



Peirce Island WWTF Upgrade

Portsmouth City Council Meeting

March 7, 2016

Introductions

- Terry Desmarais, City Engineer
 - History of Council Votes
 - History of Technical Decisions
 - Schedule
- Jon Pearson, AECOM
 - BAF Technology
 - Remedial Action Plan



Public Meetings on Wastewater

9/21/2005	11/21/2011	5/19/2014
1/12/2006	1/28/2012	8/4/2014
10/23/2007	3/19/2012	9/29/2014
3/11/2008	3/31/2012	1/20/2015
6/16/2008	4/9/2012	2/5/2015
10/6/2008	4/16/2012	3/12/2015
10/22/2008	6/11/2012	4/3/2015
12/15/2008	12/6/2012	4/16/2015
4/6/2009	2/11/2013	4/27/2015
8/3/2009	2/19/2013	6/29/2015
11/16/2009	3/13/2013	8/3/2015
2/5/2010	4/8/2013	11/16/2015
4/5/2010	7/9/2013	2/1/2016
4/27/2010	8/19/2013	2/16/2016
6/23/2010	3/3/2014	3/3/2016
11/8/2010	4/14/2014	



Conditions: ~1961

- No Wastewater Treatment
 - Many Raw Sewage Discharges to Local Water Bodies
- Recognition of Need for Sewage Control
- City Council Decision to Build at Peirce Island
 - Defines Footprint of Facility
 - Establishes Layout of Entire Collection System



City Council Vote: June 5, 1961

Following the discussion by various members of the Council, the motion passed 5-4 on a roll call vote. Following the vote, Mayor Shaines said that he would now suggest that the City Council consult the City Attorney for a ruling on whatever action is necessary.



Conditions: Pre 1985

- One Wastewater Treatment Facility
 - Primary Treatment Facility at Peirce Island
 - Pease WWTF Owned and Operated by US Air Force
 - City Had Plans to Construct Secondary Upgrade at Peirce Island
- State Applied to EPA to Obtain 301(h) Waiver for Portsmouth
- Secondary WWTF Not Constructed



Conditions: Pre 1985 301(h) Waiver

301(h)
WAIVER APPLICATION
City of Portsmouth, New Hampshire
December, 1982

Prepared by:

CITY ENGINEER PORTSMOUTH, NEW HAMPSHIRE
and
N.H. WATER SUPPLY & POLLUTION CONTROL COMMISSION

The State of New Hampshire

COMMISSIONERS

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BRUCE A. HOMER, P.E., Vice Chairman
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MAYNELL PATENAUDE
RONALD F. POLTAK
WILLIAM T. WALLACE, M.D., M.P.H.


Water Supply and Pollution Control Commission
Kazen Drive — P.O. Box 95
Concord, N.H. 03301
December 16, 1982

STAFF

WILLIAM A. HEALY, P.E.
Executive Director
DANIEL COLLINS, P.E.
Deputy Executive Director
Chief Engineer

Mr. Lester A. Sutton
Regional Administrator, Region I
Environmental Protection Agency
John F. Kennedy Federal Building
Boston, Massachusetts 02203

Dear Mr. Sutton:

Attached are two copies of the Portsmouth, New Hampshire application for a waiver of secondary treatment as provided for in section 301(h) of the Clean Water Act Amendment of 1981.

The City of Portsmouth has worked closely with the Commission staff for the last several years in the effort to develop a solution to the problem of inadequate capacity at the Pierce Island wastewater treatment plant. Although there have been no adverse effects on the environment reported to date from the discharge of untreated wastewater to the Piscataqua River estuary, the City and the State are both anxious for an early solution to this potential hazard.

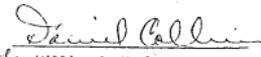
Your early review and approval of the application will allow construction of an expanded primary plant on Pierce Island in Portsmouth. By not requiring construction of secondary treatment, an estimated 10 million dollars can be saved and reallocated to treatment facilities that in our judgement are more urgently needed elsewhere in the State of New Hampshire.

Construction funds for the primary treatment plant expansion are currently on our fiscal year 1984 priority list.

If further information is required, we would appreciate hearing from you at an early date.

