



To: Jim Stewart
Borough of Naugatuck

Date: 7/28/16
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Remarks:

By: Pam Westgate, Kleinfelder



TO: Jim Stewart, Director of Public Works, Borough of Naugatuck
FROM: Pamela Westgate, P.E., Kleinfelder
DATE: July 28, 2016

A condition assessment was completed for the five pump stations that are owned by the Borough of Naugatuck and operated by Veolia during the winter of 2016. The pump stations are operating as intended and in generally good condition, although some of the equipment is beyond its design life and in need of replacement. The heart of the pump stations are submersible pumps, which are repaired or replaced as needed by Veolia. Most of the pumps have been refurbished or replaced by Veolia within the last four years. As the general life expectancy of pumps is 20 years, all of the pumps will likely need to be replaced within 20 years.

In general, the Inwood, Maple & May, and Platts Mill Pump Stations have numerous needs based on the age of the stations, and at these locations a complete overhaul of the electrical systems is recommended, along with other site repairs as indicated. The pump station with the most identified needs is the Inwood Pump Station.

Corrosion and odor at the Inwood Pump Station are indicative of hydrogen sulfide generation in the collection system. If found to be present, control of hydrogen sulfide in the collection system at or upstream of the Inwood Pump Station, as necessary, would alleviate the corrosion as well as the odor issue.

The following immediate, short and long term needs were identified at the pump stations. These needs are also listed by pump station in . Immediate needs should be addressed as soon as possible. Short term needs (Category A) are high priority items in need of replacement or repair and should be addressed within the next 5 years. Medium term needs (Category B) are items that should be addressed within the next 6-10 years, and Long term needs (Category C) will need to be addressed within the next 11-20 years.

Immediate Needs

Hop Brook PS (HP-I-1 and HP-I-2):

- The power conductors are exposed within the equipment enclosure and the seal fittings are lacking on the conduits exiting the ground into the enclosure as required by code and NEC Article 500 classification. It is recommended that these be addressed as soon as possible.

Short & Medium Term Needs

All pump Stations (All-A-1):

- Electrical equipment does not have Arc Flash labeling. Arc Flash labeling should be added to the electrical equipment based on Arc Flash testing.

Horton Hill PS:

- HH-B-1: The natural gas line to the generator from the gas meter has surface corrosion; recommendations include removing rust and paint exterior gas piping, or replacing the gas line with corrosion resistant piping.

Inwood PS:

- I-A-1: Replace service entrance equipment, panelboard, dry-type transformer and feeders.
- I-A-2: The generator is greater than 40 years old and in need of replacement.
- I-A-3: The hydrogen sulfide formation at this station has the potential to cause further corrosion damage. Investigate to determine the most economical method to reduce the odor & corrosion causing gases.
- I-A-4: To prevent further corrosion seal and/or coat exposed concrete, iron, and steel inside wetwell including piping, rails, and valves.
- I-A-5: Replace or seal wetwell and drywell covers to prevent odor issues in surrounding neighborhood.
- I-A-6: Repoint brick on building exterior.
- I-A-7: Investigate cause of roof leak and repair if it has not already been addressed.

Maple & May PS:

- MM-A-1: The generator is beyond its design life and in need of replacement.
- MM-B-1: Seal and/or coat exposed concrete, iron, and steel inside wetwell.

Platts Mill PS:

- PM-A-1: The generator and automatic transfer switch (ATS) are beyond their design life and in need of replacement
- PM-A-2: Replace grounding electrode conductor connection.
- PM-B-1: Upgrade control system.

Long Term Needs

All Pump Stations:

- Replace or refurbish pumps as necessary.
- In 20 years the lighting and controls will be outdated and beyond their life expectancy.

Hop Brook PS:

- HB-C-1: Replace submersible pumps as needed.
- HB-C-2: Replace service entrance equipment, panelboard, feeder receptacles and branch circuitry.
- HB-C-3: The generator and ATS will be beyond their design life within 20 years.

Horton Hill PS:

- HH-C-1: Seal the interior of concrete rings, with particular focus on the top cover area to prevent leaks, or realign the ring through excavation and replacement.
- HH-C-2: Repair damaged roof.
- HH-C-3: Replace submersible pumps as needed.
- HH-C-4: The generator and ATS will be beyond their design life within 20 years.

Inwood PS:

- I-C-1: Repair asphalt at door entry.
- I-C-2: Replace control system and wiring.
- I-C-3: The ATS will be beyond its design life within 20 years.
- I-C-4: Replace receptacles and branch circuitry.

- I-C-5: Replace submersible pumps as needed.

Maple & May PS:

- MM-C-1: Troubleshoot exhaust fan operation.
- MM-C-2: Repair slight damage to exterior concrete if onsite doing other structural repairs.
- MM-C-3: The ATS will be beyond its design life within 20 years.
- MM-C-4: Replace service entrance equipment, panelboard, feeder, and branch circuitry.
- MM-C-5: Replace submersible pumps as needed.

Platts Mill PS:

- PM-C-1: Repair dry well concrete casing at entry hatch.
- PM-C-2: Replace panelboard, feeder, and branch circuitry.

Opinions of probable costs will be generated for addressing the identified needs presented here as part of the overall Facilities Plan for the collection system and wastewater treatment plant.

This Technical Memorandum describes the condition assessment and needs identified in evaluations of the Hop Brook, Horton Hill, Inwood, Maple & May, and the Platts Mill Pump Stations (PSs) in the Borough of Naugatuck, CT. This assessment of the five pump stations was done as part of developing a Facilities Plan for the Borough owned wastewater collection and treatment facilities in Naugatuck. The purpose of the condition assessment was to:

1. Document the condition of the buildings, wetwells, equipment and related infrastructure, and
2. Identify and prioritize operation and structural deficiencies at the pump stations that will need to be addressed and incorporated into a Facilities Plan over the 20-year planning horizon.

Based on this evaluation an inventory of the pump station deficiencies, as determined during the field inspections, has been compiled. From this list the short and long term needs at the pump stations has been developed. Presented here is an evaluation of the assets that comprise the pump stations and identification of deficiencies, followed by a list of immediate, short and long-term recommendations to address those needs. For each asset a general timeframe for replacement is provided and deficiencies are prioritized for need for replacement or repair. The needs at the pump stations are discussed by category and priority within this Technical Memorandum and the needs are listed by pump station in . The more detailed general and electrical reports are included in and for reference.

The pump stations are currently operated and maintained by Veolia through a contract with the Borough of Naugatuck. An annual contract compliance inspection report by ARI, dated March 7, 2016, stated that the operation and maintenance of the pump stations are in compliance with the Veolia contract.

Site evaluations of all five of the pump stations were conducted on January 5, 2016 and February 17, 2016 with the assistance of Veolia staff. Evaluations consisted of visual inspections of the physical, mechanical, and electrical components of each station. Kleinfelder assessed the general and the electrical conditions with the assistance of partners JK Muir and RDK Engineers, respectively.

