.49
R	R1	7.81	95	82.00%	16.72	0.06	1.03	1.03	2.41	0.10	2.32
S	S1	11.84	92	85.33%	37.17	0.33	3.98	3.98	9.12	0.50	8.62
T	T1	9.16	92	80.73%	36.72	0.60	2.66	2.66	5.14	0.90	4.24
U	U1	3.12	83	58.91%	23.63	0.36	0.86	0.86	1.25	0.54	0.71
	U2	3.93	83	56.30%	26.95	0.46	1.39	1.39	2.33	0.69	1.65
	U3	7.87	83	55.89%	46.55	0.92	2.49	2.49	3.93	1.37	2.56
V	V1	6.98	90	81.97%	17.06	0.20	1.35	1.35	2.89	0.30	2.59

Appendix 6.7
Existing Conditions Peak Stages

Appendix 6.7
Existing Conditions Peak Stages

Basin	Sub-Basin	Indicator Elevations		Peak Stage Elevations				Level of Service Analysis	
		Finish Floor Elevation	Low Pavement Elevation	5 Year 1 Day Storm	10 Year 1 Day	25 Year 3 Day Storm	100 Year 3 Day Storm	Deviation from Low Pavement Elevation	Deviation from Finish Floor Elevation
A	A1	3.53	1.89	1.17	1.17	1.921	2.829	0.72	0.70
	A2	4.52	2.13	2.803	3.29	3.453	3.588	-0.67	0.93
B	B1	3.68	2.47	1.921	2.598	2.879	3.192	0.55	0.49
C	C1	3.93	2.12	3.184	3.347	3.39	3.637	-1.06	0.29
	C2	3.86	2.08	2.371	2.793	3.313	3.637	-0.29	0.22
E	E1	4.91	3.29	4.311	4.579	4.785	5.081	-1.02	-0.17
	E2	4.59	3.50	4.31	4.579	4.785	5.081	-0.81	-0.49
	E3	5.95	3.80	4.519	4.935	5.239	5.629	-0.72	0.32
	E4	4.92	3.37	4.595	4.885	5.123	5.463	-1.23	-0.54
	E5	4.94	3.60	2.414	3.512	4.04	4.537	1.19	0.40
	E6	4.82	2.50	4.435	4.759	4.975	5.297	-1.94	-0.48
	E7	4.47	2.59	4.696	5.134	5.583	5.979	-2.11	-1.51
G	G1	5.68	2.89	4.696	5.134	5.583	5.979	-1.81	-0.30
H	H1	4.12	4.00	4.697	5.135	5.583	5.979	-0.70	-1.86
I	I1	4.26	3.12	5.664	5.734	5.871	5.98	-2.54	-1.72
L	L1	4.78	2.88	4.242	4.435	4.612	4.915	-1.36	-0.14
	L2	4.04	2.5	4.242	4.435	4.611	4.914	-1.74	-0.87
	L3	3.47	2.7	4.236	4.434	4.61	4.914	-1.54	-1.44
	L4	4.05	3.02	4.225	4.433	4.61	4.913	-1.21	-0.86
	L5	4.47	2.62	4.168	4.433	4.61	4.913	-1.55	-0.44
	L6	4.17	2.71	4.168	4.433	4.61	4.913	-1.46	-0.74
	L7	4.44	2.87	4.168	4.434	4.61	4.914	-1.30	-0.47
	L8	4.53	2.71	4.187	4.434	4.611	4.914	-1.48	-0.38
M	M1	6.94	5.81	6.634	6.769	6.858	7.021	-0.82	-0.08
N	N1	9.56	7.8	9.801	10.024	10.161	10.454	-2.00	-0.89
O	O1	8.83	7.75	9.789	10.022	10.174	10.481	-2.04	-1.65
P	P1	5.27	3.6	4.41	4.568	4.607	4.756	-0.81	0.51
	P2	4.52	3.74	3.868	4.476	4.586	4.758	-0.13	-0.24
	P3	4.51	3.54	3.584	4.163	4.576	4.759	-0.04	-0.25
	P4	6.28	3.58	1.52	1.702	1.706	3.454	2.06	2.83
	P5	4.65	4.12	6.291	6.388	6.452	6.549	-2.17	-1.90
	P6	3.9	2.95	4.627	4.971	5.261	5.758	-1.68	-1.86
	P7	3.63	2.03	4.627	4.971	5.261	5.757	-2.60	-2.13
Q	Q1	8.07	5	6.973	7.243	7.397	7.665	-1.97	0.41
R	R1	6.16	7.76	5.357	5.472	5.558	5.76	2.40	0.40
S	S1	9.48	7.89	9.032	9.324	9.48	9.773	-1.14	-0.29
T	T1	9.86	6.4	9.351	9.638	9.789	10.062	-2.95	-0.20
U	U1	3.46	2.5	3.335	3.609	3.762	3.931	-0.84	-0.47
	U2	4.71	3.25	2.42	2.42	2.42	3.141	0.83	1.57
	U3	3.59	2.73	3.818	4.094	4.278	4.567	-1.09	-0.98
V	V1	11.59	6.2	6.783	7.183	7.434	7.913	-0.58	3.68

* 100 year - 3 day Storm Event Assumes Zero Offsite Discharge
** Negative Elevations indicate Ponding
Please Note: All Elevations in NVAD 88

Appendix 6.8
Existing Conditions Peak Discharges

Appendix 6.8
Existing Conditions Peak Discharge Per Outfall

Peak Outfall Discharge (CFS) for 25 Year - 3 Day Design Storm

Outfall #	ICPR Link Name	Existing Conditions
1	A-1 Outfall	38.917
2	A-2 Outfall	26.945
3	B Outfall	4.195
4	C-1 Outfall	3.929
5	C-2 Outfall	14.162
6	E-1 Outfall	2.451
7	E-2 Outfall	3.685
8	E-3 Outfall	10.147
9	E-4 Outfall	3.124
10	E-5 Outfall	16.476
11	E-6 Outfall	6.269
12	E-7 Outfall	7.459
13	L-1 Outfall	4.389
14	L-2 Outfall	12.256
15	L-3 Outfall	13.652
16	L-4 Outfall	10.703
17	L-6 Outfall	10.69
18	L-7 Outfall	5.614
19	L-8 Outfall	4.722
20	P-1 Outfall	4.508
21	P-2 Outfall	5.469
22	P-3 Outfall	10.545
23	P-4 Outfall	47.639
24	P-5 Outfall	11.348
25	P-6 Outfall	6.141
26	P-7 Outfall	7.214
27	U-1 Outfall	5.76
28	U-2 Outfall	18.665
29	U-3 Outfall	6.311
Total Discharge:		323.385

