

City of Taunton, MA
2017 Pump Station Inspection Report

April 2017



BETA

6 Blackstone Valley Place
Suite 101
Lincoln, Rhode Island 02865
401.333.2382
www.BETA-Inc.com

2017 Pump Station Inspection Report

City of Taunton, MA

Prepared by: BETA GROUP, INC.
Prepared for: City of Taunton Department of Public Works

April 2017

TABLE OF CONTENTS

1.0 Introduction	1
1.1 History	1
1.2 Purpose of Inspections	1
1.3 Scope of Inspections	1
2.0 Summary of Inspections.....	4
2.1 Site	4
2.2 Architectural	4
2.3 Structural.....	5
2.4 Mechanical	6
2.4.1 Pumps.....	6
2.4.2 Pipe and Valve Maintenance	7
2.5 Instrumentation and Controls	8
2.6 Heating, Ventilation, and Air Conditioning (HVAC)	9
2.7 Electrical Service	10
2.8 Inspection and Maintenance Records	10
3.0 RECOMMENDATIONS	12
3.1 Short-Term Recommendations	12
3.2 Long-Term Recommendations	20
3.3 Maintenance Recommendations.....	20
3.4 Future Inspections	20

LIST OF TABLES

Table 1-1 – Taunton Pump Station Information.....	2
Table 2-1 – Taunton Pump Stations Beyond Design Life	6
Table 3-1 Short Term Repair Recommendations	12

LIST OF APPENDICES

- Appendix A – List of Deficiencies Found During Inspections
- Appendix B – Pump Station Inspection Forms and Photo Logs

1.0 INTRODUCTION

1.1 HISTORY

In 1998, the City of Taunton signed a 20-year contract with Professional Services Group (PSG) to operate and maintain the City's Wastewater Treatment Facility and pumping stations. PSG was later purchased by Veolia, who currently holds the contract. This contract is scheduled to expire in 2018, with a possible 5-year extension. In preparation for the contract expiring and/or being extended, the City has decided to conduct a review of the contract, and perform a comprehensive inspection of the wastewater treatment facility and pumping stations to assess their condition and ensure that contract obligations are being met.

1.2 PURPOSE OF INSPECTIONS

Pumping station inspections were conducted to assess the overall operating condition and to evaluate the level of operation and maintenance (O&M) being conducted by Veolia. At the same time, estimates for the remaining useful life of equipment were made as well as recommendations for improvement. Inspections included general visual observations of equipment and their operation. Detailed examinations of system components were not made as part of these inspections.

1.3 SCOPE OF INSPECTIONS

The following pumping station aspects were reviewed and data was collected as part of each inspection:

- Station age, style, hydraulic capacity
- Site: Condition of fencing, access, pavement
- Architectural & Structural: conditions of sewer pumping station structure, including concrete condition, building doors, windows, siding, louvers, etc.
- Mechanical: Condition of sewage pumps, piping, valves, sump pumps
- Instrumentation and Controls: level control, flow and runtime meters, alarms, communication
- HVAC: Condition of heaters, fans and louvres
- Electrical: Condition of main power elements, backup power generators, lighting, etc.

Pump Station inspections were conducted during the period of January to March 2017. Each station inspection was recorded on an assessment form, and photos were taken to document conditions. Individual components were scored on a scale of 1-5, with 1 being very good, and 5 being very poor and inoperable. A complete list of deficiencies found during inspections is included as Appendix A to this report. Complete assessment forms and photo logs for all stations are included as Appendix B to this report. Table 1 below lists the pump stations in the City and their type and capacity.