If present the following electrical components were inspected:

- Generator
- Automatic Transfer Switch
- Service Entrance

- Panelboard
- Receptacles
- Conduit
- Lighting

The following components, if present, were inspected:

- Structure, including building, roof, grounds and fencing
- HVAC
- Wetwell
- Pumps, Pipes, and Valves
- Alarm System
- OSHA Compliance/ Safety

The Inwood PS is approximately 40 years old, while the others were built in the 1980's and are approximately 30 years old. Each pump station has a wetwell made of concrete or fiberglass (see). All of the pump stations have adjacent dry wells that house associated piping systems except for the Horton Hill PS, which only has the single wetwell.

All five Naugatuck pump stations are generally in good condition and are performing as intended. The Veolia staff at the visit had excellent operations knowledge of the facilities. Veolia staff reported that they have minor operation and maintenance issues with the pump stations. The original construction data for the pump stations, including plans and specifications for the equipment is not available for staff reference, nor for this evaluation.

All of the pump stations appear to have excess capacity based on operating conditions from 2015 when monthly pump run times were relatively low, as seen in . Platts Mill PS is the only pump station with an installed flow meter. Flow tracking should be added to the other pump stations in the future for flow monitoring and tracking purposes.

Hop Brook	1985	Precast Concrete	1,974	NA
Horton Hill	1985	Precast Concrete	4,151	NA
Inwood	1975	Fiberglass	3,328	NA
Maple & May	1985	Fiberglass	3,941	NA

Platts Mill	1985	Concrete	8,900	0.255 (0.196 -0.346)

Note: Pump station flows from 2015 data.

Since the pumps at all five pump stations are submersible visual inspection was not possible. All of the pumps were reported by Veolia to have been replaced or rebuilt within the last four years. The pumps for each pump station are listed in . No immediate or short term needs were identified based on the reported age of these pumps, but regular maintenance is required. Because of the general life expectancy of this equipment, all of the pumps are expected to need replacement within the 20 year planning horizon of the Facilities Plan.

Hop Brook	Flygt (MP3085 HT)	2	2	New 2012	46 (12-80)
Horton Hill	Flygt (MP3085 HT)	3	2	1 New 2016; 1 Rebuilt 2014	136 (80-203)
Inwood	Myers Grinder (MG75OH)	7.5	3	Unknown	122 (70-160)
Maple & May	Myers Grinder (WG75H)	2	2	Rebuilt 2012	83 (46-115)
Platts Mill	Myers (4R30M4-03)	3	2	Rebuilt 2014	203 (128-291)

Note: Pump run times from 2015 data.

The piping, valves, and pump rails in the wet and drywells at all of the pump stations are in good condition with the exception of the Inwood PS, where there is deterioration from corrosion. Inwood PS also has had some odor issues, which have been somewhat abated with the addition of mats over the wetwell hatches (see). The corrosion and odor at the Inwood PS are indicative of hydrogen sulfide generation in the collection system. If found to be present, control of hydrogen sulfide in the collection system at or upstream of the Inwood PS, as necessary, would alleviate the corrosion as well as the odor issue.



The focus on safety by Veolia staff was evident during the site visit. Safety nets have been added to each wetwell and OSHA appropriate signage was visible. A number of safety related items were identified during the site visits:

- Although the wetwells at each of the pump stations are confined space entry they do not have engineered ventilation systems.
- None of the electrical equipment has proper Arc Flash labeling. An Arc Flash study should be completed and the equipment properly labeled.
- The power conductors at the Hop Brook PS are exposed within the equipment enclosure and subject to physical damage, and there are no seal fittings installed on the conduits exiting the ground into the enclosure as required by code to meet the classification of NEC Article 500. These should be addressed immediately.

Each of the pump stations has an auto dialer system that is maintained by United Alarm. Alarms are triggered by low, low-low, high, and high-high floats and are sent to the Wastewater Treatment Plant (WWTP). Feedback on wet well level, pump run time, or flow rate is not communicated. For ease of monitoring this information could be communicated to the plant Supervisory Control and Data Acquisition (SCADA) System with a controls upgrade, however, a more advanced control system is not necessary for the continued operation of the stations. According to the March 7, 2016 Annual Contract Compliance Report submitted by ARI, SCADA has been added to the Inwood, Maple & May and Platts Mill PS's, though these were not observed since this occurred after the completion of the site inspections.

The controls are in good condition at the Hop Brook, Horton Hill, and Maple & May PSs. At the Inwood PS the control panel and wiring is in fair condition, while the control panel at the Platts Mill PS is obsolete and the wiring is in poor condition (see). The control panels and wiring will need to be replaced within the 20 year planning period.



There is no HVAC in the wet or dry wells at any of the pump stations. The Inwood, Maple & May, and Platts Mill PS buildings, which house the generators and electrical equipment, have utility heaters and exhaust fans that are assumed to be the same age as the buildings. The Maple & May building exhaust fan may require maintenance or replacement as it did not initially start when placed into the on position. The Inwood and Platts Mill building exhaust fans and heaters were in good condition.

The building type at each pump station, along with the presence of fencing and building HVAC are listed in . Minor damage to the buildings and site were identified at the site visits. Deficiencies in these items and the building HVAC are listed in ; some are shown in the pictures below the table. At the Horton Hill PS the front corner of the roof is slightly damaged (see) and the concrete rings of the wetwell are misaligned and could result in leakage into the wetwell from the ground, although no signs of leakage were observed (see). At the Inwood PS the asphalt pad surrounding the building is in fair condition and a section is cut out in front of the building doors and should be replaced (see), and the exterior brick mortar is degraded (see).

Hop Brook	Wooden shed Chain link fence	NA	
Horton Hill	Wooden shed	NA	Minor roof damage (). Misaligned concrete rings in wetwell ().
Inwood	CMU block building Brick exterior	Utility heater Exhaust fan	Evidence of leaks noticed on the roof plywood interior. Asphalt section missing (). Exterior brick mortar is degraded ().
Maple & May	Concrete with precast roof	Utility heater Exhaust fan with louvers	Exhaust fan did not initially start. Slight damage to exterior concrete.
Platts Mill	CMU block building Concrete brick exterior Shingled sloped roof Chain link fence	Utility heater Exhaust fan	Spalled concrete on drywell concrete pad ().





The lighting, lighting controls, and general purpose receptacles/ power equipment (conduits, electrical boxes, device covers, etc.) at all of the pump stations are in good physical and operational condition and are expected to continue functioning in their current capacity for the next 20 years provided they are properly maintained.

The electrical equipment in the Hop Brook and Horton Hills PSs appear to be in the range of 10-15 years of age, is generally in good condition, and is expected to continue functioning in its current capacity for the next 20 years if properly maintained. Issues of concern:

- Electrical equipment does not have proper Arc Flash labeling at any of the pump stations.
- At Hop Brook PS the power conductors at the Hop Brook PS are exposed within the equipment enclosure and subject to physical damage ().
- At Hop Brook PS there are no seal fittings installed on the conduits exiting the ground into the enclosure as required by code to meet the classification of NEC Article 500.
- At Horton Hill PS the natural gas line to the generator from the gas meter has surface corrosion as seen in .





