



# Peirce Island WWTF Upgrade Construction

Public Information Meeting

May 20, 2020

# Topics of Discussion

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- Introductions
- Work Completed Since Last Meeting
- Work to be Completed in Coming Month
- Work Anticipated in Next 6 Months
- Project Construction Costs
- Consent Decree Schedule
- Events & Recreation
- Public Input/Comments/Concerns
- Next Meeting



# Introductions

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- City Staff:

- Terry Desmarais, City Engineer, 603-766-1421  
tldesmarais@cityofportsmouth.com

- Website:

<https://www.cityofportsmouth.com/publicworks/wastewater/peirce-island-wastewater-facility/peirce-island-wastewater-facility-upgrade-project>

- News and Updates
- Recreational Info
- Project Info
- Report Form
- Etc.





Piscataqua River

# Areas of Ongoing Construction May 2020

**Operations/ Lab Building**

**Chlorine Contact Tanks**

Permanent Fence

Ops. Bldg

Chlorine Contact Tank

Gen

Elec

Chem.

**Site Work**

Biological Aerated Filter (BAF)

Grit Building

Primary Clarifier No. 2

Solids Processing Building

**BAF Building**

GT1

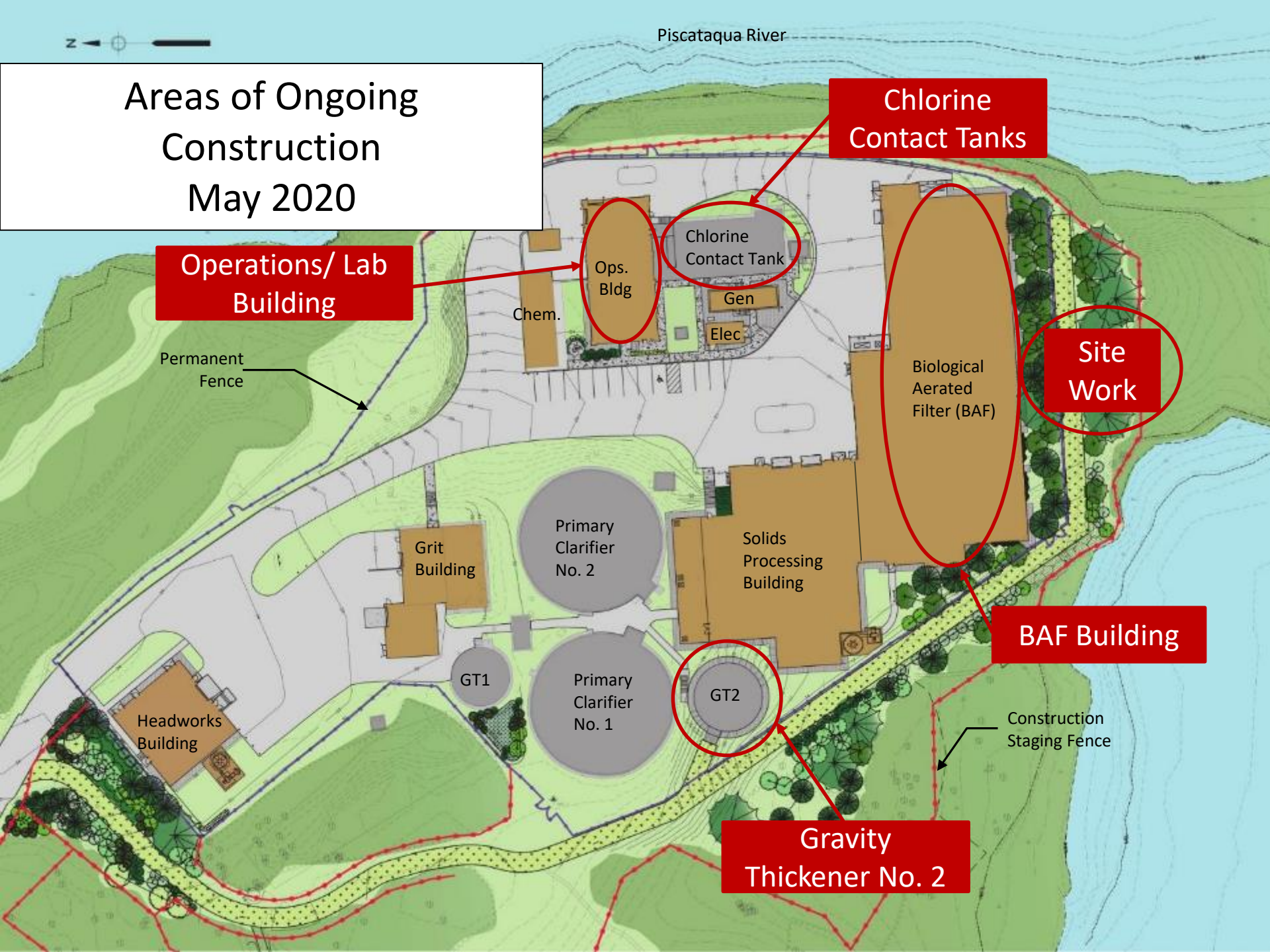
Primary Clarifier No. 1

GT2

Construction Staging Fence

Headworks Building

**Gravity Thickener No. 2**



# Site Overview November 2016



# Work Completed Since Last Meeting



# Work Completed Since Last Meeting



Site Work



# Work Completed Since Last Meeting



## Site Work





# Work Completed Since Last Meeting



Site Work



# Work Completed Since Last Meeting



**Ops/Lab Building**



# Work Completed Since Last Meeting



Ops/Lab Building



# Work Completed Since Last Meeting



Ops/Lab Building



# Work Completed Since Last Meeting



**Ops/Lab Building**



# Work Completed Since Last Meeting



Ops/Lab Building



# Work Completed Since Last Meeting



**Ops/Lab Building**



# Work to be Completed in Coming Month

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- Continue minor finish work at the Headworks Building, Grit Building, Solids Building, and BAF Building
- Continue startup of the BAF Building process
- Continue minor interior touch up painting in the BAF, Solids and Grit Buildings
- Continue integration of the BAF control system with the plant's SCADA system
- Complete outstanding work and startup Gravity Thickener No. 2 mechanism





# Work to be Completed in Coming Month

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- Continue structural steel, metal roof deck, interior metal stud framing, interior masonry, and exterior brick work at the new Operations/Lab Building
- Continue mechanical process work at the new Operations/Lab Building
- Continue HVAC, electrical, and plumbing rough in work at the new Operation /Lab Building lower level.
- Prepare site for planting and continue installation of landscaping



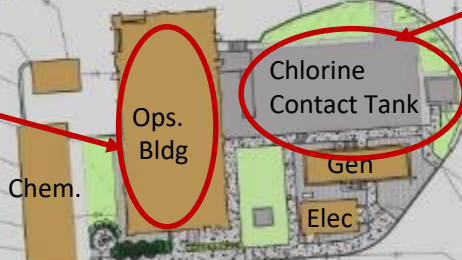


Piscataqua River

Anticipated Construction  
May – November 2020

Chlorine Contact Tanks

Operations/Lab Building



Site Work

Permanent Fence

Biological Aerated Filter (BAF)

