



AGENDA
ENVIRONMENTAL ADVISORY BOARD
CITY OF PORT ORANGE

Meeting Date: Tuesday, June 20, 2017

Time: 5:00 PM

Type of Meeting: Special

Location: 2nd Floor Conference Room
City Hall, 1000 City Center Circle

A. CALL TO ORDER

1. Roll Call

B. DISCUSSION/ACTION

2. Wade Trim Septic System Study

C. NEXT MEETING DATE

3. Next Meeting Date: July 25, 2017

D. ADJOURNMENT

ANY PERSON WHO DECIDES TO APPEAL ANY DECISION MADE BY THE **ENVIRONMENTAL ADVISORY BOARD** WILL NEED A RECORD OF THE PROCEEDINGS, AND FOR SUCH PURPOSE HE OR SHE MAY NEED TO ENSURE AT HIS OR HER OWN EXPENSE FOR THE TAKING AND PREPARATION OF A VERBATIM RECORD OF ALL TESTIMONY AND EVIDENCE OF THE PROCEEDINGS UPON WHICH THE APPEAL IS TO BE BASED. **NOTE:** IF YOU ARE A PERSON WITH A DISABILITY WHO NEEDS AN ACCOMMODATION IN ORDER TO PARTICIPATE IN THIS PROCEEDING, YOU ARE ENTITLED, AT NO COST TO YOU, TO THE PROVISION OF CERTAIN ASSISTANCE. PLEASE CONTACT THE CITY CLERK FOR THE CITY OF PORT ORANGE, 1000 CITY CENTER CIRCLE, PORT ORANGE, FLORIDA 32129, TELEPHONE NUMBER 386-506-5563, CITYCLERK@PORT-ORANGE.ORG, AS FAR IN ADVANCE AS POSSIBLE, BUT PREFERABLY WITHIN 2 WORKING DAYS OF YOUR RECEIPT OF THIS NOTICE OR 5 DAYS PRIOR TO THE MEETING DATE. IF YOU ARE HEARING OR VOICE IMPAIRED, CONTACT THE RELAY OPERATOR AT 7-1-1 or 1-800-8771. UPON REQUEST BY A QUALIFIED INDIVIDUAL WITH A DISABILITY, THIS DOCUMENT WILL BE MADE AVAILABLE IN AN ALTERNATE FORMAT. IF YOU NEED TO REQUEST THIS DOCUMENT IN AN ALTERNATE FORMAT, PLEASE CONTACT THE CITY CLERK WHOSE CONTACT INFORMATION IS PROVIDED ABOVE.

City of Port Orange On-Site Wastewater Treatment System Evaluation Study

Port Orange City Council Presentation
July 25, 2017



Presentation Outline

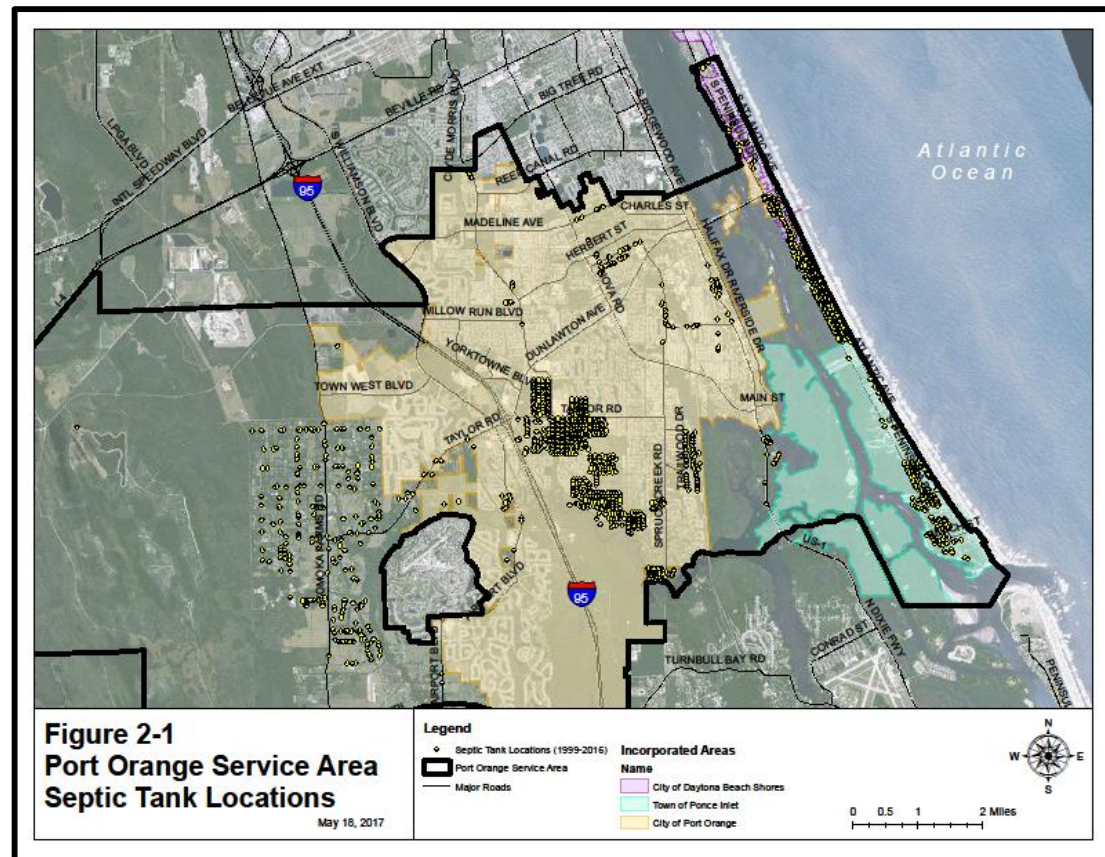
- Purpose of Study
- Study Area Description
- Methodology
- Alternative Collection Systems
- Project Identification
- Estimated Capital Costs
- Recommendations

Purpose of Study

- Identify where City wastewater infrastructure can be extended to serve parcels that are using septic tanks or on-site wastewater treatment systems (OWTS).
- Develop criteria for a priority-based plan that provides central sewers to parcels using septic systems.
- Identify the most cost effective method for constructing central sewers in the City's service area.
- Develop planning level cost estimates and a prioritized capital improvement plan for eliminating septic tanks in the Port Orange service area.

Study Area

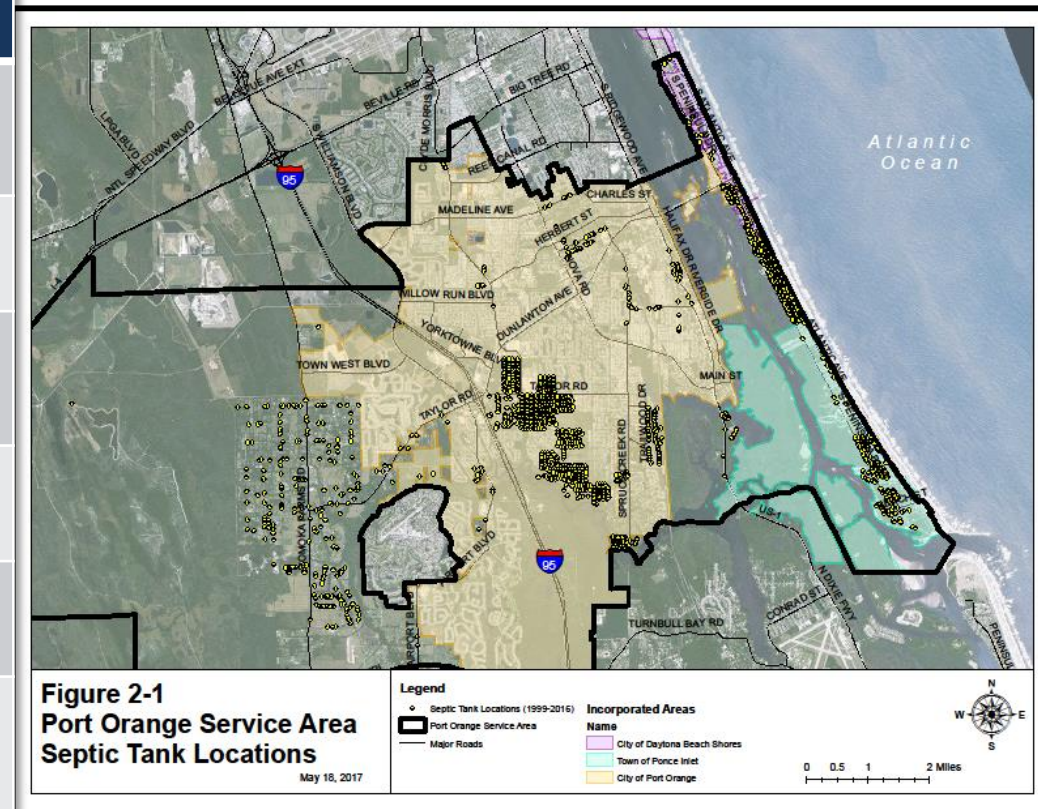
1. Property Identification
 - all properties currently using OWTS were compiled and organized
 - Approximately 2,200+ septic systems were identified within the City's wastewater service area