TABLE 1-1 – TAUNTON PUMP STATION INFORMATION

Station Name	Year Built	Pump Year ¹	Station type	HP	Pumps	Design Flow (GPM) Each
Alicia Dr	1991	1991	Submersible	3	2	330
Briggs St	1987	2008	Submersible	1.5	2	150
Burt Street	2012	2012	Submersible	7.5	2	75
Chamberlain School	2000?	2010	Submersible			
Christine Ln	2001	2001?	Submersible	2	2	100
Colt Circle	2006	2005	Submersible	5	2	80
Davis St	1992 / 2001	2001?	Submersible	7.5	2	200
Dean Street	2012	2012	Submersible	60	3	1,650
E. Pole School	2007	2007	Suction Lift	7.5	2	200
Fairview Ave	1986	1986?	Dry Pit/Wet Pit	3	2	150
Fisher St	1993	1993?	Submersible	4	2	100
Hart Street	1987	2006	Submersible	2	2	100
Industrial Park NW	1991	2006 ²	Dry Pit / Wet Pit	75	2	2,000
King James	1989	2011 ²	Dry Pit/Wet Pit	10	2	250
Lakeview Ave	2003	2003	Submersible	4.5	2	50
Main Lift	1947, 1974, 1998, 2016	2016/	Dry Pit / Wet Pit	130	4	5,200
Mary Drive	1989	1989?	Wet pit / Dry Pit	10	2	620
Matthews Landing	2012	2012	Submersible	3	2	290
Myles Standish	1981	1981?	Dry Pit/Wet Pit	7.5	2	350
Norton Ave	1990	1990/2016	Submersible	10	2	150
O'Connell Way	2007	2007/2016	Submersible	6.5	2	156
Partridge Circle	1987	2006	Submersible	2	2	100/25
Paul Dever	2015	2015	Submersible			
Powhattan	2002	2002	Submersible	3	2	80
Red Lane/East Taunton	1965	2006	Dry Pit / Wet Pit	66	2	1,250
Roundtable	1986	1992/2009	Suction Lift	3	2	120
Route 140	1971	2017 ³	Dry Pit / Wet Pit	56	2	1,600
Rowley St	1980s	2016 ⁴	Suction Lift	4	2	120
Sakonnet	2002	2015	Submersible	5	2	115
Scadding St	2003	2003	Submersible	4.5	2	50
School St	1980s	2016	Submersible	2.5	2	25
Shore Drive	2003	2003	Submersible	2	2	26

South Street	1985	1985?	Dry Pit / Wet Pit	50	3	775
South Walker	1980s/2000	2014?	Submersible	3	2	150
Spring Street	1985 / 1970's	?	Dry Pit / Wet Pit	36	2	870
Stevens Street	1990s	1990s	Suction Lift	7.5	2	350
Taunton high School	2010	2010	Submersible	7.5	2	350
Warner Blvd.	1975	2013/2016	Can Dry Pit/wet pit	10	2	550
Wellesley Cir	1994	1994?	Suction Lift	2	2	100
Westville	2006	2006	Submersible	17	2	275

¹ Pump age is from Veolia's Standard Operating Procedure, where known. Pump ages with question marks are estimated.

² Age indicates pump motors only, not entire pumps

³ Between pump station inspection and the writing of this report, both pumps at Rte 140 were replaced

⁴ Age indicates pump rebuilds (impellers, etc.)

Information relative to the overall function and appearance of the stations was utilized to evaluate the effectiveness of the O&M provided by Veolia. Language in the Contract between Veolia and the City was also reviewed. Veolia's responsibilities are outlined in Exhibit 301 of the Contract documents. Among other requirements, Veolia is responsible to provide preventative, corrective, and predictive maintenance for the pumping stations. Definitions for the different types of maintenance referenced are provided below.

- Preventative Maintenance – means those maintenance activities that are routine or repetitive activities required by the equipment or facility manufacturer or Veolia to maximize the service life of equipment, vehicles and facility, listed in the O&M Manual, required by warranties or otherwise identified as necessary or desirable in accordance with Good Industry Practice.
- Corrective Maintenance – non-routine and unscheduled repair activities required for operational continuity, safety, and performance generally due to failure or to avert failure of the equipment, vehicles or facilities or some component thereof.
- Predictive Maintenance – those non-repetitive and non-routine maintenance activities that are identified as necessary during annual testing and inspection conducted in accordance with the O&M Manual that are outside of Preventative and Corrective maintenance.

In addition Veolia is responsible for repairing and/or replacing any materials, equipment or structures in need of repair or that fail during the term of the service contract.

2.0 SUMMARY OF INSPECTIONS

The following is a general summary of the conditions encountered. Specific deficiencies at each pumping station are presented in reports included as Appendix A, and complete inspection reports and photo logs are included as Appendix B.

2.1 SITE

Each station was evaluated for site conditions, including site access, pavement, landscaping, fencing, and security. In general, access to pumping stations was in reasonable condition during inspections. Fences are present at all but one station (South St), and generally are in good condition. All fence gates are padlocked for security. In general, site conditions at stations across the City were very good. Access to Industrial Park and the Red Lane Pumping Station, alternately known as "East Taunton", were exceptions. Both stations are at the end of unimproved roadways and access in dry conditions is marginal. However, during wet conditions or winter weather, access to both stations is a challenge. The Red Lane station in particular is in a remote area and subject to regular vandalism as evidenced by a dilapidated fence, dents/holes in the door from gun projectiles and spray paint on the face of the building that had recently been repainted by Veolia.



Photo: Industrial Park PS Access Road

2.2 ARCHITECTURAL

The stations with significant structures, such as buildings with brick facades, include:

- Main Lift
- Red Lane
- South Street
- Route 140/Mozzone Blvd
- Spring Street
- Sakonet
- Stevens St
- Powhattan
- Colt Circle

Minor architectural issues, such as rusted hatch/door operators and hinges, and limited exterior water staining were identified at each of the buildings. The building with the most severe water damage was at the South Street pumping station. Moisture has penetrated the brick at the chimney and the south facing wall and started to separate from the wall.