BAF Building

Grit Building

Primary Clarifier No. 2

Solids Processing Building

Construction Staging Fence

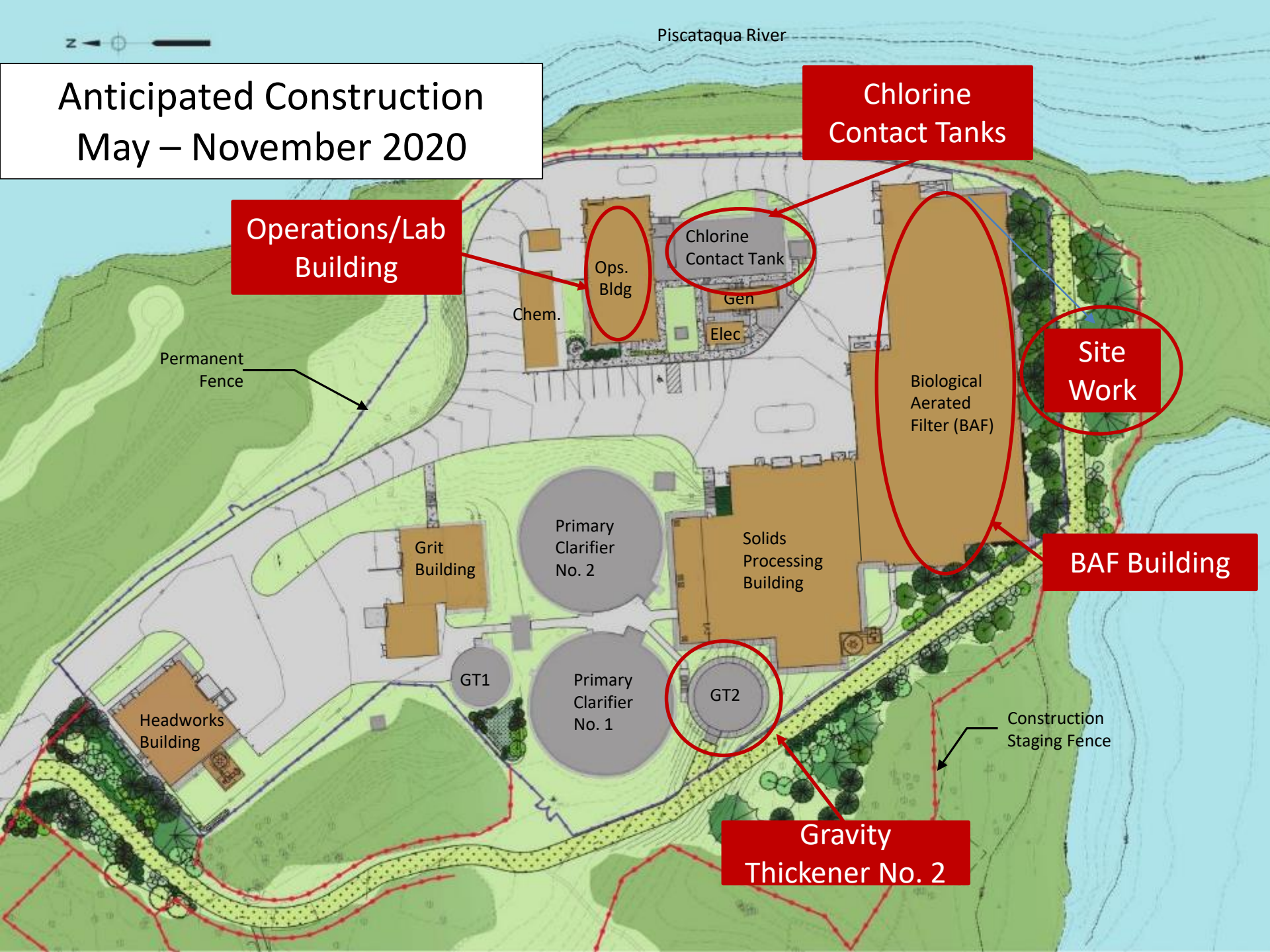
GT1

Primary Clarifier No. 1

GT2

Headworks Building

Gravity Thickener No. 2



# Project Construction Costs

- Original Contract: \$72.786 million
- Change Order No. 1: \$0.367 million
- Change Order No. 2: \$0.547 million
- Change Order No. 3: \$0.093 million
- Change Order No. 4: \$0.163 million
- Change Order No. 5: \$0.250 million
- Change Order No. 6: \$0.292 million
- Change Order No. 7: \$0.169 million
- Change Order No. 8: \$0.113 million
- Change Order No. 9: \$0.242 million
- Total Contract: \$75.022 million



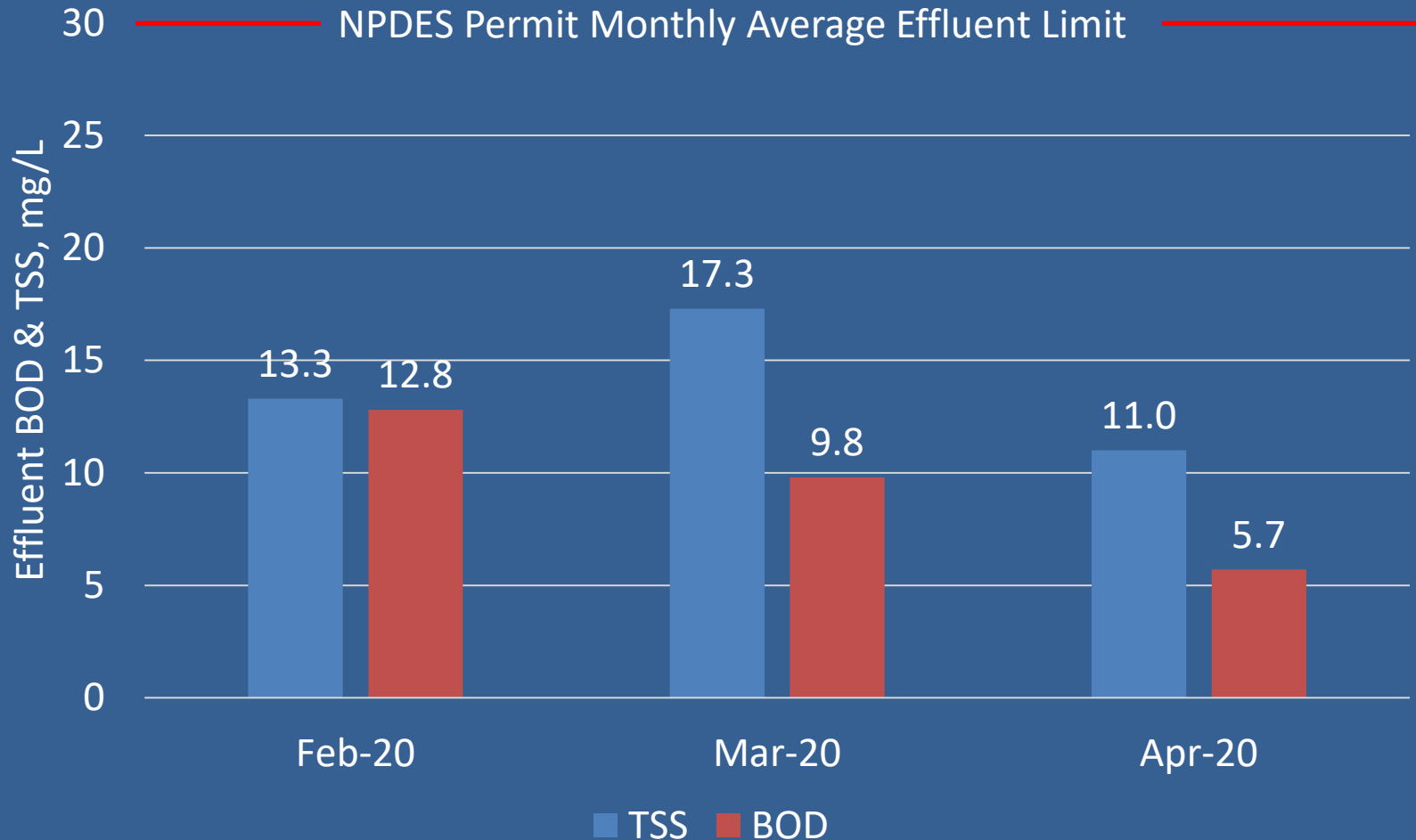
# Consent Decree Schedule

Milestone	Date	Status
Execute Contract to Construct Upgrades	September 1, 2016	Complete
Submit Two Additional Milestones for EPA Review and Approval	December 1, 2016	Complete
Additional Milestone 1: Transfer of the existing SCADA system to the new Headworks Building	November 21, 2017	Complete
Additional Milestone 2: Startup and testing of the Secondary Influent Pump Station in the new Solids Building	May 9, 2019	Complete
BAF Substantial Completion	<del>December 1, 2019</del> December 31, 2019	Complete
Achieve Compliance with NPDES Permit Limits	April 1, 2020	Complete
Achieve Compliance with Consent Decree Total Nitrogen Limits*	June 1, 2020	On Schedule