The electrical equipment at the Inwood, Maple & May, and Platts Mill Pump Stations is original to the pump stations and is 30-40 years old. In general, at these pump stations the electrical distribution equipment and standby generators () have exceeded the industry standard life expectancy and should be replaced. Other issues of concern:

- Exterior grounding electrode connection does not appear to meet code requirements at the Platts Mill PS ().
- The generator at the Maple & May PS has had failures and been rebuilt within the past year ().
- The working space between the generator and the main pump control panels at the Inwood and Platts Mill PSs is not adequate per code requirements.
- Electrical equipment does not have proper Arc Flash labeling at any of the pump stations.



All-A-1	All Pump Stations	Arc Flash labeling for electrical equipment	Safety/Code	Provide labels
HP-I-1&2	Hop Brook	Conduit (in enclosure)	Safety/Code	Replace with compliant materials
HP-C-1	Hop Brook	Submersible pumps	Beyond life expectancy	Replace in kind
HP-C-2	Hop Brook	Service entrance, panelboard, feeders, receptacles and branch circuitry	Beyond life expectancy	Replace in kind
HP-C-3	Hop Brook	Generator and automatic transfer switch	Beyond life expectancy	Replace in kind
HH-B-1	Horton Hill	Gas Piping	Condition	Clean & Paint or Replace
HH-C-1	Horton Hill	Seal or realign wetwell concrete rings	Condition	Realign & Seal Well Ring
HH-C-2	Horton Hill	Roof	Condition	Repair
HH-C-3	Horton Hill	Submersible pumps	Beyond life expectancy	Replace in kind
HH-C-4	Horton Hill	Generator and automatic transfer switch	Beyond life expectancy	Replace In Kind
I-A-1	Inwood	Electrical service entrance, panelboard, transformer & feeders	Beyond life expectancy	Replace
I-A-2	Inwood	Generator	Beyond life expectancy	Replace
I-A-3	Inwood	H ₂ S Formation Investigation	Condition / Odor	Investigate
I-A-4	Inwood	Wetwell	Condition	Seal and/or Coat
I-A-5	Inwood	Wet and Dry Well Covers	Odor Control	Replace with Sealed
I-A-6	Inwood	Building Exterior	Condition	Repoint
I-A-7	Inwood	Roof - evidence of leak	Condition	Investigate & Repair if necessary
I-C-1	Inwood	Asphalt- at door entry	Condition	Repair
I-C-2	Inwood	Control System and wiring	Beyond life expectancy	Upgrade
I-C-3	Inwood	Automatic Transfer Switch	Beyond life expectancy	Replace
I-C-4	Inwood	Receptacles and branch circuitry	Beyond life expectancy	Replace In Kind
I-C-5	Inwood	Submersible pumps	Beyond life expectancy	Replace
MM-A-1	Maple & May	Generator	Beyond life expectancy	Replace In Kind
MM-B-1	Maple & May	Wetwell	Condition	Seal and/or Coat
MM-C-1	Maple & May	Exhaust fan	Condition	Repair if necessary
MM-C-2	Maple & May	Exterior concrete	Beyond life expectancy	Replace In Kind
MM-C-3	Maple & May	Automatic Transfer Switch	Beyond life expectancy	Replace In Kind
MM-C-4	Maple & May	Service entrance, panelboard, feeders, receptacles and branch circuitry	Beyond life expectancy	Replace In Kind
MM-C-5	Maple & May	Submersible pumps	Beyond life expectancy	Replace In Kind
PM-A-1	Platts Mill	Generator and automatic transfer switch	Beyond life expectancy	Replace In Kind
PM-A-2	Platts Mill	Grounding electrode connection	Condition	Repair
PM-B-1	Platts Mill	Control System	Beyond life expectancy	Upgrade
PM-C-1	Platts Mill	Dry Well	Condition	Repair concrete
PM-C-2	Platts Mill	Panelboard, feeder and branch circuitry	Beyond life expectancy	Replace In Kind
PM-C-3	Platts Mill	Submersible pumps	Beyond life expectancy	Replace In Kind

- Items that have an immediate need for repair or replacement because of their condition or importance. Items that are safety or code concerns were included in this category.

- Items that have an expected remaining service life of 5 or fewer years - repair or replacement is expected to be necessary during this period.

= - Items that have an expected remaining service life of 5-10 years - repair or replacement is expected to be necessary during this period.

= - Items that have an expected remaining service life of 11-20 years - repair or replacement is expected to be necessary during this period.



To: Kleinfelder
From: JKMuir
Subject: Borough of Naugatuck Pump Station Evaluation
Date: July 2016

Introduction

The Borough of Naugatuck has requested the services of Kleinfelder to assess the condition of their wastewater collection and treatment facilities. Kleinfelder obtained the services of JKMuir to assess the condition of five wastewater collection system pump stations as part of this effort. The following memorandum summarizes the evaluation of the following pump stations.

- Hop Brook Pump Station
- Horton Hill Pump Station
- Inwood Pump Station
- Maple & May Pump Station
- Platts Mills Pump Station

Purpose

This report summarizes the condition of the pump stations in the Borough of Naugatuck, Connecticut, collection system to determine which, if any, of the collection system assets requires process, mechanical, structural, or instrumentation upgrades. JKMuir conducted a site visit to evaluate these facilities on January 22, 2016. The pump station site visits were guided by the contract operator, Veolia's, staff, who possessed excellent facilities operations knowledge. Safety was held paramount during the site visits and Veolia's attention to detail was evident.

JKMuir's evaluation approach was visual observation of the facilities and equipment. Destructive or non-destructive analysis to determine asset condition was not performed as part of this evaluation. Veolia staff reported that all pumps had been replaced or overhauled (rebuilt at a minimum) within the past four years. Drawdown tests were not conducted at any of the stations due to low flows and resulting lack of accuracy in these measurements. The level differences between the start and stop floats for the pumps was not considered sufficient to calculate accurate pump flow rates for comparison to the pump curves.

Summary

The facilities' were found to be in overall good condition with few areas that need improvement or replacement, as summarized herein. The Veolia staff indicated that they experience only relatively minor operation and maintenance issues with these pump stations. The pump stations predate the Veolia operations contract, which began in approximately 2001. Based on this, some of the construction data, and operation and maintenance information was not available for evaluation of the existing equipment.

Each station had OSHA compatible signage as well as safety nets covering each wetwell. All wetwells are confined space entry and did not have power ventilation systems. Inwood station also contained a vent charcoal filter to reduce odors from the wetwell.

Each of the pump stations had an auto dialer system that is maintained by United Alarm and notifies the plant of station specific alarms including low, low-low, high, and high-high float alarms. These stations do not provide feedback on wet well level, run hours, or flow rate. Based on the current controls and infrastructure at these pump stations, a more advanced control system may not be necessary for continued operation. However, the Borough may want to consider upgrading the system and integrating the station controls with the plant SCADA system to provide real time information on the operation of each station.

The Recommendations section is presented at the end of this report following the description of observations for each pump station.

Hop Brook Pump Station

Description

The Hop Brook Pump Station services a local restaurant located at a town owned golf course. Flow from this station is pumped to the gravity line located nearby along the main road. This station is located underground with access hatches to the wetwell, where the submersible pumps are located. The generator, generator propane tank, controls and power panel are located outside with a chain link fence surrounding it for security. The existing controls have been updated and are adequate. The chain link fence is in good operating condition.



