



**Warwick Sewer Authority  
City of Warwick, Rhode Island**

# **FACILITY PLAN REAFFIRMATION**

**JULY 2017**

**WARWICK SEWER AUTHORITY  
CITY OF WARWICK, RHODE ISLAND  
FACILITY PLAN REAFFIRMATION**

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## **SECTION I.**

### **STATEMENT OF CURRENT NEED**

The purpose of this document is to reaffirm the Warwick Sewer Authority's selected alternative detailed in Section VIII of the 2012 Facility Plan Amendment, prepared by AECOM.

The Warwick Sewer Authority (WSA) owns and operates the wastewater collection system and treatment plant serving the City of Warwick, Rhode Island. This includes approximately 310 miles of sanitary sewer, 48 pumping stations, and a 7.7 million gallons per day (mgd) Advanced Wastewater Treatment Facility (WWTF). The WWTF is one of three municipal facilities that discharge treated effluent directly to the Pawtuxet River. Warwick's WWTF and collection system went online in 1965 and have been upgraded and expanded several times since.

In 2008, the City of Warwick and the WSA negotiated a consent agreement with the Rhode Island Department of Environmental Management (RIDEM) that required the WSA to prepare a Facility Plan Amendment and complete necessary upgrades to meet a revised phosphorus limit of 0.1 mg/L and a nitrogen discharge limit of 8.0 mg/L. The Facility Plan Amendment (FPA), prepared by AECOM, was approved in 2012. The FPA identified several WWTF and collection system improvements needed to meet the more stringent nutrient effluent water quality requirements of the 2008 permit. The selected improvement alternative is detailed in Section VIII of the 2012 FPA. The WSA has determined the 2012 selected improvement alternative is still viable at this time, and will meet the needs of the WSA and the City of Warwick. The WSA wishes to reaffirm the 2012 selected improvement alternative. The WSA will be seeking funding for the recommended upgrades through the State Revolving Fund administered by the Rhode Island Infrastructure Bank.

The status of the 2012 FPA selected improvements for the WWTF is shown in Table I-1. A revised list of WWTF improvement recommendations for this Facility Plan Reaffirmation is detailed in Table I-2.

**TABLE I-1**  
**SUMMARY OF PROJECT STATUS FOR**  
**RECOMMENDED IMPROVEMENTS TO THE WWTF**

<b>Recommended Improvement</b>	<b>Total Capital Cost (Escalated to 2013)</b>	<b>Program Implementation</b>
Actiflo Ballasted Flocculation Process	\$ 11,600,000	Completed
Replace Fine Screen	\$ 293,000	Completed
Replace Submersible Mixers	\$ 300,000	Completed
Retrofit Existing Center Clarifiers	\$ 755,000	Completed
Rehab Existing RST/Centrifuge	\$ 50,000	Not completed
Install New RST	\$ 512,000	Completed
Flood Protection/Levee Improvements	\$ 4,800,000	Completed

**TABLE I-2**  
**SUMMARY OF CURRENT RECOMMENDED WWTF IMPROVEMENTS**

<b>Recommended Improvement</b>	<b>Total Capital Cost</b>	<b>Program Implementation</b>
BNR Diffuser Replacement	\$ 780,000	2018, pending funding
Secondary Clarifier Drive	\$ 280,000	2018, pending funding
Grease Skimmer Replacement	\$ 350,000	2018, pending funding
Channel Macerator & Dimminutor for Primary Clarifier Influent Channel	\$ 160,000	2018, pending funding
Backup Grit Removal System	\$ 70,000	2018, pending funding
Dewatering System Improvements	\$350,000	2018, pending funding
Utility Garage	\$ 70,000	2018, pending funding
250 kW Generator	\$ 100,000	2018, pending funding

Expansion of the Warwick collection system, as detailed in the 2012 FPA is ongoing. A summary of 2012 FPA recommended improvements to the collection system and the project status is found in Table I-3.