Sincerely,


Calvin A. Canney
City Manager


for William A. Healy, P.E.
Executive Director

WAH/CAC/GLP/csc
Attachments
cc: Mr. Kevin McSweeney, Chief, Water Quality Branch



Conditions: 2007

- Aging Wastewater Treatment Facilities
 - Enhanced Primary WWTF at Peirce Island
 - Secondary WWTF at Pease
- NPDES Permit Issued for Secondary Treatment
- Consent Decree to Perform Wastewater Facilities Master Plan
 - Comprehensive Evaluation of Two WWTFs, 20 Pumping Stations and CSO LTCP
- Regulatory Concerns with Nitrogen
 - Peirce Island WWTF Permit Appealed



Conventional Secondary

Originally Presented to City Council January 12, 2006



Department of Public Works

Conventional Secondary

Originally Presented to City Council January 12, 2006



Conditions: 2010

- Wastewater Master Plan Complete (\$1.7M)
- Recommended Phased Buildout at Pease WWTF to Minimize Sewer User Rate Impacts
- Regulators Disagree with Implementation Timeframe
 - Require City to Move Forward and Expedite Secondary Upgrade at Peirce Island (5 to 7 Years)



City Council Vote: Nov 8, 2010

Voted to authorize the City Manager to submit its final Wastewater Master Plan to the EPA which included upgrading Peirce Island to a Secondary Treatment Facility as outlined in the memorandum dated November 2, 2010.





Technology: Primary Clarifier

Technology: Moving Bed Bioreactor (MBBR)
Pilot Vendor: 

Technology: 

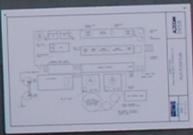
Wastewater Reactor Plant
Pilot Plant
ACCOR
ACCOR

Most Common Wastewater Treatment Processes

Water Treatment Processes



Technology: Biological Aerated Filter (BAF)
Pilot Vendor: **KRÜGER**

Conditions: 2013

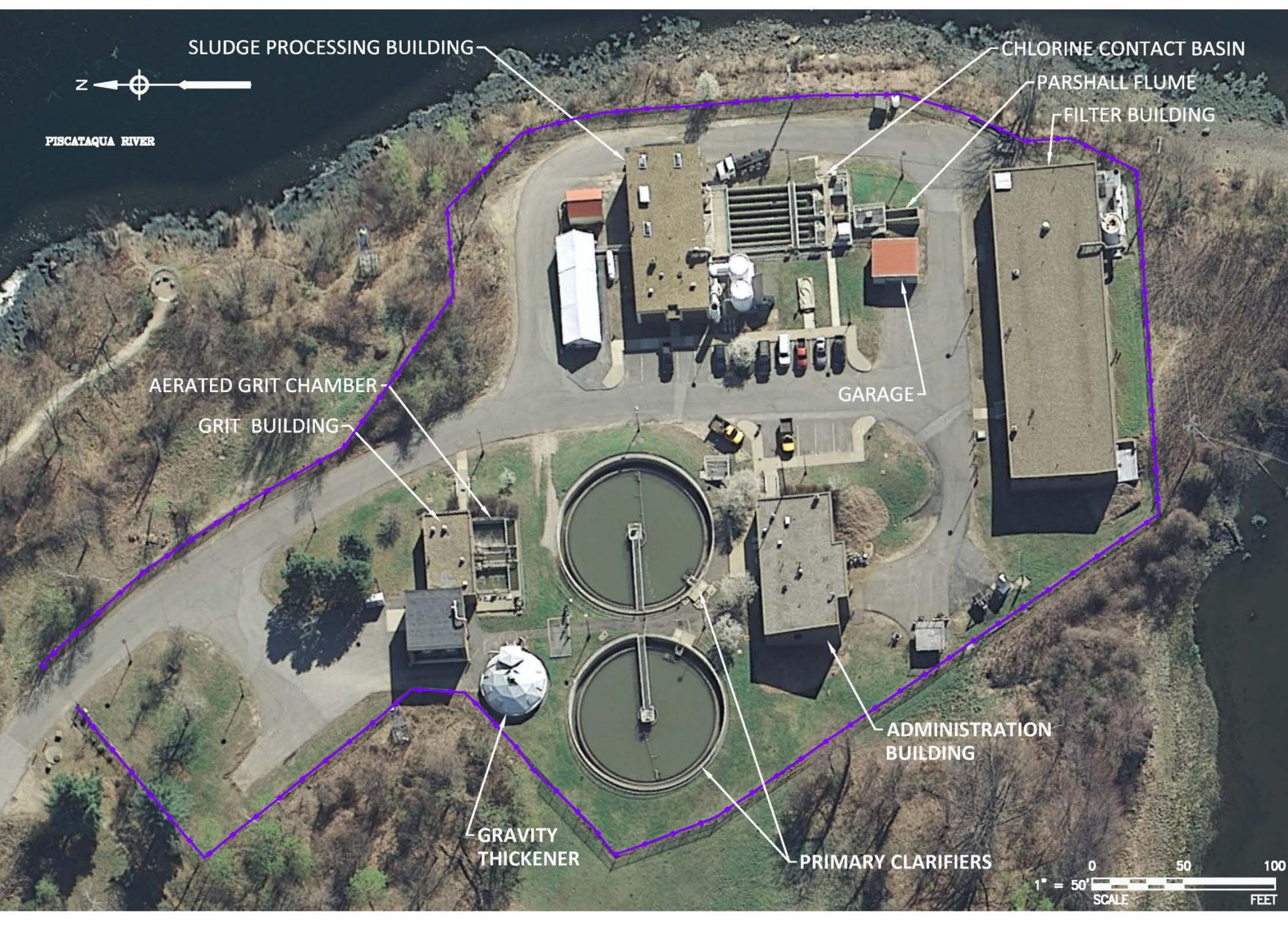
- Completed Wastewater Technology Piloting (\$1.8M)
 - Focus on High Rate Small Footprint Technologies
 - Weighted Evaluation Matrix
 - Cost Estimates
 - Technology Options
- Some Regulatory Uncertainty Over Potential Nitrogen Effluent Level
- Recommended Options for City Council Consideration



