



# PEIRCE ISLAND WASTEWATER TREATMENT FACILITY UPGRADE PROJECT

Progress  
Report  
November  
2018



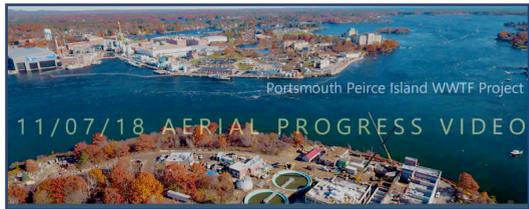
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## Aerial Videos

Aerial videos and photographs are available on the City's project web page to keep citizens informed about ongoing construction at the Peirce Island WWTF. The most recent video is dated November 7, 2018. This is a great way to see how construction has progressed on the site.



[www.cityofportsmouth.com/  
publicworks/wastewater/peirce-island-  
wastewater-facility/peirce-island-  
wastewater-facility-upgrade-project](http://www.cityofportsmouth.com/publicworks/wastewater/peirce-island-wastewater-facility/peirce-island-wastewater-facility-upgrade-project)

# INTRODUCTION & HIGHLIGHTS

The Peirce Island Wastewater Treatment Facility (WWTF) Upgrade Project has entered its third year of construction. Construction of the upgrade started in September 2016. This project will improve the quality of effluent from the Peirce Island WWTF that gets discharged into the Piscataqua River.

## First New Components Are Now In Service

The construction involves a series of sequential steps to build the new elements of the upgraded facility, while keeping the existing WWTF in service. The different components of the upgraded WWTF will be completed and put into service at different times during the four-year construction period. Since the last progress report, the first of the new WWTF components were put into service including the new electrical switchgear, the new standby engine-generator and the Headworks.

Following the installation of the temporary electrical services, a new underground electrical service was constructed from the Peirce Island Pool along Peirce Island Road to the WWTF. The new service connects to a new pad mounted transformer.

The switchgear is the electrical equipment that brings the utility electrical service into the WWTF and distributes the incoming power to the separate buildings on the site. The switchgear also houses the automatic transfer switch that starts the standby engine-generator to provide emergency power in the event of a power system failure.

The new electrical service and switchgear were energized on December 21, 2017, after completion, inspection and testing of the new electrical facilities. The existing WWTF buildings were sequentially transferred from the old electrical service to the new one. The existing electrical service to the WWTF was de-energized and all of the temporary electrical facilities have been removed. All facilities at the Peirce Island WWTF are now running on the new permanent power system, with backup power available from the new standby engine-generator. The new generator is much larger than the old one and provides emergency power for the facility.

## New Electrical Components and Facilities

**ELECTRICAL TRANSFORMER**



**SWITCHGEAR**



**STANDBY ENGINE-GENERATOR**



# PROJECT MILESTONES

## Headworks Building



The new Headworks Building was placed into service and accepted for use by the City on May 21, 2018. Wastewater generated in Portsmouth (except for the Pease WWTF service area) is conveyed to the Mechanic Street Pump Station. This pump station pumps the collected wastewater to the Peirce Island WWTF. The first step in the upgraded WWTF process is the Headworks Building. The Headworks Building houses mechanically cleaned bar screens to capture and remove debris, large objects and stringy material contained in the wastewater pumped by the Mechanic Street Pump Station to the Peirce Island WWTF. These materials can damage process equipment and clog piping if they are not removed.

The pumped wastewater flows through large bar screens with ¼ inch wide openings.

The screens are mechanically cleaned to remove the captured material. The removed material, called *screenings*, is washed and compressed to remove water, and deposited in a screenings container for disposal at a landfill. The dual channels, automated flow control gates and screens in the Headworks Building are designed to screen an average daily flow of 6.1 million gallons per day (mgd) up to a peak flow of 22 mgd, consistent with the downstream facilities.

The air from the screenings room is exhausted to a carbon filtration odor control system. The building heat is partially provided by a solar wall, which uses solar energy to preheat incoming ventilation air in the winter. The Headworks Building also contains the instrumentation and communications systems for the WWTF.