Figure 1. Hop Brook Wetwell



Figure 2. Hop Brook Wetwell Access Hatch

Table 1. Hop Brook Pump Station Data

Wetwell Data	Total Volume: 529 gallons	Material: Precast concrete
Pump Data	2 Submersible Pumps: Flygt MP3085HT	Pump HP: 3
Generator Data	Generator Type: Generac 15kW	Fuel Type: Propane

Based on monthly operation data provided from 2015, the Hop Brook pump station operated an average of 46 hours per month with a range of 12 to 80 hours per month.

Observations

- This station has a wetwell with two submersible pumps installed on a rail system that discharges the sewage to a piping system located in a drywell adjacent to the wetwell.
- Piping and valves are stainless steel and appear to be in good condition.
- Both pumps were rebuilt in 2012 and are in good operating condition.

Horton Hill Pump Station

Description

The Horton Hill Pump Station is a small pump station located between two residential driveways. This station has a small shed housing the power and control systems, a natural gas powered generator and a single wet well. The shed is in good condition with no evidence of leakage at the shingled roof, however, there is some minor damage to a corner of the roof adjacent to the neighboring property.



Figure 3. Horton Hill Wetwell

Table 2. Horton Hill Pump Station Data

Wetwell Data	Total Volume: 1,272 gallons	Material: Precast concrete
Pump Data	2 Submersible Pumps: Flygt	Pump HP: 3
Generator Data	Generator Type: Generac 20kW	Fuel Type: Natural Gas

Based on monthly operation data provided from 2015, the Horton Hill pump station operated an average of 136 hours per month with a range of 80 to 203 hours per month.

Observations

- The wet well is made from concrete ring sections with one of the upper rings slightly displaced, as presented in the following figure, and may benefit from realignment or sealing to prevent leakage.



Figure 4. Horton Hill Misaligned Concrete Ring

- The natural gas line to the generator from the gas meter has surface corrosion as seen in the following figures. Replacing the natural gas line with corrosion resistant material may be considered.
- The pumping and piping systems appear to be in good condition.



Figure 5. Horton Hill Generator Gas Line

- The edge of the roof has minor damage, as can be seen in the following figure.



Figure 6. Horton Hill Exterior Damage

Inwood Pump Station

Description

The Inwood Pump Station is a concrete masonry unit (cmu) block building with a brick exterior that houses the power panel, controls and generator. There is also a small exhaust fan and utility heater in the building. The controls, exhaust fan, heater, and fence seem to be in good operating condition. This station has three submersible pumps and receives the flow from the Maple & May pump station. A thick layer of grease was visible on the interior of the wetwell. The vent on the wetwell has a carbon canister to remove odors.



Figure 7. Inwood Wetwell

Table 3. Inwood Pump Station Data

Wetwell Data	Total Volume: 2,480 gallons	Material: Fiberglass
Pump Data	3 Submersible Pumps: Myers grinder WG750H	Pump HP: 7.5
Generator Data	Generator Type: Onan KR-15/9218P, 55kW	Fuel Type: Natural Gas

Based on monthly operation data provided from 2015, the Inwood pump station operated an average of 122 hours per month with a range of 70 to 160 hours per month.

Observations

- The roof appears to be in good condition on the exterior, but evidence of leaks were noticed on the roof plywood interior.
- The brick exterior mortar has degraded and repointing is recommended, as presented in the following figure. The deterioration of mortar may be due to corrosion from hydrogen sulfide since this edge of the building is closest to the wetwell hatch.
- The asphalt pad surrounding the building is in fair condition, however, a section is cut out in front of the building doors and should be replaced, as seen in the following figure.



Figure 8. Inwood Asphalt & Brick Damage

- The hatch covers have mats covering them as seen in the following figure. This station is located in a residential neighborhood, odor issues are of high importance and it is recommended to replace the hatches with tighter seals through replacement or provide a better seal on the existing hatches to prevent odor emissions.



Figure 9. Inwood Pads over Access Hatches

- The generator for this station appear to be old (circa 1980's) and should be considered for upgrading. It should be noted that the generator is in operating condition and is able to maintain the full-load during the monthly test.
- Current efforts to minimize odors around the Inwood station have helped reduce customer complaints. However, there is evidence of corrosion deterioration on the steel, cast iron, and

concrete materials in the Inwood wetwell. In addition, Maple & May pumps station, which are up stream of Inwood, are showing evidence of corrosion. Hydrogen sulfide may be forming at Maple & May pump station and increasing in concentration as it continues to Inwood pump station. The conditions favorable to hydrogen sulfide formation are not currently being addressed. This may lead to increased corrosion and degradation over time. The Borough could consider collection system odor control and corrosion control to prevent further deterioration at Inwood pump station and Maple & May pump station.

Maple & May Pump Station

Description

The Maple & May pump station houses a wet well and two drywells with a one story concrete building with precast roof. The emergency generator is located inside the building. The building has a louver style exhaust system. The wetwell houses two submersible pumps on a rail system and the drywells house the piping and valves. The building has a utility heater and ventilation fan. The station previously had an odor control system that has since been removed.



Figure 10. Maple & May Pump Station and Wetwell

Table 4. Maple & May Pump Station Data

Wetwell Data	Total Volume: 1,222 gallons	Material: Fiberglass
Pump Data	2 Submersible Pumps: Myers grinder	Pump HP: 7.5
Generator Data	Generator Type: Kohler 20R0Z J61, 25 kW	Fuel Type: Diesel

Based on monthly operation data provided from 2015, the Maple & May pump station operated an average of 83 hours per month with a range of 46 to 115 hours per month.

Observations

- The concrete exterior of the building has a few damaged areas concentrated in one area, which may have been due to an impact event, but overall appears to be in good condition.
- There was no evidence of leaking from the cast roof.
- The generator and diesel tank were refurbished in 2015 and appear to be in good condition.

- The exhaust fan may require maintenance or replacement on the interior of the building. It did not initially start when placed into the on position. This may be an electrical connection issue.
- The wetwell, rails and piping systems appear to be in good condition.
- Minor corrosion was noticed at this station, which may be due to corrosive gases from Inwood PS, which is down stream of this station.

Platts Mill Pump Station

Description

The Platts Mill Pump Station is a cmu block building with concrete exterior and a shingled sloped roof housing the power panel, controls, and generator systems with a wetwell and drywell located outside. There is a utility heater and exhaust fan located inside the building. The wetwell and drywell access hatches are located outside the building. The site is enclosed with a chain link fence for security.



Figure 11. Platts Mill Wetwell

Table 5. Platts Mill Pump Station Data

Wetwell Data	Total Volume: 6,014 gallons	Material: Concrete
Pump Data	2 Submersible Pumps: Myers	Pump HP: 3
Generator Data	Generator Type: Kohler 20RZ, 18 kW	Fuel Type: Propane

Based on monthly operation data provided from 2015, the Platts Mill pump station operated an average of 203 hours per month with a range of 128 to 291 hours per month. From an installed flow meter at Platts Mill, during 2015 the station pumped an average of 251,000 gallons per month, with a range of 169,000 gallons to 346,000 gallons per month.

Observations

- The piping system, wetwell, and pumping system appears to be in good condition.
- The station control system is original to construction with outdated relay logic technology, and should be considered for replacement. It should be noted that the controls are still functioning, however, replacement parts may be difficult to obtain.



