

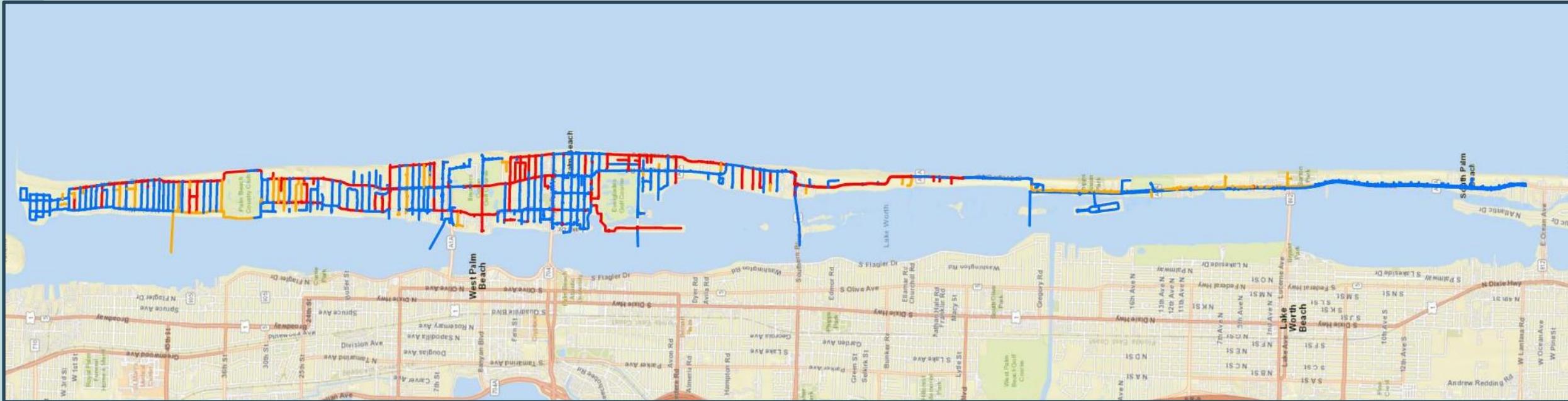
Town of Palm Beach Water Supply Feasibility Study

Meeting
August 2022

Overview

- Age Based Watermain Assessment
 - Remaining Asbestos Concrete Pipe
 - Remaining Cast Iron Pipe
- Renewal and Replacement Programs
- Timeline and Complexity
- Membrane Treatment
- Horizontal Saltwater Wells Concept
- Transmission Pipe in the Intracoastal
- Conceptual Town Utility Department Structure

Age Based Watermain Assessment



Legend

WATERMAIN AGE

— 1940'S OR OLDER

— 1950'S

— 1960'S OR NEWER

Age Based Watermain Assessment

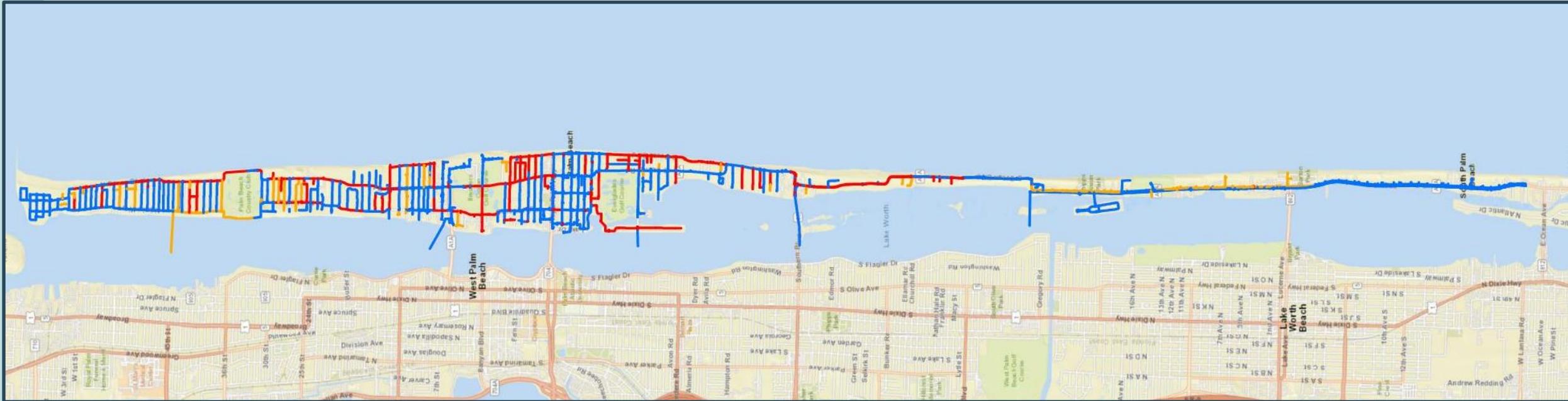


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WATERMAIN AGE

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Age Based Watermain Assessment



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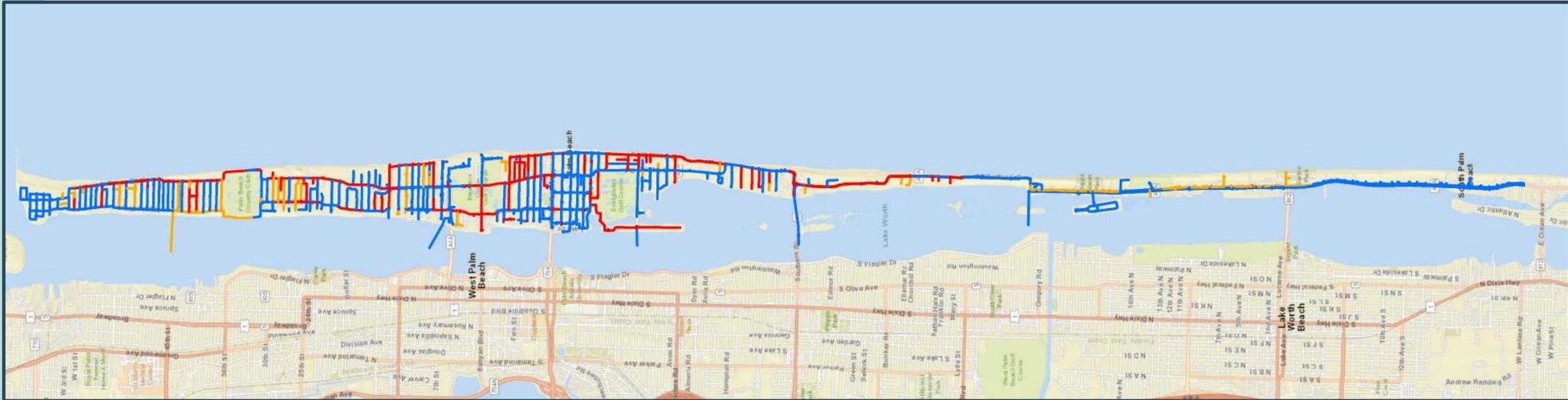