Photo: South Street PS

Water staining was also observed at the Route 140 Pumping station because down spouts had been removed. Staining was observed on the exterior of the building and on the interior ceiling, indicating that the roof is leaking.



Photo: Route 140 PS

One pervasive issue that was noted in all buildings was inoperable or blocked ventilation louvers. In general, in older station buildings louvers for generators and for building ventilation do not work. Generator louvers should open automatically when the generator turns on (or on power failure). Building louvers were generally blocked with insulation, presumably to save on heating costs.

2.3 STRUCTURAL

Structural inspections covered buildings, where present, and also concrete structures such as wet wells, dry wells, and valve vaults. In general, stations are in good structural shape, with a few exceptions. Industrial Park PS showed some spalling of concrete, and infiltration was noted at Colt Circle, Burt St, and Hart St.

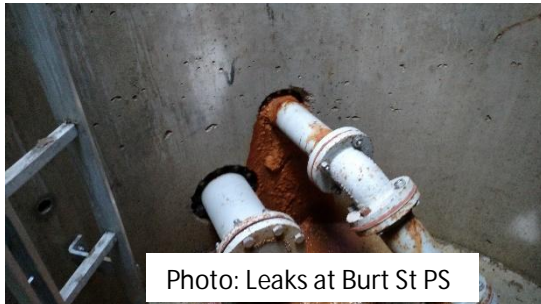


Photo: Leaks at Burt St PS



Photo: Concrete Deterioration at Industrial Park PS

2.4 MECHANICAL

Primarily, inspections focused on the functionality and condition of the mechanical process equipment, piping, and valves. Observations related to sewage pump performance were limited to visual appearance, noise and vibration. Detailed information regarding pump performance (via draw-down tests, etc.) was not able to be done during these inspections due to time and equipment restrictions. Submersible pumps were not removed from wetwells for inspection. Mechanical field data was obtained for wastewater pumps, motors, valves, and piping used for sewage conveyance. Other mechanical elements such as sump pumps, ventilation fans were also reviewed.

2.4.1 PUMPS

Mechanical conditions at the pump stations varied widely across the City, from stations that were almost new (Burt St) to those in dire need of mechanical repair or upgrade (South St, Rte 140, Myles Standish, etc.). Others had pumps that had recently been replaced or rebuilt.



Photo: Leaking pump at Myles Standish PS

A few were noted to have deteriorated mechanical equipment, operational issues and potential hazardous conditions for operators visiting the pumping stations. While many of the pumping stations reviewed contain components nearing or beyond their intended useful design life, they are still capable of performing their primary function. However, due to the critical nature of pumping stations it is necessary that

known pump issues be resolved, and equipment that has exceeded its design life be replaced. In general, emergency response actions to sewer pumping station issues are far more costly than preventative measures. The following is a list of stations whose pumps have surpassed or are near their anticipated design life and do not have documented improvements.

TABLE 2-1 – TAUNTON PUMP STATIONS BEYOND DESIGN LIFE

Station Name	Station Location	Date	Type	Pump HP	# of Pumps	Capacity (GPM)
Norton Ave	355 Norton Ave	1990	Submersible	10	2	150
Route 140	140 County Street	1971	Dry Pit / Wet Pit	56	2	1,600
Red Lane	20 Red Lane	1965	Dry Pit / Wet Pit	66	2	1,250
Rowley St	Rowley Street	1980s	Gorman Rupp	4	2	120
Mary Drive	51 Mary Drive	1989	Wet pit / Dry Pit	10	2	620
King James	440 King James Blvd.	1989	Dry Pit/Wet Pit	10	2	250
Wellesley Cir	76 Wellesley Circle	1993	Smith/Loveless	2	2	100
Briggs St	71 Briggs Street	1987	Submersible	1.5	2	150
Fisher St	21 Fisher Street	1991	Submersible	4	2	100

Partridge Circle	150 Partridge Circle	1987	Submersible	2	2	100/25
South Street	63 South Street	1985	Dry Pit / Wet Pit	50	3	775
Christine Ln	58 Christine Lane	2001	Submersible	2	2	100
Westville	404 Winthrop Street	2006	Submersible	17	2	275
South Walker Upgrade	212 South Walker Street	2000	Submersible	3	2	150
Fairview Ave	45 Florence Street	1985	Dry Pit/Wet Pit	3	2	150
Spring Street	17 Spring Street	1985 / 1970's	Dry Pit / Wet Pit	36	2	870
Industrial Park NW	385 John Hancock Blvd	Upgrade 1988	Dry Pit / Wet Pit	75	2	2,000
Myles Standish	650 Myles Standish Blvd.	1981	Dry Pit/Wet Pit	7.5	2	350
School St	School Street across from 275	1980s	Submersible	2.5	2	25
Alicia Dr	11 Alicia Drive	1991	Submersible	3	2	330
Hart Street	198 Hart Street	1987	Submersible	2	2	100
Main Lift	690 W Water Street	1947, 1974, 1998, 2016	Dry Pit / Wet Pit	130	4	5,200