Figure 12. Platts Mill Control System

- The drywell concrete pad shows evidence of spalling, as presented in the following figure, and should be repaired.



Figure 13. Platts Mill Drywell hatch and Concrete

Recommendations

Hop Brook PS

- HB1 – The pumps at this location were overhauled in 2012, although they appear to be in good operating condition, they may require replacement in the next 20 to 25 years.

Horton Hill PS

- HH1 – Seal the interior of concrete rings, with particular focus on the top cover area to prevent leaks. A more costly alternative to sealing would be to realign the ring through excavation and replacement.
- HH2 – Remove rust and paint exterior gas piping, or replace the gas line with corrosion resistant piping.
- HH3 – Roof damage visible. Appears to be from a single impact event.
- HH4 – One of the pumps at this location was overhauled in 2014 and one pump is new, although they appear to be in good operating condition, they may require replacement in the next 20 to 25 years.

Inwood PS

- IW1 – The hydrogen sulfide formation at this station has the potential to cause further corrosion damage. This issue should be further investigated to determine the most economical method to reduce the odor causing gases.
- IW2 – Replace emergency generator.
- IW3 – Seal wetwell and drywell covers to prevent odor issues in surrounding neighborhood. A more costly alternative to increasing the seal on the existing covers would be to replace the covers. It should be noted that the hatch sizes seem to be custom and may require custom fabrication.
- IW4 – Seal and/or coat exposed concrete, iron, and steel inside wetwell including piping, rails, and valves.
- IW5 – Repoint brick on building exterior.
- IW6 – Repair asphalt at door entry.
- IW7 – Control system and wiring is in fair condition, may require replacement in the future.
- IW8 – Interior and exterior roof shows signs of leakage. The roof is currently in good condition, will need replacement at some point.
- IW9 – The age of the pumps at this location is unknown, it is assumed that this pump will require replacement at some point over the next 20 years.

Maple & May PS

- MM1 – Seal and/or coat exposed concrete, iron, and steel inside wetwell.
- MM2 – Troubleshoot exhaust fan operation connecting wires.
- MM3 – Exterior building is in good condition, slight damage visible on concrete.
- MM4 – The pumps at this location were either rebuilt or replaced in 2012. The pumps appear to be in good operating condition, they may require replacement in the next 20 to 25 years.

Platts Mill PS

- PM1 – Upgrade control system.
- PM2 – Repair dry well concrete casing at entry hatch.
- PM3 – The pumps at this location were either rebuilt or replaced in 2014. The pumps appear to be in good operating condition, they may require replacement in the next 20 to 25 years.

Conclusion

Based on the evaluation conducted, the pump stations appear to be in good operating condition for the current flows. None of the stations operate at full capacity and pump operating hours are relatively low. The following table (Table 14) presents the prioritized list of recommendations for the evaluated pump stations. Please note that the Priority for the recommendations are as follows: high and medium-high priority is recommended for the next zero to five years (0 – 5 years), medium in the next six to ten years (6 – 10 years), and medium-low and low are in the eleven to twenty-year (11 – 20 years) timeframe.

The prioritization is based on items that are considered capital improvements excluding items that may be conducted as maintenance on a regular basis or at a minimal cost. The capital improvement projects identified include the following projects.

- Horton Hill: seal upper wet well ring
- Inwood: replace emergency generator
- Inwood: seal wetwell and drywell hatches
- Inwood: repoint exterior brick
- Platts Mill: upgrade control system
- Pump replacement for all stations

Table 14. Naugatuck Pump Station Prioritized Recommendations

Location	Recommendation	Priority
Inwood PS	Control corrosive impact of hydrogen sulfide at Inwood wetwell. Seal and/or coat exposed concrete, iron, and steel inside the Inwood pump station wetwell.	High
Inwood PS	Seal wet and dry well covers to prevent odor issues in surrounding neighborhood.	Medium/High
Inwood PS	Repoint brick on Inwood PS building exterior.	Medium/High
Horton Hill PS	Remove rust and paint exterior gas piping, or replace the gas line at Horton Hill with corrosion resistant piping.	Medium
Maple & May PS	Seal and/or coat exposed concrete, iron, and steel inside the Maple & May pump station wetwell.	Medium
Platts Mill PS	Upgrade Platts Mill control system.	Medium
Platts Mill PS	Repair Platts Mill dry well concrete casing at entry hatch.	Medium/Low
Horton Hill PS	Seal the interior upper wet well ring to prevent infiltration leaks at Horton Hill PS.	Medium/Low
Hop Brook PS	Replace Pumps.	Low
Horton Hill PS	Replace Pumps.	Low
Horton Hill PS	Roof Repair.	Low
Inwood PS	Replace Pumps.	Low
Inwood PS	Replace Inwood generator.	Low
Inwood PS	Repair asphalt at door entry of Inwood PS.	Low
Inwood PS	Control system and wiring replacement.	Low
Inwood PS	Roof Repair.	Low
Maple & May PS	Replace Pumps.	Low
Maple & May PS	Building exterior repair.	Low
Platts Mill PS	Replace Pumps.	Low



MEMORANDUM

DATE: May 31, 2016
TO: Jason Tang at Kleinfelder
SUBJECT: Naugatuck Waste Water Treatment Pump Stations: Conditions Assessment
PROJECT NO.: 20150771
COPIES TO: RDK: Rich Lee, Ryan LaFalam

INTRODUCTION

RDK Engineers visited the Naugatuck WWTF (waste water treatment facility) on January 22, 2016 to perform an evaluation of the Electrical systems for the five (5) pump stations located throughout the borough.

ELECTRICAL SUMMARY

The condition of the electrical equipment at each pump station varies in age.

Pump stations with older electrical equipment (30-40 years old) are Platts Mill, Maple & May and Inwood while the pump stations with newer equipment (10-15 years old) are Hop Brook and Horton Hill.

In general, most of the older electrical distribution equipment and generators are in need of replacement while the newer equipment is in useable condition.

High priority should be given to replacing the generators at the Platts Mill, Maple & May and Inwood pump stations as they are 30-40 years old and nearing the end of their life expectancy.

More detailed observations are included on the Condition Assessment forms included as an appendix to this document.

ELECTRICAL RECOMMENDED IMMEDIATE IMPROVEMENTS

We recommend that the following issues should be addressed as soon as possible due to safety and code compliance:

Hop Brook Pump Station #1:

- Rewire all exposed wiring in electrical equipment enclosure.

- Provide seal fittings on conduits in electrical equipment enclosure.

ELECTRICAL SHORT TERM RECOMMENDATIONS

Platts Mill Pump Station #2:

- Replace generator and ATS.
- Replace grounding electrode conductor connection.
- Provide arc flash labeling for electrical equipment based on arc flash study.

Maple & May Pump Station #3:

- Replace generator.
- Provide arc flash labeling for electrical equipment based on arc flash study.

Inwood Pump Station #4:

- Replace service entrance equipment, panelboard, dry-type transformer and feeders.
- Replace generator.
- Provide arc flash labeling for electrical equipment based on arc flash study.