Appendix 6.9
Existing Conditions Model Input Data

```
==========================================================================================
======
==== Basins
==============================================================================
==========================================================================================
======

         Name: A-1                      Node: A-1                     Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 56.61
            Area(ac): 10.980                     Time Shift(hrs): 0.00
        Curve Number: 74.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 58.68


------------------------------------------------------------------------------------------
----------------
         Name: A-2                      Node: A-2                     Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 38.68
            Area(ac): 11.830                     Time Shift(hrs): 0.00
        Curve Number: 74.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 57.26


------------------------------------------------------------------------------------------
----------------
         Name: B                        Node: B                       Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 59.14
            Area(ac): 1.930                      Time Shift(hrs): 0.00
        Curve Number: 73.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 59.40


------------------------------------------------------------------------------------------
----------------
         Name: C-1                      Node: C-1                     Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 59.00
            Area(ac): 6.380                      Time Shift(hrs): 0.00
        Curve Number: 71.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 61.96
```

```
--------------------------------------------------------------------------------
----------------
         Name: C-2                      Node: C-2                     Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 68.29
            Area(ac): 8.050                      Time Shift(hrs): 0.00
         Curve Number: 71.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 65.19


--------------------------------------------------------------------------------
----------------
         Name: E-1                      Node: E-1                     Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 36.74
            Area(ac): 4.180                      Time Shift(hrs): 0.00
         Curve Number: 75.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 60.88


--------------------------------------------------------------------------------
----------------
         Name: E-2                      Node: E-2                     Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 19.34
            Area(ac): 4.310                      Time Shift(hrs): 0.00
         Curve Number: 75.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 51.96


--------------------------------------------------------------------------------
----------------
         Name: E-3                      Node: E-3                     Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 15.13
            Area(ac): 4.470                      Time Shift(hrs): 0.00
         Curve Number: 75.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 55.84
```

```
--------------------------------------------------------------------------------
----------------
         Name: E-4                      Node: E-4                    Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 17.44
            Area(ac): 4.880                      Time Shift(hrs): 0.00
        Curve Number: 75.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 51.48


--------------------------------------------------------------------------------
----------------
         Name: E-5                      Node: E-5                    Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 32.99
            Area(ac): 5.240                      Time Shift(hrs): 0.00
        Curve Number: 75.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 58.84


--------------------------------------------------------------------------------
----------------
         Name: E-6                      Node: E-6                    Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 22.20
            Area(ac): 5.340                      Time Shift(hrs): 0.00
        Curve Number: 75.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 61.24


--------------------------------------------------------------------------------
----------------
         Name: E-7                      Node: E-7                    Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 29.51
            Area(ac): 6.920                      Time Shift(hrs): 0.00
        Curve Number: 75.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 54.49


--------------------------------------------------------------------------------
----------------
         Name: G                        Node: G                      Status: Onsite
```

```
        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 53.16
            Area(ac): 7.820                      Time Shift(hrs): 0.00
        Curve Number: 94.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 55.16


--------------------------------------------------------------------------------
----------------
         Name: H                        Node: H                      Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 66.73
            Area(ac): 8.000                      Time Shift(hrs): 0.00
        Curve Number: 92.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 67.08


--------------------------------------------------------------------------------
----------------
         Name: I                        Node: I                      Status: Onsite

        Group: NORTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 53.26
            Area(ac): 6.040                      Time Shift(hrs): 0.00
        Curve Number: 92.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 61.53


--------------------------------------------------------------------------------
----------------
         Name: L-1                      Node: L-1                    Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 66.43
            Area(ac): 6.230                      Time Shift(hrs): 0.00
        Curve Number: 80.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 61.72


--------------------------------------------------------------------------------
----------------
         Name: L-2                      Node: L-2                    Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN
```

```
        Unit Hydrograph: UH323                    Peaking Factor: 323.0
          Rainfall File:                       Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                   Time of Conc(min): 34.48
                Area(ac): 4.620                    Time Shift(hrs): 0.00
            Curve Number: 79.00                Max Allowable Q(cfs): 999999.000
                 DCIA(%): 50.74


--------------------------------------------------------------------------------
----------------
         Name: L-3                       Node: L-3                     Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                    Peaking Factor: 323.0
          Rainfall File:                       Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                   Time of Conc(min): 31.45
                Area(ac): 4.740                    Time Shift(hrs): 0.00
            Curve Number: 79.00                Max Allowable Q(cfs): 999999.000
                 DCIA(%): 58.67


--------------------------------------------------------------------------------
----------------
         Name: L-4                       Node: L-4                     Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                    Peaking Factor: 323.0
          Rainfall File:                       Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                   Time of Conc(min): 32.30
                Area(ac): 4.710                    Time Shift(hrs): 0.00
            Curve Number: 79.00                Max Allowable Q(cfs): 999999.000
                 DCIA(%): 58.13


--------------------------------------------------------------------------------
----------------
         Name: L-5                       Node: L-5                     Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                    Peaking Factor: 323.0
          Rainfall File:                       Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                   Time of Conc(min): 28.58
                Area(ac): 4.820                    Time Shift(hrs): 0.00
            Curve Number: 79.00                Max Allowable Q(cfs): 999999.000
                 DCIA(%): 57.25


--------------------------------------------------------------------------------
----------------
         Name: L-6                       Node: L-6                     Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                    Peaking Factor: 323.0
          Rainfall File:                       Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                   Time of Conc(min): 39.40
```

```
            Area(ac): 5.260                  Time Shift(hrs): 0.00
        Curve Number: 79.00              Max Allowable Q(cfs): 999999.000
             DCIA(%): 69.31


--------------------------------------------------------------------------------
----------------
         Name: L-7                       Node: L-7                     Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 44.36
            Area(ac): 5.580                  Time Shift(hrs): 0.00
        Curve Number: 79.00              Max Allowable Q(cfs): 999999.000
             DCIA(%): 56.58


--------------------------------------------------------------------------------
----------------
         Name: L-8                       Node: L-8                     Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 44.24
            Area(ac): 13.040                 Time Shift(hrs): 0.00
        Curve Number: 79.00              Max Allowable Q(cfs): 999999.000
             DCIA(%): 69.82


--------------------------------------------------------------------------------
----------------
         Name: M                         Node: M                       Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 29.09
            Area(ac): 29.320                 Time Shift(hrs): 0.00
        Curve Number: 90.00              Max Allowable Q(cfs): 999999.000
             DCIA(%): 80.00


--------------------------------------------------------------------------------
----------------
         Name: N                         Node: N                       Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 31.94
            Area(ac): 13.400                 Time Shift(hrs): 0.00
        Curve Number: 94.00              Max Allowable Q(cfs): 999999.000
             DCIA(%): 85.75
```

```
--------------------------------------------------------------------------------
----------------
         Name: O                        Node: O                       Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 35.24
            Area(ac): 10.950                     Time Shift(hrs): 0.00
         Curve Number: 89.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 70.09


--------------------------------------------------------------------------------
----------------
         Name: P-1                      Node: P-1                     Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 24.39
            Area(ac): 4.360                      Time Shift(hrs): 0.00
         Curve Number: 84.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 78.10


--------------------------------------------------------------------------------
----------------
         Name: P-2                      Node: P-2                     Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 50.95
            Area(ac): 3.360                      Time Shift(hrs): 0.00
         Curve Number: 70.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 49.75


--------------------------------------------------------------------------------
----------------
         Name: P-3                      Node: P-3                     Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                  Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 88.77
            Area(ac): 7.210                      Time Shift(hrs): 0.00
         Curve Number: 70.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 58.43
```

```
--------------------------------------------------------------------------------
----------------
         Name: P-4                      Node: P-4                     Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                      Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                  Time of Conc(min): 9.25
               Area(ac): 2.570                    Time Shift(hrs): 0.00
           Curve Number: 84.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 89.51


--------------------------------------------------------------------------------
----------------
         Name: P-5                      Node: P-5                     Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                      Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                  Time of Conc(min): 28.46
               Area(ac): 5.820                    Time Shift(hrs): 0.00
           Curve Number: 78.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 55.21


--------------------------------------------------------------------------------
----------------
         Name: P-6                      Node: P-6                     Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                      Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                  Time of Conc(min): 30.93
               Area(ac): 6.270                    Time Shift(hrs): 0.00
           Curve Number: 76.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 53.43


--------------------------------------------------------------------------------
----------------
         Name: P-7                      Node: P-7                     Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                      Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                  Time of Conc(min): 42.63
               Area(ac): 5.270                    Time Shift(hrs): 0.00
           Curve Number: 76.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 50.56


--------------------------------------------------------------------------------
----------------
         Name: Q                        Node: Q                       Status: Onsite
```

```
        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 32.82
            Area(ac): 14.460                     Time Shift(hrs): 0.00
        Curve Number: 87.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 85.20


--------------------------------------------------------------------------------
----------------
         Name: R                        Node: R                      Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 16.72
            Area(ac): 7.810                      Time Shift(hrs): 0.00
        Curve Number: 95.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 82.00


--------------------------------------------------------------------------------
----------------
         Name: S                        Node: S                      Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 37.17
            Area(ac): 11.840                     Time Shift(hrs): 0.00
        Curve Number: 92.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 85.33


--------------------------------------------------------------------------------
----------------
         Name: T                        Node: T                      Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                   Peaking Factor: 323.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 36.72
            Area(ac): 9.160                      Time Shift(hrs): 0.00
        Curve Number: 92.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 80.73


--------------------------------------------------------------------------------
----------------
         Name: U-1                      Node: U-1                    Status: Onsite

        Group: SOUTH                    Type: SCS Unit Hydrograph CN
```

```
        Unit Hydrograph: UH323                    Peaking Factor: 323.0
          Rainfall File:                       Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                   Time of Conc(min): 23.63
                Area(ac): 3.120                    Time Shift(hrs): 0.00
            Curve Number: 83.00                Max Allowable Q(cfs): 999999.000
                 DCIA(%): 58.91


--------------------------------------------------------------------------------
----------------
         Name: U-2                       Node: U-2                     Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                    Peaking Factor: 323.0
          Rainfall File:                       Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                   Time of Conc(min): 26.95
                Area(ac): 3.930                    Time Shift(hrs): 0.00
            Curve Number: 83.00                Max Allowable Q(cfs): 999999.000
                 DCIA(%): 56.30


--------------------------------------------------------------------------------
----------------
         Name: U-3                       Node: U-3                     Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                    Peaking Factor: 323.0
          Rainfall File:                       Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                   Time of Conc(min): 46.55
                Area(ac): 7.870                    Time Shift(hrs): 0.00
            Curve Number: 83.00                Max Allowable Q(cfs): 999999.000
                 DCIA(%): 55.89


--------------------------------------------------------------------------------
----------------
         Name: V                         Node: V                       Status: Onsite

        Group: SOUTH                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: UH323                    Peaking Factor: 323.0
          Rainfall File:                       Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                   Time of Conc(min): 17.06
                Area(ac): 6.980                    Time Shift(hrs): 0.00
            Curve Number: 90.00                Max Allowable Q(cfs): 999999.000
                 DCIA(%): 81.97


================================================================================
======
==== Nodes
================================================================================
================================================================================
======

      Name: A-1                 Base Flow(cfs): 0.000          Init Stage(ft): 1.170
```

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.170	0.0000
1.500	0.0005
2.000	0.0204
2.500	0.6040
3.000	1.6969
3.500	3.2423
4.000	5.2362
4.500	7.2895
5.000	9.3991
5.500	10.7296
6.000	10.9051
6.500	10.9766
7.000	10.9816
7.080	10.9816

Name: A-2 Base Flow(cfs): 0.000 Init Stage(ft): 1.690

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.690	0.0000
2.000	0.0004
2.500	0.0632
3.000	0.3683
3.500	1.9653
4.000	4.5540
4.500	7.1321
5.000	8.8810
5.500	10.2086
6.000	11.2854
6.500	11.7650
7.000	11.8250
7.500	11.8303
7.570	11.8303

Name: B Base Flow(cfs): 0.000 Init Stage(ft): 0.000

Group: NORTH Warn Stage(ft): 0.640

Type: Stage/Area

Stage(ft)	Area(ac)
0.640	0.0000

1.000	0.0007
1.500	0.0039
2.000	0.0094
2.500	0.0512
3.000	0.3173
3.500	0.9363
4.000	1.4238
4.500	1.8205
5.000	1.9175
5.500	1.9244
6.000	1.9260
6.320	1.9263

Name: C-1 Base Flow(cfs): 0.000 Init Stage(ft): 0.120

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
0.120	0.0000
0.500	0.0010
1.000	0.0046
1.500	0.0125
2.000	0.0255
2.500	0.2065
3.000	1.3569
3.500	2.7181
4.000	4.8357
4.500	6.1063
5.000	6.3420
5.500	6.3546
6.000	6.3602
6.500	6.3650
7.000	6.3692
7.500	6.3726
8.000	6.3753
8.500	6.3774
9.000	6.3792
9.400	6.3797

Name: C-2 Base Flow(cfs): 0.000 Init Stage(ft): 1.180

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.180	0.0000
1.500	0.0004
2.000	0.0034
2.500	0.3857
3.000	1.2012

3.500	2.3694
4.000	3.9009
4.500	5.4960
5.000	6.4156
5.500	6.7340
6.000	7.0109
6.500	7.1666
7.000	7.3527
7.500	7.7121
8.000	8.0130
8.500	8.0483
8.820	8.0516

Name: E-1 Base Flow(cfs): 0.000 Init Stage(ft): 1.350

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.350	0.0000
1.500	0.0006
2.000	0.0155
2.500	0.0445
3.000	0.1024
3.500	0.3431
4.000	0.7878
4.500	1.6432
5.000	2.5220
5.500	3.4354
6.000	3.9397
6.500	4.1599
7.000	4.1778
7.220	4.1783

Name: E-2 Base Flow(cfs): 0.000 Init Stage(ft): 1.370

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.370	0.0000
1.500	0.0001
2.000	0.0012
2.500	0.0038
3.000	0.0112
3.500	0.0775
4.000	0.4683
4.500	0.9914
5.000	1.6312
5.500	2.1412
6.000	2.5849