2.4.2 PIPE AND VALVE MAINTENANCE

In older stations, piping and valves in dry pits and in valve vaults of submersible stations was often found to be in need of paint and piping exhibited evidence of rust. Isolation gate, plug, and check valves are not exercised regularly and have corrosion in most locations. In many locations, suction and/or discharge shutoff valves are not functional and are leaking in several stations. While this does not affect the day-to-day operation of the station, in an emergency it is critical that these valves be operable for pump repair or replacement operations.



Photo: Spring St PS leaking check valve

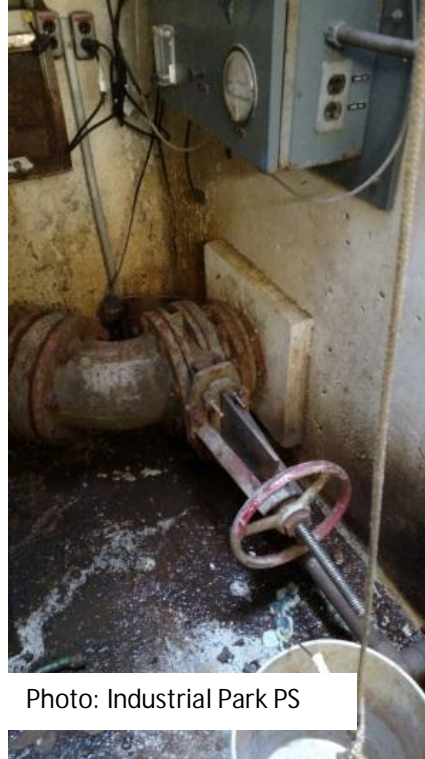


Photo: Industrial Park PS



Photo: South Street PS

2.5 INSTRUMENTATION AND CONTROLS

Instrumentation and controls (I&C) inspections primarily focused on internal controls (level control, flow metering, run-time meters) as well as communication with the station operators (alarms, SCADA/Mission). As with mechanical, the degree and condition of I&C systems varied widely across the City's pump stations. Most stations had adequate level controls for operating pumps, varying in style and complexity (bubbler system, pressure transducer, float switches). Most stations, particularly the newer ones, often have both a primary and backup level control system. The backup system is most often float switches, and sometimes bypasses the station's main control panel as well. Control panels generally reflect the age of the station, with newer

stations having better controls and displays, and older stations using more manual and older type switches and controls.



Photo: Davis St PS Controls



Photo: Burt St PS Controls

Alarms and communications with the stations work on two separate systems. Several of the stations are connected to the WWTF SCADA (Supervisory Control and Data Acquisition) system through a fiber-optic connection. This system allows operators at the WWTF to have real-time monitoring of stations, but has the drawback of not notifying pump station personnel in the field if there is an issue. Most of the stations are monitored with the Mission system, which operates on a wireless network. This system has the advantage of notifying field personnel remotely (via smartphone app) of alarm conditions, but has limited alarm inputs and does not allow for real-time monitoring of pump station conditions. Inspections observed that there is little standardization with alarms and communications, even within the systems. For example, several stations were observed to not have any alarm generated or transmitted on station loss of power or generator start. It is recommended that a standard set of alarm points be generated, and that all stations be programmed to transmit these alarms so that responses can be efficient and effective.

2.6 HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

HVAC inspections examined systems at three different levels. First, safety-related systems, i.e. ventilation for confined spaces such as wetwells, drywells and valve vaults. Second, systems to protect equipment – heaters and dehumidifiers to keep equipment from freezing or rusting, and louvers to provide adequate air for generators. Third, comfort-related items, such as heaters and air conditioners in operator-occupied spaces.

The condition of HVAC systems at the pump stations is mixed. In most locations, safety-related ventilation systems were operational, and frequently automatic (ventilation fan would turn on when drywell hatch was opened, for example). Equipment protection systems were spotty – in some locations dehumidifiers were missing or non-functional, resulting in very humid environments which will shorten the life of piping and equipment. Building heaters were



Photo: Blocked louver
(Colt Circle PS)

similarly mixed – in many locations, stock building or enclosure heaters had been disabled or disconnected, and after-market electrical unit heaters were in use. Generally, however, some form of heat was in use. One item of concern that was noted was the condition of building louvers. In many stations, louvers were not functional and did not open when power failed and the generator started. In almost all stations, louvers were covered with insulation for heating purposes. While this practice is normal and acceptable for building ventilation, louvers which supply air to backup generators should never be covered. It is recommended that all generator-un-blocked immediately, and that any after-market heaters in use be checked to ensure that they are not causing a fire hazard or affecting insurance coverage.