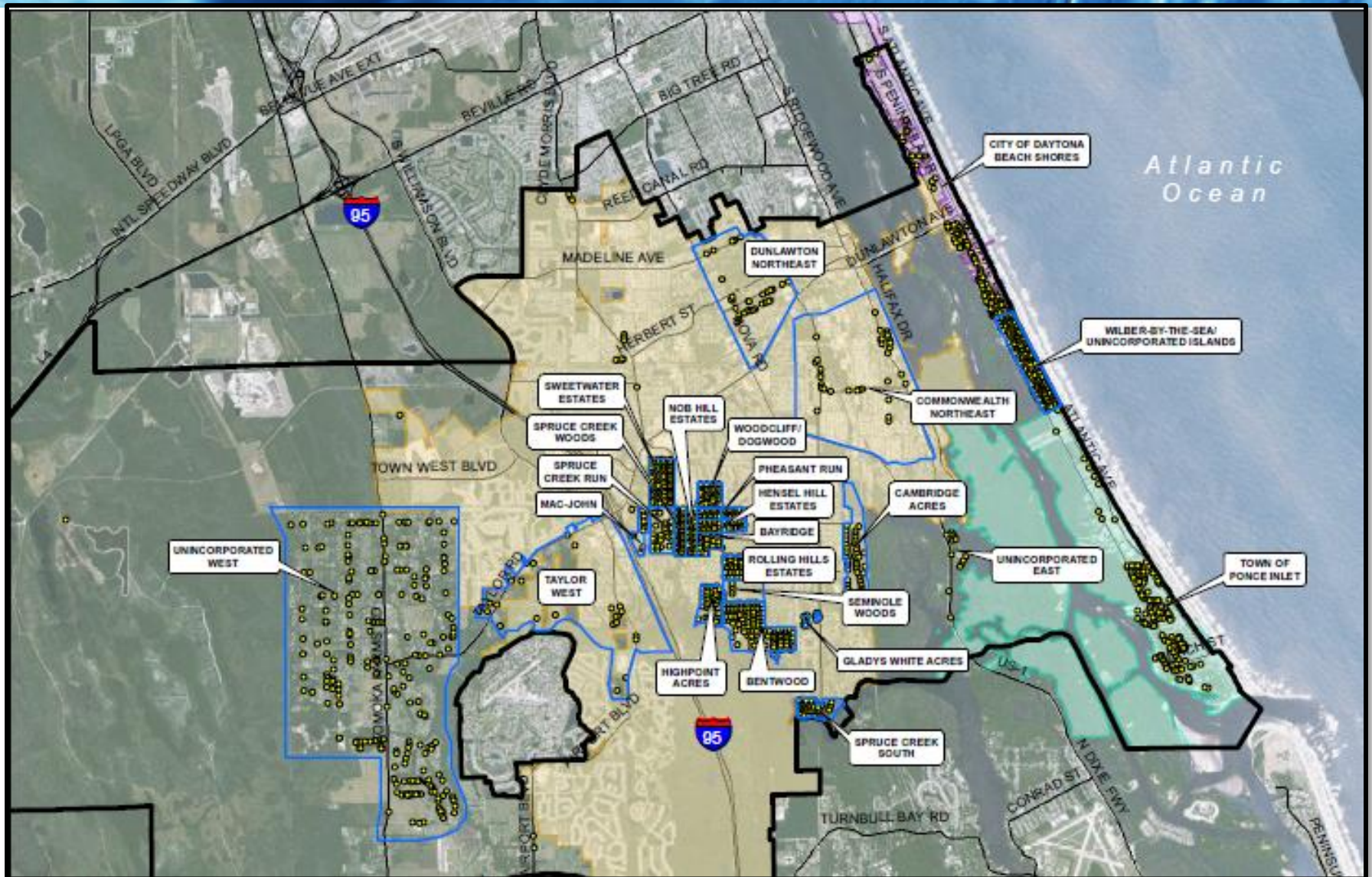
Study Area

2. Property Distribution – properties using OWTS were organized based on whether incorporated or unincorporated

Area Description	# OWTS
City of Port Orange & Enclaves	733
Town of Ponce Inlet	412
City of Daytona Beach Shores	19
Unincorporated West	710
Unincorporated East	15
Wilber-By-The-Sea/ Unincorporated Islands	353



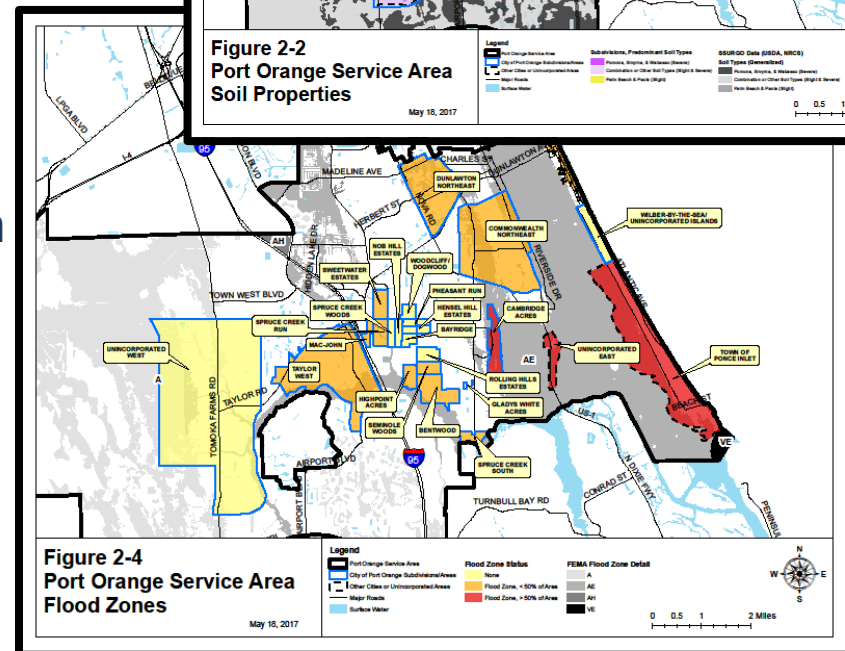
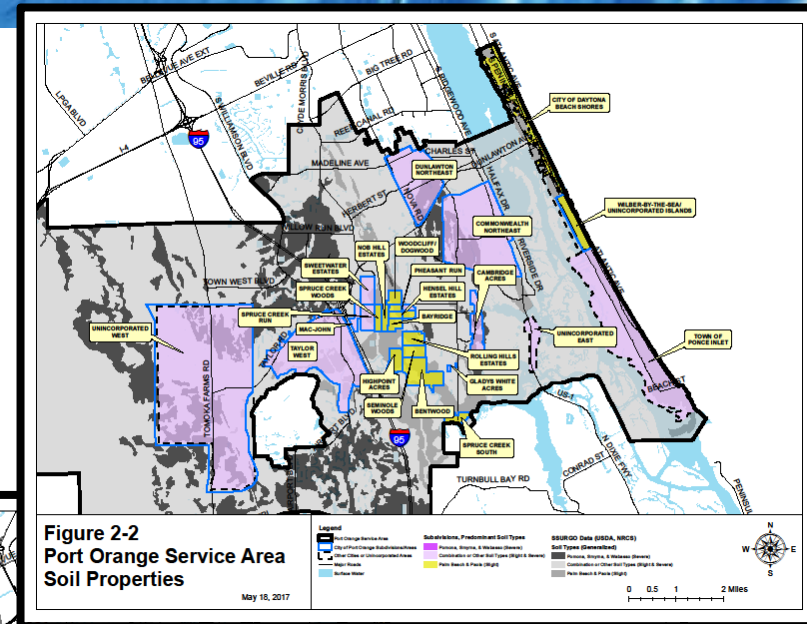
Methodology



Ranking Priority Review Criteria

Review Criteria Developed:

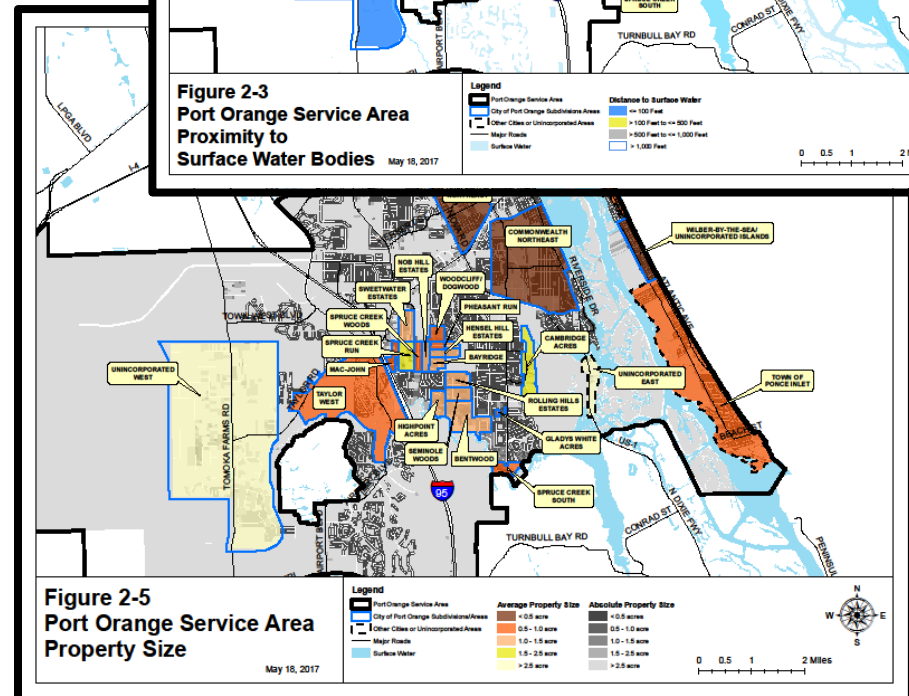
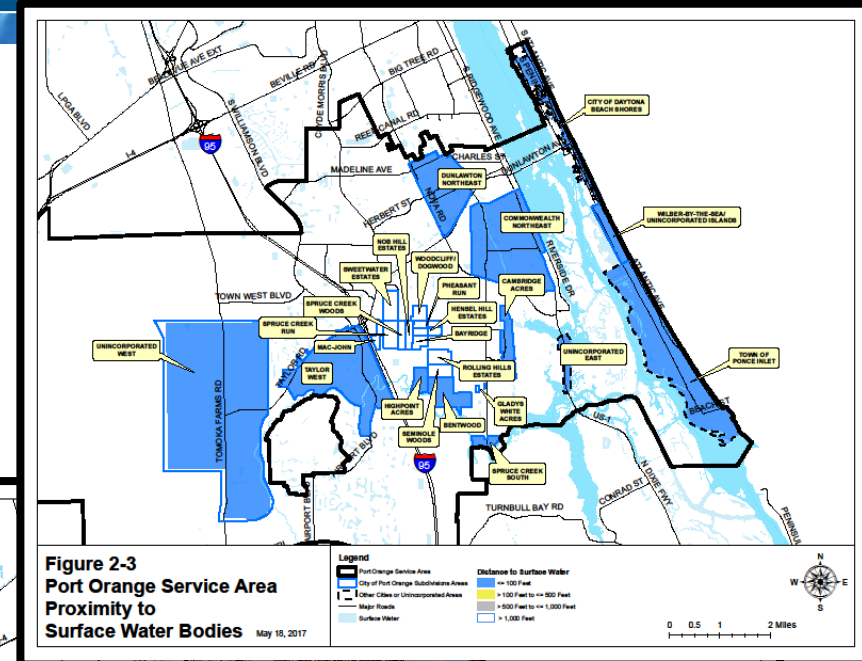
- Water Table Elevations
 - ✓ Minimum separation distance w/ Seasonal High Water Table
- Soil Properties
- Port Orange City Limits
- FEMA Flood Zones
 - ✓ Within the 100-year flood plain