**TABLE I-3**  
**SUMMARY OF PROJECT STATUS FOR**  
**RECOMMENDED IMPROVEMENTS TO THE COLLECTION SYSTEM**

Service Area	Total Cost (2017 Costs)	Program Implementation
Governor Francis III	\$ 5,200,000	2017-2018
Northwest Gorton Pond	\$ 5,200,000	2018
O'Donnell Hill Area	\$ 1,600,000	2018
Bayside Interceptor and Lateral Pressure Sewers *	\$ 21,000,000	2018-2019
Warwick Neck South	\$ 13,400,000	Pending funding
Strawberry Field II	\$ 950,000	Pending funding
Greenwood East	\$ 14,800,000	Pending funding
Pilgrim Park	\$ 4,800,000	Pending funding
East Natick and Knight St. Pump Stations Flood Hardening**	\$ 450,000	2017-2018
Upgrades associated with Warwick Neck P.S.	\$ 2,800,000	Pending funding
Upgrades to 7 Existing Ejector Stations	\$ 2,700,000	Pending funding
Cedar Swamp Pump Station Upgrades	\$ 300,000	Pending funding
Emmons Ave. Pump Station Upgrades	\$ 300,000	Pending funding
Warwick Ave. Pump Station Upgrades	\$ 450,000	Pending funding
Oakland Beach Pump Station Upgrades	\$ 600,000	Pending funding
Lockwood P.S. Force Main Relocation	\$ 1,400,000	Pending funding
Warwick Vets P.S. Force Main Relocation	\$ 750,000	Pending funding
Loveday Pump Station Upgrades	\$ 300,000	Pending funding
Apponaug Pump Station Upgrades	\$ 300,000	Pending funding

\*Formerly Bayside I, Bayside II, and Bayside III (2012 FPA)

\*\*Formerly Knight St. Pump Station Upgrades (2012 FPA)

Since the 2012 FPA, the Bayside I, Bayside II, and Bayside III projects have been revised to use directional drilling to minimize historic and archeological disturbance. The three projects were combined into a single sewer expansion project to create a more competitive bid process. Improvements to the East Natick and Knight Street pump stations were combined into a single project to take advantage of a Community Development Block Grant (CDBG) alternative flood hardening funding source.



## **SECTION II.**

### **PLANNING AREA**

#### **A. PLANNING AREA**

The planning area for this project includes the entire City of Warwick, as identified in the 2012 FPA. Approximately two-thirds of the City's population contributes flow to the WWTF. A small amount of flow is directed to the West Warwick WWTF. Approximately one third of the population uses on-site treatment systems. Existing and proposed service areas were identified in the 2012 FPA, and are shown in Appendix A. The Potowomut and Cowesett neighborhoods have not been designated for sewer expansion at this time, and will continue to be served by individual onsite wastewater systems.

Characteristics, topography, geophysical conditions, and historical, cultural and archaeological features of the planning area have been previously documented in the 1996 Facility Plan and 2008 and 2012 Facility Plan Amendments and remain unchanged.

#### **B. POLITICAL JURISDICTIONS**

The planning area includes the City of Warwick, located within Kent County, Rhode Island.

#### **C. INSTITUTIONAL (GOVERNMENTAL UNIT) STRUCTURES**

The City of Warwick is governed by a Mayor and City Council.

#### **D. WASTEWATER UTILITY**

The Warwick Sewer Authority is a political subdivision established by state law in 1962 with all the prerequisite authorities to construct, operate and maintain the City's sewer infrastructure as an independent enterprise. The WSA owns and maintains the Warwick WWTF, 48 wastewater pump stations, and approximately 310 miles of sewers.

## E. CURRENT RATE STRUCTURE

Those who use the Warwick sewer system are charged sewer user fees by the WSA. The fees are used for operation, maintenance, and administration of the WWTF, the pumping stations, and the sewer collection system. The user fees are classified into two categories: residential and commercial (including industrial). The charges include both fixed fees and consumption-based fees. The current fee structure and descriptions are shown in Table II-1. The cost-of-service rate study, approved in 2011, has been updated for fiscal years 2017 through 2021, and is reviewed annually.

**TABLE II-1  
WARWICK SEWER AUTHORITY USER FEES**

<b>Fee</b>	<b>Description</b>
Sewer Usage Fee	Sewer Usage Fees pay for the collection and treatment of wastewater, including maintenance of pipes, pump stations, and the WWTF. Usage fees are consumption based.
Service Charge	Service Charge pays for debt service and administration and billing-related services. The residential service charge is a fixed fee. Commercial service charge varies based on the size of the water meter.
Renewal and Replacement Charge	Renewal and replacement charges pay for necessary capital improvements to WSA infrastructure. The Renewal and Replacement Charge is a consumption based fee.

## F. ENTITIES CONDUCTING PLANNING

This Facility Plan Reaffirmation has been prepared by Wright-Pierce, 10 Dorrance Street, Suite 840, Providence, RI 02903.

## **G. RELATIONSHIP BETWEEN THE FACILITY PLAN AND THE COMMUNITY COMPREHENSIVE PLAN**

In 2015, the WSA passed a resolution to comply and take actions in concert with the City's Comprehensive Community Plan. The WSA's Facility Plan Amendment is consistent with the City's Comprehensive Community Plan's goal of building sustainable, resilient, and responsive public services. The City of Warwick's comprehensive planning documents can be found on the City's website: <http://www.warwickri.gov/planning-department/pages/comprehensive-plan>. "Chapter 10: Public Services" details the Warwick Sewer Authorities role in the City's comprehensive 20-year plan.