6.500	2.9685
7.000	3.2644
7.500	3.4741
8.000	3.7398
8.500	4.0660
9.000	4.2541
9.500	4.3050
9.960	4.3060

Name: E-3 Base Flow(cfs): 0.000 Init Stage(ft): 3.330

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
3.330	0.0000
3.500	0.0005
4.000	0.1226
4.500	0.3719
5.000	0.6947
5.500	1.0722
6.000	1.7572
6.500	2.4012
7.000	2.9795
7.500	3.2179
8.000	3.4258
8.500	3.5867
9.000	3.7997
9.500	3.9940
10.000	4.1388
10.500	4.2421
11.000	4.3283
11.500	4.3934
12.000	4.4459
12.500	4.4670
12.900	4.4695

Name: E-4 Base Flow(cfs): 0.000 Init Stage(ft): 1.430

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.430	0.0000
1.500	0.0000
2.000	0.0006
2.500	0.0022
3.000	0.0088
3.500	0.1520
4.000	0.5750
4.500	1.0799

5.000	1.6293
5.500	2.2729
6.000	2.7303
6.500	3.2537
7.000	3.6620
7.500	3.7914
8.000	3.8526
8.500	3.8931
9.000	3.9339
9.500	3.9978
10.000	4.0840
10.500	4.1614
11.000	4.2164
11.500	4.2796
12.000	4.3714
12.500	4.5158
13.000	4.6952
13.500	4.8152
14.000	4.8684
14.500	4.8814
14.820	4.8823

Name: E-5 Base Flow(cfs): 0.000 Init Stage(ft): 0.400

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
0.400	0.0000
0.500	0.0001
1.000	0.0030
1.500	0.0105
2.000	0.0193
2.500	0.0291
3.000	0.0390
3.500	0.0830
4.000	0.3010
4.500	0.7223
5.000	1.7335
5.500	2.9238
6.000	3.8637
6.500	4.5717
7.000	4.8346
7.500	5.0240
8.000	5.1854
8.500	5.2323
9.000	5.2367
9.170	5.2370

Name: E-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.910

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.910	0.0000
2.000	0.0001
2.500	0.0228
3.000	0.0934
3.500	0.2085
4.000	0.3822
4.500	0.9633
5.000	1.7222
5.500	2.3690
6.000	3.2443
6.500	3.9991
7.000	4.2904
7.500	4.6579
8.000	4.9381
8.500	5.1718
9.000	5.3279
9.400	5.3443

Name: E-7 Base Flow(cfs): 0.000 Init Stage(ft): 1.480

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.480	0.0000
1.500	0.0000
2.000	0.0009
2.500	0.0464
3.000	0.5709
3.500	1.6232
4.000	2.6963
4.500	3.6670
5.000	4.4883
5.500	4.8332
6.000	5.0201
6.500	5.3692
7.000	5.7876
7.500	6.2220
8.000	6.7457
8.500	6.9179
9.000	6.9218
9.400	6.9219

Name: G Base Flow(cfs): 0.000 Init Stage(ft): 0.700

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
0.700	0.0000
1.000	0.0001
1.500	0.0008
2.000	0.0098
2.500	0.0473
3.000	0.1626
3.500	0.4317
4.000	0.8667
4.500	1.3418
5.000	2.1856
5.500	3.2671
6.000	4.2883
6.500	4.9387
7.000	5.8847
7.500	6.9581
8.000	7.6187
8.500	7.8096
9.000	7.8181

Name: H Base Flow(cfs): 0.000 Init Stage(ft): 2.880

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.880	0.0000
3.000	0.0001
3.500	0.0028
4.000	0.0261
4.500	0.4317
5.000	1.4112
5.500	3.1338
6.000	4.2700
6.500	5.6796
7.000	6.8594
7.500	7.6775
8.000	7.9851
8.500	7.9993
8.980	8.0012

Name: I Base Flow(cfs): 0.000 Init Stage(ft): 0.000

Group: NORTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
0.000	0.0000
0.500	0.0002
1.000	0.0015

1.500	0.0049
2.000	0.0112
2.500	0.0205
3.000	0.0335
3.500	0.1068
4.000	0.2854
4.500	0.6046
5.000	1.4663
5.500	2.9577
6.000	3.4939
6.500	3.9353
7.000	4.5443
7.500	5.0906
8.000	5.4001
8.500	5.9335
9.000	6.0430
9.500	6.0440
9.520	6.0440

Name: L-1 Base Flow(cfs): 0.000 Init Stage(ft): 1.990

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.990	0.0000
2.000	0.0000
2.500	0.0028
3.000	0.0906
3.500	0.7827
4.000	2.2908
4.500	3.8844
5.000	5.3275
5.500	6.0919
6.000	6.2148
6.500	6.2326
7.000	6.2338

Name: L-2 Base Flow(cfs): 0.000 Init Stage(ft): 1.560

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.560	0.0000
2.000	0.0005
2.500	0.0089
3.000	0.2495
3.500	0.7722
4.000	1.6573
4.500	2.9507

5.000	4.0357
5.500	4.5090
6.000	4.6011
6.500	4.6114
7.000	4.6169
7.180	4.6169

Name: L-3 Base Flow(cfs): 0.000 Init Stage(ft): 2.080

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.080	0.0000
2.500	0.0119
3.000	0.0892
3.500	0.8072
4.000	1.7566
4.500	3.4371
5.000	4.2472
5.500	4.5472
6.000	4.6387
6.500	4.7386
7.000	4.7472
7.500	4.7509
8.000	4.7527
8.440	4.7533

Name: L-4 Base Flow(cfs): 0.000 Init Stage(ft): 2.340

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.340	0.0000
2.500	0.0002
3.000	0.0198
3.500	0.5529
4.000	1.6792
4.500	3.1782
5.000	4.1377
5.500	4.5800
6.000	4.6937
6.500	4.7033
7.000	4.7048
7.500	4.7055
7.620	4.7055

Name: L-5 Base Flow(cfs): 0.000 Init Stage(ft): 2.080

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.080	0.0000
2.500	0.0025
3.000	0.1006
3.500	0.6905
4.000	1.5817
4.500	3.2485
5.000	4.5012
5.500	4.7788
6.000	4.8097
6.500	4.8158
7.000	4.8186
7.060	4.8187

Name: L-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.970

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.970	0.0000
2.000	0.0000
2.500	0.0015
3.000	0.1544
3.500	1.0076
4.000	2.1832
4.500	3.5873
5.000	4.5473
5.500	4.9712
6.000	5.2004
6.500	5.2555
6.810	5.2635

Name: L-7 Base Flow(cfs): 0.000 Init Stage(ft): 2.470

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.470	0.0000
2.500	0.0000
3.000	0.0375
3.500	0.5102

4.000	1.5878
4.500	3.1093
5.000	4.7530
5.500	5.3298
6.000	5.5398
6.500	5.5822
6.880	5.5836

Name: L-8 Base Flow(cfs): 0.000 Init Stage(ft): 0.600

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
0.600	0.0000
1.000	0.0002
1.500	0.0015
2.000	0.0113
2.500	0.0327
3.000	0.1243
3.500	0.6902
4.000	2.4304
4.500	5.4102
5.000	8.9970
5.500	11.2932
6.000	12.2485
6.500	12.8937
7.000	13.0341
7.500	13.0405
8.000	13.0418
8.140	13.0418

Name: M Base Flow(cfs): 0.000 Init Stage(ft): 3.310

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
3.310	0.0000
3.500	0.0024
4.000	0.0476
4.500	0.1402
5.000	0.3712
5.500	0.5759
6.000	0.8593
6.500	1.8969
7.000	5.6260
7.500	12.2810
8.000	18.5651
8.500	23.2446
9.000	26.0594

9.500	27.6818
10.000	28.5732
10.500	29.1289
11.000	29.3068
11.330	29.3185

Name: N Base Flow(cfs): 0.000 Init Stage(ft): 7.090

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
7.090	0.0000
7.500	0.0004
8.000	0.0027
8.500	0.0615
9.000	0.4284
9.500	1.6124
10.000	5.3780
10.500	7.8377
11.000	10.4311
11.500	12.5195
12.000	13.0053
12.500	13.2009
13.000	13.3362
13.500	13.3552
14.000	13.3709
14.500	13.3840
15.000	13.3947
15.440	13.4047

Name: O Base Flow(cfs): 0.000 Init Stage(ft): 5.680

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
5.680	0.0000
6.000	0.0003
6.500	0.0099
7.000	0.0406
7.500	0.0874
8.000	0.2805
8.500	0.8090
9.000	2.6057
9.500	5.1280
10.000	7.6605
10.500	8.8941
11.000	10.0560
11.500	10.6616
12.000	10.9414

```
         12.500         10.9515
         12.710         10.9516

-------------------------------------------------------------------------------------
------
      Name: Outfall North       Base Flow(cfs): 0.000          Init Stage(ft): 0.400

     Group: NORTH                                              Warn Stage(ft): 0.500

      Type: Time/Stage


      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00           0.400
         999.00           0.500

-------------------------------------------------------------------------------------
------
      Name: Outfall South       Base Flow(cfs): 0.000          Init Stage(ft): 0.400

     Group: SOUTH                                              Warn Stage(ft): 0.500

      Type: Time/Stage


      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00           0.400
         999.00           0.500

-------------------------------------------------------------------------------------
------
      Name: P-1                 Base Flow(cfs): 0.000          Init Stage(ft): 0.660

     Group: SOUTH                                              Warn Stage(ft): 0.000

      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          0.660          0.0000
          1.000          0.0001
          1.500          0.0014
          2.000          0.0050
          2.500          0.0157
          3.000          0.0384
          3.500          0.0848
          4.000          0.5156
          4.500          1.3378
          5.000          2.5525
          5.500          3.4891
          6.000          3.8626
          6.500          4.0065
          7.000          4.1054
          7.500          4.1902
          8.000          4.2481
          8.500          4.3522
          9.000          4.3634
```

9.500	4.3640

Name: P-2 Base Flow(cfs): 0.000 Init Stage(ft): 1.720

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.720	0.0000
2.000	0.0001
2.500	0.0002
3.000	0.0019
3.500	0.0156
4.000	0.1933
4.500	0.6184
5.000	1.3938
5.500	2.0793
6.000	2.4552
6.500	2.7106
7.000	2.8199
7.500	2.9407
8.000	3.1486
8.500	3.3487
8.910	3.3629