Ranking Priority Review Criteria

Review Criteria (con't):

- Proximity to Surface Waters
- Surface Water Management Criteria
 - ✓ TMDLs, i.e. Spruce Creek
- Property Size
- Estimated Nutrient Loadings
 - ✓ Annual Nitrogen Loadings (lbs-N/yr)



Priority 1 Projects

Properties Located in the City Limits

Ranking	Project Area	Est. Parcels
1	Bentwood	115
2	Spruce Creek South	42
3	Taylor West	24
4	Commonwealth NE	35
5	Dunlawton NE	34
6	Cambridge Acres	47
7	Highpoint Acres	40
8	Sweetwater Estates	67
9	Spruce Creek Run	27
10	Mac-John	17
11	Gladys White Acres	19
12	Spruce Creek Woods	37
13	Rolling Hills	48
14	Seminole Woods	5
15	Pheasant Run	31
16	Woodcliff/Dogwood	40
17	Hensel Hill Estates	33
18	Nob Hill Estates	35
19	Bayridge	26
20	Miscellaneous Streets	11
TOTAL EST. PARCELS		733

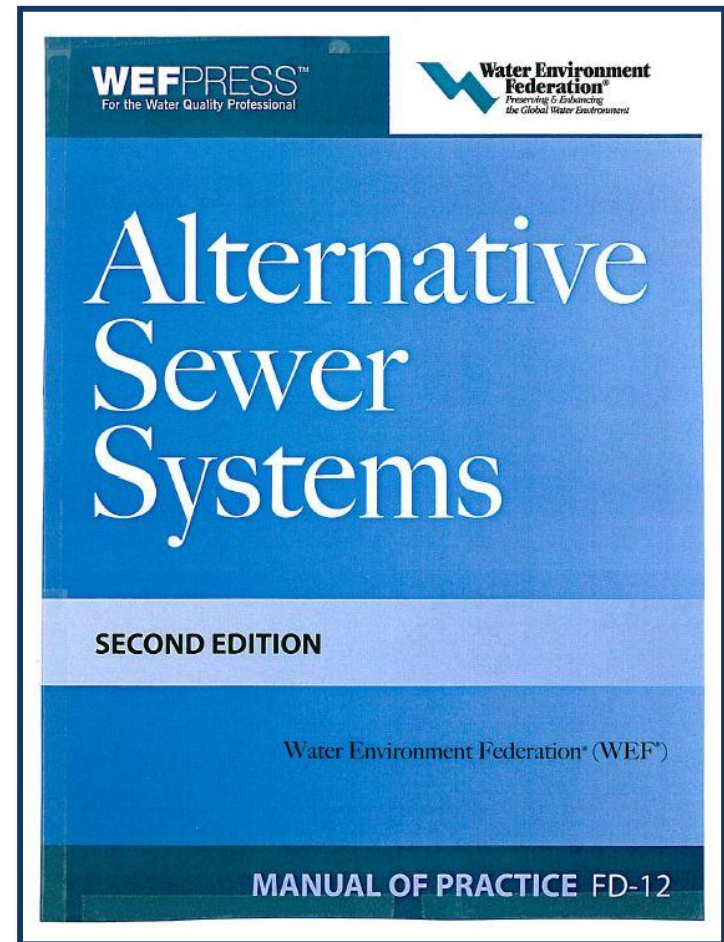
Priority 2 Projects

Properties Located Outside the City Limits

Ranking	Project Area	Est. Parcels
1	Unincorporated West	710
2	Town of Ponce Inlet	412
3	Wilber-by-the-Sea	353
4	Unincorporated East	15
5	City of Daytona Beach Shores	19

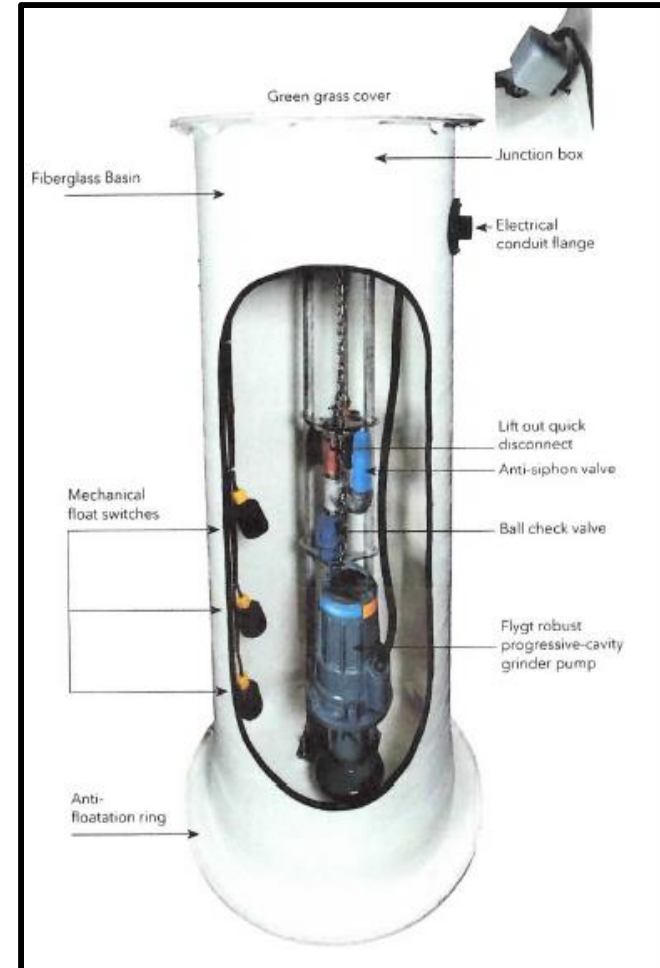
Alternative Collection Systems

- Low Pressure sewers
- Gravity sewers
- Vacuum sewers



Low Pressure Sewer Basics

- Recognized by the EPA & the Water Environment Federation as an alternative sewer system when limited by poorly drained soils, high groundwater table, shallow rock, etc.
- Individual grinder pump stations are located each residential property
- Grinder pump station discharges to a low pressure force main which connects w/ the City's wastewater collection system.

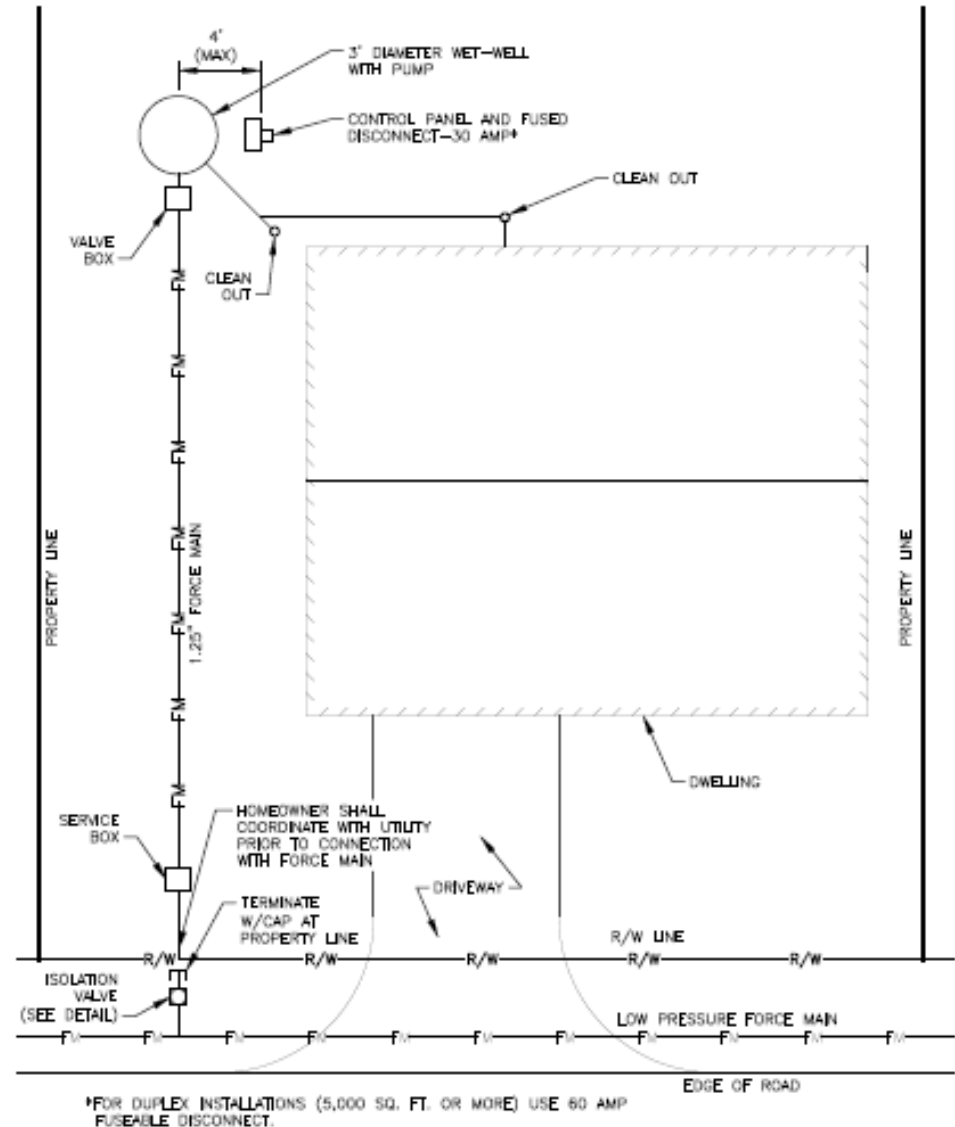


Low Pressure Sewers

- Major components include:
 - Simplex grinder pump stations are used for single family residences and include:
 - Grinder Pump
 - Wet Well
 - Control Panel
 - Low pressure force main
 - Air release valves & combination air valves