## **H. MAPS**

Maps of the future and proposed service area, and collection system expansion projects were developed as part of the 2012 FPA. These maps have been included as Appendix A of this document. When available, updated plans have also been included. Additional mapping is available in the 2012 FPA.

### Service Area Maps:

- Service Area Map (existing and proposed): Figure II-1 2012 FPA
- Service Area Map (future): Figure V-1 2012 FPA

### Future Collection System and Upgrades Maps:

- Warwick Neck South Future Wastewater Collection System: Figure VI-1 2012 FPA
- Kirby Avenue to Narragansett Bay Avenue Sewer Extension Conceptual Layout, June 2016
- Greenwood East Future Wastewater Collection System: Figure VI-2 2012 FPA
- Pilgrim Park Future Wastewater Collection System: Figure VI-3 2012 FPA
- Governor Francis III Future Wastewater Collection System: Figure VI-4 2012 FPA
- Bayside I Future Wastewater Collection System: Figure VI-5 2012 FPA
- Bayside II Future Wastewater Collection System: Figure VI-6 2012 FPA
- Bayside III Future Wastewater Collection System: Figure VI-7 2012 FPA

- Bayside Sewer Design Project Limits: Figure-1, March 2015
- Strawberry Field II Future Wastewater Collection System: Figure VI-8 2012 FPA
- O'Donnell Hill Area Future Wastewater Collection System: Figure VI-9 2012 FPA
- Northwest Gorton Pond Future Wastewater Collection System: Figure VI-10 2012 FPA
- Overall Plan for Sanitary Sewer Extension, Northwest Gorton Pond, June 2016
- Upgrades Associated with Warwick Neck Pump Station: Figure VI-11 2012 FPA

## **SECTION III.**

### **EFFLUENT LIMITATIONS**

#### **A. RIPDES PERMIT**

The Rhode Island Department of Environmental Management (RIDEM) issued a Rhode Island Pollution Discharge Elimination System (RIPDES) Permit (No. RI0100234) to the Warwick Sewer Authority in 2008. A revised permit was released in draft form in June 2017. The Draft June 2017 permit was used to complete this document. A summary of the proposed effluent discharge limitations from the latest permit draft are provided in this section. Changes to the existing permit are summarized below. The 2008 final permit and the 2017 draft permit are attached in Appendix B.

The June 2017 Draft Permit includes more stringent discharge limitations for total ammonia (as N). Discharge limitations for enterococci, chloroform, total aluminum, total iron, hexavalent chromium, and total nickel are introduced. Fecal coliform, total cadmium, total zinc, and total copper discharge limitations have been removed, but monitoring requirements remain in place. Weekly sampling and monitoring for Total Iron and Total Aluminum are in effect during months in which Iron-based or Aluminum-based chemicals are used in the treatment process. For other periods, sampling for Total Aluminum is required quarterly. The WSA will be investigating the impacts of the proposed new permit limits and various ways to meet the proposed limits, including operational and process changes.

**TABLE III-1**  
**SUMMARY OF KEY RIPDES PERMIT EFFLUENT LIMITATIONS**  
**DRAFT JUNE 2017 PERMIT**

Effluent Characteristic	Discharge Limitations			Monitoring Requirements	
	Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
<b>Flow</b>	7.7 mgd		-- mgd	Continuous	Recorder
<b>CBOD<sub>5</sub></b> (Nov 1 – May 31)	25 mg/l 1,605 lb/day	40 mg/l --	45 mg/l 2,890 lb/day	1/Day	24-Hr. Comp.
(June & October)	15 mg/l 963 lb/day	15 mg/l --	20 mg/l 1,284 lb/day	1/Day	24-Hr. Comp.
(July 1 - Sept. 30)	10 mg/l 642 lb/day	10 mg/l --	15 mg/l 963 lb/day	1/Day	24-Hr. Comp.
<b>CBOD<sub>5</sub> - %Removal</b> (June 1-Oct 31)	85%	--	--	1/Month	Calculated
<b>TSS</b> (Nov 1 - May 31)	30 mg/l 1,927 lb/day	45 mg/l	50 mg/l 3,211 lb/day	1/Day	24-Hr. Comp.
(June & October)	25 mg/l 1,605 lb/day	25 mg/l	30 mg/l 1,927 lb/day	1/Day	24-Hr. Comp.
(July 1 - Sept. 31)	20 mg/l 1,284 lb/day	20 mg/l	30 mg/l 1,927 lb/day	1/Day	24-Hr. Comp.
<b>TSS - % Removal</b>	85%	--	--	1/Month	Calculated
<b>Enterococci</b>	54 cfu/ 100 ml		175 cfu/ 100 ml	5/Week	Grab
<b>Fecal Coliform</b>	-- MPN/ 100 ml	-- MPN/ 100 ml	-- MPN/ 100 ml	5/Week	Grab
<b>Total Residual Chlorine (TRC)</b>	20 µg/l		34 µg/l	Continuous	Recorder
<b>pH</b>	(6.0 SU)		(9.0 SU)	2/Day	Grab
<b>Dissolved Oxygen</b> (June 1 - Oct. 31)	(6.0 mg/l)			Continuous	Recorder
<b>Total Phosphorus</b> (Nov.1 - March 31)	1.0 mg/l		-- mg/l	1/Week	24-Hr. Comp.
(April 1 - Oct. 31)	0.1 mg/l		-- mg/l	1/Week	24-Hr. Comp.