ELECTRICAL LONG TERM RECOMMENDATIONS

Hop Brook Pump Station #1:

- Replace service entrance equipment, panelboard, feeder, receptacles and branch circuitry.
- Replace generator and ATS.

Platts Mill Pump Station #2:

- Replace panelboard, feeder and branch circuitry.
- Replace lighting and controls.

Maple & May Pump Station #3:

- Replace ATS.
- Replace service entrance equipment, panelboard, feeder and branch circuitry.
- Replace lighting and controls.

Inwood Pump Station #4:

- Replace ATS.
- Replace receptacles and branch circuitry.
- Replace lighting and controls.

Horton Hill Pump Station #5:

- Replace ATS.
- Replace generator.

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Hop Brook Pump Station	Form Number: E-PS1-01 <small>(Discipline Code – Sequence)</small>				
Discipline: ELECTRICAL POWER	Date and Time: 1-22-2016 9AM				
Inspector Name: Keith Giguere	Photos Taken: E-PS1-1,2,3,4				
<p>Overall Scoring:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; padding: 5px;"> Condition: 1 (wiring in enclosure); 5 (remainder) Score between 1 and 5: 5 = good condition, 1 = poor condition </td> <td style="width: 50%; padding: 5px;"> Safety: 1 (wiring in enclosure); 5 (remainder) Score between 1 and 5: 5 = safe, 1 = unsafe </td> </tr> <tr> <td style="padding: 5px;"> Performance: 5 Score between 1 and 5: 5 = performs well, 1 = performs poorly </td> <td style="padding: 5px;"> Overall Priority: 1 (enclosure wiring); 5 (remainder) Score between 1 and 5: 1 = highest priority, 5 = lowest priority </td> </tr> </table>		Condition: 1 (wiring in enclosure); 5 (remainder) Score between 1 and 5: 5 = good condition, 1 = poor condition	Safety: 1 (wiring in enclosure); 5 (remainder) Score between 1 and 5: 5 = safe, 1 = unsafe	Performance: 5 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Overall Priority: 1 (enclosure wiring); 5 (remainder) Score between 1 and 5: 1 = highest priority, 5 = lowest priority
Condition: 1 (wiring in enclosure); 5 (remainder) Score between 1 and 5: 5 = good condition, 1 = poor condition	Safety: 1 (wiring in enclosure); 5 (remainder) Score between 1 and 5: 5 = safe, 1 = unsafe				
Performance: 5 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Overall Priority: 1 (enclosure wiring); 5 (remainder) Score between 1 and 5: 1 = highest priority, 5 = lowest priority				
<p>Description and General Observations:</p> <ol style="list-style-type: none"> 1. General: The electric distribution is located in a pad mounted enclosure, not a building or structure. 2. Normal Electric Service <ol style="list-style-type: none"> a. The electric service for this pump station is derived from a utility pole mounted, transformer bank located adjacent to the building. There is a utility meter socket enclosure with integral main breaker located on the associated utility. The main circuit breaker rating is unknown as the meter enclosure was pad-locked and inaccessible. b. This transformer bank, in turn, runs underground to serve the main 60A MCB, 120/240V, 1 Phase – 3 Wire panelboard located on the inside of a free-standing, equipment enclosure/cabinet, via the exterior mounted utility company meter. c. The main circuit breaker serves a 60A, 208Y/120V, 3 Phase – 4 Wire MCB panelboard via the “normal” side of a 100A-2P automatic transfer switch (ATS). The standby feed to the ATS runs from the generator via a 70A-2P generator output circuit breaker, located on the generator set. <p style="margin-left: 40px;"><u>Condition:</u> 2</p> 3. Existing Generator <ol style="list-style-type: none"> a. The well has an exterior, standby generator. b. The unit and associated ATS is manufactured by Generac, operates on liquid propane gas and is rated 15kW/15kVA, 120/240V, 1 Phase – 3 Wire. The run-time meter had 298 hours of time logged. <p style="margin-left: 40px;"><u>Condition:</u> 2</p> 					
<p>Issues of Concern:</p> <p>Electrical equipment does not have proper Arc Flash labeling.</p> <p>Power conductors are run exposed (not in raceway) within the equipment enclosure and are subject to physical damage. There were cut and abandoned conductors/cables within the enclosure.</p> <p>There were no seal fittings installed on conduits exiting the ground into the enclosure as required by code to meet the classification of NEC Article 500.</p>					
<p>Detailed Observations:</p> <p>With the exception of the noted exposed wiring and conduit issues, in general, the pump station’s existing electrical distribution equipment, standby generator and ATS are in good physical and operational condition.</p> <p>If properly maintained, this equipment can continue functioning in its current capacity for the next 11-20 years.</p>					

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Hop Brook Pump Station	Form Number: E-PS1-02 (Discipline Code – Sequence)
Discipline: ELECTRICAL LIGHTING & GENERAL PURPOSE POWER	Date and Time: 1-22-2016 9AM
Inspector Name: Keith Giguere	Photos Taken:
Overall Scoring: Condition: 5 Score between 1 and 5: 5 = good condition, 1 = poor condition	Safety: 5 Score between 1 and 5: 5 = safe, 1 = unsafe
Performance: 5 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Overall Priority: 5 Score between 1 and 5: 1 = highest priority, 5 = lowest priority
Description and General Observations: <ol style="list-style-type: none">1. Lighting and Lighting Control<ol style="list-style-type: none">a. There is no Interior lighting or exterior lighting.2. Receptacles<ol style="list-style-type: none">a. There is a general purpose receptacle located in the enclosure.3. Conduits/Boxes/Device Covers<ol style="list-style-type: none">a. Conduits within the enclosure is a combination of galvanized, rigid steel or EMT.b. Conduits within well were galvanized, rigid steel.	
Issues of Concern: None	
Detailed Observations: In general, the general purpose receptacles/power equipment are in good physical and operational condition. If properly maintained, this equipment can continue functioning in its current capacity for the next 11-20 years.	



E-PS1-1 GENERATOR



E-PS1-2 MAIN SERVICE DISCONNECT/METER



E-PS1-3 PANELBOARD



E-PS1-4 EXPOSED WIRING

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Horton Hill Pump Station	Form Number: E-PS5-01 (Discipline Code – Sequence)
Discipline: ELECTRICAL POWER	Date and Time: 1-22-2016
Inspector Name: Keith Giguere	Photos Taken: E-PS5-1,2,3,4
Overall Scoring:	
Condition: 5 Score between 1 and 5: 5 = good condition, 1 = poor condition	Safety: 5 Score between 1 and 5: 5 = safe, 1 = unsafe
Performance: 5 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Overall Priority: 5 Score between 1 and 5: 1 = highest priority, 5 = lowest priority
Description and General Observations:	
<p>1. Normal Electric Service</p> <ul style="list-style-type: none">a. The electric service for this pump station is derived from a utility pole mounted, transformer bank located adjacent to the building. There is a utility meter socket enclosure located on the exterior of the building.b. This transformer bank, in turn, runs overhead to serve the main 200A, 208Y/120V, 3 Phase – 4 Wire circuit breaker located on the inside of the building/shed, , via the exterior mounted utility company meter.c. The 200A main circuit breaker serves an adjacent 225A, 208Y/120V, 3 Phase – 4 Wire MLO panelboard via the “normal” side of a 200A-3P automatic transfer switch (ATS). The standby feed to the ATS runs from the generator via an 80A-3P generator output circuit breaker, located on the generator set.d. All distribution equipment was manufactured by GE. <p>2. Existing Generator</p> <ul style="list-style-type: none">a. The building has an exterior, standby generator.a. The unit and associated ATS is manufactured by Generac, operates on natural gas and is rated 20kW/25kVA, 208Y/120V, 3 Phase – 4 Wire. The run-time meter had 322 hours of time logged.	
Issues of Concern: Electrical equipment does not have proper Arc Flash labeling.	
Detailed Observations: In general, the building’s existing electrical distribution equipment, standby generator and ATS are in good physical and operational condition. If properly maintained, this equipment can continue functioning in its current capacity for the next 11-20 years.	

