Town of Sewall's Point
Septic Tank Conversion to Sanitary Sewer

November 15, 2016

CAPTEC Engineering, Inc.
Civil Engineering Professionals

Town of Sewall's Point
Septic Tank to Sanitary Sewer

History

In 2015, Martin County Utilities completed a Septic to Sewer conversion study which illustrated the need to remove septic tanks from the Indian River Lagoon and St. Lucie Estuary.

- Town Comprehensive Plan – Sanitary Sewer Element
- Land Development Regulations – Sewage Collection (dry sewer lines)
- Current Sanitary Sewer Service
  - 931 septic tanks
  - Sanitary sewer service to Benihana's / Harbour Bay Plaza / Castle Hill / Plantation / River Oaks Subdivision
  - Pressure sewer main in N. Sewall's Point Road, less than 5 homes with grinder stations at their homes
- Martin County Septic System Elimination – Final Report (February 2015)

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Comprehensive Plan

SANITARY SEWER

Introduction, data, and analysis.

Residential sewer service is provided entirely by on site sewage disposal systems (septic tanks) in the Town of Sewall's Point. There are two package waste water collection and treatment plants in service within the Town. These provide service to a restaurant (Benihana) and a shopping plaza (Harbour Bay Plaza). They are monitored under the jurisdiction of the Florida Department of Environmental Regulations. The remaining commercial and public uses have septic tanks.

PROBLEMS AND OPPORTUNITIES FOR SANITARY SEWER FACILITIES REPLACEMENT

The Town will undertake a study to determine the viability of the septic tank systems in the Town and the feasibility of connection to Martin County's sanitary sewer system. This study shall determine the cost effective layout of connecting Martin County Utilities to the Town system for the whole Town as well as the performance of the septic tank system. The Town has initiated a dialogue with Martin County regarding the possibility of a tie-in of the sanitary sewer system the Martin County Regional waste water facilities. The County has stated its willingness to allow the Town to tie into their system and that the County system is adequate to support the tie in.

Analysis of soil surveys for areas served by septic tank.

The soils map. Appendix B, indicates the soil by type, which are located in the Town. The Sewall's Point peninsula is divided approximately in half along the ridge line running in a north-south direction identified by the highest elevation reading in that corridor. Limitations of the soils (Paola and St. Lucie, generally) located to the west of the ridge line are considered slight and are generally favorable for septic tank absorption fields. Ground water contamination is possible in places where there are many septic tank absorption fields. Ground water contamination is possible in places where there are many septic tank absorption fields. The soils (Jonathan sand, Salerno, Canaveral, Pomello, Bessie Muck and Wave Land sand, predominantly) located east of the ridge line afford limitations that are considered severe. These limitations include the following characteristics: poor filtering, slow rate of peculation, wetness, flooding, and shallow depth to a cemented pan. These characteristics affect absorption of effluent. The depth to cemented pan also affects installation of a septic tank system. The use of septic tanks in these areas must be studied to determine limitations and so that the natural limitations may be

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Land Development Regulation

Sec. 78-149. - Sanitary sewage collection, treatment and disposal.

It shall be the responsibility of the developer to provide for central sanitary sewage collection, treatment and disposal system. In the case of a subdivision that will not have a working system, it will be the responsibility of the developer to install a sewage collection system and pumping station wet well for future use in the subdivision. All sanitary sewage collection, treatment and disposal systems are to be designed and constructed to meet the requirements of the state department of environmental protection, and a permit for construction shall be secured from that agency. Additionally, the system shall be designed and constructed in a manner consistent with recognized and accepted standards, improvements shall be located to ensure that operation and maintenance activities shall not adversely affect other subdivision improvements, and no element of the system shall create an aesthetic or nuisance problem.

(Ord. No. 106, § C(8)(h), 11-9-1977; Ord. No. 201, § 1, 7-25-1990; Ord. No. 203, § 1, 7-25-1990; Ord. No. 195, § 1, 8-8-1990; Ord. No. 199, § 1, 8-8-1990; Ord. No. 200, §§ 1, 4, 8-8-1990)

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Mission Objective – Martin County Utilities

Pollution from septic tanks poses a significant threat to our waterways. Martin County recently conducted extensive research to identify the sites of greatest concern regarding potential pollution from septic tanks. The study found **five of the 14 sites** sampled had signs of chemical and/or biological markers and elevated bacterial counts including the presence of a human fecal source marker. The County recently updated a report that prioritizes 24 areas in need of septic to sewer conversion.