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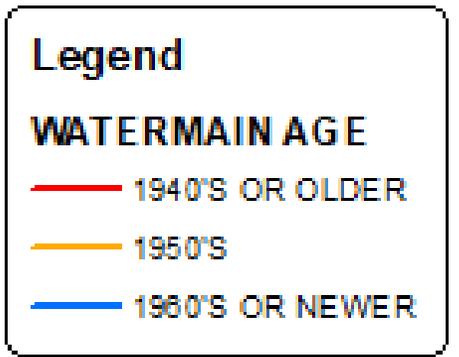


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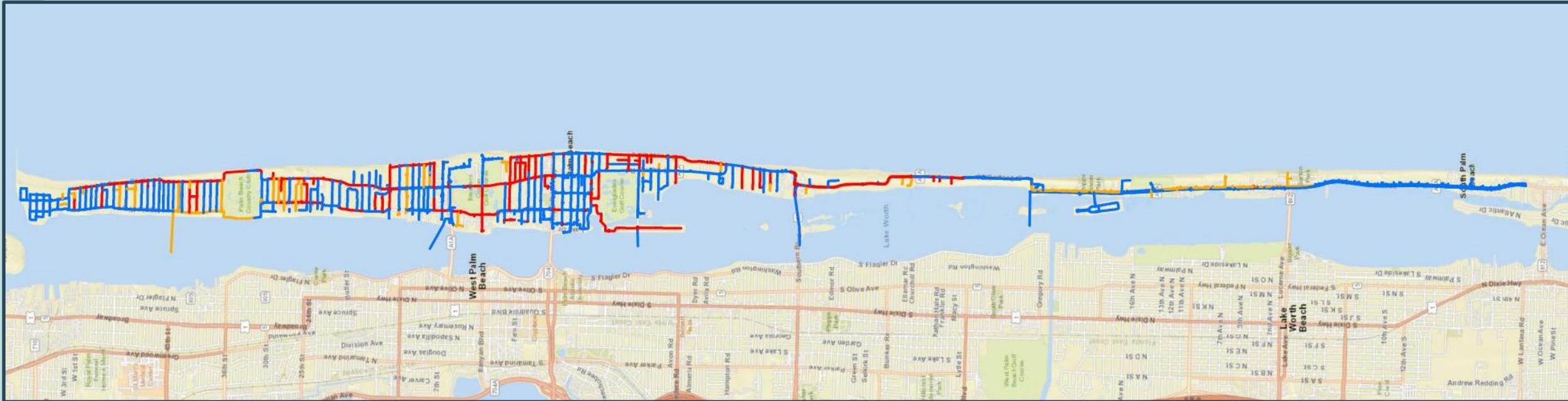
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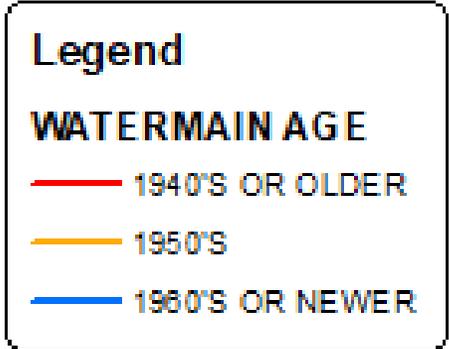


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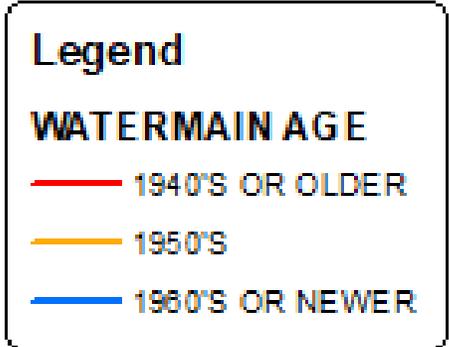
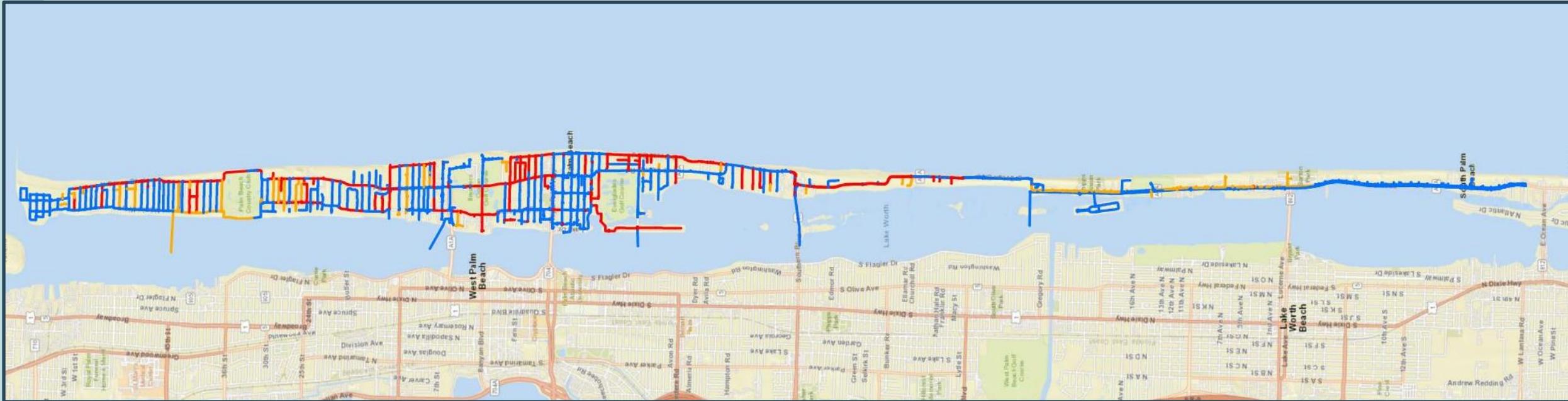
WATERMAIN AGE