2.7 ELECTRICAL SERVICE

Primarily, electrical inspections were concerned with the functionality and condition of the primary electrical service and controls, as well as the automatic transfer switches and standby power equipment. In large part, the primary electrical services at the pump stations are adequate, although it was noted that in several locations pump stations did not have three-phase power, necessitating the use of phase converters or variable frequency drives to operate three phase pumps. Most electrical issues that were found were related to the backup power supplies (generators). Issues ranged from generators that did not start, to automatic transfer switches that did not transfer power to generators, to generators that would run but were incapable of operating under load. In several locations generators were operational, but were excessively old (30-40 years) and could not be considered reliable. Several stations do not have their own backup generator, but rely on having 48 hours of storage capacity, or share generators with other stations. Such an arrangement is perfectly acceptable for smaller stations, provided that a protocol is in place to periodically check and pump out these stations in the event of catastrophic failure. Most stations, with the exception of the newest stations (Dean Street and Burt Street), are not equipped with provisions for bypass operation utilizing portable pumps.



Photo: Old Generator (South St PS)

Based on these observations, there are two recommendations. First, a more comprehensive testing protocol should be instituted, where generators are regularly tested under load, and transfer switches are confirmed to work properly. In accordance with TR-16, such tests should be performed twice per year. Second, a review of all generators city-wide should be done, and a determination made on which ones should be replaced, and if any additional generators (and/or automatic transfer capacity) should be provided to stations which do not currently have them.

2.8 INSPECTION AND MAINTENANCE RECORDS

Inspection records are kept at the pump stations, and pump run times are recorded daily. Based on conversations with Operations Personnel, pump and equipment maintenance is difficult to track. Records of maintenance are not readily available and therefore identifying trends and anticipating remaining equipment life on factors other than age and use is not practical. It is

recommended that each station have its own Operation and Maintenance Manual , and that a running log of maintenance activities be kept as part of the manual.



Photo: Pump Run-time log (Red Lane PS)

3.0 RECOMMENDATIONS

Based on the field inspections, four sets of recommendations were made – short term repairs, long-term capital improvement planning, maintenance recommendations, and future inspection recommendations. Capital recommendations assume that all pumping stations are required to remain in service.

3.1 SHORT-TERM RECOMMENDATIONS

Based on observations made during field inspections, short-term and long-term capital improvement recommendations have been tabulated. In addition, recommendations for operations and maintenance of the pumping stations were made. Capital recommendations assume that the pumping station will remain in service for the foreseeable future.

Table 3-1 below lists short-term needs of the wastewater pumping stations that were identified during the inspections. These needs address specific deficiencies to mechanical, alarm, environmental control and electrical systems. Failing to address these recommendations in short order could lead to pumping station failure or reduced reliability to perform its job function and potential hazardous working conditions for pumping station operators. It should be noted that several items on this list have already been addressed at the time of this report, having been immediately repaired by Veolia upon identification during the inspections. Such items are noted in the Table. In addition, items may have been addressed since the writing of this report.

TABLE 3-1 SHORT TERM REPAIR RECOMMENDATIONS

Station	Issue	Recommendation	Status
Alicia Drive	Pump rails are heavily rusted and likely not functional	Replace rails	Scheduled (Veolia, 2017)
	Discharge globe valves difficult to turn and may need replacement	Exercise or replace valves	Open
	Generator shut down on overspeed when pump was turned on while it was running	Repair generator	Repaired (Veolia, 2/24/17)
	Enclosure light does not work	Repair Light	Repaired (Veolia, 3/6/17)
Briggs Street	Discharge piping and valves are old, rusty, and valves are not properly functional, all require replacement	Replace pipe and valves	Open
	Alarms programming – power failure and generator start did not transmit any alarms	Program alarm	Open
Burt Street	Valve vault and future wetwell are leaking groundwater badly	Seal leaks	Open