Name: P-3 Base Flow(cfs): 0.000 Init Stage(ft): 2.600

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.600	0.0000
3.000	0.0003
3.500	0.0066
4.000	0.3732
4.500	1.3578
5.000	3.0599
5.500	4.8035
6.000	5.6603
6.500	6.0630
7.000	6.3688
7.500	6.6719
8.000	7.1055
8.500	7.1943
9.000	7.2107
9.500	7.2134
10.000	7.2147

Name: P-4 Base Flow(cfs): 0.000 Init Stage(ft): 1.030

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.030	0.0000
1.500	0.0024
2.000	0.0144
2.500	0.0341
3.000	0.0705
3.500	0.1257
4.000	0.4254
4.500	0.8916
5.000	1.5699
5.500	2.1602
6.000	2.4528
6.500	2.5611
6.770	2.5673

Name: P-5 Base Flow(cfs): 0.000 Init Stage(ft): 2.260

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.260	0.0000
2.500	0.0008
3.000	0.0112
3.500	0.0537
4.000	0.1121
4.500	0.3681
5.000	0.8733
5.500	1.5716
6.000	2.4050
6.500	3.2900
7.000	4.3263
7.500	5.6032
8.000	5.8187
8.220	5.8204

Name: P-6 Base Flow(cfs): 0.000 Init Stage(ft): 2.640

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.640	0.0000

3.000	0.0208
3.500	0.5776
4.000	1.9976
4.500	3.7147
5.000	4.6983
5.500	5.2723
6.000	5.6318
6.500	5.8885
7.000	6.1113
7.500	6.2654
7.730	6.2680

Name: P-7 Base Flow(cfs): 0.000 Init Stage(ft): 1.600

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
2.000	0.0123
2.500	0.1806
3.000	0.8986
3.500	2.2153
4.000	3.6844
4.500	4.7579
5.000	5.1225
5.500	5.1948
6.000	5.2578
6.500	5.2679
6.520	5.2679

Name: Q Base Flow(cfs): 0.000 Init Stage(ft): 4.200

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
4.200	0.0000
4.500	0.0001
5.000	0.0018
5.500	0.0551
6.000	0.2215
6.500	0.5699
7.000	2.0502
7.500	4.9748
8.000	7.2988
8.500	9.2647
9.000	11.2833
9.500	13.0258
10.000	14.0240
10.500	14.4117

11.000	14.4491
11.500	14.4559
11.840	14.4567

Name: R Base Flow(cfs): 0.000 Init Stage(ft): 0.000

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
0.000	0.0371
0.500	0.0449
1.000	0.0535
1.500	0.0629
2.000	0.0730
2.500	0.0838
3.000	0.0954
3.500	0.1079
4.000	0.1539
4.500	0.3048
5.000	0.4778
5.500	0.6569
6.000	0.9801
6.500	1.5917
7.000	2.3001
7.500	2.5980
8.000	3.1705
8.500	4.2167
9.000	5.2244
9.500	5.8022
10.000	6.3229
10.500	6.9492
11.000	7.3101
11.500	7.5378
12.000	7.5973
12.500	7.6369
13.000	7.6695
13.500	7.6984
14.000	7.7242
14.500	7.7476
15.000	7.7680
15.500	7.7850
16.000	7.7985
16.470	7.8144

Name: S Base Flow(cfs): 0.000 Init Stage(ft): 6.690

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)

6.690	0.0000
7.000	0.0010
7.500	0.0078
8.000	0.0718
8.500	0.4302
9.000	1.4271
9.500	3.5957
10.000	6.5570
10.500	9.5968
11.000	11.1872
11.500	11.7750
12.000	11.8361
12.380	11.8393

Name: T Base Flow(cfs): 0.000 Init Stage(ft): 4.970

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
4.970	0.0000
5.000	0.0000
5.500	0.0505
6.000	0.0794
6.500	0.1171
7.000	0.1774
7.500	0.2732
8.000	0.4641
8.500	0.8902
9.000	1.8455
9.500	3.3218
10.000	5.9021
10.500	7.6254
11.000	8.3447
11.500	8.7294
12.000	9.1000
12.500	9.1504
13.000	9.1561
13.070	9.1561

Name: U-1 Base Flow(cfs): 0.000 Init Stage(ft): 2.170

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.170	0.0000
2.500	0.0011
3.000	0.2032
3.500	0.6103
4.000	1.5278

4.500	2.3905
5.000	2.9040
5.500	3.0794
6.000	3.0983
6.500	3.1088
7.000	3.1144
7.440	3.1161

Name: U-2 Base Flow(cfs): 0.000 Init Stage(ft): 2.420

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
2.420	0.0000
2.500	0.0000
3.000	0.0019
3.500	0.0807
4.000	0.4691
4.500	0.8335
5.000	1.2978
5.500	1.4430
6.000	1.5245
6.500	1.6119
7.000	1.7513
7.500	1.8947
8.000	2.0365
8.500	2.3795
9.000	2.9380
9.500	3.4202
10.000	3.7876
10.500	3.9104
11.000	3.9193
11.500	3.9242
12.000	3.9267
12.250	3.9270

Name: U-3 Base Flow(cfs): 0.000 Init Stage(ft): 1.430

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
1.430	0.0000
1.500	0.0000
2.000	0.0013
2.500	0.0139
3.000	0.2329
4.000	2.2855
4.500	3.8466
5.000	4.5481

5.500	4.8673
6.000	5.0415
6.500	5.1987
7.000	5.2953
7.500	5.4240
8.000	5.5974
8.500	5.8354
9.000	6.2218
9.500	6.9619
10.000	7.5965
10.500	7.8415
10.880	7.8669

Name: V Base Flow(cfs): 0.000 Init Stage(ft): 4.630

Group: SOUTH Warn Stage(ft): 0.000

Type: Stage/Area

Stage(ft)	Area(ac)
4.630	0.0000
5.000	0.0036
5.500	0.0263
6.000	0.1957
6.500	0.3537
7.000	0.5169
7.500	0.7179
8.000	1.0105
8.500	1.5687
9.000	2.1630
9.500	3.1441
10.000	3.9729
10.500	4.6609
11.000	5.2999
11.500	5.6334
12.000	5.7626
12.500	5.8844
13.000	5.9891
13.500	6.0908
14.000	6.1937
14.500	6.3124
15.000	6.3856
15.500	6.4364
16.000	6.4854
16.500	6.5335
17.000	6.5806
17.500	6.6358
18.000	6.9482
18.500	6.9772
18.640	6.9773

==========

==== Pipes

==========

```
         Name: A-1 Outfall         From Node: A-1                Length(ft): 108.00

        Group: NORTH                 To Node: Outfall North           Count: 2

                                                              Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 24.00          24.00                       Entrance Loss Coef: 0.20
     Rise(in): 24.00          24.00                           Exit Loss Coef: 0.00
   Invert(ft): -2.440         -2.320                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                          Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: A-2 Outfall         From Node: A-2                Length(ft): 118.00

        Group: NORTH                 To Node: Outfall North           Count: 1

                                                              Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 24.00          24.00                       Entrance Loss Coef: 0.20
     Rise(in): 24.00          24.00                           Exit Loss Coef: 0.00
   Invert(ft): -0.720         -1.980                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                          Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: B Outfall           From Node: B                  Length(ft): 140.00

        Group: NORTH                 To Node: Outfall North           Count: 1

                                                              Friction Equation:
```

```
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.970         -2.810                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: C-1 Outfall         From Node: C-1                Length(ft): 207.00

        Group: NORTH                 To Node: Outfall North           Count: 1

                                                             Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): -1.310         -3.280                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: C-2 Outfall         From Node: C-2                Length(ft): 256.00

        Group: NORTH                 To Node: Outfall North           Count: 4

                                                             Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
```

```
     Rise(in): 12.00          12.00                          Exit Loss Coef: 0.00
   Invert(ft): -0.810         -1.820                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                          Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: E-1 Outfall         From Node: E-1                Length(ft): 887.00

        Group: NORTH                 To Node: Outfall North           Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                       Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                           Exit Loss Coef: 0.00
   Invert(ft): 0.040          -1.650                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                          Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: E-2 Outfall         From Node: E-2                Length(ft): 371.00

        Group: NORTH                 To Node: Outfall North           Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                       Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                           Exit Loss Coef: 0.00
   Invert(ft): -0.190         -2.620                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                          Inlet Ctrl Spec: Use dc
```

```
 Bot Clip(in): 0.000          0.000                        Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: E-3 Outfall         From Node: E-3                Length(ft): 452.00

        Group: NORTH                 To Node: Outfall North           Count: 1

                                                              Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.20
     Rise(in): 18.00          18.00                          Exit Loss Coef: 0.00
   Invert(ft): 0.730          -4.020                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                          Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: E-4 Outfall         From Node: E-4                Length(ft): 575.00

        Group: NORTH                 To Node: Outfall North           Count: 1

                                                              Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                      Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                          Exit Loss Coef: 0.00
   Invert(ft): 0.200          -2.910                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                          Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
```

```
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



--------------------------------------------------------------------------------
----------------
         Name: E-5 Outfall         From Node: E-5                Length(ft): 525.00

        Group: NORTH                 To Node: Outfall North           Count: 2

                                                                 Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                       Entrance Loss Coef: 0.20
     Rise(in): 18.00          18.00                           Exit Loss Coef: 0.00
   Invert(ft): -0.200         -4.240                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



--------------------------------------------------------------------------------
----------------
         Name: E-6 Outfall         From Node: E-6                Length(ft): 552.00

        Group: NORTH                 To Node: Outfall North           Count: 2

                                                                 Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                       Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                           Exit Loss Coef: 0.00
   Invert(ft): 0.490          -1.770                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
--------------------------------------------------------------------------------
----------------
         Name: E-7 Outfall         From Node: E-7                Length(ft): 434.00

        Group: NORTH                 To Node: Outfall North           Count: 2

                                                                 Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.830         -2.480                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: L-1 Outfall         From Node: L-1                Length(ft): 1070.00

        Group: SOUTH                 To Node: Outfall South           Count: 2

                                                                 Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.530         -1.410                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: L-2 Outfall         From Node: L-2                Length(ft): 243.00
```

```
        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 18.00          18.00                       Entrance Loss Coef: 0.20
     Rise(in): 18.00          18.00                           Exit Loss Coef: 0.00
   Invert(ft): -1.640         -2.240                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: L-3 Outfall         From Node: L-3                Length(ft): 183.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 18.00          18.00                       Entrance Loss Coef: 0.20
     Rise(in): 18.00          18.00                           Exit Loss Coef: 0.00
   Invert(ft): -1.430         -2.270                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: L-4 Outfall         From Node: L-4                Length(ft): 339.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                              Friction Equation:
Automatic
```

```
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 18.00          18.00                     Entrance Loss Coef: 0.20
     Rise(in): 18.00          18.00                         Exit Loss Coef: 0.00
   Invert(ft): -1.270         -2.010                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: L-5                 From Node: L-5                Length(ft): 300.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                              Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.570         -2.200                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: L-6 Outfall         From Node: L-6                Length(ft): 340.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                              Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 18.00          18.00                     Entrance Loss Coef: 0.20
     Rise(in): 18.00          18.00                         Exit Loss Coef: 0.00
```

```
   Invert(ft): -1.250         -2.200                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: L-7 Outfall         From Node: L-7                Length(ft): 505.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 15.00          15.00                     Entrance Loss Coef: 0.20
     Rise(in): 15.00          15.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.670         -1.140                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: L-8 Outfall         From Node: L-8                Length(ft): 201.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.990         -1.640                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None
```