- 1940'S OR OLDER
- 1950'S
- 1960'S OR NEWER

Age Based Watermain Assessment



Age Based Watermain Assessment



Age Based Watermain Assessment

Age Group	Quantity (Linear Feet - LF)	% of total Pipe in the Town
1940's and Older	89,321	23%
1950's	48,522	12%
1960's to Present	258,426	65%
Total	396,269	

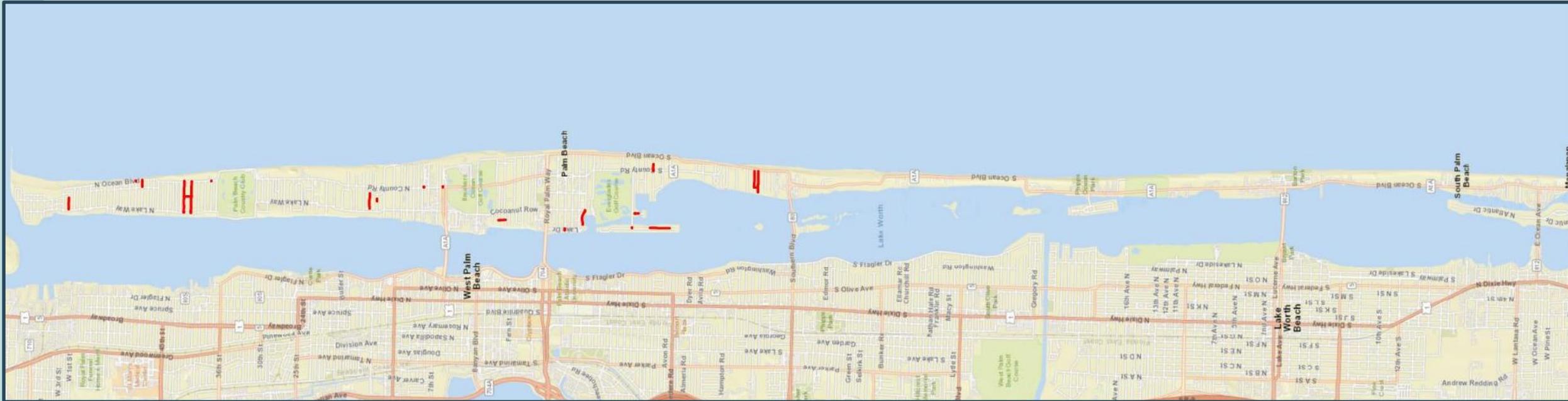
Age Based Watermain Assessment – Arterial Streets and Side Streets

Age Group	Quantity (LF)	Arterial Streets			Side Streets		
		Pipes on Arterial Streets (LF)	% of Age Group	% of Total Pipelines	Pipes on Side Streets (LF)	% of Age Group	% of Total Pipelines
1940's and Older	89,321	49,472	55%	12%	39,849	45%	10%
1950's	48,522	20,593	42%	5%	27,929	58%	7%
1960's to Present	258,426	129,707	50%	33%	128,719	50%	32%
Total	396,269	199,772		50%	196,497		50%

Age Based Watermain Assessment – Arterial Streets and Side Streets

Age Group	Arterial Street Pipes % of Total Pipeline	Side Street Pipes % of Total Pipeline
1940's and Older	12%	10%
1950's	5%	7%
1960's to Present	33%	32%