Chamberlain School	none	none	
Christine Lane	Hatches are not properly secured to concrete of wetwell or valve vault	Secure Hatches	Repaired (Veolia, 3/21/17)
Colt Circle	Valve vault is leaking groundwater very badly – was being pumped into wetwell during inspection (i.e. inflow).	Seal Valve Vault	Open
Davis Street	Discharge pipe inside wetwell is rusty and needs paint or replacement. No pipe access outside of wetwell (no valve vault or bypass connection)	Paint or replace pipe	Open
	Automatic transfer switch failed to transfer power to generator	Repair Switch	Repaired (Veolia, 1/27/17)
	Pump controls are outdated, poorly labeled, and require updating and replacement.	Replace Controls	Open
Dean St	Generator did not turn on when main circuit breaker was turned off	Repair	Repaired (Veolia, 1/24/17)
E. Pole School	none	none	
Fairview Ave	Wetwell hatch is old and rusty	Replace hatch	Open
	Pumps are 30+ years old and are beyond design life	Replace Pumps	Open
	Generator is 30+ years old and does not have an automatic transfer switch	Replace Generator, install new ATS	Open
	All controls (including run time meters) are located at the bottom of the drywell, a confined space.	Move controls to surface	Open
Fisher Street	Wetwell hatch does not latch (rock holding it closed)	Repair Hatch	Repaired (Veolia, 3/7/17)
	Check valve arms do not move, questionable that they work – repair or replace	Repair Valves	Scheduled (Veolia, 2017)
Hart Street	Groundwater infiltration around station influent pipe	Seal leaks	Scheduled (Veolia, 2017)
	Globe discharge valves do not have handles	Get handles, exercise valves	Scheduled (Veolia, 2017)

	Generator is 30+ years old (original to station)	Replace generator	Open
Industrial Park	Access driveway is dirt in poor condition	Pave Driveway	Open
	Drywell concrete is spalling badly	Repair Concrete	Open
	Suction and discharge pipe and valves is rusty	Paint or replace pipe	Scheduled (Veolia, 2017)
	Pumps are 25 years old, and pump #1 has already been rebuilt (2015).	Replace Pumps	Open
	Drywell heater does not work	Heater is unnecessary - remove heater	Open
	Drywell has no dehumidifier and needs one	Install Dehumidifier	Installed (Veolia, 3/8/17)
King James	Pump motors have been replaced (2009&2011), but pumps are almost 30 years old	Replace Pumps	Open
	Discharge pipe and valves are in poor condition	Replace pipe and valves	Open
	Drywell unit heater does not work	Heater is unnecessary - remove heater	Open
	Station houses a portable generator that powers this and several other stations. At the time of inspection the generator was not generating sufficient voltage to power station.	Repair or replace generator	Repaired (Veolia, 1/24/17)
	All pump controls (including run time meters) are at the bottom of the drywell, a confined space.	Move controls to surface	Open
Lakeview Ave	Both pumps are scheduled to be replaced within the year	Replace Pumps	Scheduled (Veolia, 2017)
	Discharge plug valves and bypass gate valve will not turn and should be replaced	Exercise or replace valves	Open
	Electric unit heater does not work	Replace Heater	Scheduled (Veolia, 2017)

Main Lift	<i>Note – due to the importance and complexity of the Main Lift station, in addition to the fact that it is scheduled to be replaced, major elements of the station were not checked (power failure not simulated).</i>		
	Spiral stairs are old, paint is gone in many locations.	Paint Stairs	Scheduled (Veolia, 2017)
	Building louvers are not functional	Repair Louvers	Repaired (Veolia, 3/6/17)
	Suction valves on “old” pumps (those not recently replaced) are heavily rusted	Exercise and paint valves	Open
	Float backup system only operates Pump #3 – station should be capable of running more than one pump on control failure.	See lead/lag comment below	Open
	Electric unit heater not operational in dry well	Heater is unnecessary - remove heater	Open
	Lead/lag pump selection is manual – should be automatic to ensure even use of pumps.	Program lead/lag	Open
Mary Drive	Electric unit heater in drywell does not work	Heater is unnecessary - remove heater	Open
	Pressure gauges need replacing (1 is functional)	Replace gauges	Open
	Pump motors have been replaced, but pumps are almost 30 years old	Replace Pumps	Open
Matthews Landing	Garage roof is old and moldy/mossy	Re-shingle roof	Open
	Alarms are limited to high wetwell level (A/B/C) and power failure – additional alarm points should be added	Program alarm	Open
Myles Standish	Drywell hatch is old and rusty	Paint or Replace hatch	Scheduled (Veolia, 2017)
	Station building/hut is sunk half below grade, low door, rusted metal floor, showing age.	Replace hut with above-grade enclosure	Open
	Pumps are 35+ years old and are loud, leaking	Replace Pumps	Open
	Discharge piping and valves are old and in poor condition	Replace pipe and valves	Open