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: N-S                 From Node: N                  Length(ft): 250.00

        Group: SOUTH                 To Node: S                       Count: 3

                                                            Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                    Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                        Exit Loss Coef: 1.00
   Invert(ft): 4.360          4.360                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: O-N                 From Node: O                  Length(ft): 45.00

        Group: SOUTH                 To Node: N                       Count: 4

                                                            Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                    Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                        Exit Loss Coef: 1.00
   Invert(ft): 5.920          5.920                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: P-1 Outfall         From Node: P-1                Length(ft): 224.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                       Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                           Exit Loss Coef: 0.00
   Invert(ft): -0.270         -3.760                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: P-2 Outfall         From Node: P-2                Length(ft): 139.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                       Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                           Exit Loss Coef: 0.00
   Invert(ft): -0.860         -1.030                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
--------------------------------------------------------------------------------
----------------
         Name: P-3 Outfall         From Node: P-3                Length(ft): 152.00

        Group: SOUTH                 To Node: Outfall South           Count: 2

                                                          Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): 0.020          -3.860                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: P-4 Outfall         From Node: P-4                Length(ft): 244.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                          Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 36.00          36.00                     Entrance Loss Coef: 0.20
     Rise(in): 36.00          36.00                         Exit Loss Coef: 0.00
   Invert(ft): -1.200         -5.270                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: P-5 Outfall         From Node: P-5                Length(ft): 200.00
```

```
        Group: SOUTH                 To Node: Outfall South           Count: 2

                                                          Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): 1.880          -2.330                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: P-6 Outfall         From Node: P-6                Length(ft): 125.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                          Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): -1.190         -3.770                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: P-7 Outfall         From Node: P-7                Length(ft): 80.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                          Friction Equation:
Automatic
                UPSTREAM       DOWNSTREAM                 Solution Algorithm:
```

```
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                       Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                           Exit Loss Coef: 0.00
   Invert(ft): -1.170         -2.770                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: Q-P4                From Node: Q                  Length(ft): 150.00

        Group: SOUTH                 To Node: P-4                       Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                       Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                           Exit Loss Coef: 0.00
   Invert(ft): 2.750          2.230                           Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: Q-P5                From Node: Q                  Length(ft): 150.00

        Group: SOUTH                 To Node: P-5                       Count: 1

                                                              Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 36.00          36.00                       Entrance Loss Coef: 0.20
     Rise(in): 36.00          36.00                           Exit Loss Coef: 0.00
   Invert(ft): -0.600         -1.240                          Bend Loss Coef: 0.00
```

```
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: S-Q                 From Node: S                  Length(ft): 344.00

        Group: SOUTH                 To Node: Q                       Count: 1

                                                                 Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                     Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                   Flow: Both
     Span(in): 24.00          24.00                        Entrance Loss Coef: 0.20
     Rise(in): 24.00          24.00                            Exit Loss Coef: 0.00
   Invert(ft): 4.410          3.350                            Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: S-r                 From Node: S                  Length(ft): 383.00

        Group: SOUTH                 To Node: R                       Count: 1

                                                                 Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                     Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                   Flow: Both
     Span(in): 18.00          18.00                        Entrance Loss Coef: 0.20
     Rise(in): 18.00          18.00                            Exit Loss Coef: 0.00
   Invert(ft): 4.600          3.250                            Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None
```

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: T-S                 From Node: T                  Length(ft): 64.00

        Group: SOUTH                 To Node: S                       Count: 2

                                                            Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                       Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                           Exit Loss Coef: 1.00
   Invert(ft): 5.820          5.820                           Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------
----------------
         Name: U-1 Outfall         From Node: U-1                Length(ft): 90.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                            Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                       Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                           Exit Loss Coef: 0.00
   Invert(ft): -0.890         -1.260                          Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                      Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                           Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: U-2 Outfall         From Node: U-2                Length(ft): 200.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                                Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 24.00          24.00                     Entrance Loss Coef: 0.20
     Rise(in): 24.00          24.00                         Exit Loss Coef: 0.00
   Invert(ft): -1.450         -2.440                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------
----------------
         Name: U-3 Outfall         From Node: U-3                Length(ft): 85.00

        Group: SOUTH                 To Node: Outfall South           Count: 1

                                                                Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                  Solution Algorithm:
Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.20
     Rise(in): 12.00          12.00                         Exit Loss Coef: 0.00
   Invert(ft): -1.500         -2.340                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
--------------------------------------------------------------------------------
----------------
         Name: V-R                 From Node: V                  Length(ft): 120.00

        Group: SOUTH                 To Node: R                       Count: 2

                                                          Friction Equation:
Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm:
Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 18.00          18.00                     Entrance Loss Coef: 0.20
     Rise(in): 18.00          18.00                         Exit Loss Coef: 0.00
   Invert(ft): 4.500          4.370                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc
or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


================================================================================
======
==== Weirs
================================================================================
================================================================================
======

         Name: A1-A2               From Node: A-1
        Group: SOUTH                 To Node: A-2
         Flow: Both                    Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 3.310
       Control Elevation(ft): 3.310
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: C1-C2               From Node: C-1
        Group: SOUTH                 To Node: C-2
         Flow: Both                    Count: 4
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 3.300
```

```
       Control Elevation(ft): 3.300
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: E2-E1               From Node: E-2
        Group: SOUTH                 To Node: E-1
         Flow: Both                    Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 4.180
       Control Elevation(ft): 4.180
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: E3-E2               From Node: E-3
        Group: SOUTH                 To Node: E-2
         Flow: Both                    Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 5.730
       Control Elevation(ft): 5.730
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: E4-E3               From Node: E-4
        Group: SOUTH                 To Node: E-3
         Flow: Both                    Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 7.830
       Control Elevation(ft): 7.830
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600
```

```
--------------------------------------------------------------------------------
----------------
         Name: E5-E4               From Node: E-5
        Group: SOUTH                 To Node: E-4
         Flow: Both                    Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 5.990
       Control Elevation(ft): 5.990
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: E6-E5               From Node: E-6
        Group: SOUTH                 To Node: E-5
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 6.740
       Control Elevation(ft): 6.740
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: E7-E6               From Node: E-7
        Group: SOUTH                 To Node: E-6
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 7.110
       Control Elevation(ft): 7.110
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: G                   From Node: G
```

```
        Group: NORTH                 To Node: E-7
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 360.00
                    Rise(in): 999.00
                  Invert(ft): 3.310
       Control Elevation(ft): 3.310
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: H                   From Node: H
        Group: NORTH                 To Node: E-7
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 360.00
                    Rise(in): 999.00
                  Invert(ft): 3.960
       Control Elevation(ft): 3.960
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: I                   From Node: I
        Group: NORTH                 To Node: H
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 360.00
                    Rise(in): 999.00
                  Invert(ft): 5.590
       Control Elevation(ft): 5.590
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: L1-L2               From Node: L-1
        Group: SOUTH                 To Node: L-2
         Flow: Both                    Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
```

```
                Invert(ft): 3.640
     Control Elevation(ft): 3.640
                                          TABLE
           Bottom Clip(in): 0.000
              Top Clip(in): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
       Name: L3-L2               From Node: L-3
      Group: SOUTH                 To Node: L-2
       Flow: Both                    Count: 2
       Type: Vertical: Paved      Geometry: Rectangular

                  Span(in): 240.00
                  Rise(in): 999.00
                Invert(ft): 3.800
     Control Elevation(ft): 3.800
                                          TABLE
           Bottom Clip(in): 0.000
              Top Clip(in): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
       Name: L4-L3               From Node: L-4
      Group: SOUTH                 To Node: L-3
       Flow: Both                    Count: 2
       Type: Vertical: Paved      Geometry: Rectangular

                  Span(in): 240.00
                  Rise(in): 999.00
                Invert(ft): 3.750
     Control Elevation(ft): 3.750
                                          TABLE
           Bottom Clip(in): 0.000
              Top Clip(in): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
       Name: L5-L4               From Node: L-5
      Group: SOUTH                 To Node: L-4
       Flow: Both                    Count: 2
       Type: Vertical: Paved      Geometry: Rectangular

                  Span(in): 240.00
                  Rise(in): 999.00
                Invert(ft): 3.920
     Control Elevation(ft): 3.920
                                          TABLE
           Bottom Clip(in): 0.000
              Top Clip(in): 0.000
       Weir Discharge Coef: 3.200
```

```
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: L6-L5               From Node: L-6
        Group: SOUTH                 To Node: L-5
         Flow: Both                    Count: 3
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 3.630
       Control Elevation(ft): 3.630
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: L7-L6               From Node: L-7
        Group: SOUTH                 To Node: L-6
         Flow: Both                    Count: 3
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 3.940
       Control Elevation(ft): 3.940
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: L8-L7               From Node: L-8
        Group: SOUTH                 To Node: L-7
         Flow: Both                    Count: 3
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 4.020
       Control Elevation(ft): 4.020
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
```

```
         Name: M-L2                From Node: M
        Group: SOUTH                 To Node: L-2
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 180.00
                    Rise(in): 999.00
                  Invert(ft): 5.720
       Control Elevation(ft): 5.720
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: M-L3                From Node: M
        Group: SOUTH                 To Node: L-3
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 180.00
                    Rise(in): 999.00
                  Invert(ft): 5.860
       Control Elevation(ft): 5.860
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: P1-P2               From Node: P-1
        Group: SOUTH                 To Node: P-2
         Flow: Both                    Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 4.500
       Control Elevation(ft): 4.500
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: P1-P4               From Node: P-1
        Group: SOUTH                 To Node: P-4
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
```

```
                  Rise(in): 999.00
                Invert(ft): 4.510
       Control Elevation(ft): 4.510
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: P2-P3               From Node: P-2
        Group: SOUTH                 To Node: P-3
         Flow: Both                    Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                  Span(in): 240.00
                  Rise(in): 999.00
                Invert(ft): 4.450
       Control Elevation(ft): 4.450
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: P5-P4               From Node: P-5
        Group: SOUTH                 To Node: P-4
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                  Span(in): 240.00
                  Rise(in): 999.00
                Invert(ft): 5.770
       Control Elevation(ft): 5.770
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
         Name: P7-P6               From Node: P-7
        Group: SOUTH                 To Node: P-6
         Flow: Both                    Count: 3
         Type: Vertical: Paved      Geometry: Rectangular

                  Span(in): 240.00
                  Rise(in): 999.00
                Invert(ft): 3.320
       Control Elevation(ft): 3.320
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
```

```
      Weir Discharge Coef: 3.200
   Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
      Name: R-P5                From Node: R
     Group: SOUTH                 To Node: P-5
      Flow: Both                    Count: 1
      Type: Vertical: Paved      Geometry: Rectangular

                 Span(in): 156.00
                 Rise(in): 999.00
              Invert(ft): 6.690
    Control Elevation(ft): 6.690
                                                TABLE
          Bottom Clip(in): 0.000
             Top Clip(in): 0.000
      Weir Discharge Coef: 3.200
   Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
      Name: R-P6                From Node: R
     Group: SOUTH                 To Node: P-6
      Flow: Both                    Count: 1
      Type: Vertical: Paved      Geometry: Rectangular

                 Span(in): 240.00
                 Rise(in): 999.00
              Invert(ft): 4.490
    Control Elevation(ft): 4.490
                                                TABLE
          Bottom Clip(in): 0.000
             Top Clip(in): 0.000
      Weir Discharge Coef: 3.200
   Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
----------------
      Name: U1-U2               From Node: U-1
     Group: SOUTH                 To Node: U-2
      Flow: Both                    Count: 1
      Type: Vertical: Paved      Geometry: Rectangular

                 Span(in): 240.00
                 Rise(in): 999.00
              Invert(ft): 3.810
    Control Elevation(ft): 3.810
                                                TABLE
          Bottom Clip(in): 0.000
             Top Clip(in): 0.000
      Weir Discharge Coef: 3.200
   Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
```

```
----------------
         Name: U3-U2                From Node: U-3
        Group: SOUTH                  To Node: U-2
         Flow: Both                     Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999.00
                  Invert(ft): 8.460
       Control Elevation(ft): 8.460
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



==================================================================================
======
==== Hydrology Simulations
================================================================
==================================================================================
======

         Name: 100y3d
     Filename: U:\sdombrowski\Projects\LBTS\100y3d.R32



      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 18.00

Time(hrs)       Print Inc(min)
--------------- ---------------
78.000          15.00

----------------------------------------------------------------------------------
----------------
         Name: 10y1d
     Filename: U:\sdombrowski\Projects\LBTS\10y1d.R32



      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          15.00

----------------------------------------------------------------------------------
----------------
         Name: 25y3d
     Filename: U:\sdombrowski\Projects\LBTS\25y3d.R32
```

```
      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 14.00

Time(hrs)       Print Inc(min)
--------------- ---------------
78.000          15.00

-------------------------------------------------------------------------------------
----------------
         Name: 5y1d
     Filename: U:\sdombrowski\Projects\LBTS\5y1d.R32



      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 7.00

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          15.00

=====================================================================================
======
==== Routing Simulations
================================================================
=====================================================================================
======

         Name: 100y3d              Hydrology Sim: 100y3d
     Filename: U:\sdombrowski\Projects\LBTS\100y3d.I32



      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 78.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
80.000          15.000

Group           Run
--------------- -----
NORTH           Yes
SOUTH           Yes


-------------------------------------------------------------------------------------
```

```
----------------
         Name: 10y1d               Hydrology Sim: 10y1d
     Filename: U:\sdombrowski\Projects\LBTS\10y1d.I32



      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 30.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          15.000

Group           Run
--------------- -----
NORTH           Yes
SOUTH           Yes


--------------------------------------------------------------------------------------
----------------
         Name: 25y3d               Hydrology Sim: 25y3d
     Filename: U:\sdombrowski\Projects\LBTS\25y3d.I32



      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 78.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
80.000          15.000

Group           Run
--------------- -----
NORTH           Yes
SOUTH           Yes


--------------------------------------------------------------------------------------
----------------
         Name: 5y1d                Hydrology Sim: 5y1d
     Filename: U:\sdombrowski\Projects\LBTS\5y1d.I32
```

```
     Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 30.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                           Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          15.000

Group           Run
--------------- -----
NORTH           Yes
SOUTH           Yes
```