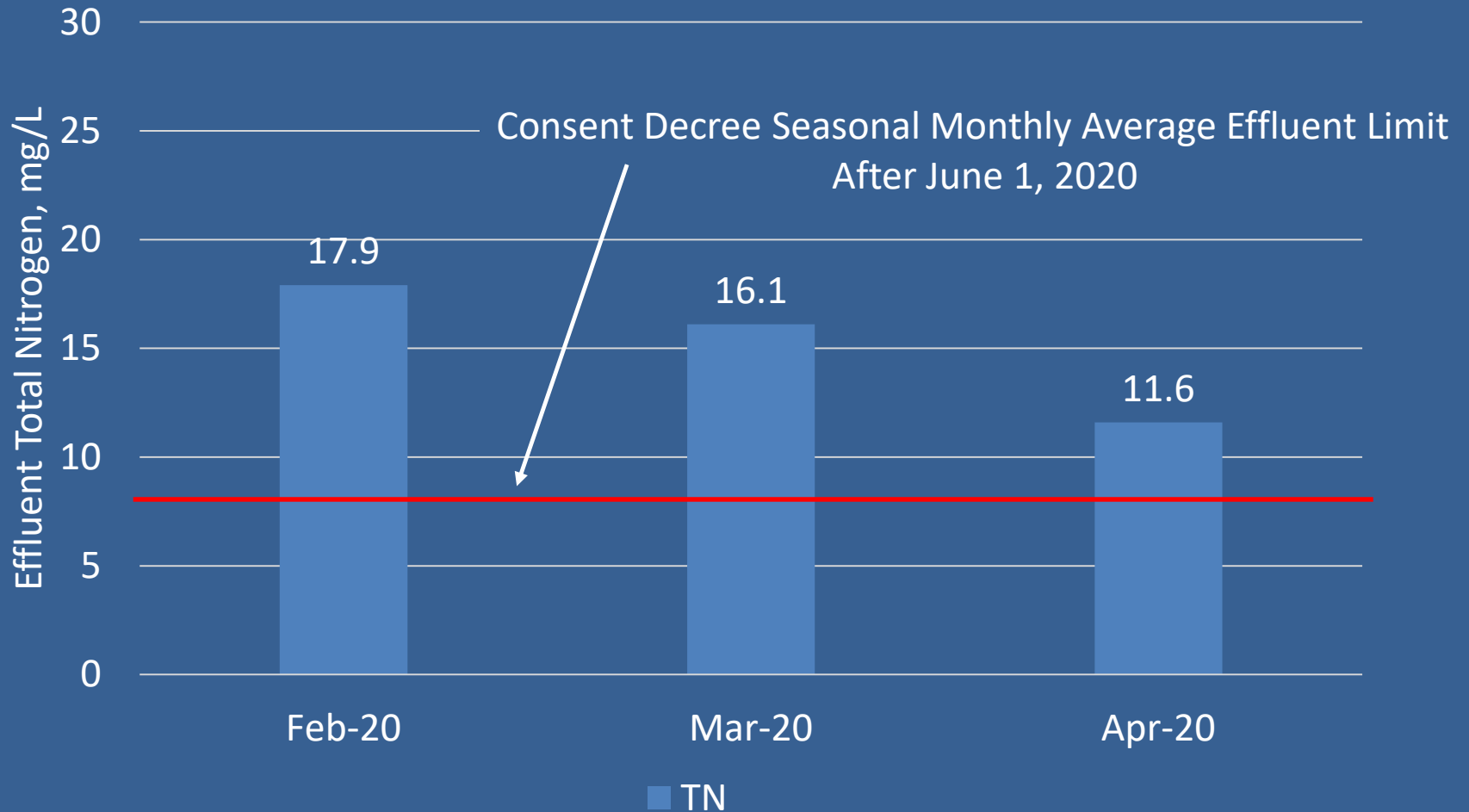
\*Seasonal Limit May through October



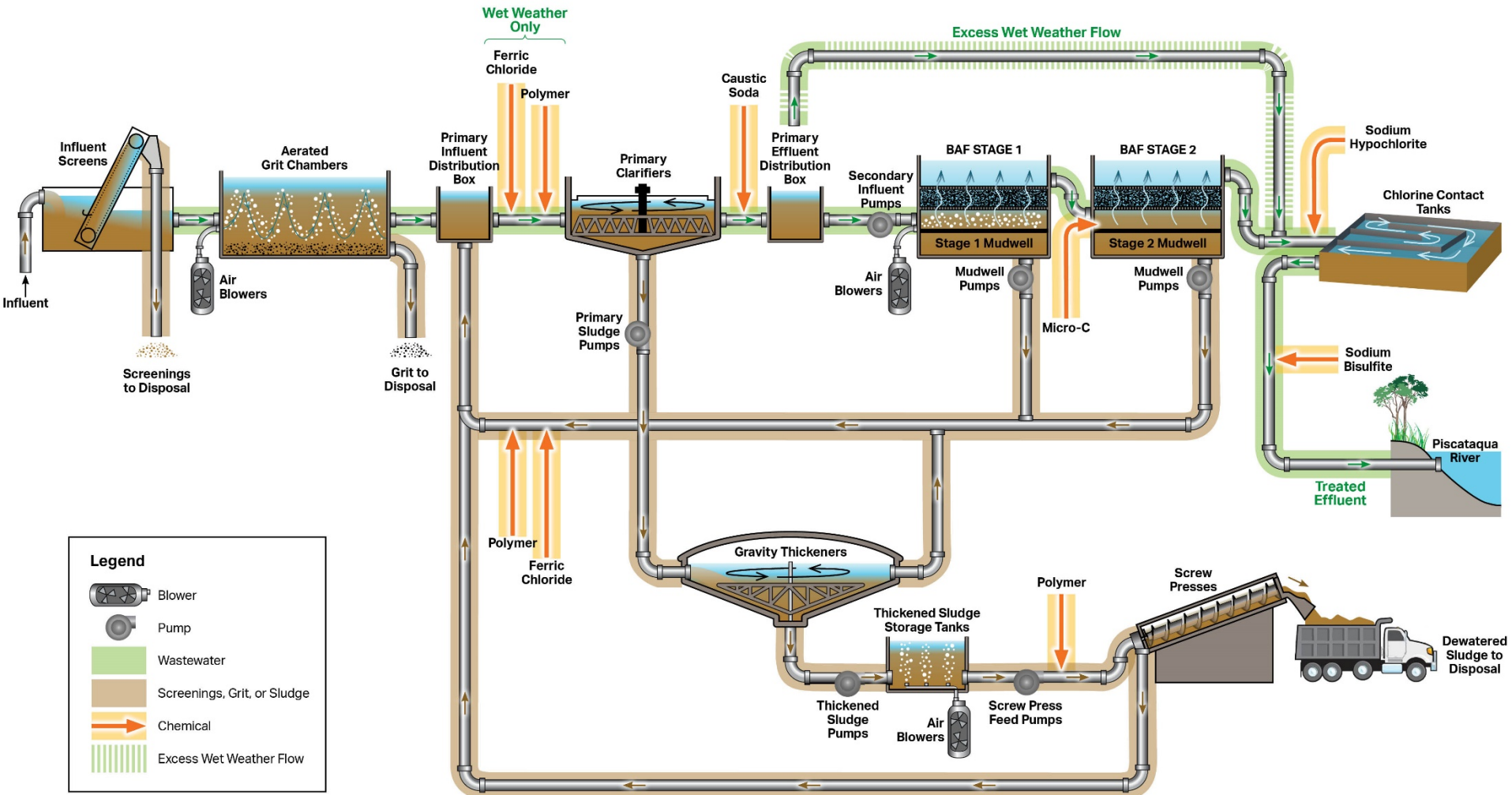
# Effluent Results



# Effluent Results



# Process Flow Schematic



# PI WWTF Wet Weather Flow Path





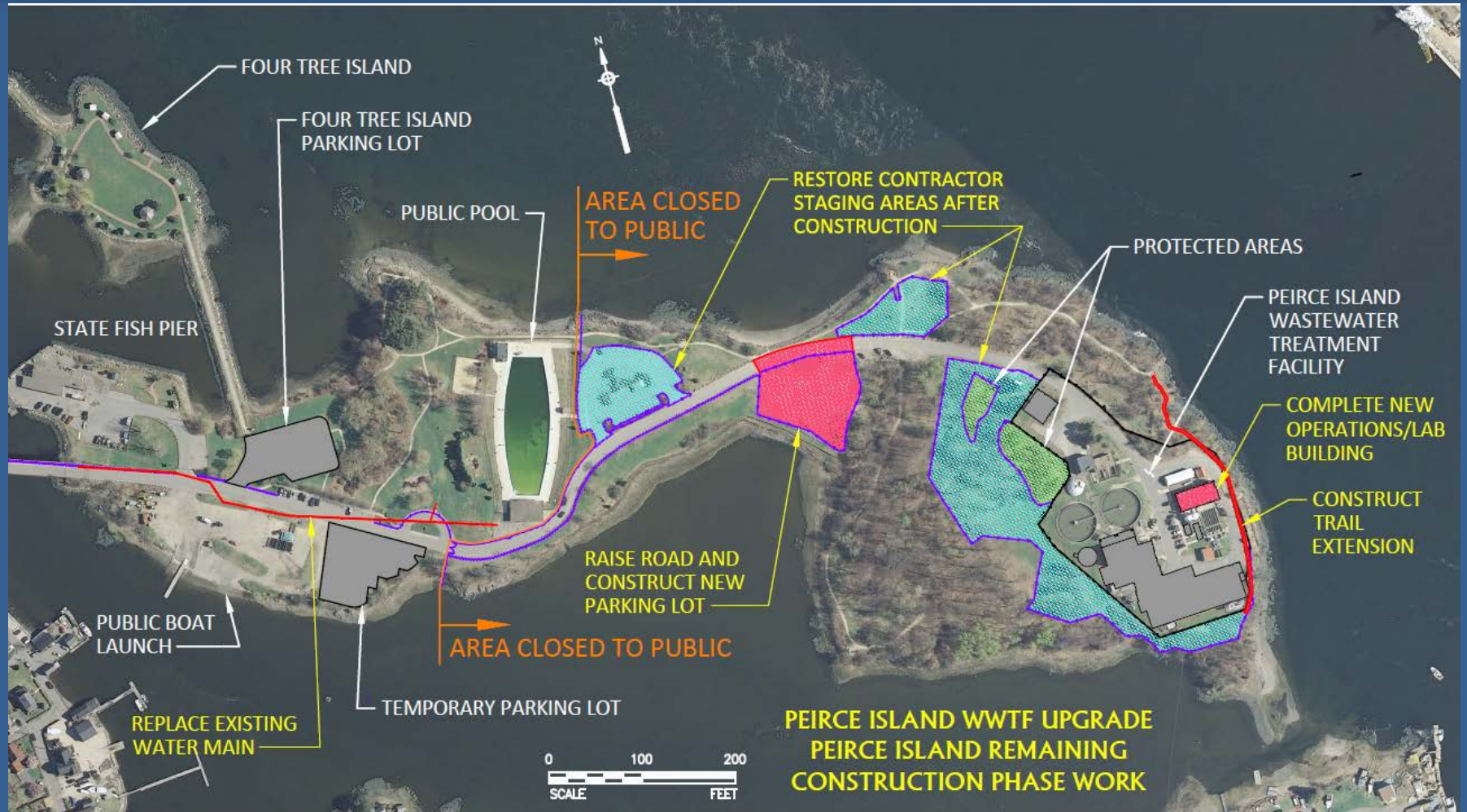
# Events and Recreation

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- Upcoming
  - None scheduled at this time



# Remaining Construction Phase Work





Public Input / Comments / Concerns

# Next Meeting

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- Public Construction Meeting
  - Next Meeting: June 17, 2020, 11:00 AM



## Meeting Notes

Subject	Peirce Island WWTF Upgrade – Monthly Public Construction Meeting
Date	May 20, 2020
Time	11:00 AM
Location	Portsmouth, NH

Due to the Coronavirus (COVID-19) State of Emergency, the May 20, 2020 public meeting was held live at 11:00 AM over a Zoom video call pursuant to NH RSA-91A: 2 Paragraph 3B guidelines for the subject project. A record of the discussion follows:

Terry Desmarais, City Engineer, gave an introduction to the meeting and outlined the topics of discussion, including work completed since the last meeting, work to be completed in the coming month, work anticipated in the next six months, construction cost to date, summary of Consent Decree milestones, and events and recreation.

The members of the Project Team in attendance introduced themselves, and included:

- Terry Desmarais, City Engineer
- Peter Rice, DPW Director
- Jon Pearson, AECOM Project Manager
- Andy Brodeur, Methuen Construction, Project Manager

Terry noted that to obtain additional information regarding the project, there is a project website that can be accessed through [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). The website is updated weekly with news and recreational information and contains a link to a reporting form that can be used to provide feedback or notify the City of any issues associated with the project. Terry Desmarais, City Engineer, is the point of contact for the City.

Jon discussed work that has been completed this month. He noted areas where work is ongoing at the site, including:

- Biological Aerated Filter (BAF) Building
- Gravity Thickener No. 2
- Existing Sludge Processing / New Operations/Lab Building
- Chlorine Contact Tanks
- Site Work

Jon reviewed photos of construction progress, including:

- Site Overview – Existing conditions of the Peirce Island Wastewater Treatment Facility in November 2016. Prior to construction, the treatment process consisted of the Aerated Grit Chambers, followed by the Primary Clarifiers and Chlorine Contact Tanks.
- Site Work – Work to restore the site in continuing this includes but is not limited to, preparations for final landscaping and grading, placement of the subgrade for walkways, and installation of mowing strips. Loam is being spread throughout the site to bring the areas to final grade, those areas include the Headworks Building, Primary Clarifiers, and BAF Building. On the west side of the island, construction of the 12' vegetated maintenance corridor is continuing. At the Primary Clarifiers, mowing strips and the subgrade for the walkways have been installed. Behind the BAF Building on the south side of the site, work to achieve final grade is underway.
- Existing Sludge Processing Building/New Operations/Lab Building – The last major building at the site that is under construction is the Existing Sludge Processing Building/New Operations/Lab. Structural work is in progress so that it can be converted from its previous use as a Sludge Processing Building to its new use as the Operations/Lab Building. Construction of the Lower Level building envelope is underway. Weather proofing of the Lower Level has been completed and installation of insulation and the brick façade is continuing. Note that the Upper Level will consist of a metal panel façade. Installation of the structural steel for the Upper Level is continuing. Interior masonry work is continuing, this includes the buildout of the Mechanical Room and installation of the thin CMU walls in the Lower Level. Work to construct chemical curbs and equipment pads is underway. Rough-in work for the mechanical, electrical and plumbing piping has begun in the Lower Level.