Effluent Characteristic	Discharge Limitations			Monitoring Requirements	
	Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
<b>Orthophosphorus</b> (Nov.1 - March 31)	-- mg/l		-- mg/l	1/Week	24-Hr. Comp.
<b>Total Ammonia, as N</b> (Nov. 1 - April 30)	13.5 mg/l	-- mg/l	60.4 mg/l	1/Week	24-Hr. Comp.
(May 1 - May 31)	5.2 mg/l	-- mg/l	61.0 mg/l	1/Week	24-Hr. Comp.
(June 1 - Oct. 31)	2.0 mg/l	2.0 mg/l	3.0 mg/l	1/Week	24-Hr. Comp.
<b>Total Nitrogen</b> (Nov. 1 – April 30)	-- mg/l -- lb/day		-- mg/l	2/Month	Calculated
(May 1 - Oct. 31)	8.0 mg/l 514 lb/day		-- mg/l	1/Week	Calculated
<b>Total Lead</b>	0.34 µg/l		8.7 µg/l	1/Week	24-Hr. Comp.
<b>Chloroform</b>	46 µg/l		2081 µg/l	1/Quarter	Grab
<b>Cyanide</b>	7.5 µg/l		32 µg/l	1/Quarter	Composite
<b>Total Aluminum</b>	125 µg/l		1080 µg/l	See Note	24-Hr. Comp.
<b>Total Iron</b>	1520 µg/l		-- µg/l	See Note	24-Hr. Comp.
<b>Total Cadmium</b>	-- µg/l		-- µg/l	1/Quarter	24-Hr. Comp.
<b>Total Copper</b>	-- µg/l		-- µg/l	1/Quarter	24-Hr. Comp.
<b>Hexavalent Chromium</b>	-- µg/l		-- µg/l	1/Quarter	24-Hr. Comp.
<b>Total Nickel</b>	-- µg/l		-- µg/l	1/Quarter	24-Hr. Comp.
<b>Total Zinc</b>	-- µg/l		-- µg/l	1/Quarter	24-Hr. Comp.

-- Indicates a parameter which must be monitored and reported, but no limit is established.

## B. RECEIVING WATER

The Warwick WWTF discharges to the main branch of the Pawtuxet River, a Category 5 (Needs a TMDL) waterbody with the following impairments: Benthic-Macroinvertebrate Bioassessments, Cadmium, Enterococcus, Non-Native Aquatic Plants, Total Phosphorus, and Mercury in Fish Tissue.

## SECTION IV.

### ASSESSMENT OF CURRENT CONDITIONS

#### A. EXISTING CONDITIONS IN PLANNING AREA

##### 1. Socio-Economic Considerations

- a. *Changes in tax base* – Not applicable.
- b. *Demographic changes* – Population data is available from the United States Census Bureau every ten years. The 2000 census population of the City of Warwick was 85,808, and the 2010 census population was 82,672.
- c. *Land Use Changes* - There have been no significant land use changes within the planning area since the 2012 FPA.

2. **Surface Water Quality** – State Water Quality Standards, Goals and Objectives are detailed in Section III. C of the 2012 FPA. As of 2014, the RIDEM has finalized a Water Monitoring Strategy to provide data to support the comprehensive assessment of surface waters. This does not affect the viability of the selected alternative described in Section I of this document. The water quality of the Pawtuxet River and Narragansett Bay has improved since the 2012 FPA.

3. **Groundwater Quality** – Not applicable.

##### 4. Other Environmental Conditions

- a. *Air Quality* – Potential air quality disturbances are documented in the 2012 FPA. Proposed sewer construction will cause dust from excavation, and increased carbon monoxide and vehicle emissions from heavy equipment. Air quality mitigation measures documented in the 2012 FPA include weekly trench paving to minimize dust from trenches, regular sweeping of pavement, and using a dust suppressant (e.g. calcium chloride).