Appendix 6.10
Cost Estimates for Proposed Alternatives

Lauderdale-By-The-Sea Stormwater Master Plan

PROPOSED IMPROVEMENTS - COST ESTIMATE SUMMARY

	ESTIMATED COSTS					
PROJECT NAME	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Grass Swale Program	$2,134,125	$2,283,514	$2,443,360	$2,614,395	$2,797,403	$2,993,221
Pipe Inspection and Cleaning Program	$301,305	$322,396	$344,964	$369,112	$394,949	$422,596
Outfall Inspection and Cleaning Program	$32,000	$34,240	$36,637	$39,201	$41,945	$44,882
Pipe Repair Program	$1,647,025	$1,762,317	$1,885,679	$2,017,676	$2,158,914	$2,310,038
Bougainvilla Drive	$1,254,715	$1,342,545	$1,436,523	$1,537,080	$1,644,675	$1,759,803
Poinciana Street	$1,037,152	$1,109,752	$1,187,435	$1,270,555	$1,359,494	$1,454,659
Pavilion Area	$588,319	$629,501	$673,566	$720,715	$771,166	$825,147
El Mar Drive (North)	$1,439,785	$1,540,569	$1,648,409	$1,763,798	$1,887,264	$2,019,372
El Mar Drive (South)	$1,596,903	$1,708,686	$1,828,294	$1,956,275	$2,093,214	$2,239,739
Alleyways (Option 1)	$305,151	$326,512	$349,367	$373,823	$399,991	$427,990
Alleyways (Option 2)	$450,450	$481,982	$515,720	$551,821	$590,448	$631,779
West Tradewinds Avenue	$234,350	$250,754	$268,307	$287,088	$307,184	$328,687
Flamingo Avenue	$318,588	$340,889	$364,751	$390,283	$417,603	$446,835
Hibiscus Avenue	$170,940	$182,906	$195,709	$209,409	$224,067	$239,752
Datura Avenue	$188,997	$202,226	$216,382	$231,529	$247,736	$265,077
Basin Drive	$236,352	$252,896	$270,599	$289,541	$309,809	$331,495
Harbor Drive	$548,163	$586,534	$627,592	$671,523	$718,530	$768,827
Terramar Drive	$25,218	$26,983	$28,872	$30,893	$33,055	$35,369
TOTAL	**$12,509,534**	**$13,385,201**	**$14,322,165**	**$15,324,717**	**$16,397,447**	**$17,545,269**

Grass Swale Program

PROPOSED IMPROVEMENTS - COST ESTIMATE

REGRADE GRASS SWALES	Quantity	Unit	Unit Price	Total
Re-grade Swale	85365	SY	$25.00	$2,134,125
			TOTAL COST:	$2,134,125

Pipe Inspection and Cleaning Program

PROPOSED IMPROVEMENTS - COST ESTIMATE

Clean and Televise Pipe	Quantity	Unit	Unit Price	Total
Clean / Televise Drainage Pipe	60261	LF	$5.00	$301,305
			TOTAL COST:	$301,305

Outfall Inspection and Cleaning Program

PROPOSED IMPROVEMENTS - COST ESTIMATE

Clean and Televise Pipe	Quantity	Unit	Unit Price	Total
Clean / Televise Drainage Pipe	4000	LF	$8.00	$32,000
			TOTAL COST:	$32,000

Drainage System Repair Program

PROPOSED IMPROVEMENTS - COST ESTIMATE

Drainage Pipe Repair	Quantity	Unit	Unit Price	Total
Remove and Replace Drainage Pipe	3110	LF	$125.00	$388,750
Install Lining on Existing Pipe	16777	LF	$75.00	$1,258,275
			TOTAL COST:	$1,647,025

Bougainvilla Drive

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	270	LF	$55.00	$14,850
24" R.C.P. Drainage Pipe with Exfiltration Trench	1,800	LF	$120.00	$216,000
Catch Basins	15	EA	$3,000.00	$45,000
Conflict Structure	2	EA	$5,200.00	$10,400
Connect to Existing Drainage	1	EA	$2,500.00	$2,500
Remove and Dispose of Existing Drainage Structure	32	EA	$1,000.00	$32,000
Remove and Dispose of Existing Drainage Pipe	3,290	LF	$30.00	$98,700
Utility Offset	2	EA	$4,000.00	$8,000
Pavement Restoration	4,420	SY	$45.00	$198,900
Paved Swale, Sidewalk and Driveway Restoration	3,140	SY	$60.00	$188,400
			Subtotal:	$814,750
			Mobilization:	$81,475
			Subtotal:	$896,225
			20% Construction Contingency:	$179,245
			15% Design and Permitting:	$134,434
			5% Construction Administration:	$44,811
			TOTAL COST:	**$1,254,715**

Poinciana Street

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	255	LF	$55.00	$14,025
24" R.C.P. Drainage Pipe with Exfiltration Trench	1,645	LF	$120.00	$197,400
Catch Basins	16	EA	$3,000.00	$48,000
Conflict Structure	2	EA	$5,200.00	$10,400
Connect to Existing Drainage	1	EA	$2,500.00	$2,500
Remove and Dispose of Existing Drainage Structure	21	EA	$1,000.00	$21,000
Remove and Dispose of Existing Drainage Pipe	975	LF	$30.00	$29,250
Utility Offset	2	EA	$4,000.00	$8,000
Pavement Restoration	3,780	SY	$45.00	$170,100
Paved Swale, Sidewalk and Driveway Restoration	2,880	SY	$60.00	$172,800
			Subtotal:	$673,475
			Mobilization:	$67,348
			Subtotal:	$740,823
			20% Construction Contingency:	$148,165
			15% Design and Permitting:	$111,123
			5% Construction Administration:	$37,041
			TOTAL COST:	**$1,037,152**