Low Pressure Sewers



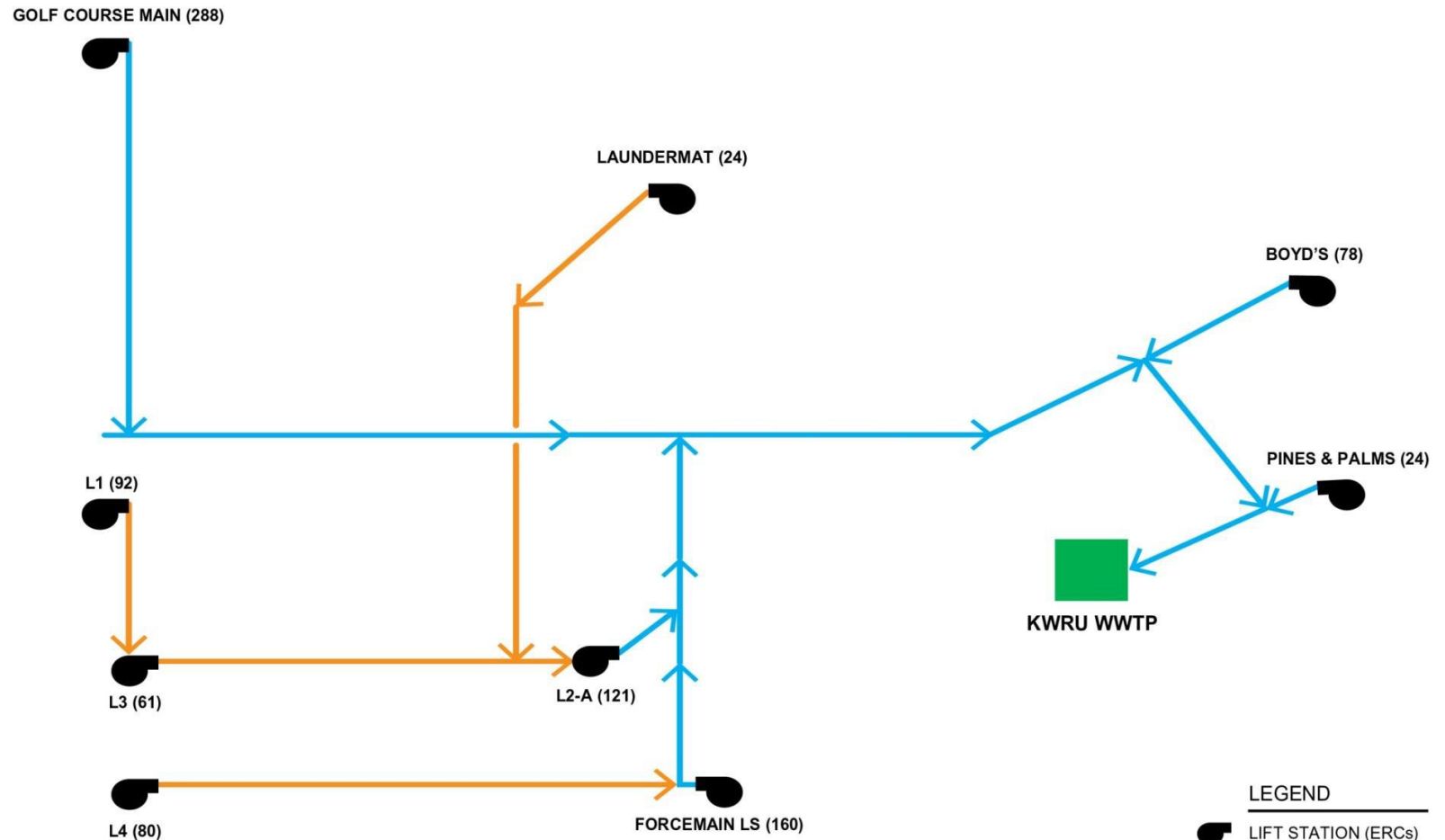
Low Pressure Sewers

- Advantages
 - Good for large parcels where gravity sewer laterals can be difficult to construct
 - Construction is less disruptive than w/ gravity sewers;
 - Pipe diameters are smaller than gravity sewers; typical burial depth is 2-1/2 to 3-feet below grade
 - Inflow and infiltration are reduced
- Disadvantages
 - Customer must provide/pay for grinder pump and the electrical costs required for operating the pump system
 - Customer is responsible for operation & maintenance on the grinder pump station unless City/County agrees to maintenance

Gravity Sewer Basics

- Large diameter pipe is used to convey wastewater from individual households, neighborhoods, and businesses to a regional WWTP for treatment and disposal
- Minimum 8-inch diameter gravity sewer size required
- Multiple pumping stations are required
- Wastewater must be transferred with a minimum pipe velocity of 2 ft/sec
- Corrosion control and protection are needed due to H₂S gas production

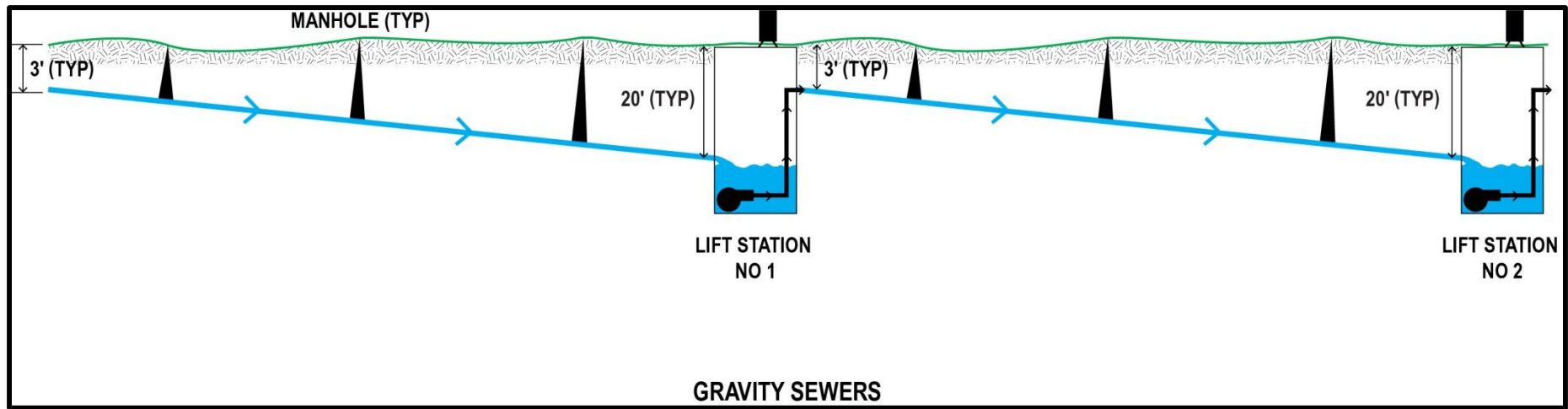
Gravity Sewer Basics



KWRU LIFT STATION LAYOUT

Gravity Sewer Basics

Lift Station Illustration



Typical Gravity Sewer & Lift Station Profile

Gravity Sewer Basics

Lift Stations –
Hydraulic
structures which
are used to
transport
wastewater



Key components:

- Wet well
- Pumps
- Motors
- Controls
- Power

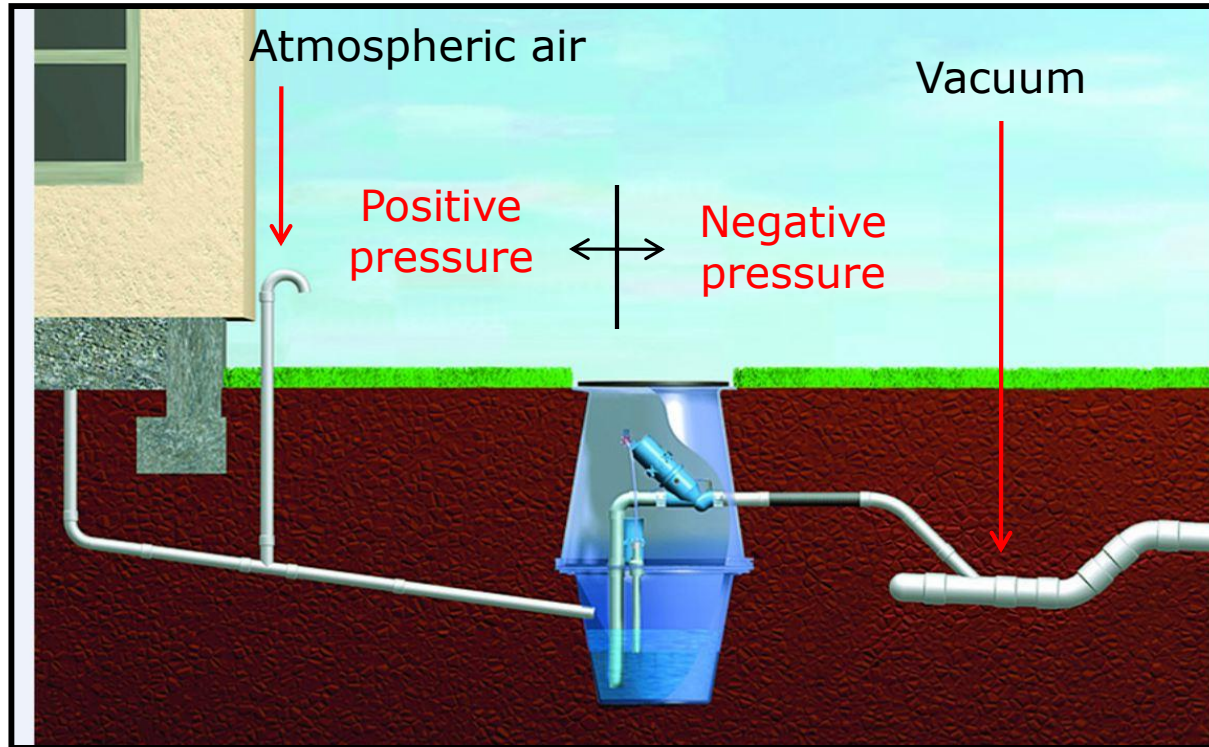
Gravity Sewer Design & Construction

- Construction can be disruptive due to the depth of construction, multiple lift stations, and dewatering requirements
- Manholes required at set intervals, pipe intersections, changes in pipe direction and changes in pipe slopes
- Manhole designs must address inflow and infiltration
- Buoyancy considerations
- Renewal and replacement costs associated with manholes & lift stations (corrosion problems).