	Alarms – drywell flood alarm did not transmit	Program alarm	Scheduled (Veolia, 2017)
	Drywell dehumidifier does not work	Dehumidifier not needed - remove dehumidifier	Removed (Veolia, 2017)
	Generator is 35+ years old and overheats if used for more than 1 hour.	Replace Generator	Open
Norton Ave	Pump #1 is beyond its design life (1990)	Replace pump	Open
	Discharge Pipe and valves rusty	Remove rust and paint pipe/valves	Scheduled (Veolia, 2017)
	Electric unit heater in valve vault does not work	Remove unit heater (not necessary)	Open
	Automatic transfer switch did not transfer power when generator started	Repair Transfer Switch	Repaired (Veolia, 1/27/17)
O'Connell Way	Valve vault does not have any access steps, making access to valves very difficult	Install manhole steps	Open
	Main circuit breaker is wired after the automatic transfer switch, so station does not recognize loss of power when main CB is turned off.	Re-wire control panel	Open
Partridge Circle	Pump controls – pump circuit breakers need to be turned off to access HOA switches, pump switches are mislabeled, Pump #1 starter chatters when called.	Replace Controls	Open
Paul Dever	none	none	
Powhattan	No access to valve vault (no steps)	Install manhole steps	Open
	No alarm was generated on power fail/generator run	Program alarm	Open
	Building louver is blocked – could not open on generator start	Un-block louver	Open
Red Lane	Wetwell hatch is old, not hinged, and unsafe.	Replace wetwell hatch	Open
	Building louvers are not functioning	Fix louvers	Repaired (Veolia, 3/7/17)
	Roof – staining on pump station ceiling indicates roof is leaking and needs repair	Repair Roof	Scheduled (Veolia, 2017)

	Suction valves are not functional and need replacement	Replace Valves	Open
	Pressure gauges on pumps are missing	Install pressure gauges	Open
	Level control – bubbler system in use is effective for pump control, but does not give accurate indication of actual Wetwell level.	Repair/Replace level control	Open
	Heat – top floor heat is functional, middle floor (generator level) has plug-in heater, no heat in drywell	Heat in drywell not needed, no action necessary	Closed
	Drywell ventilation does not work	Repair ventilation fan	Scheduled (Veolia, 2017)
	Dehumidifier for drywell does not work	Not needed - remove dehumidifier	Removed (Veolia, 2017)
	Generator is 45+ years old, extremely loud, and actively leaking oil – requires replacement	Replace Generator	Open
Roundtable	Pipe in wetwell is very rusty and requires painting or replacement	Paint or replace pipe	Open
Route 140/ Mozzone Blvd	Site pavement in poor condition	Re-pave driveway	Open
	Louvers do not work – automatic louver for generator does not open on power fail, building vent louver does not work (motor broken)	Repair Louvers	Repaired (Veolia, 3/6/17)
	Roof – staining on pump station ceiling indicates roof is leaking and needs repair	Repair Roof	Scheduled (Veolia, 2017)
	Pumps, pipe, and valves are well beyond design life and require replacement	Replace pumps	Replaced (Veolia, 2017)
	Communication – after generator test, when power was switched back to utility, a VFD fault occurred, which was not reported via the SCADA system.	Repair VFD	VFD replaced with pumps (Veolia, 2017)
	Controls – station lacks a true control panel – pumps are primarily controlled at VFDs.	Install new control panel	Open
	Heaters in middle and lower levels are missing or non-functional	Heater is unnecessary - remove heater	Open
	Dehumidification – dehumidifier in drywell does not work	Dehumidifier not needed - remove dehumidifier	Complete (Veolia 2017)

Rowley Ave	No alarm was generated on power fail/generator run – operator should be notified on power failure	Program alarm	Open
Sakonnet	Building louver is blocked – could not open on generator start	Un-block louver	Open
	On power loss, alarm generated was “pump overtemp”. Alarm should indicate correct status.	Program alarm	Scheduled (Veolia, 2017)
Scadding Street	Discharge plug valves could not be turned	Exercise or replace valves	Open
	Alarms programming – power failure/generator start did not generate an alarm.	Program alarm	Open
	Electric unit heater in enclosure does not generate heat	Replace Heater	Scheduled (Veolia, 2017)
	Ventilation fan for valve vault does not work.	Repair Fan	Repaired (Veolia, 2/28/17)
	Light in valve vault does not work	Repair Light	Repaired (Veolia, 2/28/17)
School Street	There is a tree growing through the fence	Remove tree, repair fence	Open
	Valve vault heater does not work	Heater is unnecessary - remove heater	Open
	Generator failed to start on power fail	Repair generator	Repaired (Veolia, 2/6/17)
	Lights in control cabinet and valve vault do not work	Repair lights	Repaired (Veolia, 3/6/17)
Shore Drive	Pump #2 requires frequent maintenance (and is scheduled to be replaced)	Replace Pump	Scheduled (Veolia, 2017)
	Discharge plug valves are corroded and cannot be turned – need replacement.	Replace Valves	Scheduled (Veolia, 2017)
	Control enclosure unit heater does not work	Replace Heater	Scheduled (Veolia, 2017)
	Valve vault vent fan does not work	Repair Fan	Repaired (Veolia, 2/28/17)
	Valve vault light does not work	Repair Light	Repaired (Veolia, 2/28/17)