Conditions: 2013 (Cont'd)

- Activated Sludge
 - Conventional – Not High Rate System
 - Would not Fit in Fence Line
 - Phased Upgrades for Lowest Nitrogen Limits
- Biological Aerated Filter
 - High Rate Treatment System
 - Fits within Fence Line
 - Allows for Treating Lowest Nitrogen Limits





SLUDGE PROCESSING BUILDING

CHLORINE CONTACT BASIN



PISCATAQUA RIVER

PARSHALL FLUME
FILTER BUILDING

AERATED GRIT CHAMBER

GARAGE

GRIT BUILDING

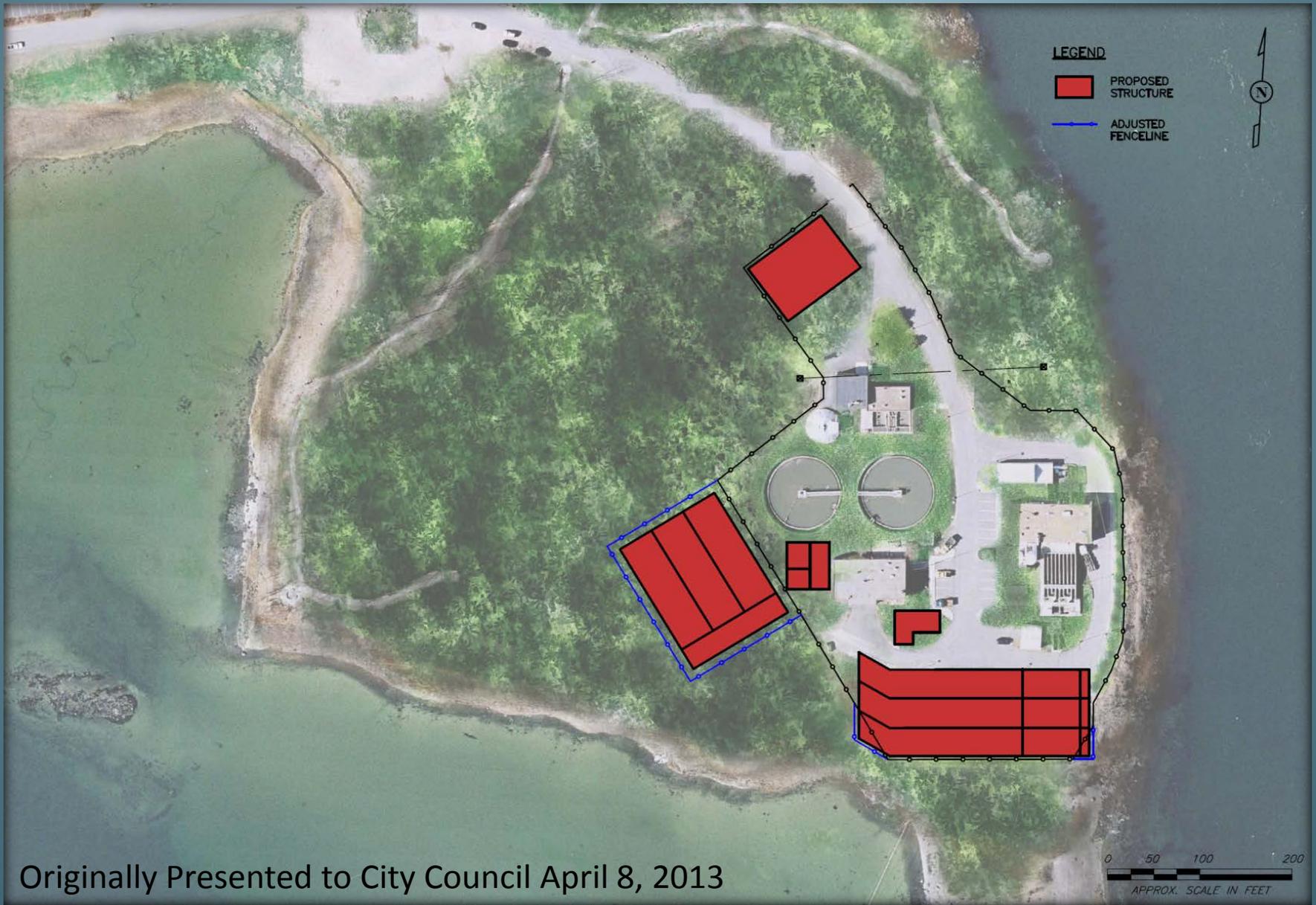
ADMINISTRATION BUILDING

GRAVITY THICKENER

PRIMARY CLARIFIERS



Conventional Activated Sludge TN



Biological Aerated Filter TN



Originally Presented to City Council April 8, 2013

City Council Vote: April 8, 2013

Move to comply with EPA mandate to meet secondary treatment at the Peirce Island Wastewater Treatment Plant with the ability to treat a total nitrogen limit 8 milligrams per liter on a seasonal rolling average basis, stay within the current fence line, and to support of the Biological Aerated Filter (BAF) technology.



Engineer Selection

- AECOM
 - Global Firm Specializing in Wastewater and Water Treatment
 - Ranked #1 Engineering Design Firm in World (ENR, 2009-current)
 - Focus on Innovative/Alternative Nutrient Removal Systems
 - Experience with High Rate Treatment Systems



BAF Technology

- Small Footprint – Fits within WWTF Fence
- State of Art Technology – Initially Developed in Europe
- Piloting Demonstrated Ability to Meet BAF Effluent Total Nitrogen of 8 mg/l and 3 mg/l