Septic to Sewer Program Mission

To promote for the orderly extension of wastewater and water service to areas of environmental concern related to septic sewer systems and to promote the environment and consequently the overall health safety and welfare of the community in a fiscally prudent manner which minimizes financial effects to existing customers of the System.

Septic to Sewer Objectives

The program goals and objectives considered in the extension program included providing service to those areas that are most critical to meeting the Program Mission and include the following:

1. **Improve water quality** through reduced nutrient loadings as a result, in part, of the removal of on-site sewage treatment disposal systems (OSTDS) along the St. Lucie Estuary and Indian River Lagoon (surface waters) within the County for the benefit of the County residents;
2. **Reduce the overall cost of service for all residents** through economies of scale and operating efficiencies related to providing regionalized wastewater treatment and disposal service. The program should not have a material adverse impact on the existing customers currently being served by the County's regional water and wastewater system;
3. **Provide for the long-term health, safety, and welfare of the County,** especially recognizing a primary health concern due to potential contamination of the on-site water supply in areas that utilize on-site wells for drinking water in conjunction with a septic system;
4. **Extend service with the highest priority that meets the Extension Program Mission.** Priorities were established by the County's Consulting Engineers.
5. **The program should** result, to the extent practical, be **the most economical alternative to the affected customer** that is connecting to the County's regional system through the extension program.

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Pollution Studies

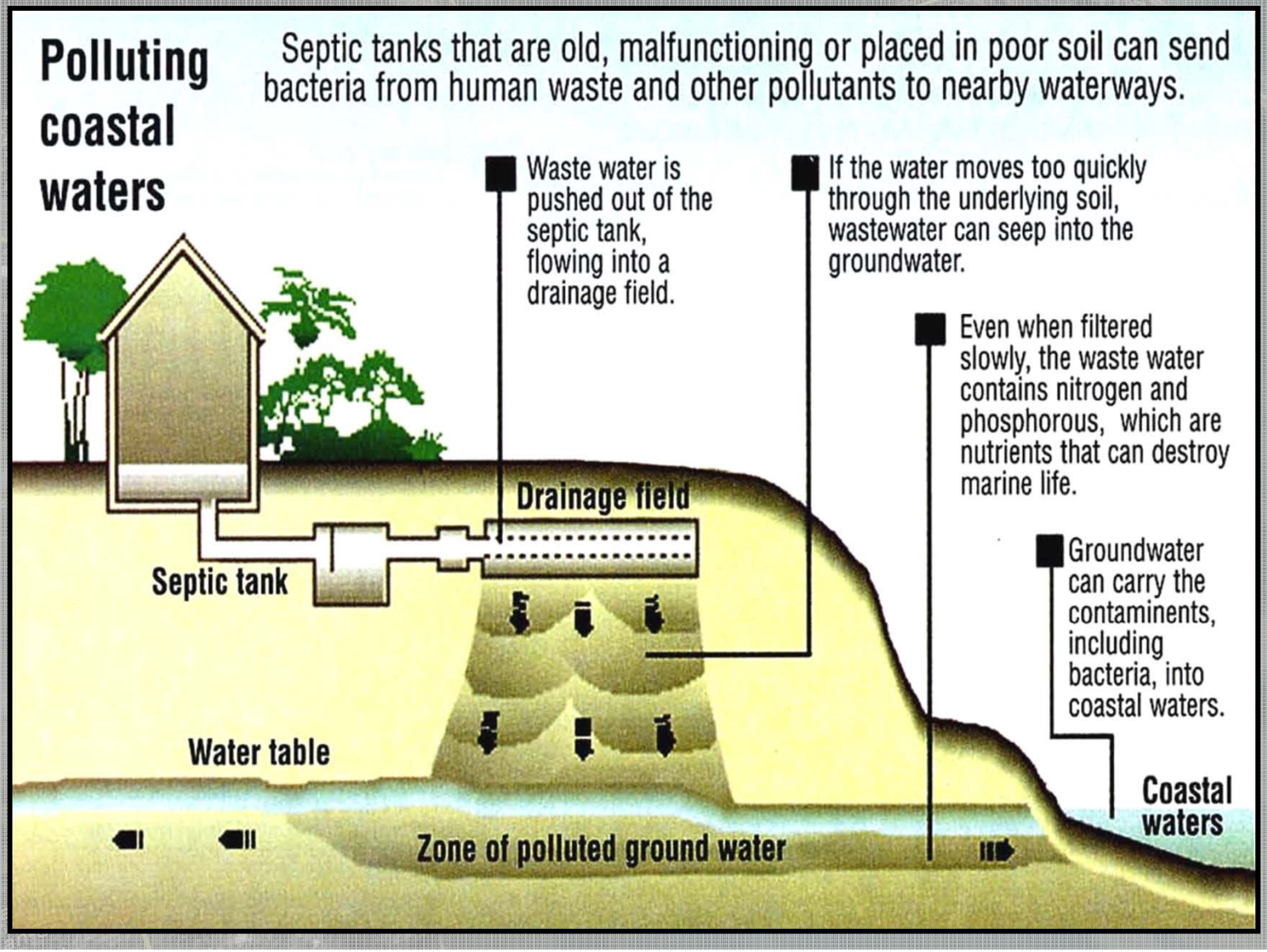
- 2015 Martin County – Watershed to Reef Septic Study – Revised Final Report – Brian E. Lapointe, July 2016