How a Vacuum Sewer Works – At the House

(1)
House to
pit via
gravity
lateral

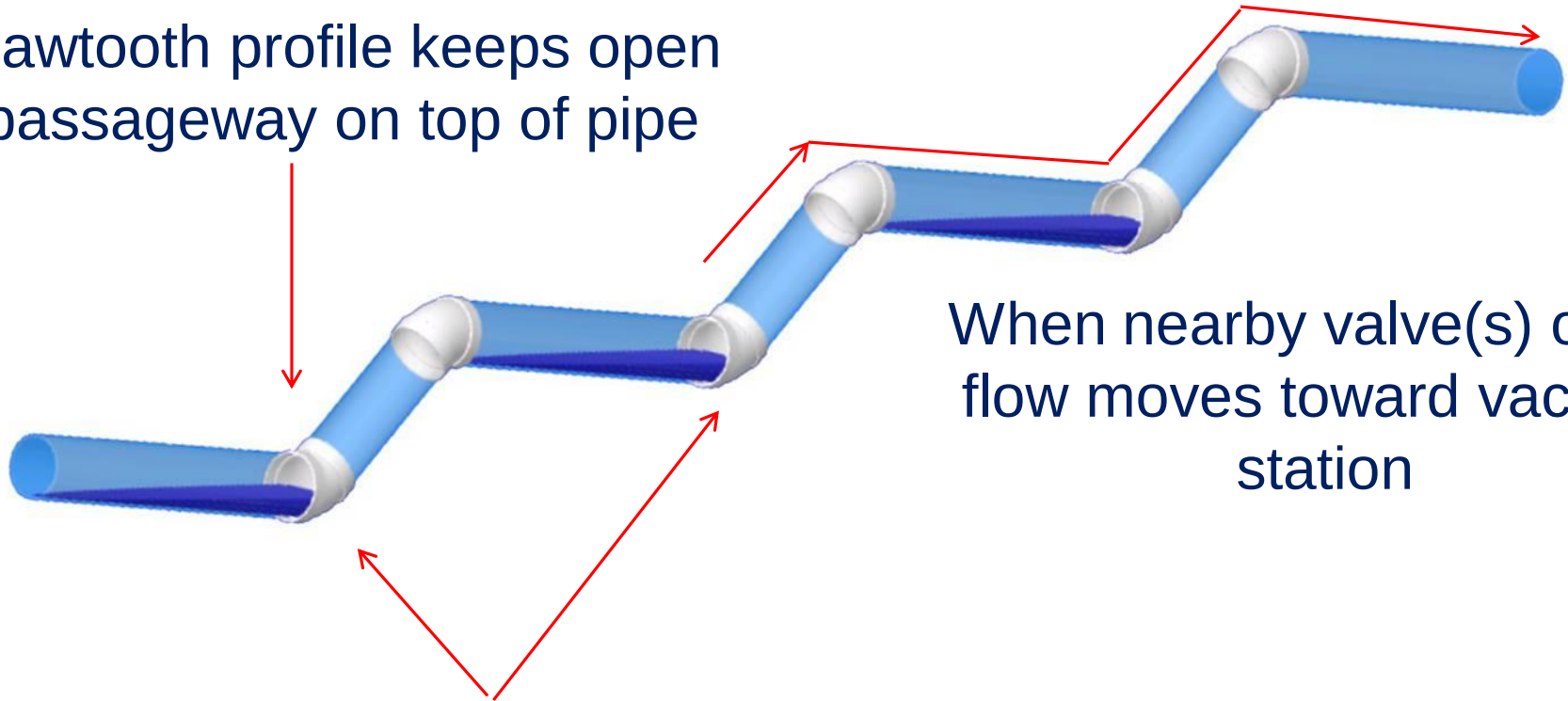


(3)
Differential
pressure
propels
sewage
toward
vacuum
station

(2)
Valve pit interface valve opens and
the contents are sucked out

How a Vacuum Sewer Works – In the Vacuum Main

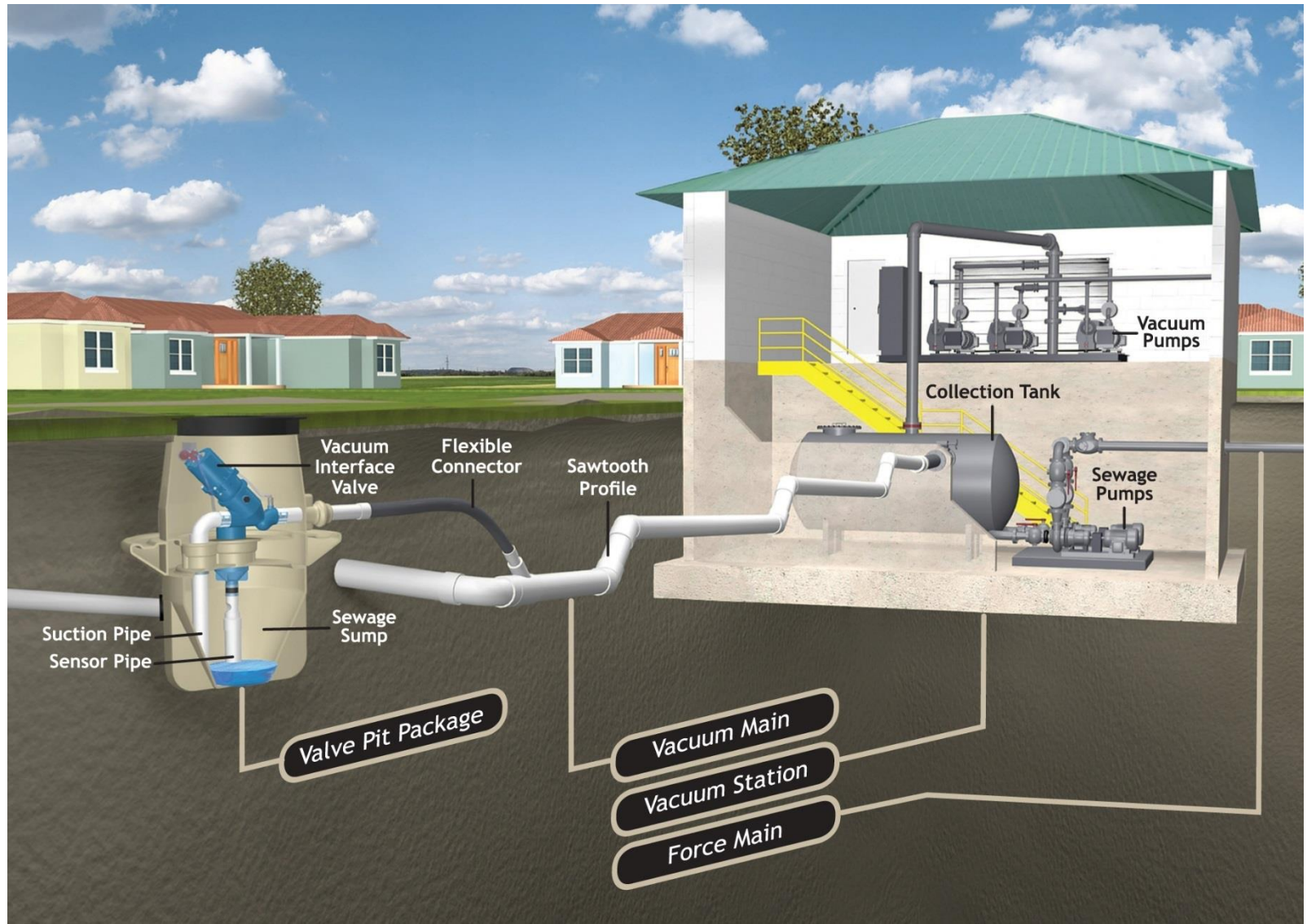
Sawtooth profile keeps open
passageway on top of pipe