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Horton Hill Pump Station	Form Number: E-PS5-02 (Discipline Code – Sequence)
Discipline: ELECTRICAL LIGHTING & GENERAL PURPOSE POWER	Date and Time: 1-22-2016
Inspector Name: Keith Giguere	Photos Taken:
Overall Scoring: Condition: 5 Score between 1 and 5: 5 = good condition, 1 = poor condition Performance: 5 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Safety: 5 Score between 1 and 5: 5 = safe, 1 = unsafe Overall Priority: 5 Score between 1 and 5: 1 = highest priority, 5 = lowest priority
Description and General Observations: <ol style="list-style-type: none">1. Lighting and Lighting Control<ol style="list-style-type: none">a. Interior lighting consists of an incandescent, porcelain base fixture controlled via a single-pole toggle switch.b. Exterior lighting consists of wall mounted, incandescent quartz fixture located at the front (exit discharge door) of the shed building. Exterior lighting is controlled through an interior single-pole, toggle switch.2. Receptacles<ol style="list-style-type: none">a. There is a general purpose receptacle located in the building.3. Conduits/Boxes/Device Covers<ol style="list-style-type: none">a. Conduits within the building station are a combination of galvanized, rigid steel or PVC.	
Issues of Concern: None	
Detailed Observations: In general, the building's existing lighting, lighting controls and general purpose receptacles/power equipment are in good physical and operational condition. If properly maintained, this equipment can continue functioning in its current capacity for the next 11-20 years.	



E-PS5-1 GENERATOR



E-PS5-2 MAIN SERVICE METER



E-PS5-3 AUTOMATIC TRANSFER SWITCH



E-PS5-4 PANELBOARD

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Inwood Pump Station	Form Number: E-PS4-01 (Discipline Code – Sequence)
Discipline: ELECTRICAL POWER	Date and Time: 1-22-2016 10AM
Inspector Name: Keith Giguere	Photos Taken: E-PS4-1,2,4
Overall Scoring: Condition: 1 (generator); 3 (remainder) Score between 1 and 5: 5 = good condition, 1 = poor condition Safety: 1 (generator); 3 (remainder) Score between 1 and 5: 5 = safe, 1 = unsafe Performance: 1 (generator); 3 (remainder) Score between 1 and 5: 5 = performs well, 1 = performs poorly Overall Priority: 1 (generator); 3 (remainder) Score between 1 and 5: 1 = highest priority, 5 = lowest priority	
Description and General Observations: 1. Normal Electric Service a. The electric service for this pump station is derived from a utility pole mounted, transformer bank located adjacent to the building. There is a utility meter socket enclosure located on the interior of the building. b. This transformer bank, in turn, runs overhead to serve the main 100A, 240V, 1 Phase – 3 Wire circuit breaker located on the inside of the building , via the interior mounted utility company meter. c. The main circuit breaker serves the main pump control panel and a 60A, 120/240V, 1 Phase – 3 Wire MLO panelboard via the “normal” side of a 150A-3P automatic transfer switch (ATS). The standby feed to the ATS runs from the generator via a 175A-3P generator output circuit breaker, located on the generator set. The ATS was replaced within the last 5 years and is in excellent condition. d. The 60A, 120/240V, 1 Phase – 3 Wire MLO panelboard is fed from a 3kVA dry-type transformer and serves 120V receptacles and controls. <u>Condition:</u> 5 (ATS), 3 (remainder) 2. Existing Generator a. The building has an interior, standby generator. b. The unit is manufactured by Onan, operates on natural gas and is rated 55kW/69kVA, 240V, 3 Phase – 3 Wire. The run-time meter had 587 hours of time logged. <u>Condition:</u> 1	
Issues of Concern: The building is extremely crowded with equipment. The working space between the generator and main pump control panel is not adequate per code requirements. The area around the building is extremely limited. Installation of a new/replacement generator will be a challenge. Electrical equipment does not have proper Arc Flash labeling.	
Detailed Observations: In general, the building’s existing electrical distribution equipment and standby generator is approximately 25-30 years old and has exceeded its industry standard life expectancy.	

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Inwood Pump Station	Form Number: E-PS4-02 (Discipline Code – Sequence)
Discipline: ELECTRICAL LIGHTING & GENERAL PURPOSE POWER	Date and Time: 1-22-2016 10AM
Inspector Name: Keith Giguere	Photos Taken: E-PS4-3
Overall Scoring: Condition: 5 Score between 1 and 5: 5 = good condition, 1 = poor condition	Safety: 5 Score between 1 and 5: 5 = safe, 1 = unsafe
Performance: 5 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Overall Priority: 5 Score between 1 and 5: 1 = highest priority, 5 = lowest priority
Description and General Observations: <ol style="list-style-type: none">1. Lighting and Lighting Control<ol style="list-style-type: none">a. Interior lighting consists of an incandescent, halogen fixtures controlled via a single-pole toggle switch.b. Exterior lighting consists of a wall mounted, incandescent quartz fixture located at the front (exit discharge door) of the shed building. Exterior lighting is controlled through an interior single-pole, toggle switch.2. Receptacles<ol style="list-style-type: none">a. There is a general purpose receptacle located in the building. <u>Condition:</u> 53. Conduits/Boxes/Device Covers<ol style="list-style-type: none">a. Conduits within the building station are a combination of galvanized, rigid steel or EMT.	
Issues of Concern: None	
Detailed Observations: In general, the lighting, lighting controls and general purpose receptacles/power equipment is in good physical and operational condition. If properly maintained, this equipment can continue functioning in its current capacity for the next 11-20 years.	