Summary:

To distinguish the management concerns between surface water discharges of Lake Okeechobee, groundwater inflows, and the local influence of on-site sewage treatment and disposal systems (OSTDS), a one year watershed study was conducted by the Harbor Branch Oceanographic Institute for the martin County Board of Commissioners. This study suggested that significant contribution of nitrogen (N) and phosphorous (P) from the St. Lucie Estuary, primarily from OSTDS. Groundwater N and P concentrations were significantly higher in the residential communities than the reference sites. Surface water concentrations of nutrients were primarily documented in the residential networks and several lines of evidence that septic tanks were contaminating the groundwater, well water, and St. Lucie Estuary.

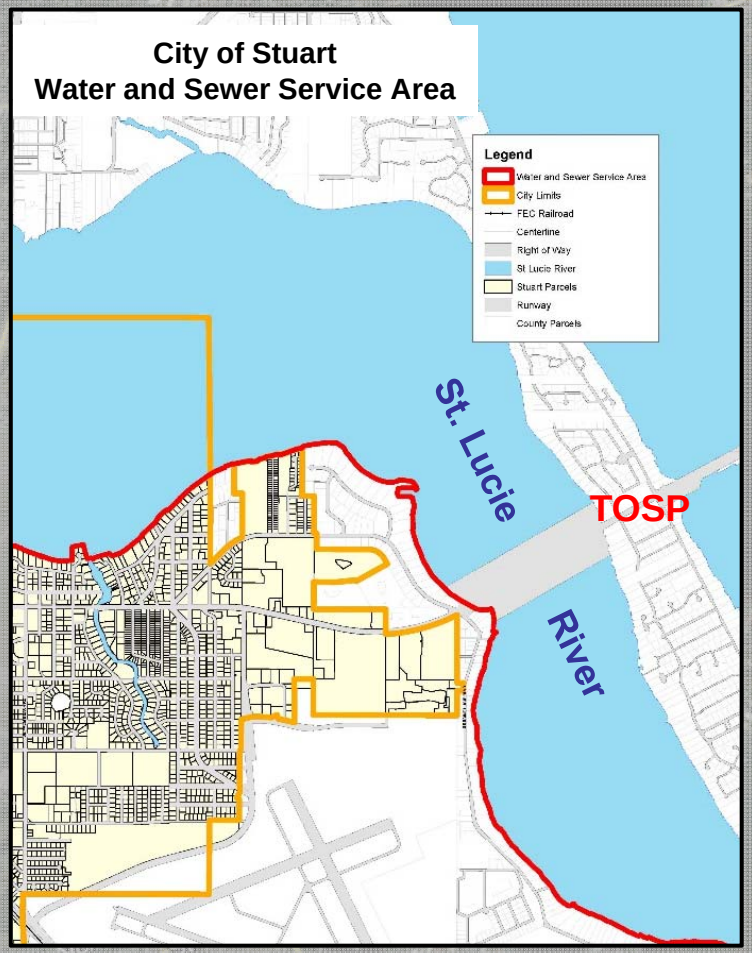
- FDEP Studies:
  a. Estimation of Nitrogen Load from Removed Septic Systems to Surface Water Bodies in the City of Port St. Lucie, the City of Stuart, and Martin County – September 2013
  b. St. Lucie River Microbial Source Tracking Wet Season Study – November 7, 2014
  c. Wekiva River Basin Nitrate Sourcing Study – MACTEC – March 2007 (Prepared for FDEP and SJRWMD)
- FSU ArcNLET GIS Modeling (ArcNLET stands for ArcGIS-based Nitrate Load Estimation Toolkit) for City of Port St. Lucie, the City of Stuart, and Martin County
- UF-IFAS Onsite Sewage, Treatment, and Disposal Study: Nitrogen Study – 2011