### MECHANICALLY CLEANED SCREEN & WASHPRESS



## MILESTONES

### CONSENT DECREE SECOND MODIFICATION 09-CV-283-PB

### DEADLINE

### STATUS

Executed Contract to Construct Upgrades	09/01/2016	08/25/2016
Submit Two Additional Milestones for EPA Review and Approval	12/01/2016	11/29/2016
Addn Milestone 1: Transfer existing SCADA system to the new Headworks Building	11/21/2017	10/18/2017
Addn Milestone 2: Start-up & Testing of Secondary Influent Pump Station in new Solids Building	05/09/2019	On Schedule
BAF Substantial Completion	12/01/2019	
Achieve Compliance with NPDES Permit Limits	04/01/2020	
Substantial Completion	05/31/2020	
Final Completion	08/30/2020	

Consent Decree Requirements, Mitigation Initiatives and Monthly Compliance Reports to the EPA can be found online at: [www.cityofportsmouth.com/publicworks/wastewater/resources](http://www.cityofportsmouth.com/publicworks/wastewater/resources)

# PROJECT COST SUMMARY

Since the last report, Change Orders No. 4 and No. 5 have been executed. These change orders included adjustments necessary during the course of construction. This is common and expected with a construction project of this size and complexity. For a summary of modifications / changes associated with each change order, please visit the project web page at: [www.cityofportsmouth.com/publicworks/wastewater/peirce-island-wastewater-facility/peirce-island-wastewater-facility-upgrade-project](http://www.cityofportsmouth.com/publicworks/wastewater/peirce-island-wastewater-facility/peirce-island-wastewater-facility-upgrade-project)

On April 20, 2016, the City of Portsmouth entered into an agreement with the New Hampshire Department of Environmental Services for a State Revolving Fund (SRF) Loan for \$75 million.

On July 10, 2017, the Portsmouth City Council voted to authorize additional borrowing for up to \$6.9 million for the Peirce Island WWTF Upgrade Project.

On February 7, 2018, an amendment to the SRF Loan Agreement was approved by the State of New Hampshire for \$3.5 million. The agreement increased the principal to \$78.5 million. The City anticipates requesting additional SRF loan amendments in FY19 and/or FY20.

<b>PROJECT CONTRACT VALUE</b>	
Original Contract Value	\$72,785,545.00
Change Order 1 - January 2017	367,290.42
Change Order 2 - May 2017	546,722.46
Change Order 3 - August 2017	93,838.31
Change Order 4 - December 2017	162,869.20
Change Order 5 - May 2018	249,828.16
<b>Contract Value Total</b>	<b>\$74,206,093.55</b>
<b>CONSTRUCTION COSTS (AS OF SEPTEMBER 30, 2018)</b>	
Construction Costs Expended	\$50,195,706.30
% Expended based on Contract Value Total	67.64%
<b>OVERALL PROJECT CAPITAL BUDGET (MILLIONS)</b>	
Primary Clarifier Replacement	\$ 1.6
Peirce Island Bridge Improvements	\$ 0.6
WWTF Design Engineering	\$ 5.2
WWTF Construction Engineering	\$ 7.4
WWTF Construction*	\$74.2
WWTF Construction Contingencies	\$ 2.6
WWTF Construction Mitigation & Public Art	\$ 0.3
<b>Total</b>	<b>\$91.9</b>
*0.4 million for water main improvements, included in the contract, but not paid from sewer funds.	

# PUBLIC TOUR

On July 24, 2018, City staff conducted its second public tour of the Peirce Island WWTF Upgrade Project. Participants in the tour gathered at the construction access gate by the Peirce Island Pool where they were welcomed by City staff and engineering consultants. Approximately 35 people attended the tour. They were guided in small groups through the construction site. Since the construction access gate is about a half mile from the WWTF, shuttle buses were used to transport tour participants to the construction site.

Participants arrived at the Headworks Building (the first stop on the tour) after passing the temporary trailers, which house the WWTF staff, contractors and engineers. The area also includes the construction storage and staging areas. Tour participants walked through the Screen Room and observed the operation of the screens and wash presses. They also saw the odor control system outside the building.

Following the Headworks Building, participants observed the ongoing work at the Grit Building, where the different process spaces are being re-arranged and separated while the equipment is being replaced. Participants were also able to view the upgrade of the aerated grit chambers that are in progress.