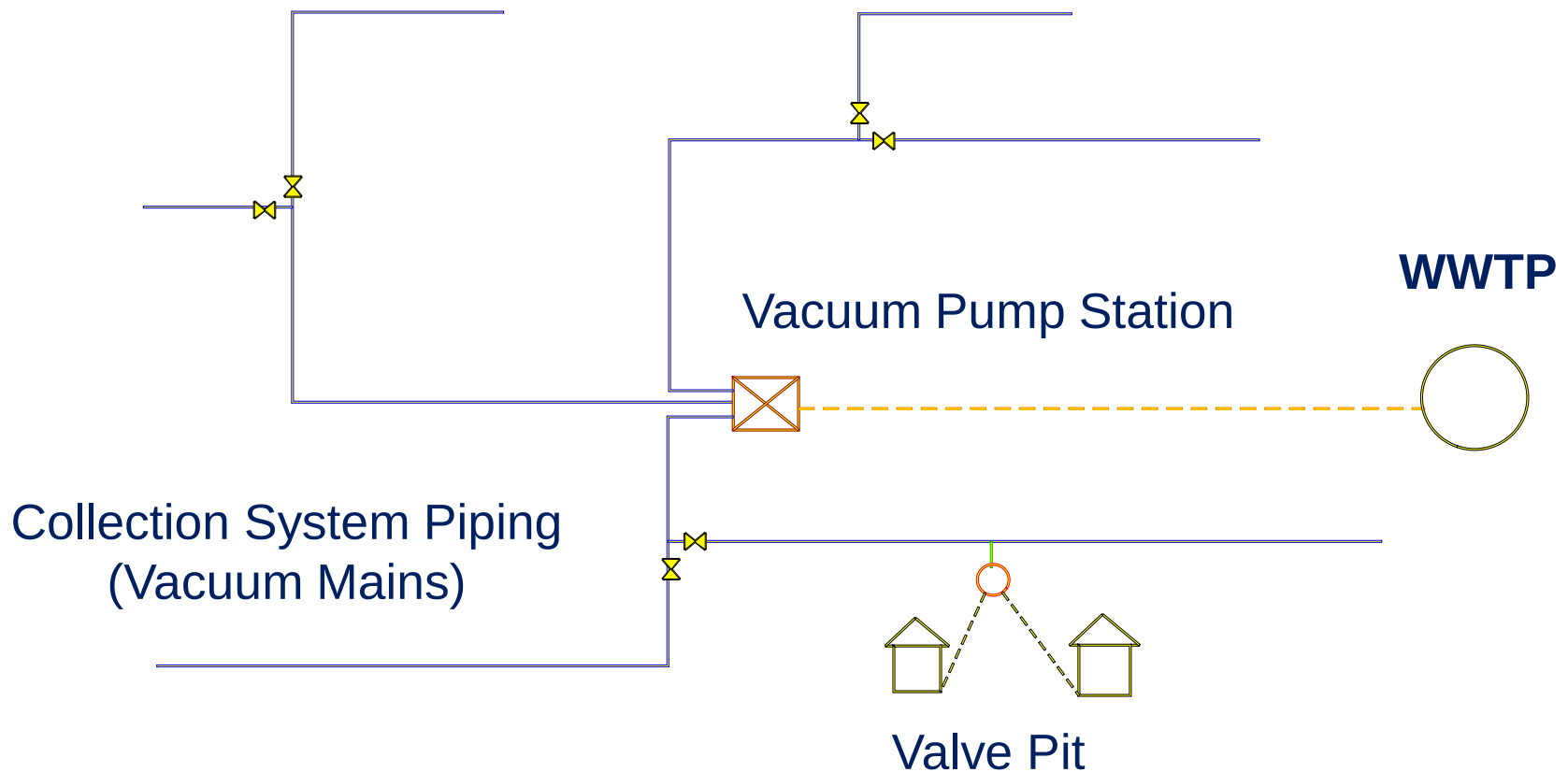
When nearby valve(s) open,
flow moves toward vacuum
station