Town of Sewall's Point
Septic Tank to Sanitary Sewer



Town of Sewall's Point
Septic Tank to Sanitary Sewer

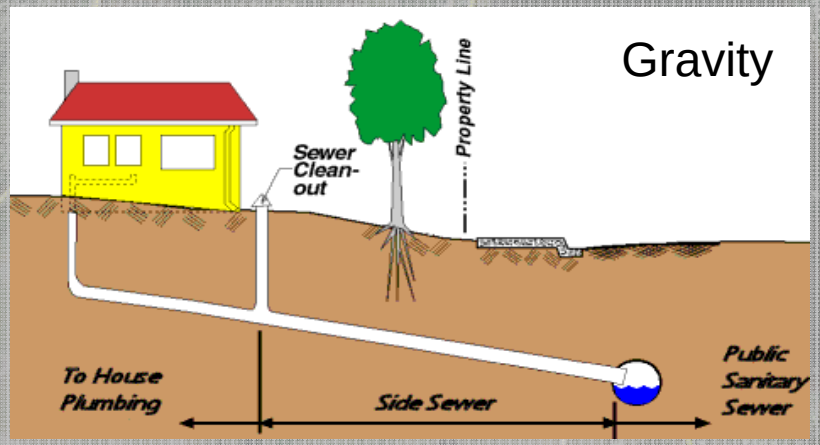
Sanitary Sewer Utility Providers



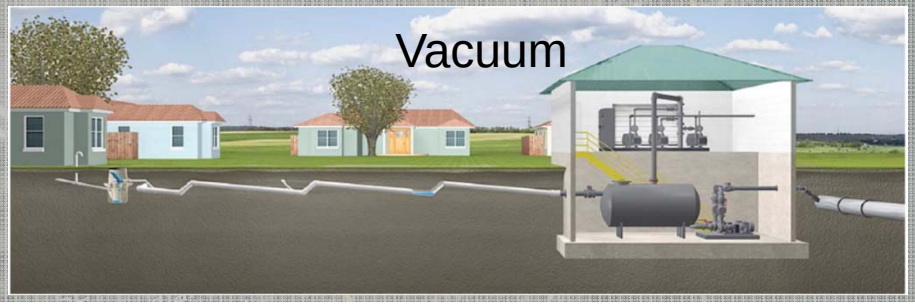
Town of Sewall's Point
Septic Tank to Sanitary Sewer

Types of Sanitary Sewer Systems

1) Existing On Site (septic tank)
2) Conventional Sewers (gravity)
3) Alternative Sewers (low pressure / grinder / vacuum)