South Street	Pumps are very old (30+ years) and have had multiple major repairs recently	Replace Pumps	Open
	Discharge piping and valves rusty, leaks at valves and pumps	Replace pipe and valves	Open
	Louvers do not open on power fail for generator	Repair Louvers	Scheduled (Veolia, 2017)
South Walker Street	Discharge plug valves cannot be turned	Exercise or replace valves	Scheduled (Veolia, 2017)
Spring Street	Building louvers are not functional and/or blocked	Repair/unblock louvers	Repaired (Veolia, 2017)
	Roof is broken in one spot	Repair Roof	Scheduled (Veolia, 2017)
	Pumps are 40+ years old and are beyond design life	Replace Pumps	Open
	Discharge piping and valves are very old/rusty	Paint or replace pipe and valves	Scheduled (Veolia, 2017)
	Level control – bubbler tube freezes in cold weather, is currently housed in insulated box with light bulb for heat	Replace or relocate level control	Open
	Generator is 40+ years old and is very loud	Replace generator	Open
Stevens Street	Wetwell access hatch is a wooden cover with metal backing – needs a proper manhole cover for safety	Replace Cover	Open
	Discharge 3-way valve is broken and requires replacement	Repair/Replace valve	Scheduled (Veolia, 2017)
	Backup power supply to station is via separate propane-fired motor for pump #1. There is no backup for pump #2, so if pump #1 is out of service there is no backup power to the station.	Install proper backup power to station	Open
Taunton High School	Air release valve structure full of water	Pump chamber out, monitor as necessary	Complete (Veolia 2017)
	Sump pump in valve vault is set too high – 2-3" of standing water in valve vault with pump not on	Re-set sump pump float	Complete (Veolia 2017)
Warner Boulevard	Building louvers blocked	Un-block louver	Open
Wellesley Circle	none	none	
Westville	Driveway is narrow dirt, needs pavement	Pave Driveway	Open
	One check valve is heavily rusted	Paint or replace valve	Open

3.2 LONG-TERM RECOMMENDATIONS

The list provided in Table 3-1 covers those repairs that are recommended to be made within the next 1-2 years, to bring all stations within the system back to an appropriate operational condition. However, it is the nature of mechanical equipment to wear out and break, and it will be necessary to plan resources for major upgrades and replacements. Several stations inspected will be in need of capital improvements within the next 5 years (Spring St, South St, Myles Standish Blvd, etc.)

It is recommended that Veolia and the City develop a 5-year Capital Improvement Plan, similar to that required by the collection system contract. Such a plan should detail which stations will require capital improvements, and approximate costs for planning purposes. This will allow the City to set aside money or otherwise arrange for funding for these improvements. The Capital Improvement Plan should be reviewed and updated at least annually.

3.3 MAINTENANCE RECOMMENDATIONS

As outlined in Section 1.2, Veolia is required to perform three types of maintenance activities on the pump stations as a condition of the contract: Corrective Maintenance, Preventative Maintenance, and Predictive Maintenance. It is evident from the pump station inspections that Preventative and Predictive activities have not been routinely performed, nor have they been budgeted for in the Contract. It is recommended that a maintenance schedule be developed for each station to ensure that proper maintenance activities are being performed. These maintenance activities should be logged and the logs checked as part of the annual inspection process. While each station is different, and different types of stations require different maintenance activities, examples of common maintenance items include:

- Inspecting pumps, including removing submersible pumps
- Testing generators under load
- Exercising valves
- Painting pipes
- Calibrating level control and flow measurement equipment
- Checking electrical and pump controls
- Checking lights, heat and ventilation systems

3.4 FUTURE INSPECTIONS

Exhibit 301 of the contract requires Veolia to conduct annual contract system inspections. It is recommended that these inspections in future be conducted in a more thorough manner than in previous years, similar to the inspections which resulted in this report. Inspections should at minimum include the following items:

- Review of maintenance logs
- Site inspection (pavement, fence, landscaping)
- Structural/Architectural – building (if present), hatches
- Mechanical – Pumps, pipe, and valves
- Instrumentation and controls – level control, flow meter, alarms/communication
- HVAC – heat, ventilation, dehumidification

- Electrical – generator, circuit breakers, lighting

Pump station inspection logs should be turned over to the City and used to develop the Capital Improvement Plan and maintenance schedules.

APPENDIX A – LIST OF DEFICIENCIES FOUND DURING INSPECTIONS

APPENDIX B – PUMP STATION INSPECTION REPORTS AND PHOTO LOGS