Flow comes to rest & temporarily
accumulates at the low points

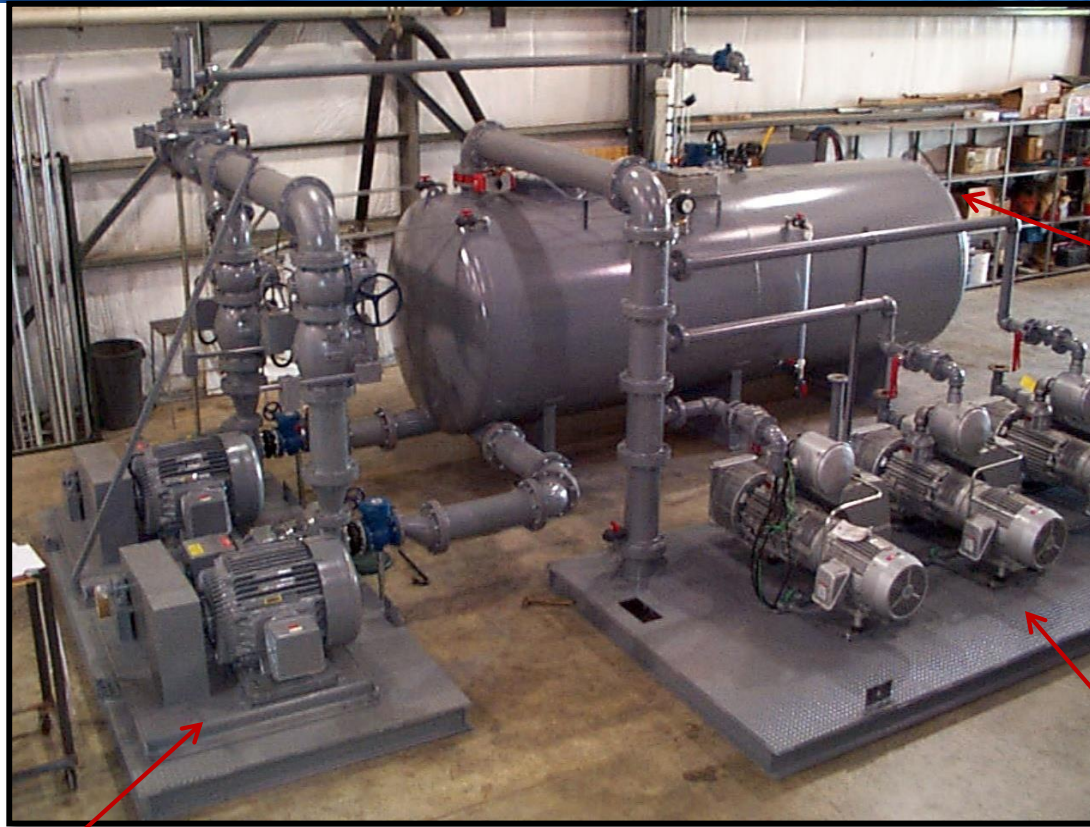
How a Vacuum Sewer Works – At the House



Vacuum System Schematic



Vacuum Station

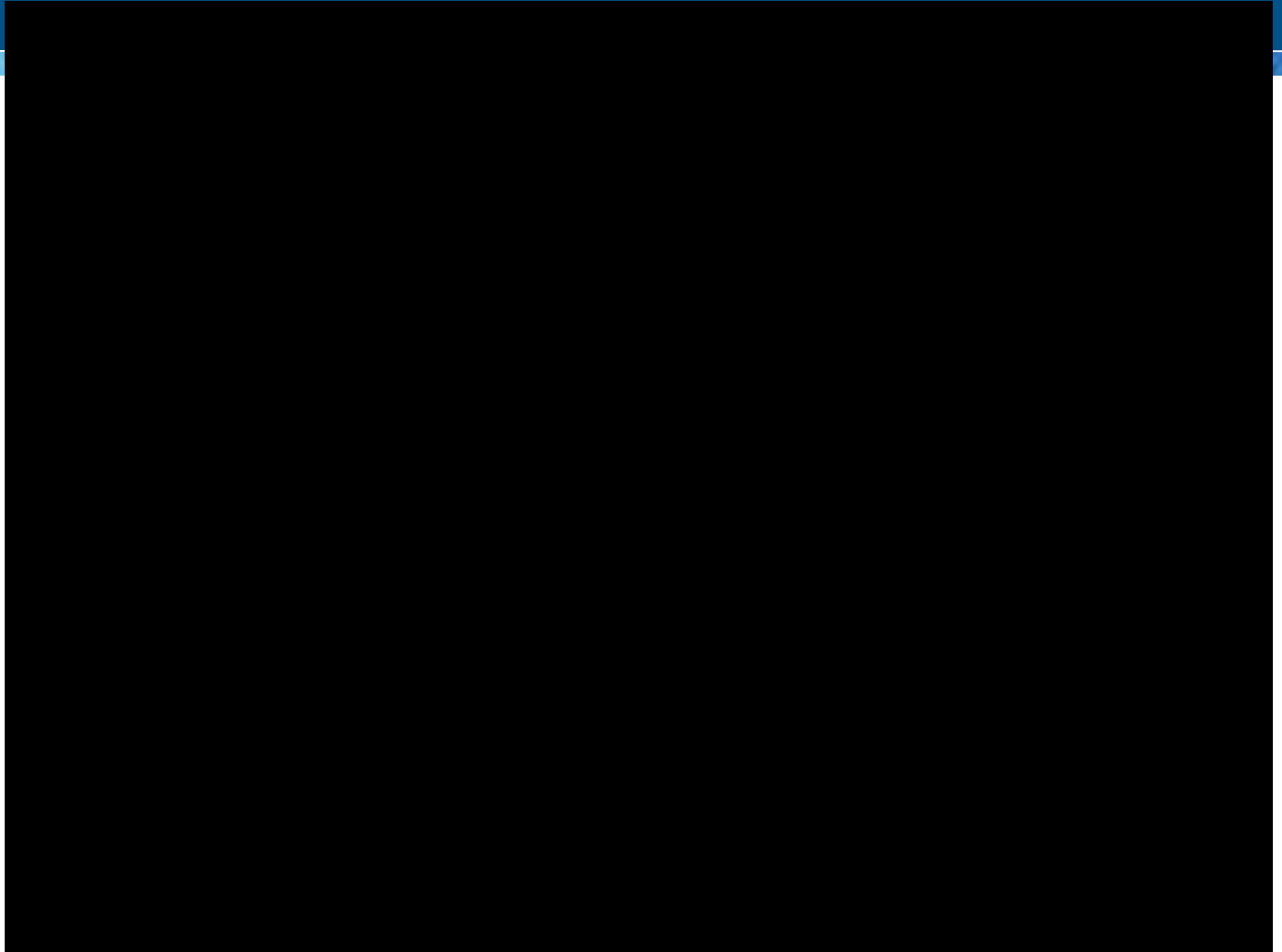


**COLLECTION
TANK**
is liquid and
vacuum
reservoir

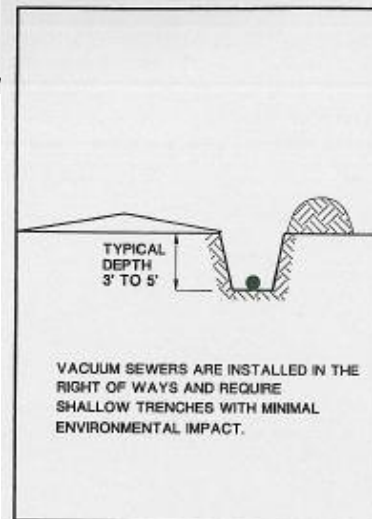
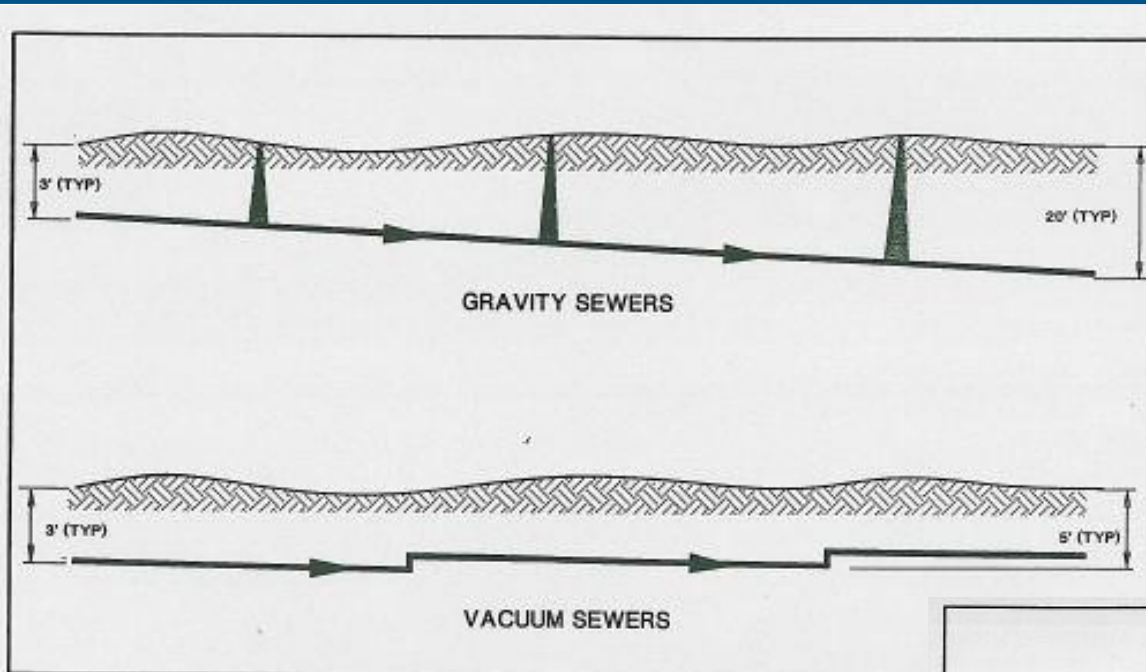
SEWAGE PUMPS
Sends sewage to gravity
main, force main, or WWTP

VACUUM PUMPS
Cycle to maintain
vacuum

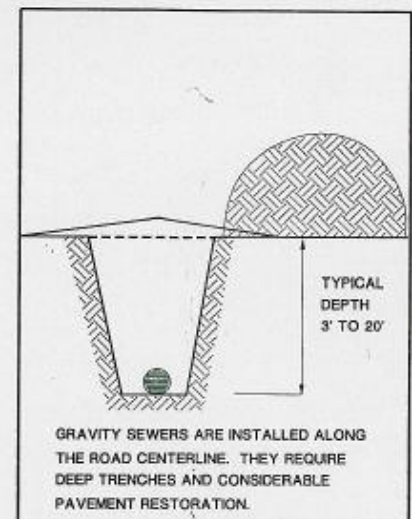
How a Vacuum Sewer Works



Vacuum & Gravity Sewer Comparisons

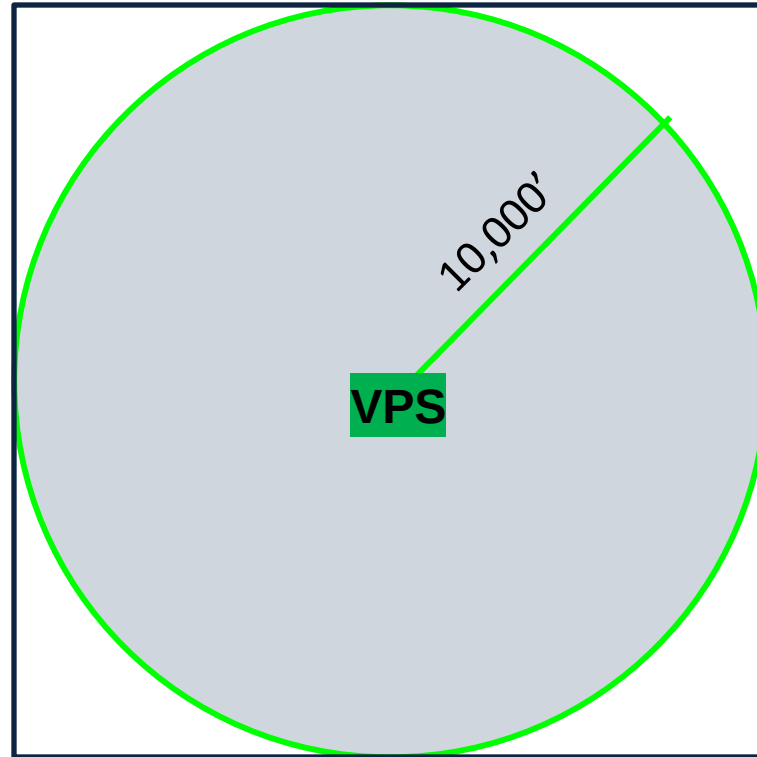


VACUUM SEWERS



GRAVITY SEWERS

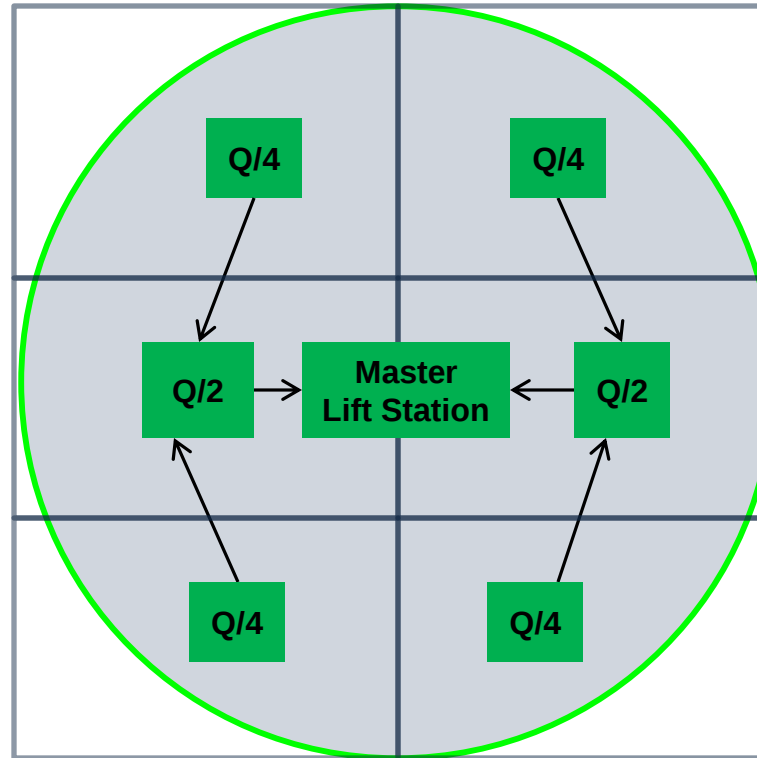
Potential Service Area Limits: Vacuum Sewer



In flat terrain, a single, large centrally located vacuum pump station (VPS) can serve an area roughly 3 to 4 square miles

Same Service Area – Gravity Sewer

To serve the same 3 to 4 square mile service area with gravity sewers would require a total of 7 Lift Stations (LS)



7 Lift Stations (LS)

- 4 small sized LS (each $Q/4$);
- 2 medium sized LS (each $Q/2$); and
- 1 Master LS (Q)

Gravity and Vacuum Sewer Comparison

Parameter	Gravity Sewers	Vacuum Sewers
# Stations Required	7 Lift Stations	1 Vacuum Station
# Vacuum Pumps	None	2 or 3 (10 – 25 Hp/ea)
# Sewage Pumps	14 (Hp varies)	2 (Hp varies)
TOTAL	7 Pump Stations & 14 Pumps	1 Pump Station & 5 Pumps

Priority 1 Projects

Properties Located in the City Limits

Ranking	Project Area	Est. Parcels	Collection System
1	Bentwood	115	Vacuum
2	Spruce Creek South	42	Low Pressure
3	Taylor West	24	Low Pressure
4	Commonwealth NE	35	Gravity/LP
5	Dunlawton NE	34	Low Pressure
6	Cambridge Acres	47	Low Pressure
7	Highpoint Acres	40	Vacuum
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10	Mac-John	17	Gravity/LP
11	Gladys White Acres	19	Gravity
12	Spruce Creek Woods	37	Vacuum
13	Rolling Hills	48	Vacuum
14	Seminole Woods	5	Vacuum
15	Pheasant Run	31	Vacuum
16	Woodcliff/Dogwood	40	Vacuum
17	Hensel Hill Estates	33	Vacuum
18	Nob Hill Estates	35	Vacuum
19	Bayridge	26	Vacuum
20	Miscellaneous Streets	11	Gravity/LP
TOTAL EST. PARCELS		733	

Priority 1 Projects (City Limits)