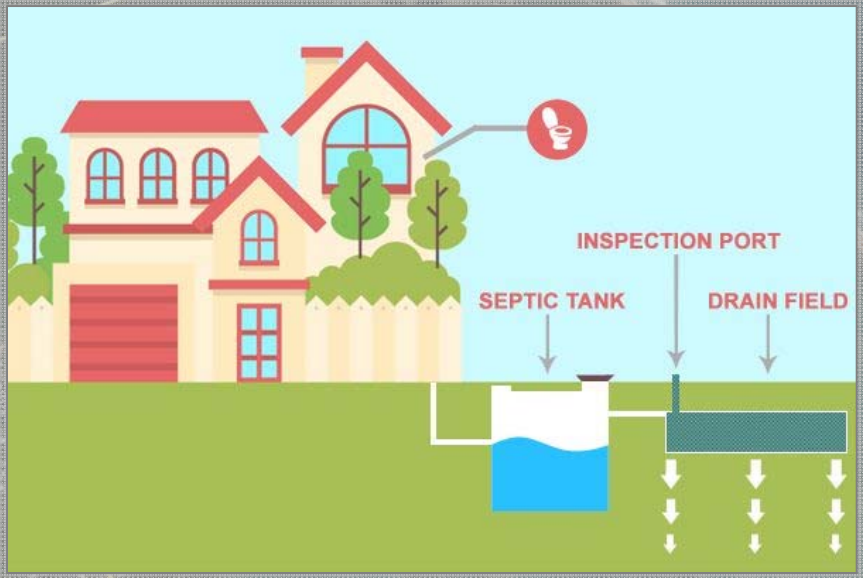
Septic Tank



Grinder

Town of Sewall's Point
Septic Tank to Sanitary Sewer

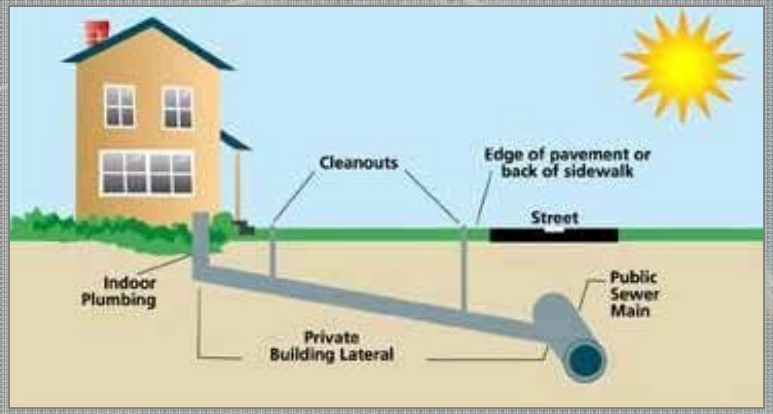
Septic Tank System



- Unsuitable environments yield poor performance and contribute to groundwater contamination (i.e. coastal communities)
- Limited size of septic tank restricts amount of flow to be treated
- Requires periodic maintenance (pumping out) non-degradable solids 4 years
- "Set it and Forget It" system rarely receives periodic maintenance and usually must fail before receiving maintenance
- Constructed of concrete that is subject to damage from cracking and subsequent infiltration of ground/surface water)
- Trees and structures cannot be placed in or near drain fields

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Gravity Sewer System



Advantages

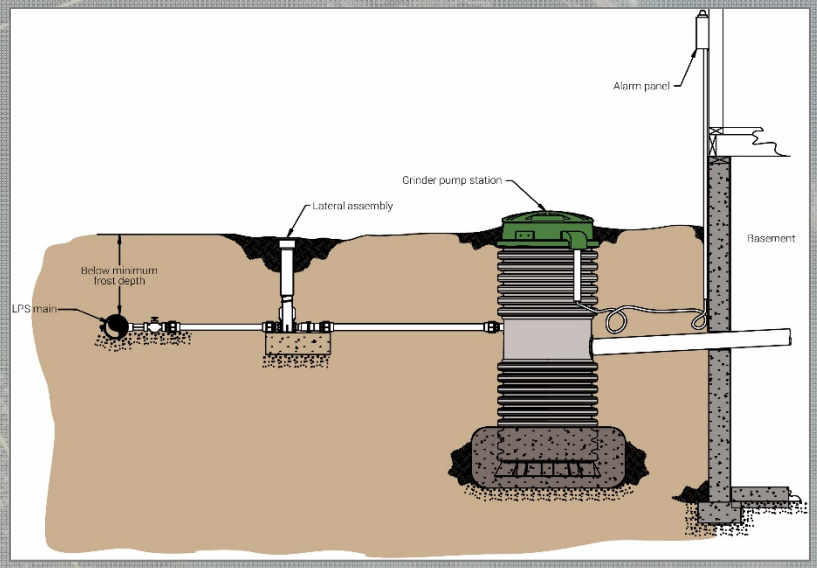
- Low Operation & Maintenance costs
- New Systems can be almost "Set and Forget"
- Requires minimal energy to operate (pipe / manhole / lift station)
- Currently, Town has 21,000 LF of dry gravity sewer lines within the Town limits

Disadvantages

- Can be expensive to construct in high groundwater conditions
- Limited length (max. 2000 lf) between lift stations / lift stations require generator power in outages
- Requires high degree of care during construction to assure low leakage
- Repairs are usually difficult, expensive, and almost always result in major road damage
- Generally require a minimum of 15 foot easement width on private property

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Grinder Pump System



Advantages:

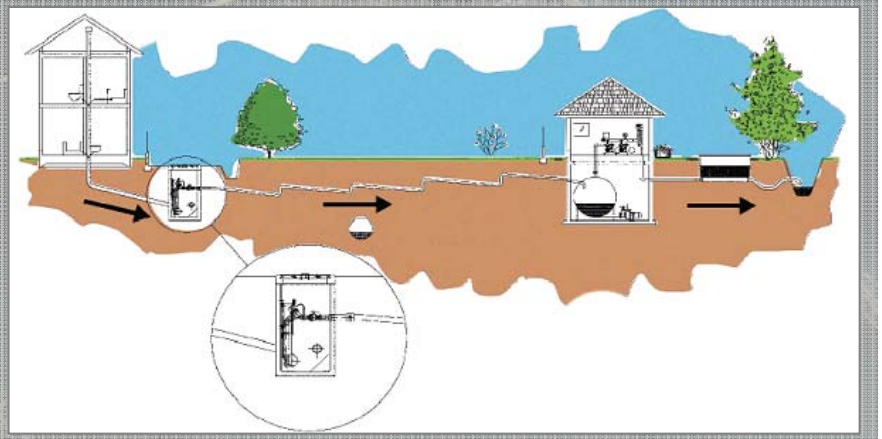
- Can be installed in variety of environmental conditions (high groundwater, limited space, etc.)
- Low pressure, small diameter sewage (force main) easily installed resulting in lower installation costs
- Allows for rapid new connections and system expansion
- On-lot costs can be passed on to homeowner resulting in lower investment costs to utility