- No Additional Capital Costs to Achieve BAF Effluent of 3 mg/l Total Nitrogen



BAF Technology

- Over 300 Operating Installations Worldwide
- Over 30 Installations in the US including:
 - ✓ West Warwick, RI
 - ✓ Cheshire, CT
 - ✓ Southington, CT
 - ✓ Syracuse, NY (2 WWTFs)
 - ✓ New Rochelle, NY
- New Rochelle Recipient of Recent Award



City Council Vote: August 5, 2013

Public Hearing - Resolution for bond authorization of up to \$10,000,000 for the Peirce Island Wastewater Treatment Plant Upgrades – Held a public hearing. Voted to adopt a Bond Resolution for Peirce Island Wastewater Treatment Plant Upgrades in the amount of \$10,000,000.00.



Conditions: 2014

Pease Wastewater Option Revisited

- Design of WWTF Ongoing
 - Costs Increased from \$65M to \$80M
- Peer Review of NHDES Numeric Nutrient Criteria for Great Bay Estuary
- Iowa League of Cities Challenge of EPA's Interpretation of Bypass and Blending
- Request from Exeter and Stratham for Regional Treatment at Pease WWTF



City Council Vote: October 20, 2014

Proposed Request to Proceed with Life Cycle Cost Estimates for Pease Wastewater Treatment Facility Alternative – Voted to authorize the City Manager to proceed with expending up to \$300,000.00 from the Pease bond proceeds for the Pease Wastewater Treatment alternative as described in the City Manager's memorandum dated October 16, 2014 and that a report back be made to the City Council following Phase I.