Andy discussed work anticipated for the coming month, including:

- Continue minor finish work at the Headworks Building, Grit Building, Solids Building, and BAF Building.
- Continue startup of the BAF Building process.
- Continue minor interior touch up painting in the BAF, Solids, and Grit Buildings.
- Continue integration of the BAF control system with the plant's SCADA system.
- Complete outstanding work and startup of Gravity Thickener No. 2 mechanism.
- Continue structural steel, metal roof deck, interior metal stud framing, interior masonry, and exterior brick work at the new Operations/Lab Building
- Continue mechanical process work at the new Operations/Lab Building.
- Continue HVAC, electrical, and plumbing rough in work at the new Operations/Lab Building lower level.
- Prepare site for planting and continue installation of landscaping.

Andy then discussed the work anticipated through May and into November 2020 includes:

- Headworks Building – Complete installation of landscaping at the Headworks Building and installation of the permanent fence.
- Grit Building – Complete minor punch-list items.
- BAF Building – Complete minor punch-list items. Complete backfilling and grading around the building, and complete landscaping on the west and south sides of the building.
- Solids Building – Complete punch-list items. Complete landscaping on the west side of the building.
- Existing Sludge / New Operations/Lab Building – Complete installation of new structural steel, including roof beams, truss system and decking. Complete exterior wall framing and sheeting, and exterior masonry work. Complete installation of the new roof system. Complete

installation of exterior windows, doors and overhead doors at the building. Complete installation of chemical containment curbs, complete mechanical process piping rough-in work and installation of equipment in the lower level. Complete the installation of interior wall framing, sheeting, and painting. On the first floor, complete mechanical, electrical and plumbing rough-in work. On the first floor begin case work and installation of laboratory equipment. Complete installation of flooring systems.

- Primary Clarifiers – Complete painting and installation of turnbuckles. Complete installation of grating at the Primary Clarifier Effluent Distribution box.
- Underground Piping and Utility Services – Construct remainder of binder course pavement at the Operations/Lab Building and install curbing. Complete installation of sidewalks, stairs and railings at the Operations/Lab Building. Final grading and landscaping activities will be completed, this includes but is not limited to, grading for asphalt walkways and stone mowing strips; installation of the 12' vegetated maintenance corridor; installation of the rain garden and installation of the permanent WWTF perimeter fence. Complete installation of remaining bollards and guard posts.

Jon provided an update on the project construction cost:

- Original Contract: \$72.786 million
- Change Order No. 1: \$0.367 million
- Change Order No. 2: \$0.547 million
- Change Order No. 3: \$0.093 million
- Change Order No. 4: \$0.163 million
- Change Order No. 5: \$0.250 million
- Change Order No. 6: \$0.292 million
- Change Order No. 7: \$0.169 million
- Change Order No. 8: \$0.113 million
- Change Order No. 9: \$0.242 Million
- Total Contract: \$75.022 million

Jon provided a summary of the project milestones set by the Consent Decree:

- Execute Contract for Construction Upgrades - Date: 9/1/2016 - Status: Complete
- Submit Two Additional Milestones for EPA Review and Approval - Date: 12/1/2016 - Status: Complete
- Additional Milestone 1: Transfer of the Existing SCADA system to the New Headworks Building - Date: 11/21/2017 - Status: Complete
- Additional Milestone 2: Startup and Testing of the Secondary Influent Pump Station in the New Solids Building - Date: 5/9/2019 - Status: Complete
- BAF Substantial Completion - Date: ~~12/1/2019~~ 12/31/2019 - Status: Complete
- Achieve Compliance with NPDES Permit Limits - Date: 4/1/2020 - Status: Complete
- Achieve Compliance with Consent Decree Total Nitrogen Limits\* - Date: June 1, 2020 – Status: On Schedule

\*Seasonal Limit: May through October

Jon provided a description of the NPDES permit limits and Consent Decree total nitrogen limits. Effluent limits for total suspended solids (TSS) and biological oxygen demand (BOD) are governed by the NPDES permit. The monthly average limit for both constituents in the plant effluent is 30 mg/L. These limits took effect April 1<sup>st</sup>. The monthly average of effluent BOD and TSS for February, March, and April were

presented and the effluent concentrations of the two constituents were well below the limit. See the table below for a summary.

**Peirce Island TSS and BOD Effluent Results**

	NPDES Permit Month Average Effluent Limit (mg/L)	Recorded Monthly Average, February (mg/L)	Recorded Monthly Average, March (mg/L)	Recorded Monthly Average, April (mg/L)
TSS	30	13.3	17.3	11.0
BOD	30	12.8	9.8	5.7

As a requirement of the NPDES permit, samples of the WWTF effluent are taken 2-3 times a week and the BOD and TSS concentrations documented. The average concentration of all the samples taken per month is the monthly average that is reported to the NHDES and USEPA. The City is required to submit reports on the Peirce Island WWTF monthly averages on the 15<sup>th</sup> the following month. Thus, reporting for the month of May will not be issued until June 15<sup>th</sup>.

Jon proceeded to present the effluent results for total nitrogen (TN) over the months of February, March and April. As noted in the project milestone discussion, the final milestone for the project is to meet the Consent Decree TN limits by June 1, 2020. The Consent Decree states that the seasonal monthly average (May thru October) for total nitrogen in the effluent be 8.0 mg/L or less. The WWTF does not yet need to meet this effluent limit and currently the effluent results are above the 8.0 mg/L limit because the BAF is in the startup/biomass development phase. The data from the past three months shows that the TN concentration is decreasing month by month which indicates that biomass necessary to accomplish nitrogen removal within the BAF is growing. The effluent TN results are expected to meet the Consent Decree permit limit by June 1. See the table below for a summary.