Disadvantages:

- Requires Regular Maintenance by Utility Maintenance Crews
- Life cycle replacement costs are higher / lower life expectancy of pumps
- Smaller pipes have greater potential for blockage
- Requires installation of a small diameter grinder pump station at each property, lift station also needed
- Requires Electrical Power (supplied by customer)
- Requires a number of spare replacement units
- Easements needed from each property for maintenance

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Vacuum Sewer System



Advantages:

- Smaller diameter pipe can be installed shallow resulting in lower pipe installation costs
- Pipe can be installed around existing utilities, in narrow right of ways, and across canals and bridges
- No manholes / smaller diameter pipe / master vacuum station (Town needs 2)
- Little/no odor
- Only one source of electrical power is required at master vacuum station / No customer electrical demand – generator needed
- Virtual elimination of inflow and infiltration
- Pipe blockages are rare
- Customer typically is responsible for connection of house piping and abandonment of existing septic tank.

Disadvantages:

- Requires construction of a master vacuum station / land area
- Requires a larger, high density customer base to distribute high cost of vacuum station
- Requires higher degree of periodic maintenance
- Vacuum sewers do not work well in areas with extreme elevation differences
- Practical limit for service is about 2 miles in any direction from the master vacuum station

Town of Sewall's Point
Septic Tank to Sanitary Sewer

STEP System

These systems convert existing residential septic tank / drain field systems to a Hybrid or Standard Septic Tank Effluent Pumping (STEP) system for collection and transmission of domestic wastewater.

A Standard Septic Tank Effluent Pumping (STEP) system is a method of domestic wastewater disposal that uses the combination of a septic tank, for onsite treatment of the solids, and a fluid handling pump to transfer the gray water to a municipal wastewater transmission system that ultimately conveys the effluent into the Master County Wastewater Treatment Plant. The STEP system replaces the drain field of a septic tank and drain field system with a solids filter and effluent pump that pumps the gray water through a small diameter force main to a connection point with the municipal utility system. A "Hybrid" system refers to a conversion system where an existing septic drain field system is converted into a STEP system and retains the drain field as a backup effluent handling method when there is a power outage or equipment failure.

Potential benefits of the STEP system include:

- Low cost of construction.
- Low impact to existing facilities during construction.
- Low cost of operation for the homeowner.

Potential negatives of the STEP system include:

- Existing septic tanks and drain fields may not perform adequately as a Hybrid STEP conversion.
- Requires special permitting and reporting with State agencies.
- STEP systems produce more hydrogen sulfide, a corrosive and hazardous gas, than standard sewer systems. The corrosive environment reduces equipment life span and significantly increases operation and maintenance costs as STEP systems age.
- Not supported by Martin County Utilities
- Residents / Utilities still would need to provide maintenance of the septic tanks

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Martin County Utilities Ranking