Conditions: 2015

- Design of Peirce Island WWTF Ongoing but Slowed
- Completion of Pease Wastewater Option Evaluation (\$290k)
 - Option 1: Peirce Upgrade BAF and Pease Upgrade for TN
 - Option 2: Pease Upgrade (All Sanitary Flow) for TN and Peirce Conversion for Wet Weather



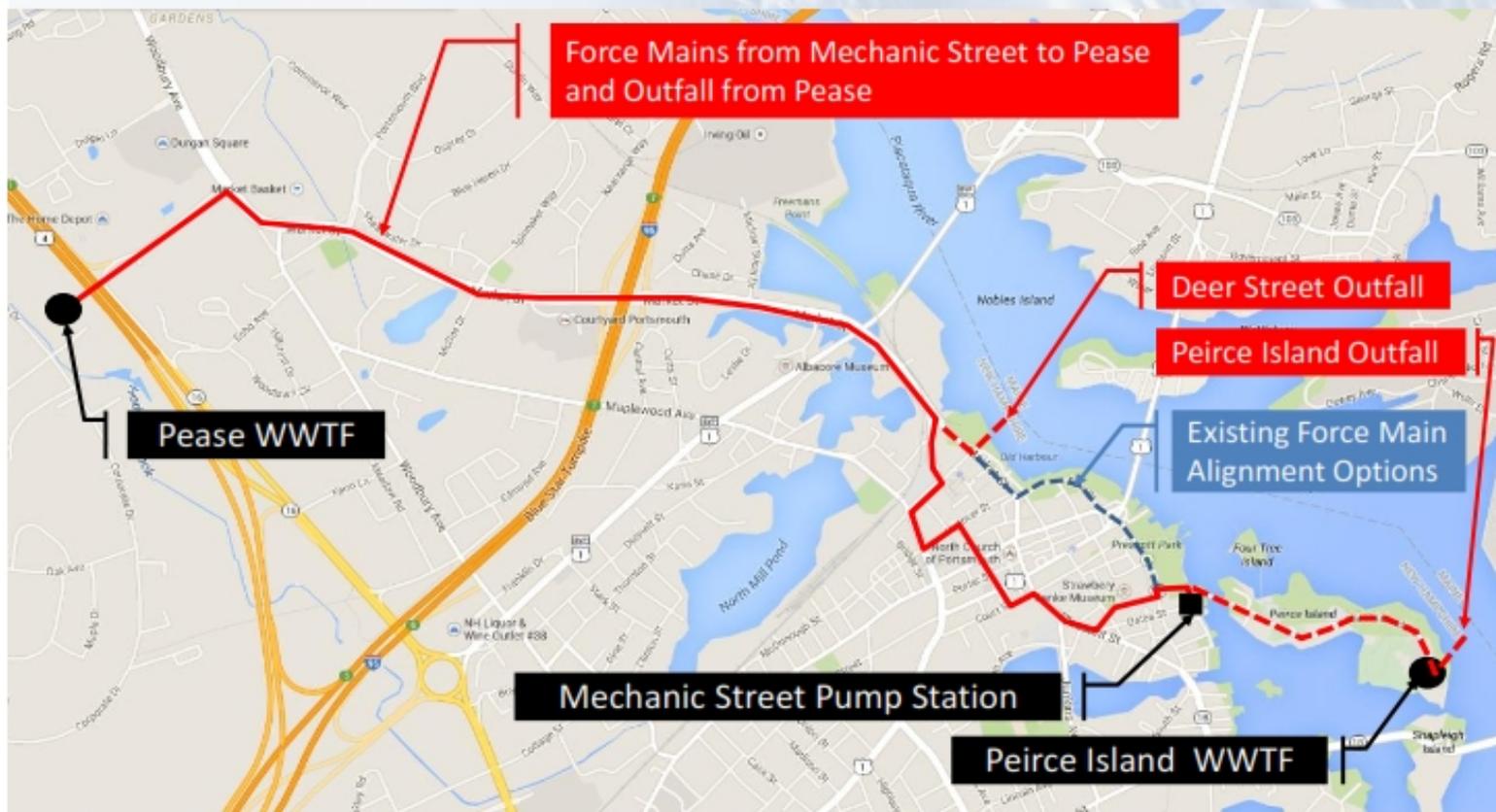


Draft Pease WWTF Site Plan

Originally Presented to City Council April 27, 2015



Potential Force Main and Outfall Alignment



Originally Presented to City Council April 27, 2015



Cost Estimates for TN 8 (\$Millions)