**Peirce Island TN Effluent Results**

	Consent Decree Seasonal Monthly Average Effluent Limit (mg/L)	Recorded Monthly Average, February (mg/L)	Recorded Monthly Average, March (mg/L)	Recorded Monthly Average, April (mg/L)
TN	8	17.9	16.1	11.6

Jon then displayed the process flow schematic of the WWTF. The WWTF was put into service at the beginning of 2020 however, this does not mean that construction was complete. As discussed, there is ongoing construction at the Operations/Lab Building and miscellaneous locations at the site. However, all liquid and solids handling process shown in the process flow schematic are now in operation.

Jon provided a description of the processes on site, indicating where they are located on the site layout, and the flow path throughout the facility.

- Wastewater from the Mechanic Street Pump Station is pumped to the Headworks Building which houses the first treatment step. In the Headworks Building are screens that will remove debris and rags from the raw wastewater. This location is also where the first monitoring sample of the wastewater is taken as required by the NPDES permit.
- Flow then proceeds to the second step of the treatment process which is grit removal by the Aerated Grit Chambers located at the Grit Building. Grit consists of sand, eggshells and other abrasive material that if left in the wastewater, can damaged downstream equipment.



- Wastewater that has had grit removed then flows to the Primary Clarifiers for primary treatment. The clarifiers are two large circular tanks. In the tanks the water velocity is reduced to allow for solids to settle to the bottom as sludge. Sludge in the clarifiers is then pushed into the center hopper of the tank by raking mechanisms. In the clarifier, wastewater flows out to the edges of the tank and flows over the clarifier weir. This is now considered primary effluent.
- Primary effluent then flows to the wet well of the Secondary Influent Pump Station located in the Solids Building. The wet well holds the primary effluent and the pumps that pump the wastewater to the BAF are located in the Solids Building. As previously discussed, the BAF is the heart of the treatment system.
- The BAF consists of two stages, each stage consists of six cells. The first stage is the larger of the two stages. In the first stage, organics in the primary effluent are consumed by bacteria and the ammonia that is present in the wastewater is biologically converted to nitrate. Nitrate is another form of nitrogen and the conversion of ammonia to nitrate is a key step in the nitrogen removal process. From the first stage, wastewater then flows by gravity to the second stage. A carbon source is added to the effluent from the first stage and is an energy source for the biological process that occurs in the second stage. In the second stage, bacteria use the carbon source to convert the nitrate that was formed in the carbonaceous stage to nitrogen gas. The nitrogen gas dissipates into the atmosphere and this is the final nitrogen removal step. Effluent from the BAF is considered secondary effluent.
- Secondary effluent from the BAF flows underground by gravity to the Effluent Distribution Box that is upstream of the Chlorine Contact Tanks. It is important to note that as part of the upgrade, the vendor of the BAF, Kruger, has provided the City with a bonded guarantee that the effluent from the BAF will meet the effluent criteria for total nitrogen removal of 3 mg/L or less under winter conditions (~10°C). This guarantees that effluent from the BAF will meet the effluent design criteria. As has been discussed in previous meetings, the City of Portsmouth's sewer system is a combined sewer system. Because of the combined sewer system, during significant wet-weather events, not all flow will undergo secondary treatment through the BAF. Note that during dry weather events, all flow will undergo secondary treatment. During significant storm events, a portion of the flow will be bypassed around the BAF and will be combined with the BAF effluent at the Effluent Distribution Box upstream of the Chlorine Contact Tanks. The combined effluent will then undergo disinfection at the Chlorine Contact Tanks to meet the effluent requirements of the NPDES for bacteria and viruses. Disinfection is carried out by the addition of sodium hypochlorite. Right before the WWTF effluent is discharged, sodium bisulfite is added to remove any remaining traces of sodium hypochlorite. After sodium bisulfite is added, the final effluent is sampled before it enters the outfall pipe and discharges to the Piscataqua River.
- All of the processes described are online and secondary treatment is being provided in accordance with the NPDES permit and the Consent Decree.

The project team is continuing to coordinate construction with community events, however due to the Coronavirus (COVID-19) State of Emergency, there are no community events scheduled at this time.

Terry then provided a description of intended additional construction activities that are outside of the WWTF Upgrade. The City and Contractor are currently discussing the schedule of these additional construction items and their impact on the WWTF site construction schedule. The initial completion date was September of 2020, however this has been delayed due to construction progress at the Peirce Island WWTF and COVID-19 State of Emergency. The additional construction items include raising the Peirce Island Road; construction a new parking lot in what was the location of the City snow dump; restoring the staging areas that have been used at Peirce Island including the area of the existing pool parking lot; and replacing the existing water main and increasing its size from the pool to the Peirce Island Road Bridge.

The meeting was opened up to public input and comments, however, there were no additional attendees to the live video conference.

The next public construction meeting will be June 17, 2020 at 11:00 AM. Whether the Public Meeting is held in person or over video conference is to be determined.

These notes present a summary of the discussion that was held.