Septic Elimination Study

Priority Ranking

	Development	Population Density Factor	Potable Water Systems Factor	Surface Water Class Factor	Proximity to Surface Water Factor	FEMA Flood Plain Factor	Ground Water Table Factor	Soil Factor	Surface Water Management Factor	Nitrogen Contribution Factor	Human Markers Found Factor	Total Score
1	Martin Downs / Sunset Gardens (Old Palm City)	8	8	8	12	8	10.38	11.38	12	9.59	12	99.35
2	Golden Gate	12	4	8	8	8	9.96	10.00	12	6.89	12	90.85
3	Beau Rivage	4	12	8	12	12	11.23	12.00	12	2.28	0	85.51
4	Gaines Ave	4	12	8	12	12	9.92	11.99	12	2.46	0	84.37
5	Hibiscus Park	12	8	4	8	4	10.93	12.00	12	12.00	0	82.93
6	Port Salerno / New Monrovia	12	8	8	8	8	8.09	10.40	12	7.81	0	82.30
7	Salerno / Manatee Pocket	8	8	8	12	12	7.65	10.00	12	4.25	0	81.90
8	North Mapp Road	8	4	8	12	12	11.22	11.98	12	1.46	0	80.66
9	Evergreen G&CC (Hideaway Isles / Mid Rivers)	4	8	8	12	8	10.39	11.38	10	7.87	0	79.64
10	South Mapp Road	4	8	8	12	12	11.03	12.00	12	0.33	0	79.36
11	South Fork	8	12	8	12	8	9.91	12.00	4	2.42	0	76.33
12	Sewalls Point	4	4	12	12	8	4.07	10.22	12	8.28	0	74.57
13	Rio / St. Lucie (East)	8	8	8	12	8	8.38	6.66	12	2.94	0	73.98
14	Rosewalk / Galleon Bay	4	4	12	12	12	8.93	12.00	8	0.22	0	73.15
15	Stuart Yacht & Country Club	8	4	8	8	8	9.54	10.67	12	4.48	0	72.69
16	Four Rivers	4	12	8	12	12	7.17	11.99	4	0.94	0	72.10
17	Crane Creek Country Club	4	12	8	8	8	8.89	7.37	12	3.39	0	71.65
18	North Rivers Shore - Phase 2	4	4	8	12	12	10.08	6.67	12	2.60	0	71.35
19	Tropical Farms	4	12	4	8	8	8.43	12.00	9	5.80	0	71.17
20	River's End	4	12	8	12	8	9.79	12.00	4	1.01	0	70.80
21	Vista Salerno / US 1	8	12	4	4	4	10.54	12.00	12	2.08	0	68.62
22	Rio / St. Lucie (West)	4	8	8	12	8	6.86	8.80	12	0.86	0	68.52
23	Captain's Creek	4	12	8	8	8	8.25	12.00	4	1.49	0	65.74
24	Lake Grove	4	12	4	4	4	8.85	12.00	4	0.68	0	53.53

The Town is ranked 12th in the Martin County Septic Elimination Study, February 2015.

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Town Master System Legend

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Estimated Cost Operations

	*Utility Cost per Parcel[1]	Total Utility Cost[5] (931 Parcels)	**Additional Resident Cost per Parcel[1,3]	Total Additional Resident Cost (931 Parcels)	Total Cost per Parcel	Total Cost
Gravity System[2] (10 Lift Stations)	$17,893	$16,658,298	$8,670	$8,071,770	$26,563	$24,730,068
LPFM / Grinder System[2,4] (4 Master Lift Stations)	$16,248	$15,127,105	$8,670	$8,071,770	$24,918	$23,198,875
Vacuum System / Gravity[2] (2 Master Vacuum Stations)	$13,133 Estimated	$12,226,399	$8,670	$8,071,770	$21,803	$20,298,169

1. Total resident cost based on 931 Septic Conversions
2. Includes Dry Sewer Lines exist for 605 Parcels that would require cleaning, Tving, and lining
3. Includes Capital Facility Charge (CFC) of $2100
4. Assumes all 931 parcels get a grinder station
5. Costs based on CAPTEC Septic Elimination Study provided to Martin County, February, 2015
6. The above Utility Costs were modified from the 2015 Martin County study

Resident Cost Breakdown

$75.00	MC Health Dept Septic Abandonment Permit
$100.00	TOSP Building Dept Plumbing Permit
$45.00	Underground Utilities Admin Fee
$1,500.00	Abandon Septic Tank (900 - 1100 Gallon) Including Pump Out
$2,850.00	Install Sewer Line from Building to County Sewer (up to 150 LF)
$2,000.00	Doesn't include well points/Water adjustments/Driveway Reconstruction/Irrigation/Landscaping (Estimated)
$6,570.00	**Subtotal**
$2,100.00	Capital Facility Charge (Includes 1 ERC)
$8,670.00	**Total**

* The utility cost per parcel does not include the deductions noted by staff in the March 29, 2016 Martin County Agenda Memo to the Board of County Commissioners.

** The additional resident cost per parcel does not include the recommendations noted by staff in the March 29, 2016 Martin County Agenda Memo to the Board of County Commissioners regarding the $2100 Capital Facility Charge.