- b. *Noise Levels* – Sewer construction will cause short term noise disturbance in residential areas. A Warwick City ordinance requires that excessive noise (over 60 dBA) be limited to the period of 8 am to 10 pm. Industry standard practices will be used to mitigate temporary impacts from construction activities.
- c. *Historical and Archaeological Sites* – Historical and archaeological sites for each construction area within the planning area are described in Section VIII of the 2012 FPA. There have been no significant changes to affect moving ahead with the 2012 FPA selected alternative.
- d. *Related Federal/State Projects* – Not applicable.
- e. *Affected Plant/Animal Communities* – Not applicable. The proposed sewer construction will generally occur in already developed roadways, and appropriate mitigation measures will be implemented during construction.
- f. *Documentation of ISDS Problems* – Individual Sewage Disposal System (ISDS) problems are documented in Section IV. A.2 of the 2012 FPA.
- g. *Climate Change Considerations* – In March 2017, RIDEM released a report titled *Implications of Climate Change for RI Wastewater Collection & Treatment Infrastructure*. The report describes the implications of climate change and sea level rise on the wastewater infrastructure throughout Rhode Island. An excerpt from that report has been included as Appendix C. The pump stations identified in Table IV-1 were identified in the report as being vulnerable to climate change and sea level rise. The Knight Street, East Natick 1 and East Natick 2 pump stations have been included in a proposed Flood Hardening Project detailed in Section I of this report.

**TABLE IV-1**

**CLIMATE CHANGE RISK ASSOCIATED WITH WARWICK PUMP STATIONS**

<b>Pump Station</b>	<b>Risk</b>
East Natick 1	Riverine
East Natick 2	Riverine
Irving Rd PS	Coastal; Riverine
Knight St PS	Riverine
Oakland Beach PS	Coastal