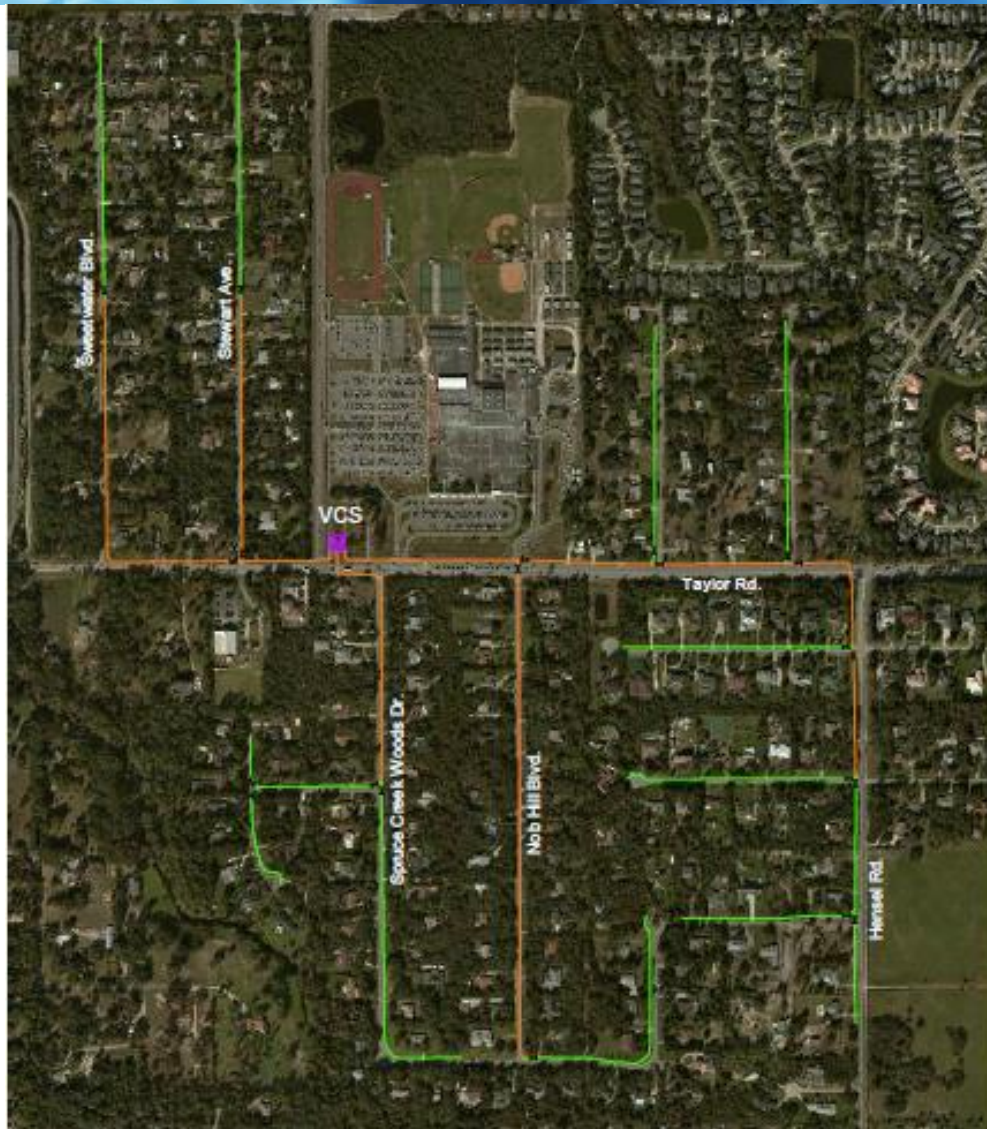
Recommended Collection Systems

Three (3) Collection System Technologies Recommended for Priority 1 Projects:

- Vacuum Sewers (499 parcels)
- Low Pressure Sewers (164 parcels)
- Gravity Sewers (70 parcels)



Priority 1 Projects (City Limits) North Vacuum Sewer System



North Sewer Project (296 parcels)

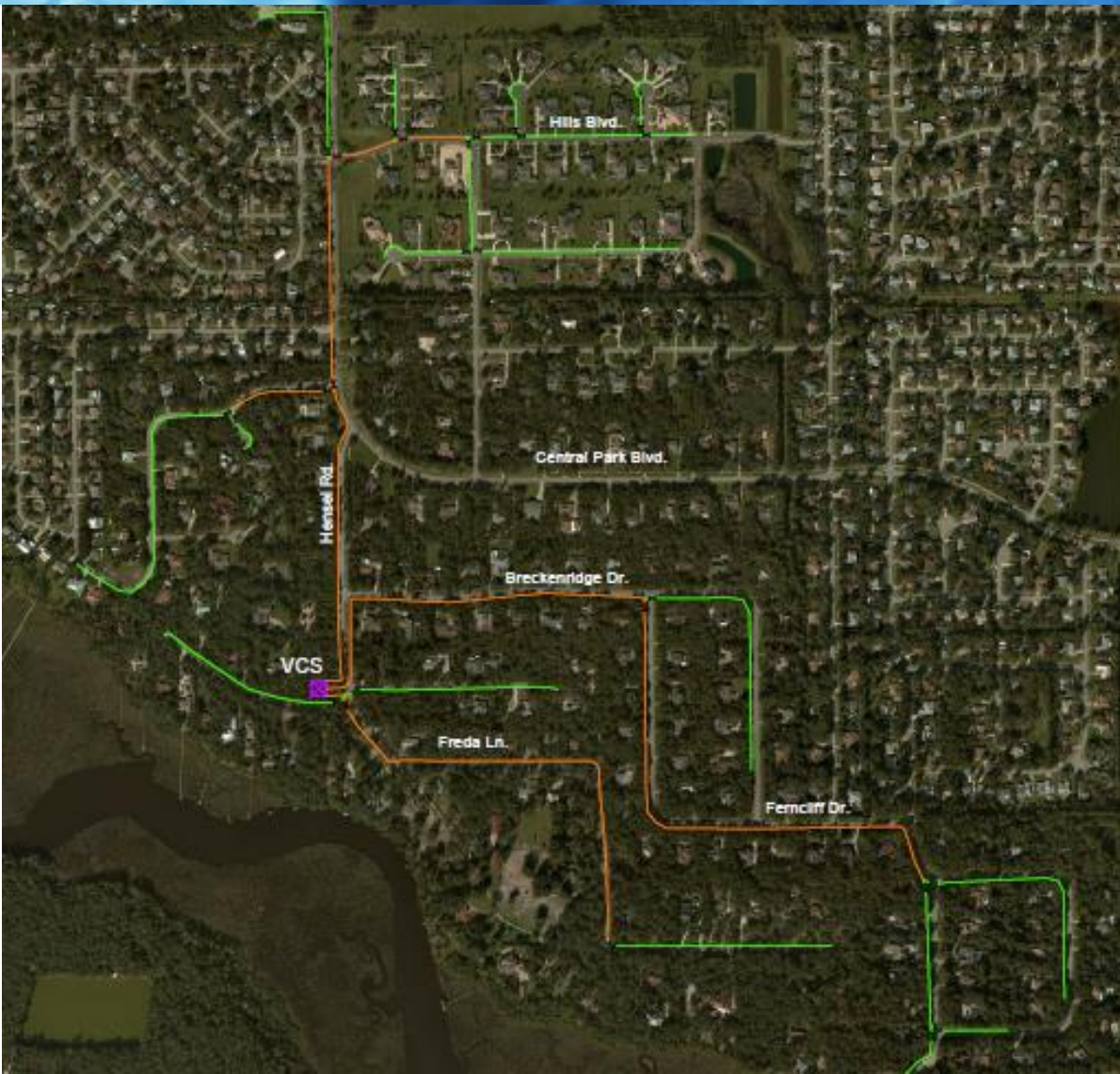
- Sweetwater Estates
- Spruce Creek Run
- Pheasant Run
- Woodcliff/Dogwood
- Nob Hill Estates
- Spruce Creek Woods
- Hensel Hill Estates
- Bayridge

LEGEND



Priority 1 Projects (City Limits)

South Vacuum Sewer System



South Sewer Project (203 parcels)

- Bentwood
- High Point Acres
- Rolling Hill Estates



CR 4070 (REED CANAL RD)

Map showing a residential area with a blue boundary line and orange markers. The area is bounded by a blue line that follows the coastline and extends inland. Orange markers are placed along the boundary and within the area, indicating specific locations. The map includes numerous street names and a title 'CR 4070 (REED CANAL RD)'.

Legend

-  City of Port Orange Subdivisions/Areas
 Septic Tank Locations (1999-2016)
 Port Orange Service Area
 Streets



May 18, 2017

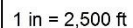
A horizontal number line representing distance in feet. The line starts at 0 on the left and ends at 4,000 on the right. Major tick marks are labeled at 0, 1,000, 2,000, and 4,000. There are 10 equal intervals between 0 and 4,000, with minor tick marks at every 200-foot interval.

Priority 2 Projects

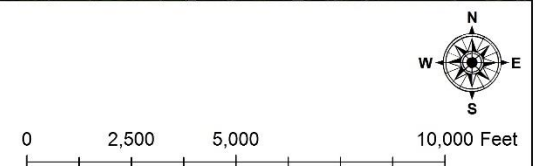
Properties Located Outside the City Limits

Ranking	Project Area Description	Estimated Parcels	Collection System
1	Unincorporated West	710	Low Pressure
2	Town of Ponce Inlet	412	Gravity/LP
3	Wilber-by-the-Sea	353	Gravity
4	Unincorporated East	15	Low Pressure
5	City of Daytona Beach Shores	19	Gravity/LP
TOTAL		1,509	

Property Class Breakdown Unincorporated West



May 22, 2017



Recommended Capital Improvements

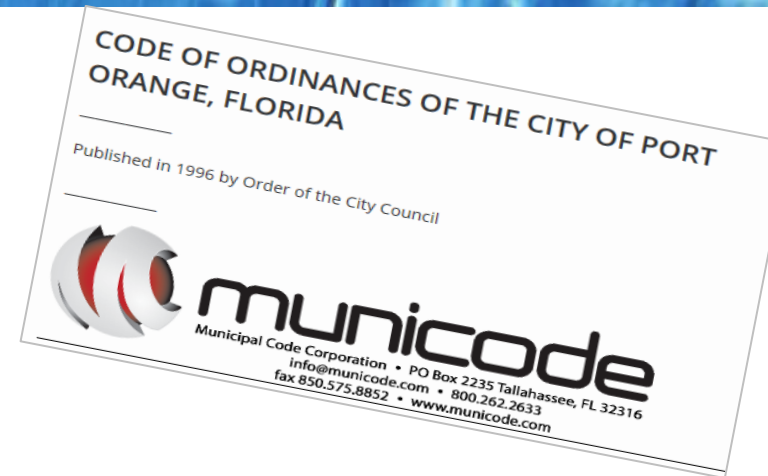
Insert Estimated Project
Construction Costs (Prioritized)



Policy Recommendations

7. Ordinances and Policies

- Current City Ordinances
- System Connection Fees
- Options for On-lot Connection Costs
- Identify Code Enforcement Options
- Recommended Policies for sewerage new developments



Questions