Town of Sewall's Point
Septic Tank to Sanitary Sewer

Latest Martin County Utilities Memo (3/29/16)

- Schedule of Top 6 Projects
- Mandatory Connection Policy (page 6 of 24)
- Financing Alternatives – County Analysis (page 7 of 24)
- Methods to Reduce Payments
  - Develop uniform charge or assessment (MCU $11,750 on first 3 projects)
  - Cost share with other infrastructure improvements (road/drainage improvements)
  - Include Captial Facilities Charges in monthly bill at 0% interest, $2,100

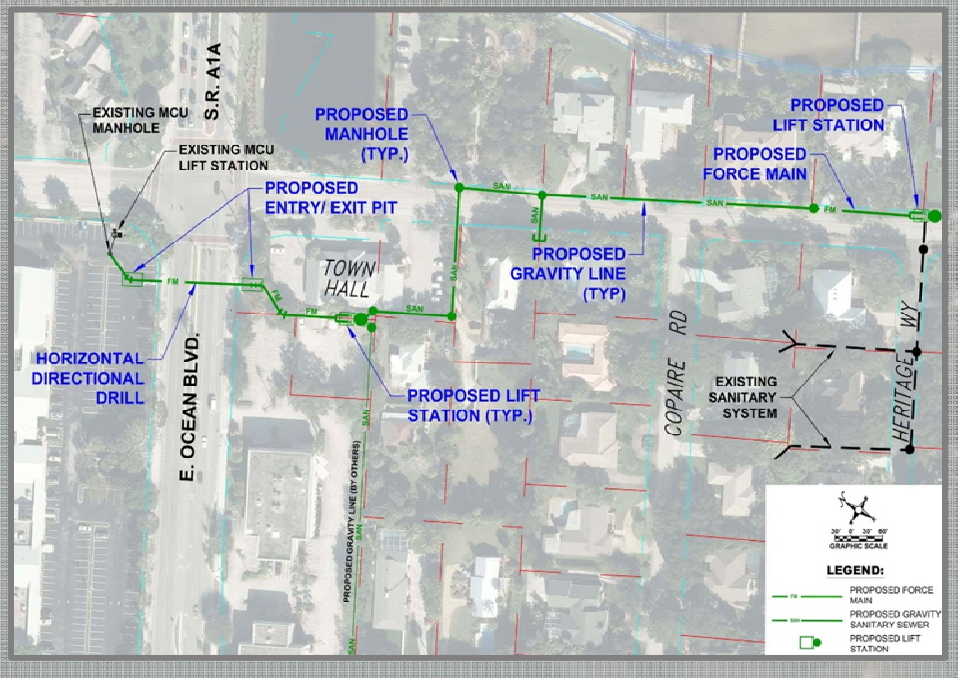
Town of Sewall's Point
Septic Tank to Sanitary Sewer

Latest Town Grant Submittal

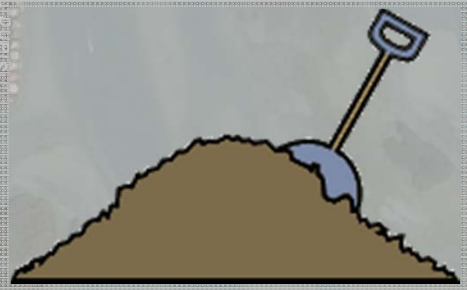
Based on prior Town Commission meetings in 2016, we have submitted a grant converting septic tanks in the Town of Sewall's Point from Town Hall to Heritage Way to a sanitary sewer system (including gravity lines, force mains and lift stations) to transmit sewage to the existing Martin County lift station at the NW corner of South Sewall's Point Road and SR A1A.

Proposed benefits from this first phase project include:

- Number of septic tanks elimiated = 46
- Provide commercial sewer to south side of SR A1A
- Amount of nitrogen removed in Phase 1 (7 lbs/yr per tank) = 322 lbs/yr
- Total nitrogen to be removed = entire conversion (831 septic tanks) = 6,517 lbs/yr overall
- Grant Funds Requested: $488,750
- Total Cost Estimate: $977,500



Town of Sewall's Point
Septic Tank to Sanitary Sewer

Next Steps

- Education Meetings
  1) Alternative Sanitary Sewer Providers
  2) Alternative Systems (vacuum/gravity/grinder)
  3) Financing Options
  4) Develop Criteria for Hook-up
- Develop Septic to Sewer Program; 5/10/15 Year Program
  - Design a Master Plan of Town Sanitary Sewer Systems(prepare cost estimates / schedules per neighborhood)
  - Develop Schedule – based on other infrastructure improvements and requests by residents
  - Pursue grants / loan funding
  - Set-up and Process Special Assessment Program (design/permit/construction)
- Comments?