Pavilion

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	25	LF	$55.00	$1,375
24" R.C.P. Drainage Pipe	25	LF	$80.00	$2,000
24" R.C.P. Drainage Pipe with Exfiltration Trench	585	LF	$120.00	$70,200
Catch Basins	6	EA	$3,000.00	$18,000
Drainage Well with Control Structure	1	EA	$50,000.00	$50,000
Conflict Structure	1	EA	$5,200.00	$5,200
Connect to Existing Drainage	5	EA	$2,500.00	$12,500
Remove and Dispose of Existing Drainage Structure	1	EA	$1,000.00	$1,000
Utility Offset	2	EA	$4,000.00	$8,000
Pavement Restoration	4,750	SY	$45.00	$213,750
			Subtotal:	$382,025
			Mobilization:	$38,203
			Subtotal:	$420,228
			20% Construction Contingency:	$84,046
			15% Design and Permitting:	$63,034
			5% Construction Administration:	$21,011
			TOTAL COST:	**$588,319**

El Mar Drive (North)

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	665	LF	$55.00	$36,575
24" R.C.P. Drainage Pipe with Exfiltration Trench	1,745	LF	$120.00	$209,400
Catch Basins	19	EA	$3,000.00	$57,000
Conflict Structure	1	EA	$5,200.00	$5,200
Connect to Existing Drainage	4	EA	$2,500.00	$10,000
Remove and Dispose of Existing Drainage Structure	17	EA	$1,000.00	$17,000
Remove and Dispose of Existing Drainage Pipe	575	LF	$30.00	$17,250
Utility Offset	2	EA	$4,000.00	$8,000
Pavement Restoration	8,640	SY	$45.00	$388,800
Paved Swale, Sidewalk and Driveway Restoration	3,095	SY	$60.00	$185,700
			Subtotal:	$934,925
			Mobilization:	$93,493
			Subtotal:	$1,028,418
			20% Construction Contingency:	$205,684
			15% Design and Permitting:	$154,263
			5% Construction Administration:	$51,421
			TOTAL COST:	**$1,439,785**

El Mar Drive (South)

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	550	LF	$55.00	$30,250
24" R.C.P. Drainage Pipe with Exfiltration Trench	2,035	LF	$120.00	$244,200
Catch Basins	18	EA	$3,000.00	$54,000
Conflict Structure	1	EA	$5,200.00	$5,200
Connect to Existing Drainage	2	EA	$2,500.00	$5,000
Remove and Dispose of Existing Drainage Structure	18	EA	$1,000.00	$18,000
Remove and Dispose of Existing Drainage Pipe	820	LF	$30.00	$24,600
Utility Offset	2	EA	$4,000.00	$8,000
Pavement Restoration	10,580	SY	$45.00	$476,100
Paved Swale, Sidewalk and Driveway Restoration	2,860	SY	$60.00	$171,600
			Subtotal:	$1,036,950
			Mobilization:	$103,695
			Subtotal:	$1,140,645
			20% Construction Contingency:	$228,129
			15% Design and Permitting:	$171,097
			5% Construction Administration:	$57,032
			TOTAL COST:	**$1,596,903**

Alleyways

PROPOSED IMPROVEMENTS - COST ESTIMATE

OPTION 1: DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	1,180	LF	$55.00	$64,900
Catch Basins	7	EA	$3,000.00	$21,000
Connect to Existing Drainage	5	EA	$2,500.00	$12,500
Utility Offset	3	EA	$4,000.00	$12,000
Pavement Restoration	1,950	SY	$45.00	$87,750
			Subtotal:	$198,150
			Mobilization:	$19,815
			Subtotal:	$217,965
			20% Construction Contingency:	$43,593
			15% Design and Permitting:	$32,695
			5% Construction Administration:	$10,898
			TOTAL COST:	**$305,151**

OPTION 2: PERVIOUS PAVEMENT	Quantity	Unit	Unit Price	Total
Remove Existing Pavement, Replace with Pervious Paver System	1950	SY	$150.00	$292,500
			Subtotal:	$292,500
			Mobilization:	$29,250
			Subtotal:	$321,750
			20% Construction Contingency:	$64,350
			15% Design and Permitting:	$48,263
			5% Construction Administration:	$16,088
			TOTAL COST:	**$450,450**

West Tradewinds Avenue

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
12" R.C.P. Drainage Pipe	137	LF	$45.00	$6,165
15" R.C.P. Drainage Pipe	115	LF	$55.00	$6,325
24" R.C.P. Drainage Pipe with Exfiltration Trench	455	LF	$120.00	$54,600
Catch Basins	4	EA	$3,000.00	$12,000
Control Structure	1	EA	$7,000.00	$7,000
Connect to Existing Drainage	4	EA	$2,500.00	$10,000
Remove and Dispose of Existing Drainage Pipe	137	LF	$30.00	$4,110
Utility Offset	1	EA	$4,000.00	$4,000
Pavement Restoration	105	SY	$45.00	$4,725
Grass Swale, Sidewalk and Driveway Approach Restoration	865	SY	$50.00	$43,250
			Subtotal:	$152,175
			Mobilization:	$15,218
			Subtotal:	$167,393
			20% Construction Contingency:	$33,479
			15% Design and Permitting:	$25,109
			5% Construction Administration:	$8,370
			TOTAL COST:	**$234,350**

Flamingo Avenue

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE OPTION 1	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	45	LF	$55.00	$2,475
24" R.C.P. Drainage Pipe with Exfiltration Trench	350	LF	$120.00	$42,000
Catch Basins	4	EA	$3,000.00	$12,000
Drainage Well with Control Structure	1	EA	$50,000.00	$50,000
Remove and Dispose of Existing Drainage Structure	4	EA	$1,000.00	$4,000
Remove and Dispose of Existing Drainage Pipe	455	LF	$30.00	$13,650
Utility Offset	1	EA	$4,000.00	$4,000
Pavement Restoration	1,750	SY	$45.00	$78,750
			Subtotal:	$206,875
			Mobilization:	$20,688
			Subtotal:	$227,563
			20% Construction Contingency:	$45,513
			15% Design and Permitting:	$34,134
			5% Construction Administration:	$11,378
			TOTAL COST:	**$318,588**

Hibiscus Avenue

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	70	LF	$55.00	$3,850
24" R.C.P. Drainage Pipe	55	LF	$80.00	$4,400
24" R.C.P. Drainage Pipe with Exfiltration Trench	180	LF	$120.00	$21,600
Catch Basins	3	EA	$3,000.00	$9,000
Drainage Manhole	1	EA	$35,000.00	$35,000
Connect to Existing Drainage	3	EA	$2,500.00	$7,500
Utility Offset	1	EA	$4,000.00	$4,000
Pavement Restoration	150	SY	$45.00	$6,750
Paved Swale, Sidewalk and Driveway Restoration	315	SY	$60.00	$18,900
			Subtotal:	$111,000
			Mobilization:	$11,100
			Subtotal:	$122,100
			20% Construction Contingency:	$24,420
			15% Design and Permitting:	$18,315
			5% Construction Administration:	$6,105
			TOTAL COST:	**$170,940**

Datura Avenue

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	75	LF	$55.00	$4,125
24" R.C.P. Drainage Pipe	125	LF	$80.00	$10,000
24" R.C.P. Drainage Pipe with Exfiltration Trench	180	LF	$120.00	$21,600
Catch Basins	4	EA	$3,000.00	$12,000
Drainage Manhole	1	EA	$35,000.00	$35,000
Connect to Existing Drainage	2	EA	$2,500.00	$5,000
Remove and Dispose of Existing Drainage Structure	1	EA	$1,000.00	$1,000
Remove and Dispose of Existing Drainage Pipe	10	LF	$30.00	$300
Utility Offset	1	EA	$4,000.00	$4,000
Pavement Restoration	200	SY	$45.00	$9,000
Paved Swale, Sidewalk and Driveway Restoration	345	SY	$60.00	$20,700
			Subtotal:	$122,725
			Mobilization:	$12,273
			Subtotal:	$134,998
			20% Construction Contingency:	$27,000
			15% Design and Permitting:	$20,250
			5% Construction Administration:	$6,750
			TOTAL COST:	**$188,997**

Basin Drive

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	120	LF	$55.00	$6,600
24" R.C.P. Drainage Pipe with Exfiltration Trench	520	LF	$120.00	$62,400
Catch Basins	6	EA	$3,000.00	$18,000
Conflict Structure	1	EA	$5,200.00	$5,200
Connect to Existing Drainage	2	EA	$2,500.00	$5,000
Remove and Dispose of Existing Drainage Structure	1	EA	$1,000.00	$1,000
Remove and Dispose of Existing Drainage Pipe	10	LF	$30.00	$300
Utility Offset	1	EA	$4,000.00	$4,000
Pavement Restoration	125	SY	$45.00	$5,625
Paved Swale, Sidewalk and Driveway Restoration	450	SY	$60.00	$27,000
Grass Swale, Sidewalk and Driveway Approach Restoration	367	SY	$50.00	$18,350
			Subtotal:	$153,475
			Mobilization:	$15,348
			Subtotal:	$168,823
			20% Construction Contingency:	$33,765
			15% Design and Permitting:	$25,323
			5% Construction Administration:	$8,441
			TOTAL COST:	**$236,352**

Harbor Drive

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
15" R.C.P. Drainage Pipe	310	LF	$55.00	$17,050
24" R.C.P. Drainage Pipe with Exfiltration Trench	960	LF	$120.00	$115,200
Catch Basins	12	EA	$3,000.00	$36,000
Drainage Manhole	2	EA	$35,000.00	$70,000
Conflict Structure	1	EA	$5,200.00	$5,200
Connect to Existing Drainage	4	EA	$2,500.00	$10,000
Utility Offset	1	EA	$4,000.00	$4,000
Pavement Restoration	300	SY	$45.00	$13,500
Grass Swale, Sidewalk and Driveway Approach Restoration	1,700	SY	$50.00	$85,000
			Subtotal:	$355,950
			Mobilization:	$35,595
			Subtotal:	$391,545
			20% Construction Contingency:	$78,309
			15% Design and Permitting:	$58,732
			5% Construction Administration:	$19,577
			TOTAL COST:	**$548,163**