Remaining AC Pipe



Legend

 REMAINING AC PIPE

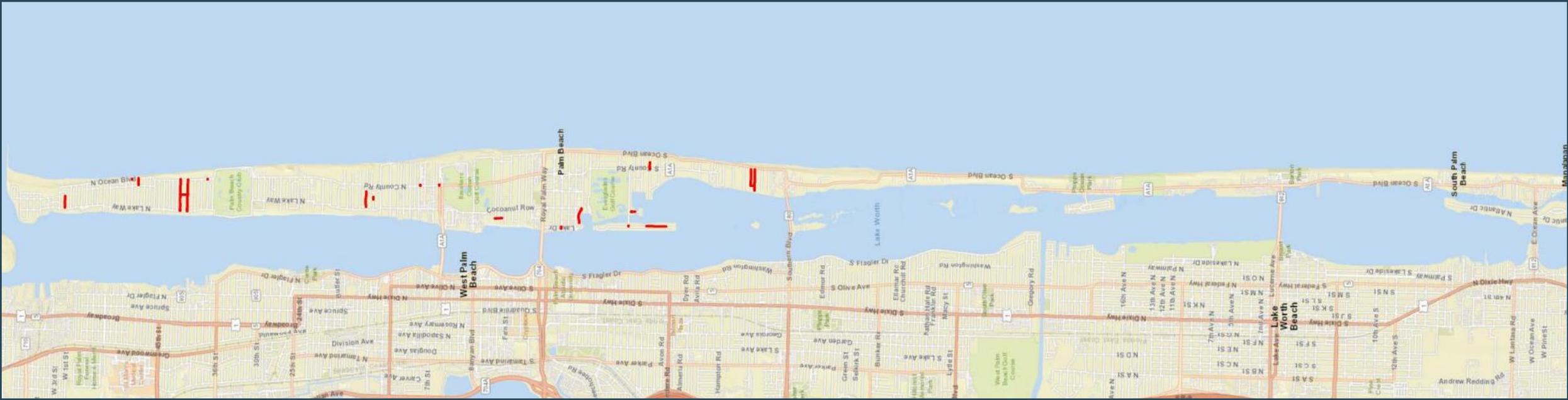
Remaining AC Pipe



Legend

— REMAINING AC PIPE

Remaining AC Pipe



Legend

— REMAINING AC PIPE

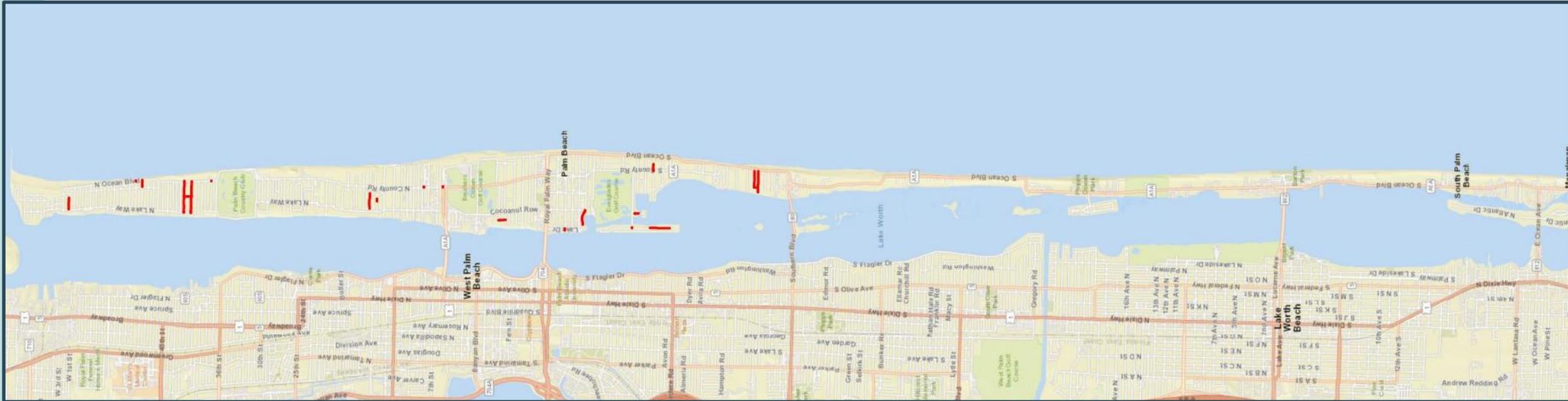
Remaining AC Pipe



Legend

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Remaining AC Pipe



Legend

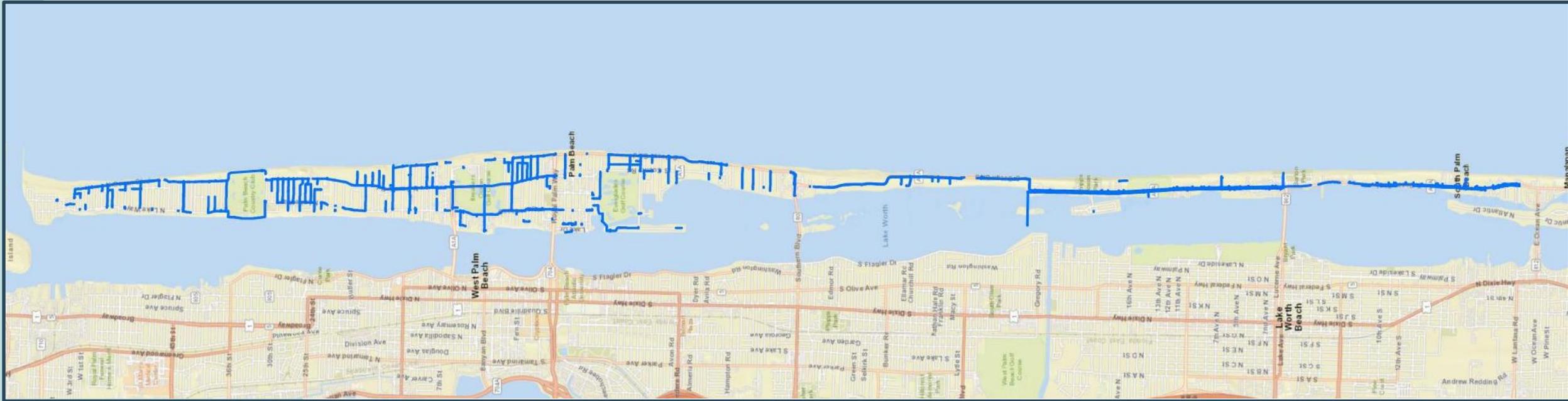
 REMAINING AC PIPE

Remaining AC Pipe

- Total Pipe in the Town = 396,000 LF
- Total AC Pipe Remaining = 8,900 LF
- % of AC Pipe Remaining = 2.2%

Age Group	Quantity (LF)	AC Pipe Remaining	AC - % of Age Group	AC - % of Total Pipe
1940's and Older	89,321	5,978	7%	1.5%
1950's	48,522	599	1.2%	0.15%
1960's to Present	258,426	2,386	0.92%	0.60%
Total	396,269	8,963		