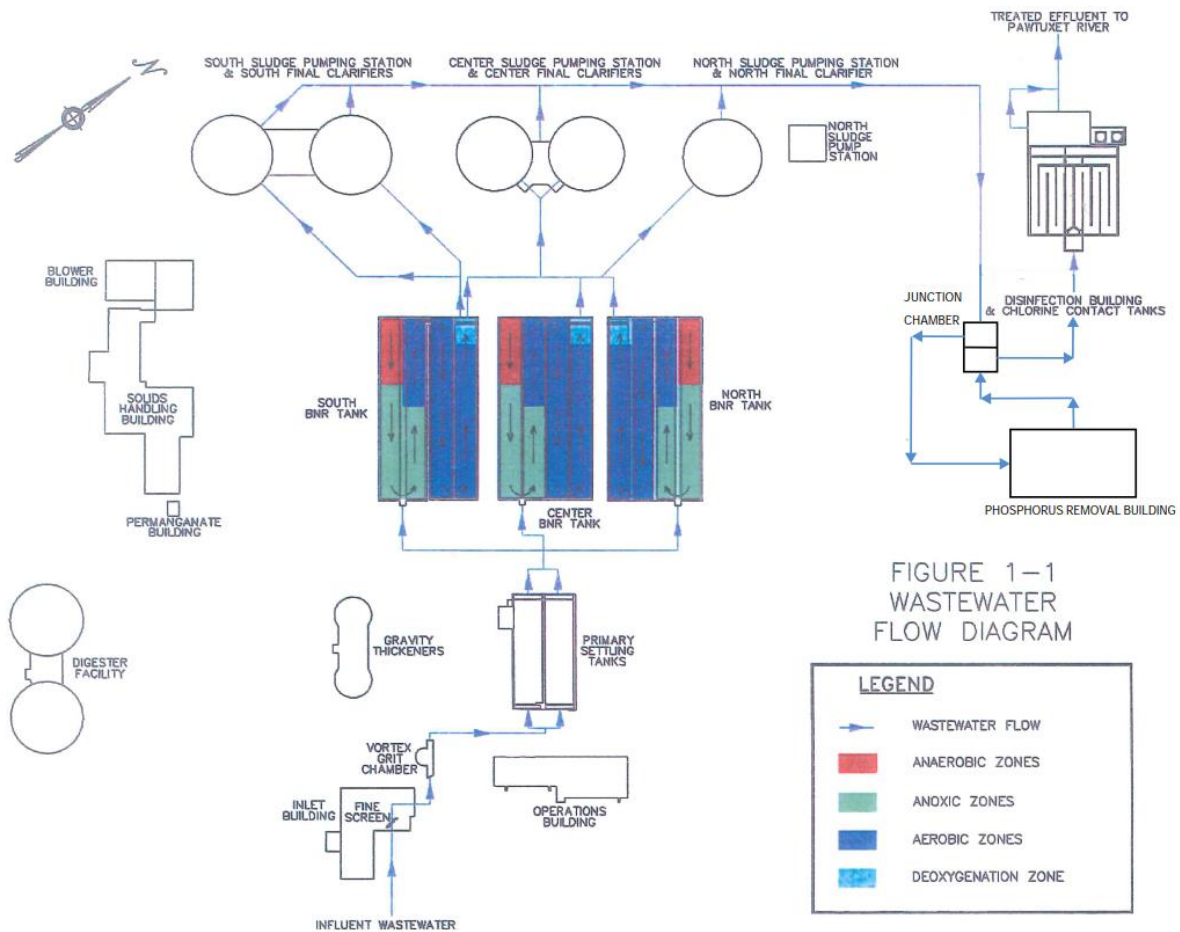
**B. EXISTING SYSTEM AND FLOWS**

**1. Existing System**

a. *WWTF* – An assessment of the existing Warwick WWTF is found in Section IV.A.1 of the 2012 FPA. The 2012 FPA assessment is still accurate, and is consistent with the selected improvement recommendations presented in Section I of this report. Since the 2012 FPA, WSA has implemented a ballasted flocculation process for phosphorous removal. The evaluation of phosphorus removal systems is detailed in Sections VII and VIII of the 2012 FPA. A Process Flow Diagram, including the new phosphorus removal process, for the Warwick WWTF is shown in Figure IV-1.

1. *Facility Location* – The Warwick WWTF is located at 125 Arthur W. Devine Boulevard in Warwick, RI.

2. *WWTF Performance Compared to RIPDES Permit* – Table IV-2 indicates the average total nitrogen and total phosphorus effluent values in the months in which the permit values are most stringent. For phosphorus, this is the period of April 1<sup>st</sup> through October 31<sup>st</sup>. For nitrogen, this is May 1<sup>st</sup> through October 31<sup>st</sup>. Total nitrogen is not limited between November 1<sup>st</sup> – April 30<sup>th</sup>. Phosphorus values consistently meet the November 1<sup>st</sup> – March 31<sup>st</sup> limit of 1.00 mg/L.



**FIGURE IV-1 WASTEWATER FLOW DIAGRAM**

**TABLE IV-2  
SEASONAL AVERAGE EFFLUENT VALUES FOR  
TOTAL NITROGEN AND PHOSPHOROUS**

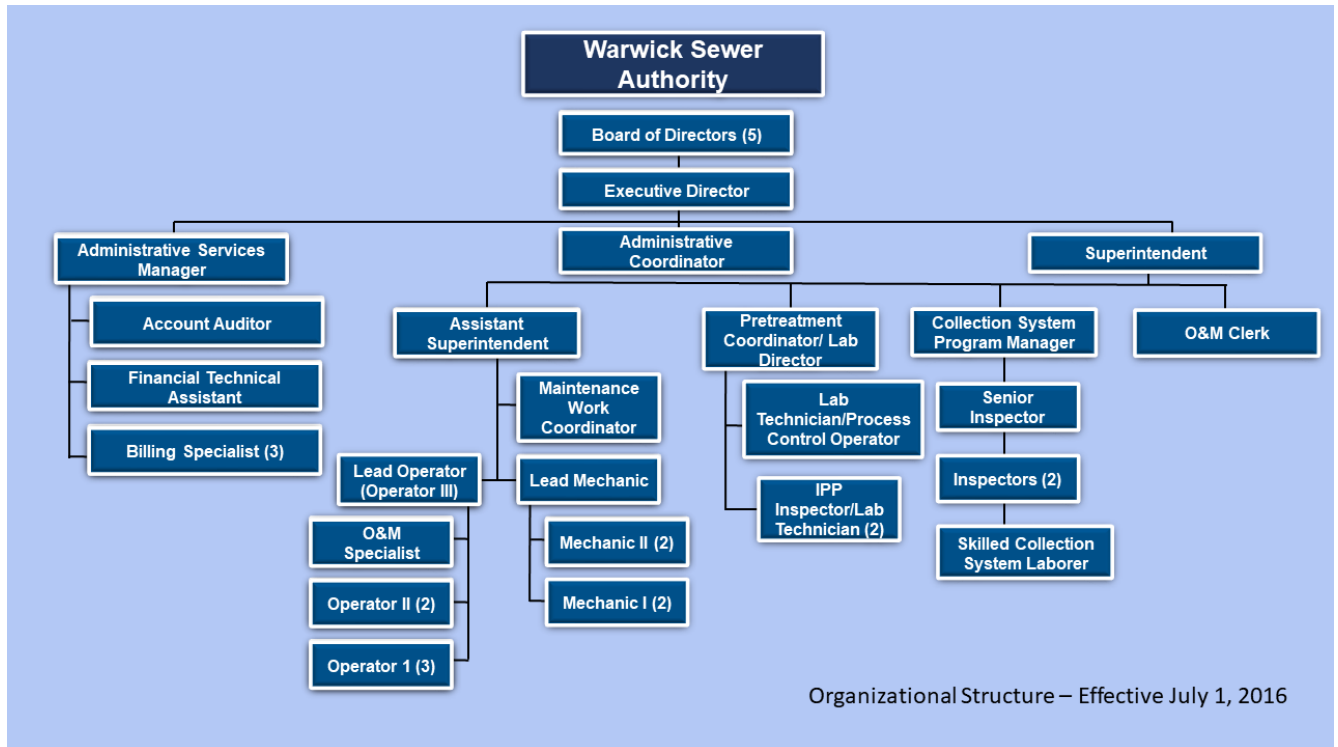
Year	TN (mg/L)	TN Limit (mg/L)	P (mg/L)	P Limit (mg/L)
2014	6.93	9.00	0.48	1.00
2015	7.08	8.00	0.48	1.00
2016	6.92	8.00	0.37	1.00
2017 (data available until May)	6.80	8.00	0.09	0.10