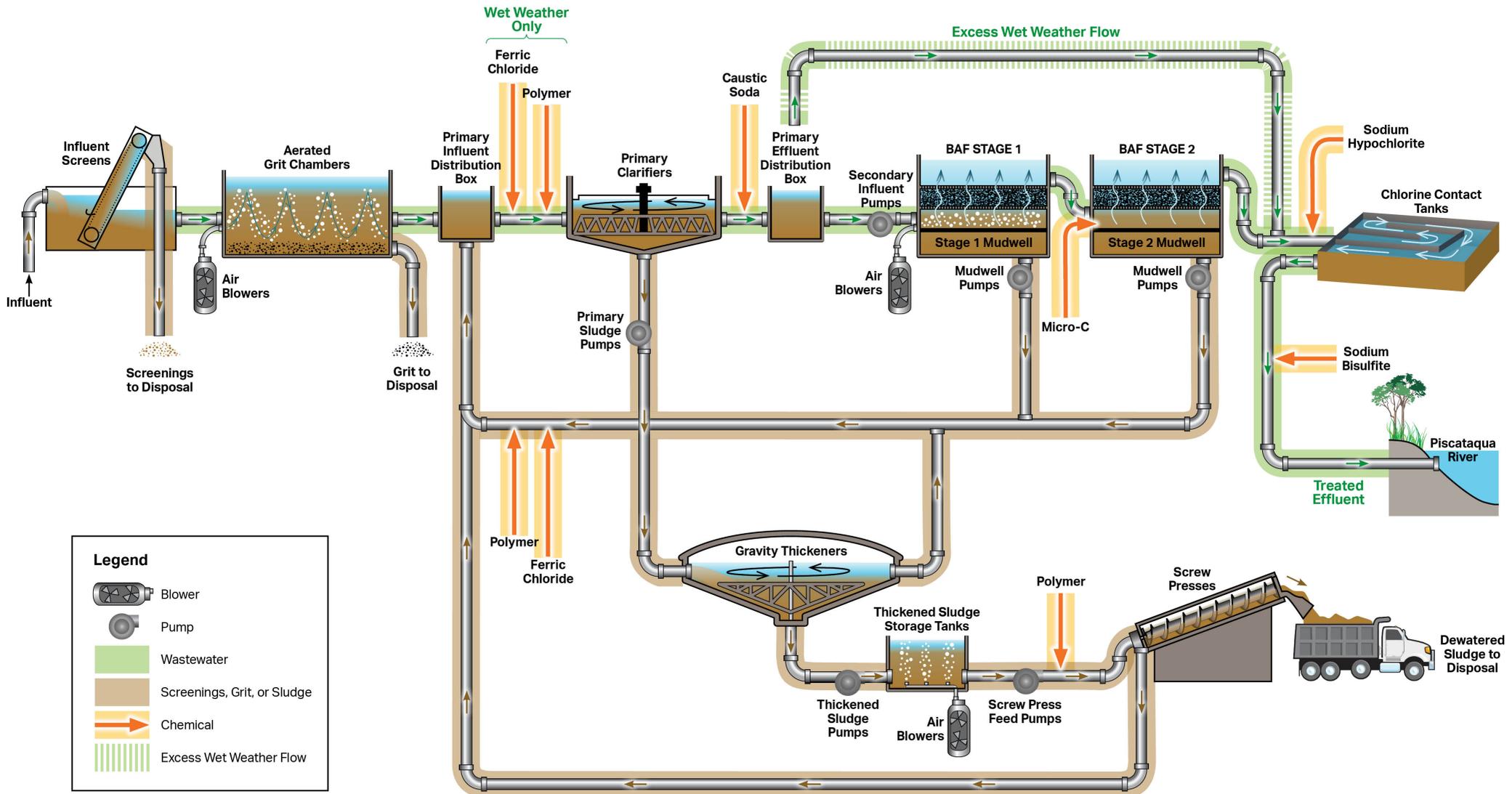
The tour moved to the area between the existing Primary Clarifiers, where the new Gravity Thickener No. 2 was observed. The Gravity Thickener structure is currently being used to temporarily house the Primary Sludge Pumps. This location also has ongoing construction of the new Solids Building. There is extensive ongoing work to construct the building foundation slab, walls and columns. The elevated slabs are also ongoing. Interior piping is beginning. The new Solids Building occupies the location where the Administration Building used to be located. Drawings of the building exterior and renderings of the finished building were provided to show how the Solids Building will look once completed.

The next stop was ongoing construction of the Biological Aerated Filter (BAF) Building. Work is proceeding on the concrete walls and elevated slabs for the BAF and masonry walls and brick facade. Installation of process piping within the BAF cells and in the pipe gallery and blower room is also ongoing. Drawings of the building exterior and renderings of the finished building were provided to show how the BAF Building will appear once completed. Beside the BAF Building is the new Electrical Building and Standby Generator, which could also be seen at this tour location.

As the tour concluded, a plan detailing the proposed landscaping of the site was shown. It illustrated how the site will be restored and the perimeter fence replaced after construction is completed.



# PROCESS FLOW DIAGRAM AT COMPLETION



City of Portsmouth, NH  
Peirce Island Wastewater Treatment Facility  
Process Flow Diagram

# TIME SEQUENCED CONSTRUCTION PHOTOGRAPHS

## Headworks Building



## Grit Building



## BAF Building



## Solids Building