Remaining Cast Iron Pipe



Legend

— REMAINING CIP PIPE

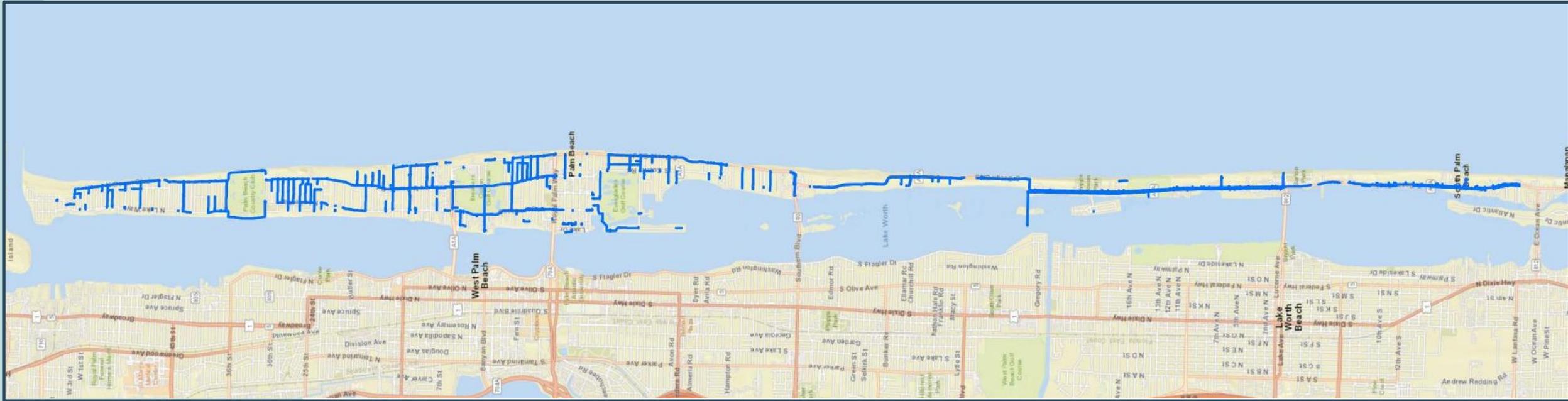
Remaining Cast Iron Pipe



Legend

— REMAINING CIP PIPE

Remaining Cast Iron Pipe



Legend

— REMAINING CIP PIPE

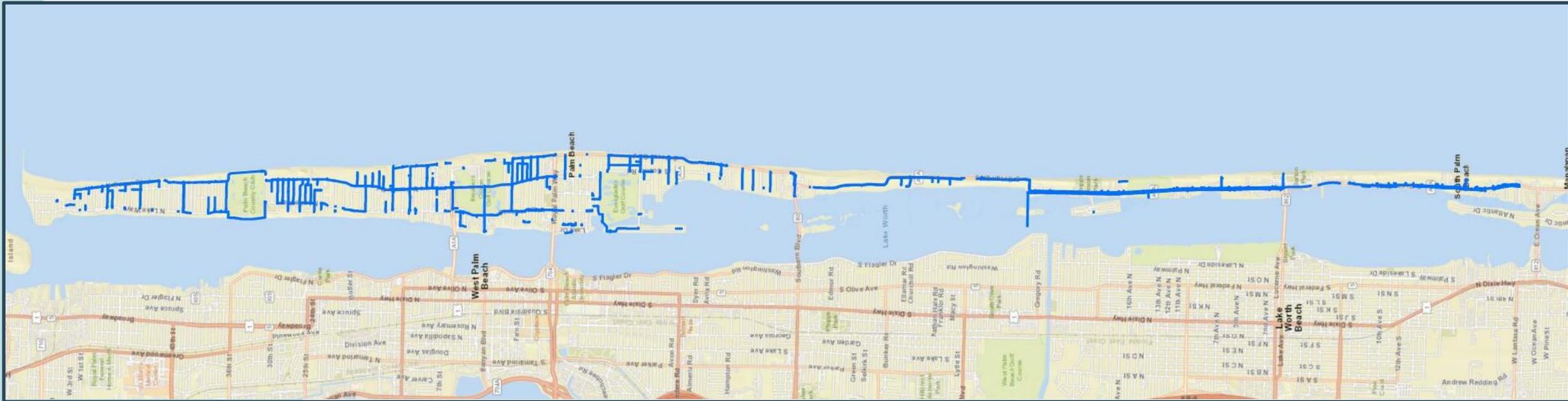
Remaining Cast Iron Pipe



Legend

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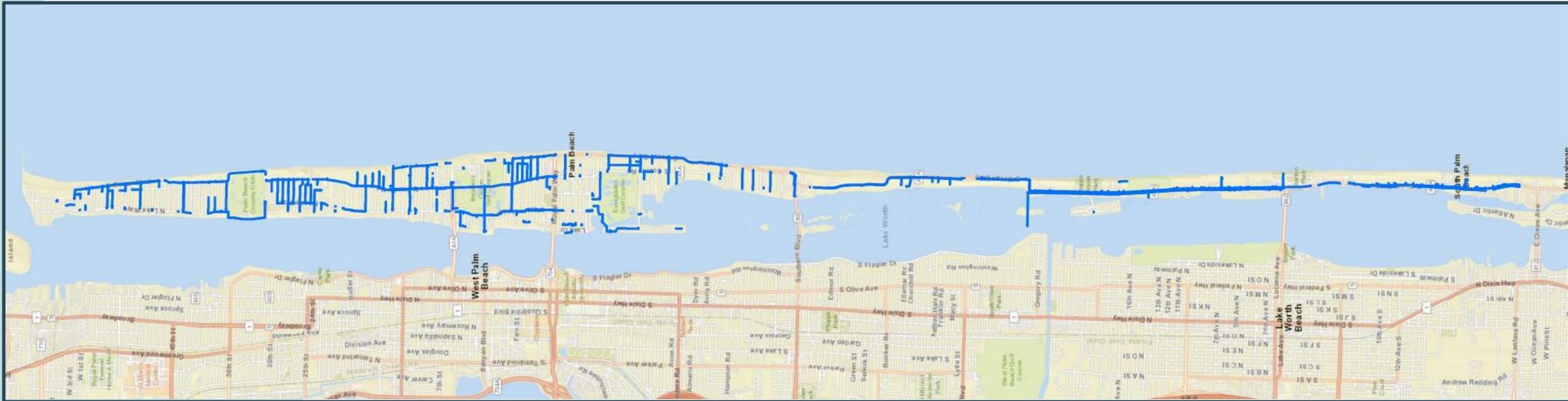
Remaining Cast Iron Pipe



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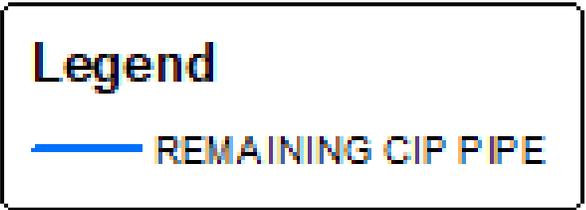
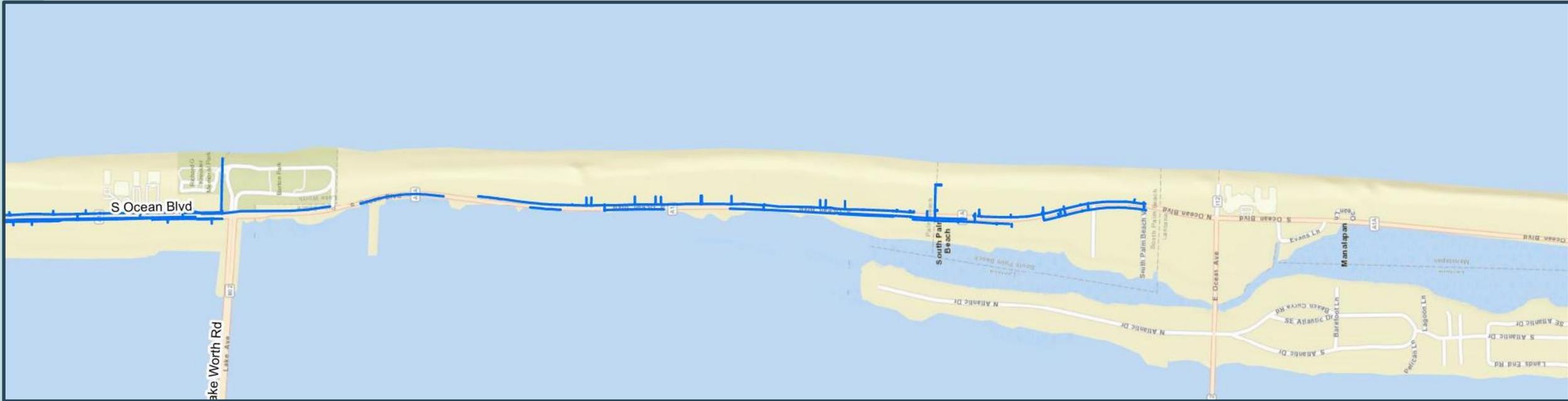
Remaining Cast Iron Pipe