The WWTF began using their tertiary treatment process (ballasted flocculation) in 2017, and reliably meets the seasonal phosphorus permit limit of 0.10 mg/L. Similarly, the WWTF reliably meets its seasonal total nitrogen limit of 8.0 mg/L.

3. *Plant Hydraulics* – The current plant hydraulics are adequate.
4. *Quality of Operation and Process Control* – The WWTF is equipped with a state-licensed/certified laboratory and full SCADA system for process control.
5. *Actual Number and Qualifications of Operating Staff* – The WSA currently employs 33 people. Staffing includes:
  - An executive director and plant superintendent;
  - Eight administrative staff (billing, accounting, clerks);
  - Fourteen operation and maintenance staff;
  - Five collection system inspectors/staff;
  - Four laboratory personnel;

The WSA plans to add the following eight positions within the next five years: two mechanics, one skilled laborer, one instrumentation technician/electrician, one Industrial Pretreatment Program inspector, one scheduler/planner/inventory controller, and one Geographic Information System (GIS) analyst. The organizational chart of the WSA is shown in Figure IV-2.

6. *Laboratory Facilities* – The WWTF is equipped with a full state-licensed laboratory for process control tests, as detailed in Section IV.A.1 of the 2012 FPA.
7. *Sampling & Testing* – Testing and sampling is done in accordance with the RIPDES discharge permit.
8. *Maintenance Program* – The WSA’s existing maintenance programs are adequate, but improvements are planned in the area of CMMS and staffing.



**FIGURE IV-2 WARWICK SEWER AUTHORITY STRUCTURE**

9. *Cost Recovery and User Charges* – The current cost recovery and user charges are adequate. The cost-of service rate study for fiscal years 2017 through 2021 has been updated, including increases in the Renewal and Replacement charges in fiscal years 2018 and 2020.
10. *Impact of Septage on WWTF* – The Warwick WWTF accepts septage generated within the City limits, as detailed in the 2012 FPA Section IV.A.1. Impact on the WWTF is negligible. Fees are charged for disposal which are adequate to recover treatment costs.
11. *Effluent Treatment/Reuse Methods* – The Existing Treatment processes are detailed in Section IV.A.1 of the 2012 FPA. Since 2012 the WSA has implemented a ballasted flocculation process for seasonal nutrient removal. Treated effluent is currently used for various purposes within the facility.

12. *Sludge Treatment/Disposal/Reuse Methods* – The existing treatment processes are detailed in Section IV.A.1 of the 2012 FPA. Primary and secondary sludge (approximately 100,000 gpd) is thickened together in one of two gravity thickeners. Sludge is thickened using a rotary drum thickener to 3 to 5 percent solids. Dewatered sludge is sent to one of two incineration facilities for final disposal.

13. *Flow/Waste Reduction Measures* – Not applicable.

b. *Collection System* – An assessment of the existing Warwick Collection System is found in Section IV.A.2 of the 2012 FPA. An assessment of the future situation of the Warwick Collection System is found in Section V of the 2012 FPA. The 2012 FPA assessment is still accurate, and is consistent with the selected alternative presented in Section I of this report.

1. *Population Served* – As of the 2012 FPA the population served by sewers was estimated to be 60,224. By 2030 the population served by sewers is projected to be 79,301.

2. *Industrial Pretreatment Program* – The WSA is responsible for administration and enforcement of local limits through its Industrial Pretreatment Program. Since the 2012 FPA, the WSA has updated their local limits, and conducted an industrial Pretreatment Program user rate and fee study. The revised local limits (approved 2015) are adequate to protect the WWTF. The WSA is planning to implement load (lbs/day) based limits for some users with high strength waste streams that cannot meet the CBOD maximum limit of 2,500 mg/L (i.e. brewery waste). Discharge limits for phosphorous and nitrogen are also being considered. Major industrial discharges are detailed in Section IV.B.2 of the 2012 FPA. Individual flow contributions for significant industrial users and non-categorical users can be found in Table IV-3.