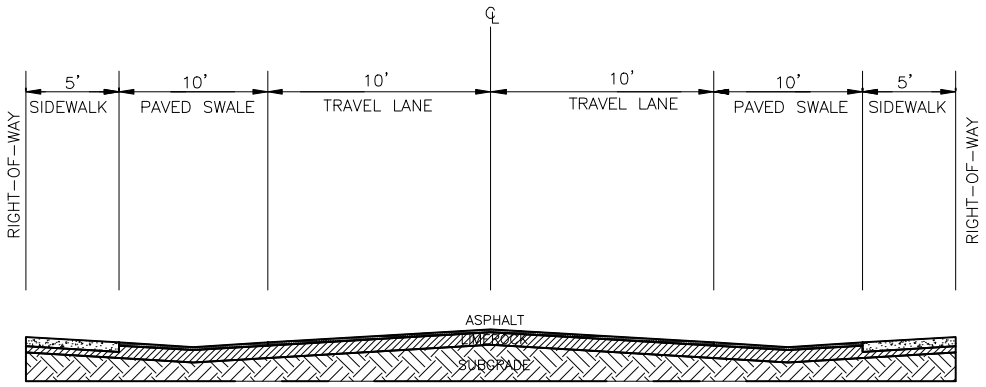
Terramar Drive

PROPOSED IMPROVEMENTS - COST ESTIMATE

DRAINAGE	Quantity	Unit	Unit Price	Total
Core Existing Drainage Structure, Regrade Area	1	LS	$4,000.00	$4,000
Pavement Restoration	275	SY	$45.00	$12,375
			Subtotal:	$16,375
			Mobilization:	$1,638
			Subtotal:	$18,013
			20% Construction Contingency:	$3,603
			15% Design and Permitting:	$2,702
			5% Construction Administration:	$901
			TOTAL COST:	**$25,218**

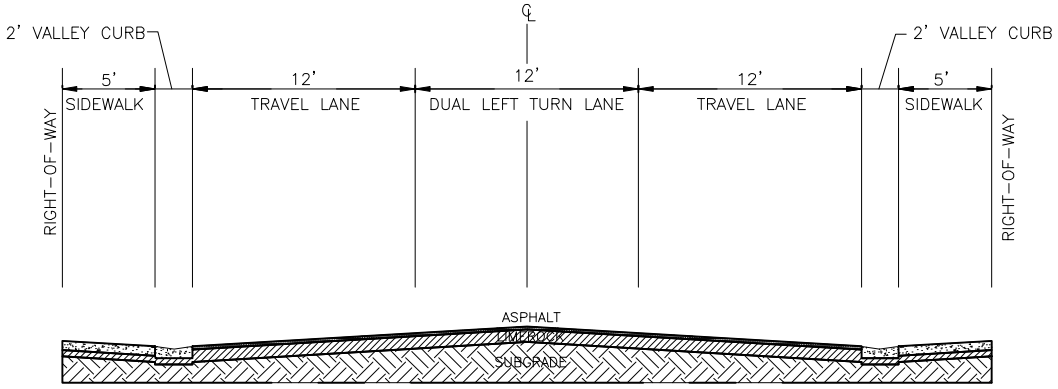
Appendix 6.11
Roadway Cross Sections

APPENDIX 6.11
ROADWAY CROSS SECTIONS



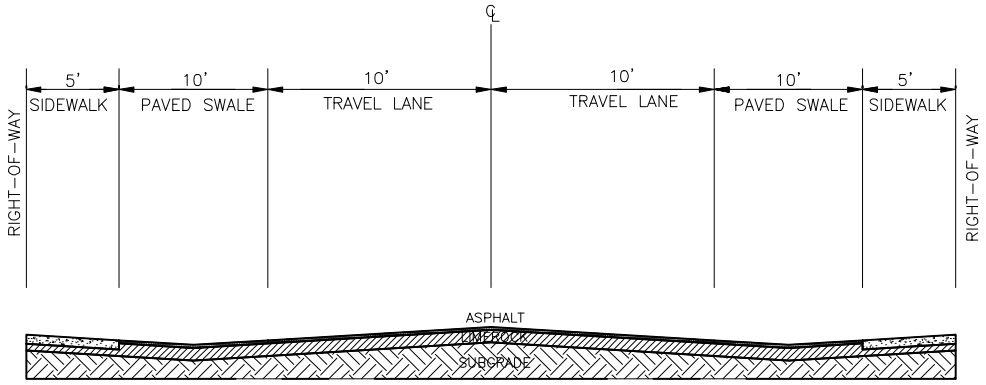
Bougainvilla Drive, North of Commercial Boulevard

SCALE: N.T.S



Bouganvilla Drive, South of Commercial Boulevard

SCALE: N.T.S



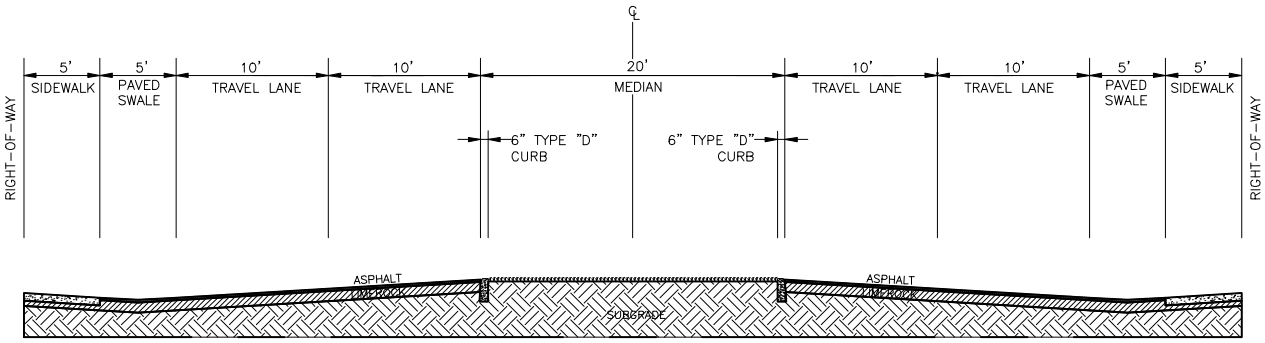
Poinciana Street

SCALE: N.T.S

CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

APPENDIX 6.11
ROADWAY CROSS SECTIONS



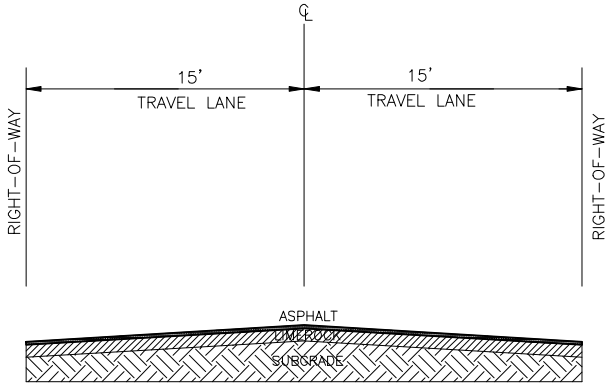
El Mar Drive

SCALE: N.T.S

CHEN&ASSOCIATES
Civil and Environmental Engineers

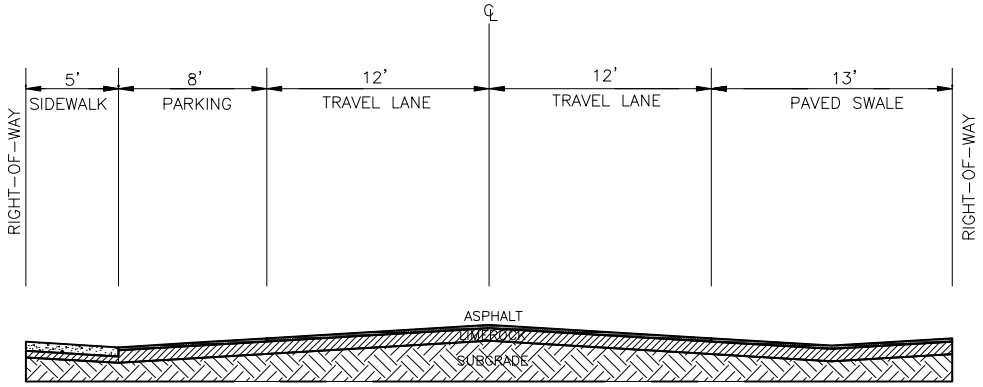
TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA

APPENDIX 6.11
ROADWAY CROSS SECTIONS



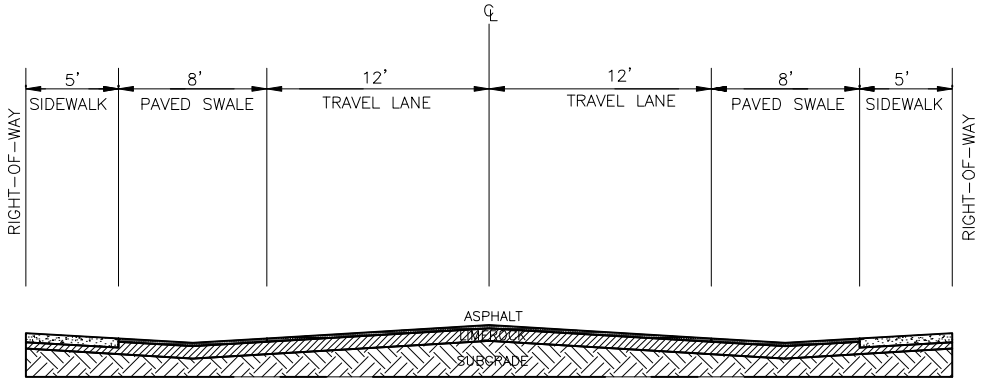
Alleyways

SCALE: N.T.S



Hibiscus Avenue

SCALE: N.T.S



Datura Avenue

SCALE: N.T.S

CHEN&ASSOCIATES
Civil and Environmental Engineers

TOWN OF LAUDERDALE-BY-THE-SEA
For the Rest of Your Life
FLORIDA