E-PS4-1 GENERATOR



E-PS4-2 MAIN SERVICE DISCONNECT SWITCH



E-PS4-3 INTERIOR LIGHTING



E-PS4-4 ATS & LOAD CENTER

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Maple & May Pump Station	Form Number: E -PS3-01 (Discipline Code – Sequence)
Discipline: ELECTRICAL POWER	Date and Time: 1-22-2016 9:30AM
Inspector Name: Keith Giguere	Photos Taken: E-PS3-1,2,4
Overall Scoring: Condition: 2 Score between 1 and 5: 5 = good condition, 1 = poor condition	Safety: 2 Score between 1 and 5: 5 = safe, 1 = unsafe
Performance: 2 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Overall Priority: 1 Score between 1 and 5: 1 = highest priority, 5 = lowest priority
Description and General Observations: 1. Normal Electric Service <ul style="list-style-type: none">a. The electric service for this pump station is derived from a utility pole mounted, transformer bank located adjacent to the building. There is a utility meter socket enclosure located on the exterior of the building.b. This transformer bank, in turn, runs overhead to serve the main 100A, 230V, 3 Phase – 3 Wire main circuit breaker, via the utility company meter, located in the building. The main circuit breaker was manufactured by Square D.c. The main circuit breaker serves the main pump control panel and a 60A, 120/240V, 1 Phase – 3 Wire MLO panelboard via the “normal” side of a 100A-3P automatic transfer switch (ATS). The standby feed to the ATS runs from the generator via a 100A-3P generator output circuit breaker, located on the generator set.d. The 60A, 120/240V, 1 Phase – 3 Wire MLO panelboard is fed from a 3kVA dry-type transformer and serves 120V receptacles and controls. 2. Existing Generator <ul style="list-style-type: none">a. The building has an interior, standby generator with a base mounted, double-walled fuel storage tank.a. The unit is manufactured by Kohler, operates on diesel fuel and is rated 25kW/31.25kVA, 240V, 3 Phase – 3 Wire. The run-time meter had 257 hours of time logged.	
Issues of Concern: The generator has experienced failures and has been re-built within the past year. Electrical equipment does not have proper Arc Flash labeling.	
Detailed Observations: In general, the pump station’s existing electrical distribution equipment and standby generator is approximately 25-30 years old and has exceeded its industry standard life expectancy.	

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Maple & May Pump Station	Form Number: E -PS3-02 (Discipline Code – Sequence)
Discipline: ELECTRICAL LIGHTING & GENERAL PURPOSE POWER	Date and Time: 1-22-2016 9:30AM
Inspector Name: Keith Giguere	Photos Taken: E-PS3-3
Overall Scoring: Condition: : 4 Score between 1 and 5: 5 = good condition, 1 = poor condition	Safety: 1 Score between 1 and 5: 5 = safe, 1 = unsafe
Performance: 5 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Overall Priority: 5 Score between 1 and 5: 1 = highest priority, 5 = lowest priority
Description and General Observations: <ol style="list-style-type: none">1. Lighting and Lighting Control<ol style="list-style-type: none">a. Interior lighting consists of linear fluorescent fixtures with enclosed and gasketed housings controlled via a single-pole toggle switch.b. Exterior lighting consists of wall mounted, halogen fixtures located at the front (exit discharge door). Exterior lighting is controlled through an interior single-pole, toggle switch.2. Receptacles<ol style="list-style-type: none">a. There are general purpose receptacles located in the building.3. Conduits/Boxes/Device Covers<ol style="list-style-type: none">a. Conduits within the building station are a combination of galvanized, rigid steel or EMT.	
Issues of Concern: None	
Detailed Observations: In general, the lighting, lighting controls and general purpose receptacles/power equipment is in good physical and operational condition. If properly maintained, this equipment can continue functioning in its current capacity for the next 11-20 years.	



E-PS3-1 GENERATOR



E-PS3-2 MAIN SERVICE DISCONNECT SWITCH



E-PS3-3 INTERIOR LIGHTING



E-PS3-4 ATS & LOAD CENTER

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Platts Mill Pump Station	Form Number: E-PS2-01 (Discipline Code – Sequence)
Discipline: ELECTRICAL POWER	Date and Time: 1-22-2016 9:30AM
Inspector Name: Keith Giguere	Photos Taken: E-PS2-1, 2, 4
Overall Scoring:	
Condition: 2 Score between 1 and 5: 5 = good condition, 1 = poor condition	Safety: 4 Score between 1 and 5: 5 = safe, 1 = unsafe
Performance: 2 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Overall Priority: 3 Score between 1 and 5: 1 = highest priority, 5 = lowest priority
Description and General Observations:	
<p>1. Normal Electric Service</p> <p>a. The electric service for this pump station is derived from a utility pole mounted, transformer bank located adjacent to the building. There is a utility meter socket enclosure located on the exterior of the building.</p> <p>b. This transformer bank, in turn, runs overhead to serve the main 200A, 230V, 3 Phase – 3 Wire main circuit breaker, via the utility company meter, located in the building. The main circuit breaker was manufactured by ITE.</p> <p>c. The 200A main circuit breaker feeds the building’s main pump control panel. This control panel incorporates a 3kVA dry-type transformer that serves 120V receptacles and controls.</p> <p><u>Condition:</u> 3</p>	
<p>2. Existing Generator</p> <p>a. The building has an interior, standby generator.</p> <p>a. The unit is manufactured by Kohler, operates on natural gas and is rated 20kW/25kVA, 240V, 3 Phase – 3 Wire. The run-time meter had 558 hours of time logged.</p> <p><u>Condition:</u> 2</p>	
Issues of Concern:	
The working space between the generator and main pump control panel is not adequate per code requirements.	
Exterior grounding electrode connection does not appear to meet code requirements.	
Electrical equipment does not have proper Arc Flash labeling.	
Detailed Observations:	
In general, the building’s existing electrical distribution equipment and standby generator is approximately 25-30 years old and has exceeded its industry standard life expectancy.	

Naugatuck – Pump Station

Condition Assessment

Building / Room or Location: Platts Mill Pump Station	Form Number: E-PS2-02 (Discipline Code – Sequence)
Discipline: ELECTRICAL LIGHTING/GENERAL PURPOSE POWER	Date and Time: 1-22-2016
Inspector Name: Keith Giguere	Photos Taken: E-PS2-3
Overall Scoring: Condition: 2 Score between 1 and 5: 5 = good condition, 1 = poor condition	Safety: 5 Score between 1 and 5: 5 = safe, 1 = unsafe
Performance: 4 Score between 1 and 5: 5 = performs well, 1 = performs poorly	Overall Priority: 5 Score between 1 and 5: 1 = highest priority, 5 = lowest priority
Description and General Observations: <ol style="list-style-type: none">1. Lighting and Lighting Control<ol style="list-style-type: none">a. Interior lighting consists of linear fluorescent fixtures controlled via a single-pole toggle switch.b. Exterior lighting consists of wall mounted, halogen fixtures located at the front (exit discharge door) and back of the building (well location). Exterior lighting is controlled through an interior single-pole, toggle switch.2. Receptacles<ol style="list-style-type: none">a. There are general purpose receptacles located in the building and in the dry-well.3. Conduits/Boxes/Device Covers<ol style="list-style-type: none">a. Conduits within the building station are a combination of galvanized, rigid steel or EMT.b. Conduits within well were galvanized, rigid steel.4. Fire Alarm<ol style="list-style-type: none">a. This building has a heat detector. It is unclear how this detector is monitored.	
Issues of Concern: None	
Detailed Observations: In general, the lighting, lighting controls and general purpose receptacles/power equipment is in good physical and operational condition. If properly maintained, this equipment can continue functioning in its current capacity for the next 11-20 years.	



E-PS2-1 GENERATOR



E-PS2-2 MAIN SERVICE DISCONNECT SWITCH



E-PS2-3 HEAT DETECTOR AND INTERIOR LIGHTING



E-PS2-4 GROUNDING ELECTRODE