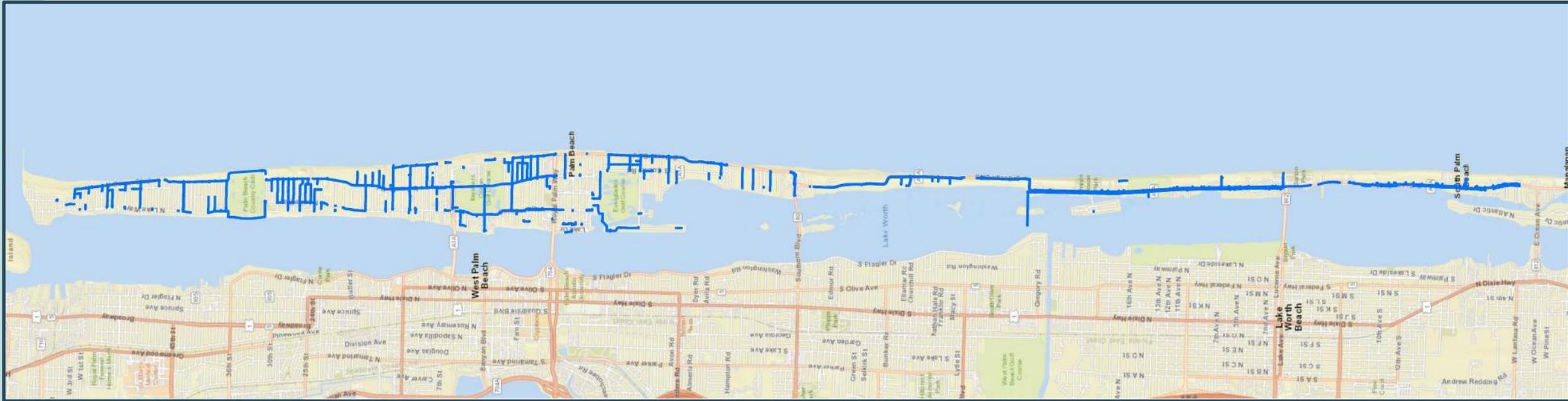
Legend

— REMAINING CIP PIPE

Remaining Cast Iron Pipe



Remaining Cast Iron Pipe



Legend

— REMAINING CIP PIPE

Remaining Cast Iron Pipe

- Total Pipe in the Town = 396,300 LF
- Total CIP Pipe Remaining = 201,740 LF
- % of CIP Pipe Remaining = 51%

Age Group	Quantity (LF)	CIP Pipe Remaining	CIP - % of Age Group	CIP - % of Total Pipe
1940's and Older	89,321	72,789	81%	18%
1950's	48,522	41,030	85%	10%
1960's to Present	258,426	87,921	34%	22%
Total	396,269	201,740		



Renewal and Replacement Programs

Renew and Replace - Pipes

- Total Pipelines in the Town = 396,300 LF
- Present Day Cost to replace all pipelines = \$239M
- Life Cycle = 75 years
- $\$239\text{M} / 75 \text{ years} = \3.18M

Renewal and Replacement - Pipes

- Total Cost of Pipelines = \$239M
- Total Pipelines = 396,300 LF
- $\$239\text{M} / 396,300 \text{ LF} = \$603 / \text{LF}$
- \$3.18M R&R fund a year

Age Group	Linear Feet	Total Cost	Approx. Years
1940's and Older	89,320	\$53.9M	17
1950's	48,520	\$29.3M	9
1960's to Present	258,430	\$155.9M	49

Timeline and Complexity

Alternative Description	Cost	Town Developed Utility Required	Water Supply Security	Water Supply Permitting Complexity	Construction Complexity	Operational Complexity and System Reliability	Land Acquisition	Program Permitting Complexity	Stakeholder Coordination
Ongoing Study									
City of West Palm Beach – As Is	\$47M - \$70M	No	Moderate	None – Already Permitted	Low	Low / High	None	Low	Low
City of West Palm Beach – Membrane Upgrade	\$547M - \$821M (\$182M - \$273M)	No	High	Moderate	High	High / High	None	Low	Low
City of Lake Worth Beach	\$263M - \$395M	Retail – No	Moderate - High	Moderate	High	Low / Moderate	Low	High	High
No Further Study									
Town Owned Phipps Park - Desal	\$352M - \$529M	Yes	High	None	High	High / High	None	High	High
Town Owned Quadrille - Nano	\$269M - \$405M	Yes	High	None	High	High / High	None	High	High
Palm Beach County	\$366M - \$443M	Yes	Moderate - High	Low	High	High / Moderate	High	High	High