	Option 1 Upgrade Peirce Island WWTF and Pease WWTF		Option 2 Upgrade Pease WWTF (Deer St Outfall)	
	Capital	Life Cycle	Capital	Life Cycle
Immediate Costs	90.1 (Peirce Island ~\$79.8M) (Pease ~\$10.3M)	164.9	131.4 137.9*	188.9
Potential Future Costs	43.6 ? (Pease ~\$9.4M)	-----	7.4 ?	-----

*Additional \$6.5M of Capital Costs to extend the outfall from Deer Street to Peirce Island



Originally Presented to City Council April 27, 2015



City Council Vote: May 18, 2015

Voted to reaffirm the City Council's vote of April 8, 2013 to move forward with the Peirce Island Wastewater Treatment Facility Upgrade.



Conditions: Now

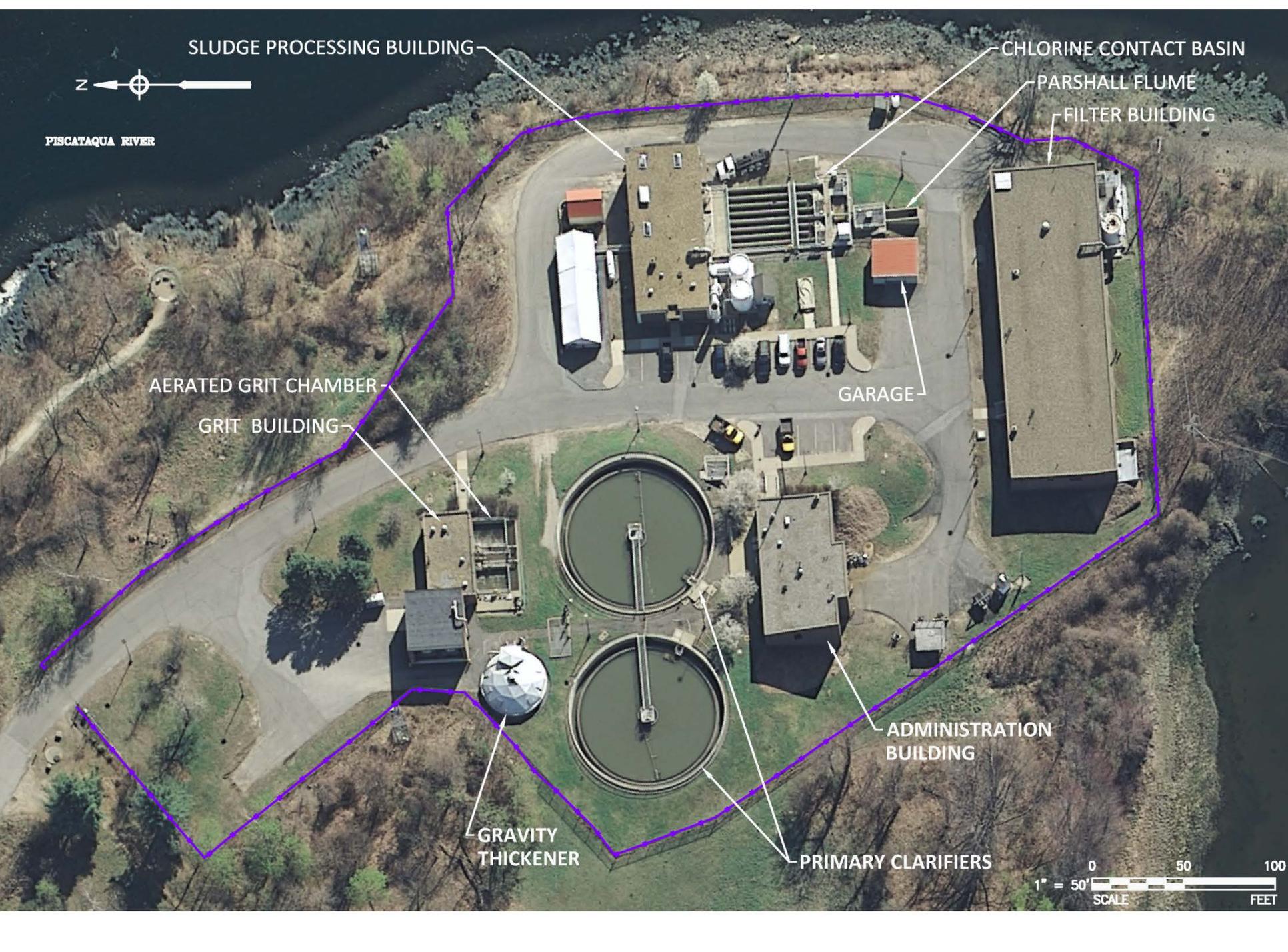
- Final Design of WWTF Complete (\$5.0M)
- Phase One Construction Complete (\$1.7M)
- Five Contractors Prequalified
- Joint Work Session Regarding Traffic Impacts to be Scheduled
- Peirce Island Road Bridge Maintenance