3. *Location of all bypasses and overflows* – Not applicable.

4. *Description and location of new service area extensions* – A detailed description of new service area extensions can be found in Section I of this report.

**TABLE IV-3**  
**2016 WARWICK SIGNIFICANT INDUSTRIAL USERS**

Significant Industrial Users & Non-Categorical Users	Permit Number	Permit Effective Dates
Advanced Chemical Company	107	6/1/2013 – 5/31/2018
Day'O'Lite	748	6/1/2013 – 5/31/2018
Fernando Originals	712	8/28/2013 – 5/31/2018
Herff-Jones, Inc.	104	6/1/2013 – 5/31/2018
Kent County Memorial Hospital	105	6/1/2013 – 5/31/2018
Jared the Galleria of Jewelry	70	5/9/2016 – 5/31/2018
Lucas-Milhaupt Warwick LLC	110	6/1/2013 – 5/31/2018
National Chain	122	6/1/2013 – 5/31/2018
Pentair Electronic Packaging	122	6/1/2013 – 5/31/2018
PMC Lighting	69	7/1/2015 – 5/31/2018
RIAC PVD Deicer Management System	609	3/13/2015 – 5/31/2018
Vishay Electrofilms	133	6/1/2013 – 5/31/2018

5. *Developed Areas Served by On-Site Systems* – Issues with onsite wastewater disposal systems are documented in the 2012 FPA, Section IV. By 2030 the WSA expects the population served by on site systems to be reduced to 5,463 persons (or 2,365 residential units).
2. **Existing flows** – Existing and future flows entering the WWTF are detailed in the 2012 FPA Section IV.B. The wastewater flow projections presented in the 2012 FPA have not changed significantly, and remain valid for the planning period associated with this Facility Plan Reaffirmation.
    - a. *Average Daily and Peak Hourly Flows* - Average Daily and Peak Hourly Flows as of the 2012 FPA are detailed in Table IV-4.

**TABLE IV-4  
AVERAGE AND PEAK WASTEWATER FLOWS  
2012 FPA DATA**

	<b>Average Daily Flow (gpd)</b>	<b>Peak Hourly Flow (gpd)</b>
Residential	2,636,500	4,350,225
Commercial	1,125,600	1,857,240
Industrial	168,900	278,685
Septage	9,000	9,000
Infiltration	1,060,000	1,060,000
Inflow		5,750,000
<b>Total</b>	<b>5,000,000</b>	<b>13,305,150</b>

- b. *Dry and Wet Weather Flows* – The average daily dry weather flow entering the WWTF is 4.18 mgd. The peak daily wet weather flow entering the WWTF is 10.99 mgd.
- c. *Septage* – Septage is accepted at the WWTF only from within City limits. The existing average daily and peak hourly flow to the facility is 9,000 gpd.
- d. *Combined Sewer Overflows* – Not applicable.
- e. *Infiltration/Inflow (I/I)* – The volume of infiltration and inflow entering the collection system was documented in Section IV.B.1 of the 2012 FPA. Since the 2012 FPA, the WSA Collection System Division has implemented a preventative maintenance program, including sewer flushing, cleaning, inspection and repair. Since the initiation of the preventative maintenance program, the WSA has seen a significant decrease in infiltration and inflow. The WSA submits a bi-annual infiltration/inflow summary report, summarizing the Authority’s I/I efforts. The 2014 Inflow/Infiltration Summary Report is included in Appendix D. A comparison of the 2012 FPA and 2014 reported I/I values are shown in Table IV-5.



**TABLE IV-5  
INFLOW AND INFILTRATION SUMMARY**

	<b>2012 FPA Value</b>	<b>2014 Reported Value</b>
Inflow	5.75 mgd	3.29 mgd
Infiltration	1.06 mgd	0.99 mgd

- f. *Wastewater Characteristics* – The characteristics of the wastewater entering the WWTF remain similar to the characteristics identified in the 2012 FPA. No significant changes in the influent wastewater characteristics are anticipated during the planning period of the Facility Plan Reaffirmation.

**TABLE IV-6  
EXISTING WASTEWATER CHARACTERISTICS  
2012 FPA DATA**

	<b>Annual Average</b>	<b>Maximum Month</b>	<b>Hydraulic Peak</b>
Flow (gpd)	5,000,000	6,350,000	13,305,150
BOD (lb/day)	11,828	19,308	
TSS (lb/day)	12,318	16,762	
TKN (lb/day)	1,447	2,362	
TP (lb/day)	209	340	