Timeline and Complexity

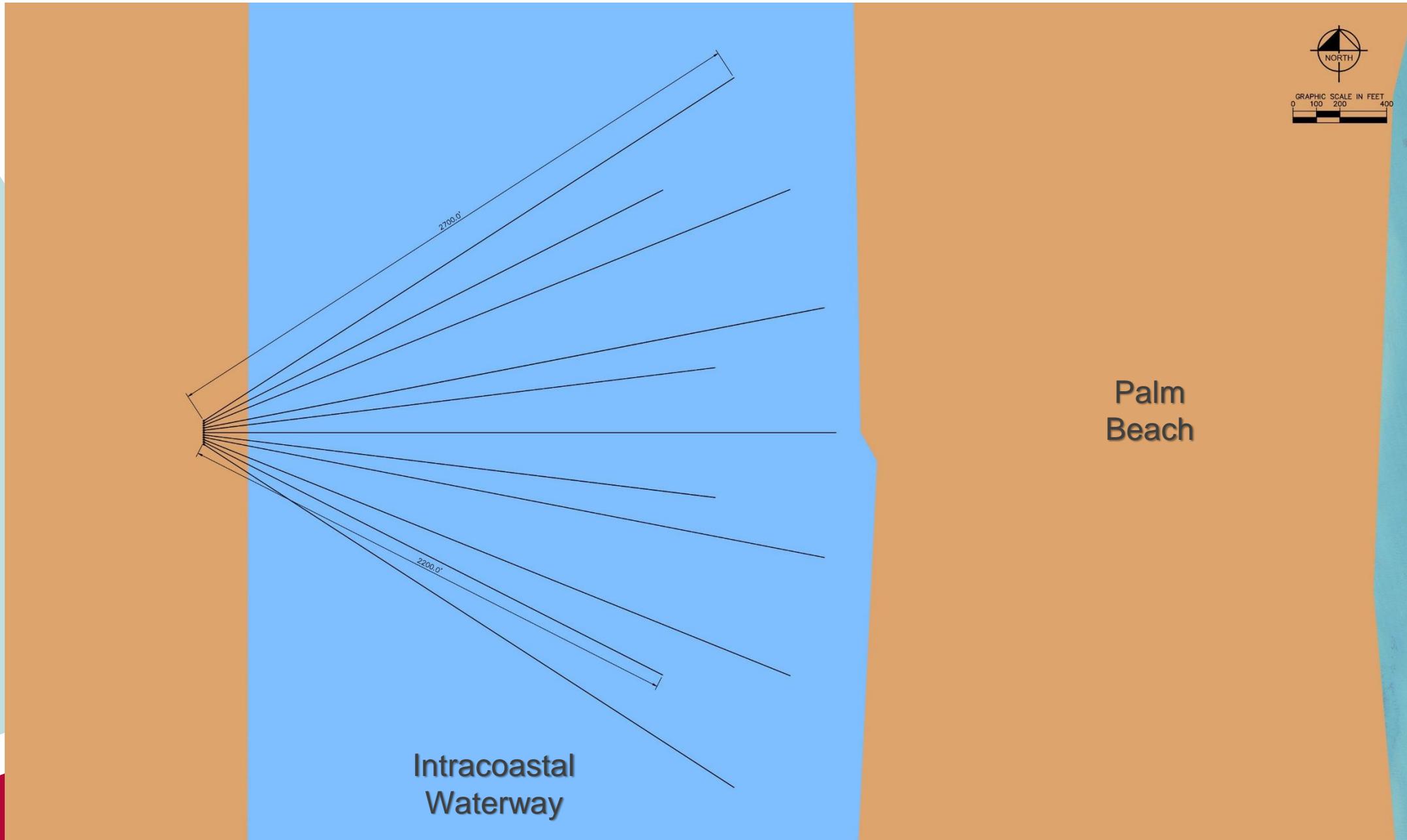
TOWN OF PALM BEACH ALTERNATIVE WATER SUPPLY STUDY
ESTIMATED COMPLETION DURATIONS OF SELECTED ALTERNATIVES

Alternate	Task/Activity	Duration (Months)	Duration (Quarters)	2023				2024				2025				2026				2027				2028				2029				2030				2031			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
WPB WTP Treatment - As is	West Palm Beach- As is	0	0																																				
Upgrade WPB WTP Treatment	West Palm WTP Membrane Water Treatment Facility Construction	69	23																																				
LWB Supply	Town Water Distribution System Construction	69	23																																				

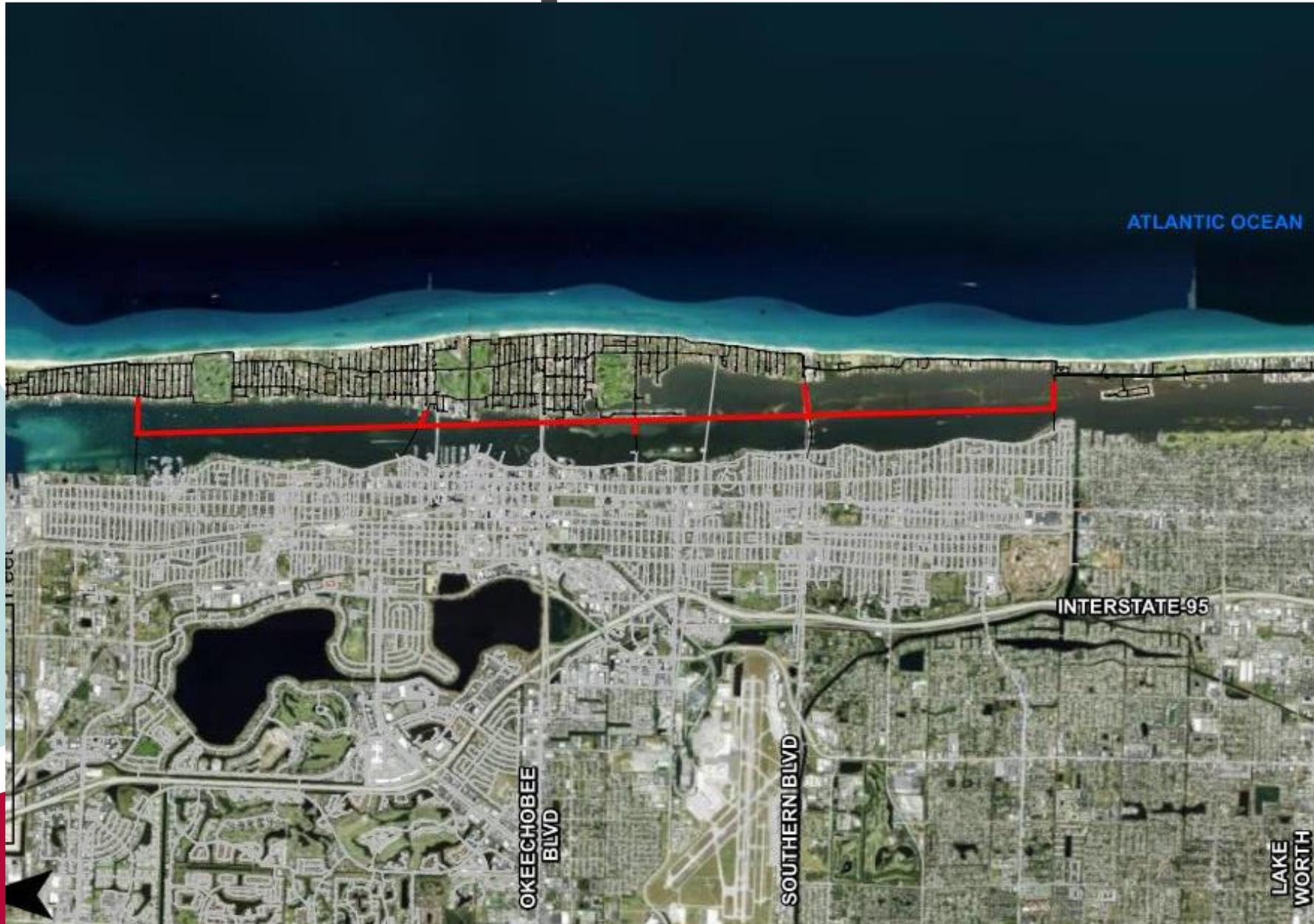
Compounds Removed by Membrane Treatment Process

Source Water	Seawater	Floridan Aquifer	Surface Water	Source Water
Process	Desalination - Reverse Osmosis (SWRO)	Brackish Water - Reverse Osmosis (BWRO)	Nanofiltration (NF)	Untreated
EXAMPLE COMPOUNDS PRESENT IN SOURCE WATER AND AMOUNT THAT PASS EACH MEMBRANE PROCESS (PARTICLE SIZE)	SWRO Membrane	BWRO Membrane	NF Membrane	 <ul style="list-style-type: none"> Giardia (None Pass) Cysts (None Pass) Salt (80% Pass) Viruses (None Pass) Bacteria (None Pass) Hardness (25% Pass) Color (5% Pass) THM (5% Pass) Organics (None Pass) CEC (None Pass) PFA (None Pass) Iron (20% Pass)
		Salt (<1% Pass)	Salt (2% Pass)	
		Iron (None Pass)		
OPERATING PRESSURE (PSI)	500 PSI TO 1000 PSI	120 PSI TO 300 PSI	60 PSI TO 120 PSI	
WATER LOST TO WASTE	65% TO 45%	30% TO 20%	20% TO 7%	

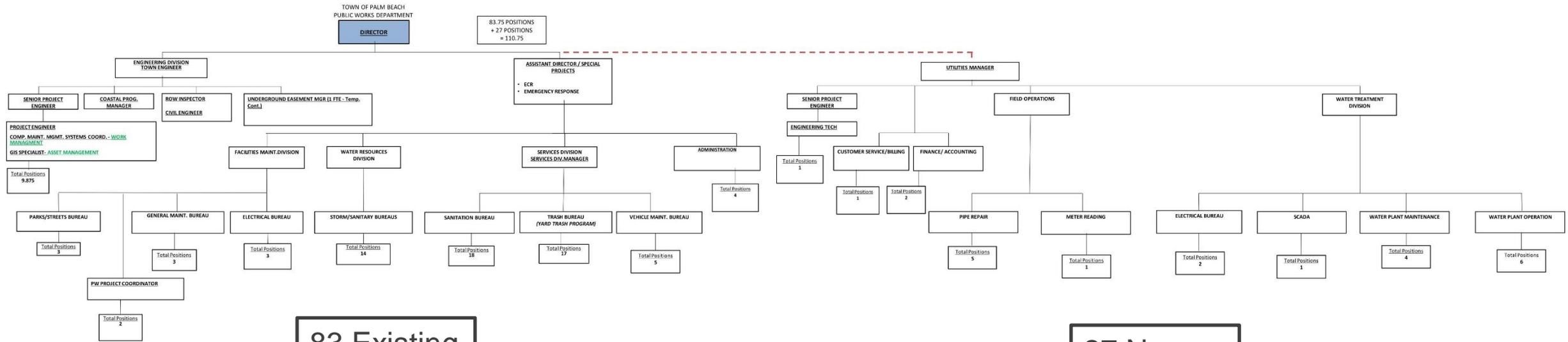
Horizontal Saltwater Wells Concept



Transmission Pipe in the Intracoastal



Utility Formation

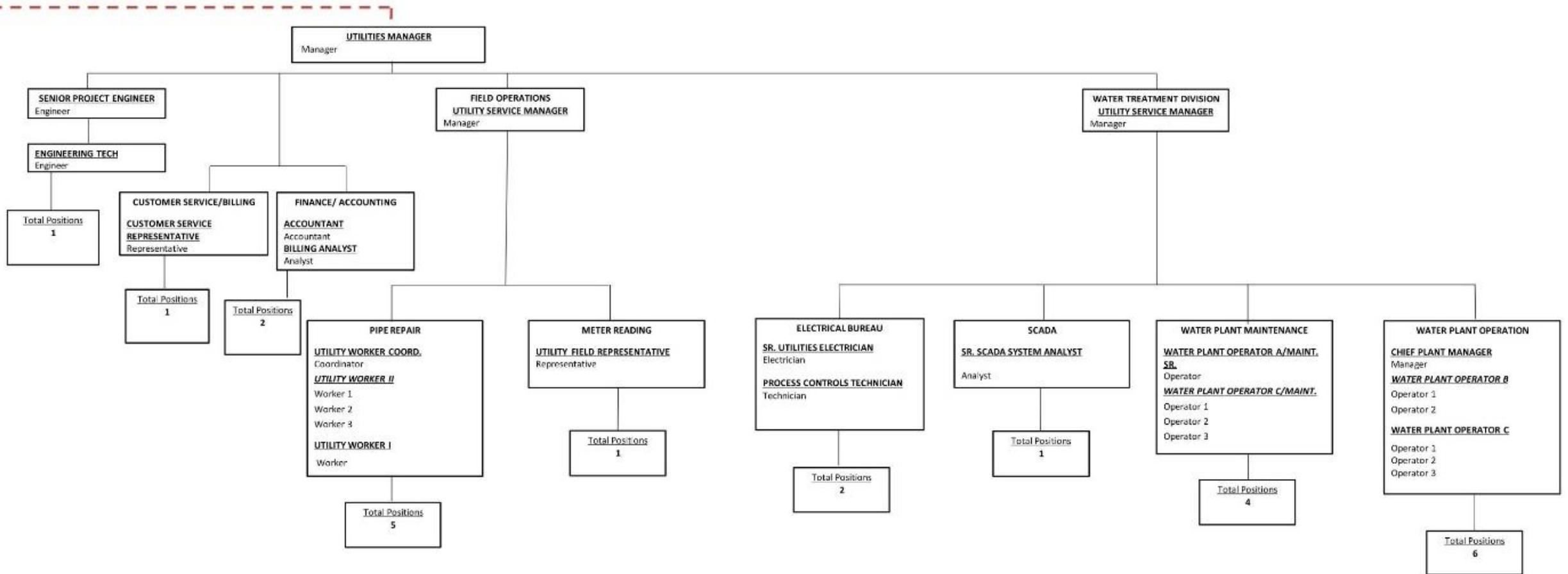


83 Existing Positions

27 New Positions

110 Total Positions

Utility Formation



27 New Positions

Renew and Replace – Treatment Plant

- Present Day Cost of Treatment Plant = \$140M (Desalination Plant)
- Life Cycle = 50 years
- $\$140\text{M} / 50 \text{ years} = \2.8M