Conditions: Now

- Consent Decree Second Modification Drafted
 - Defined Nitrogen Treatment Level
 - Minimize Second Shift Work
 - Defined Implementation Timeframe
 - Concessions for Delay
- Sewer User Rate Stabilization Reserve Policy to Minimize Rate Impact
- SRF Low Interest Loan





SLUDGE PROCESSING BUILDING

CHLORINE CONTACT BASIN



PISCATAQUA RIVER

PARSHALL FLUME
FILTER BUILDING

AERATED GRIT CHAMBER

GARAGE

GRIT BUILDING

ADMINISTRATION
BUILDING

GRAVITY
THICKENER

PRIMARY CLARIFIERS

0 50 100
1" = 50'
SCALE FEET

SLUDGE PROCESSING BUILDING

CHLORINE CONTACT BASIN

Partial Demolition PCB Remedial Action Plan

PARSHALL FLUME

FILTER BUILDING

LEGEND

 EXISTING BUILDING OR TANK

 EXISTING BUILDING OR TANK TO BE DEMOLISHED

AERATED GRIT CHAMBER

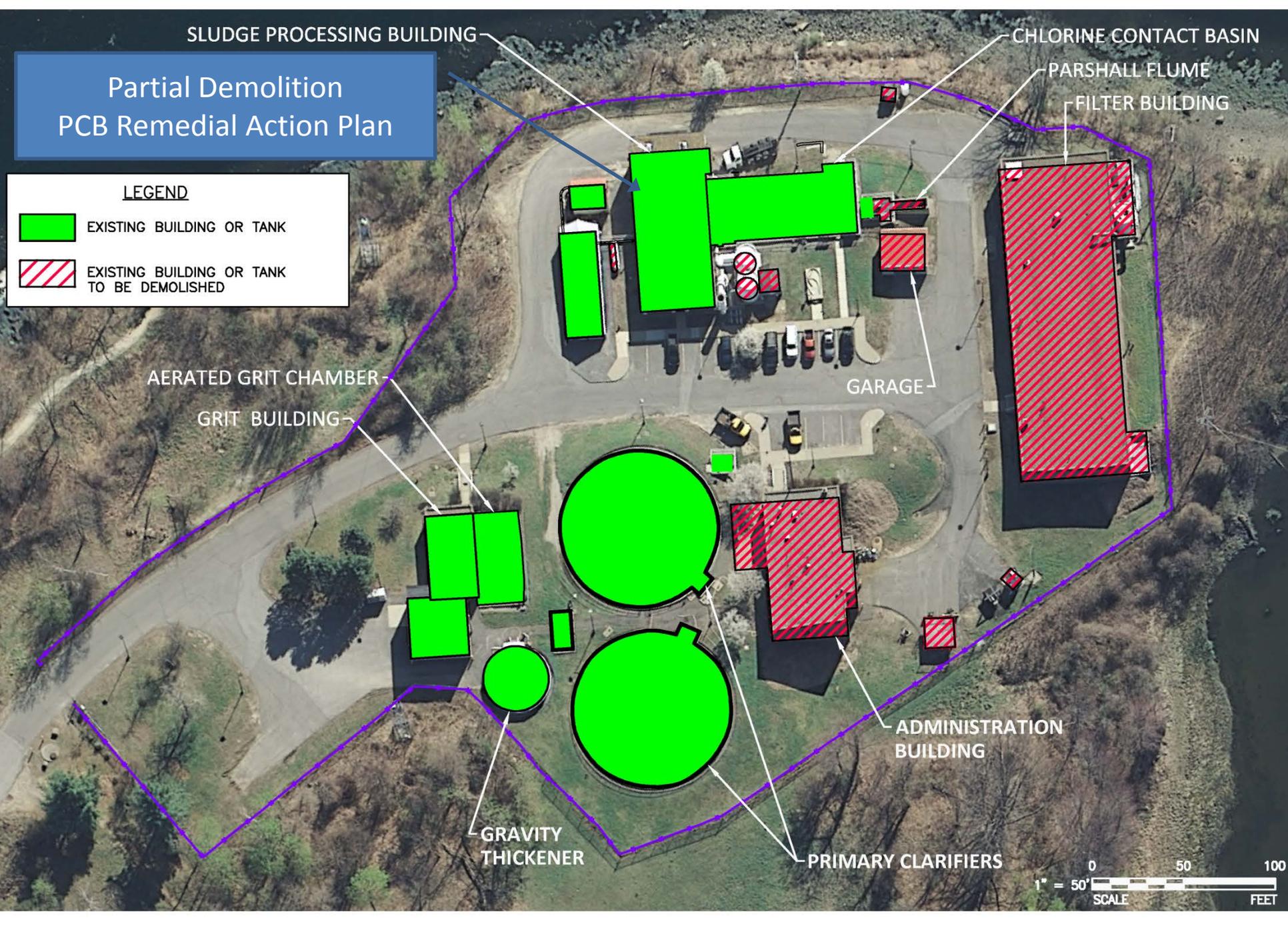
GRIT BUILDING

GARAGE

GRAVITY THICKENER

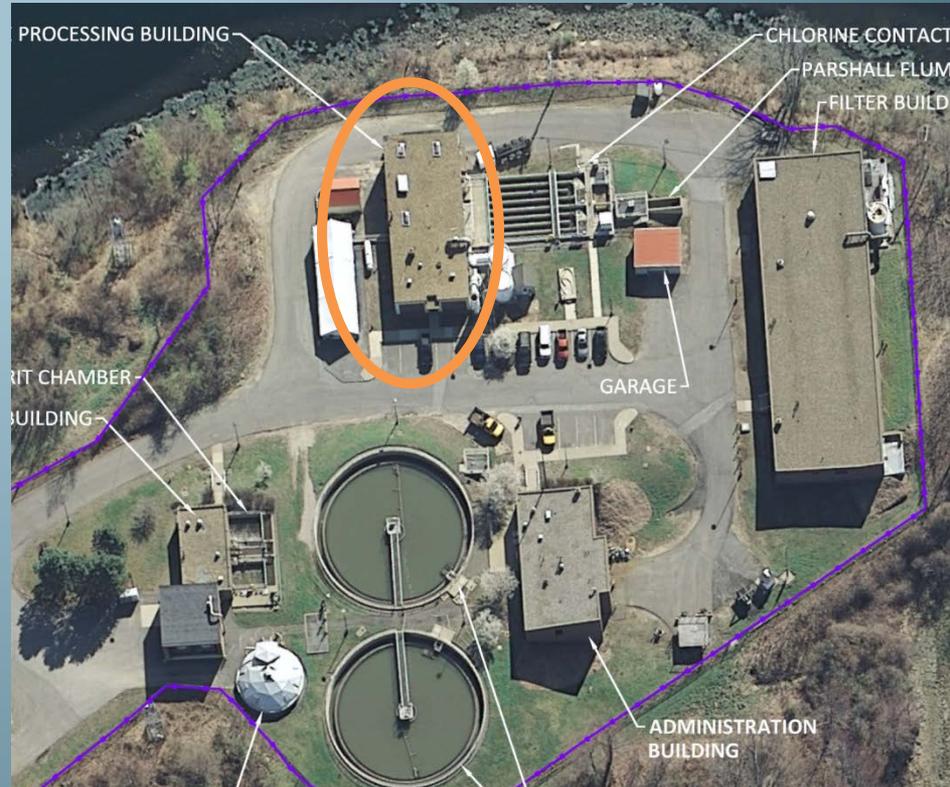
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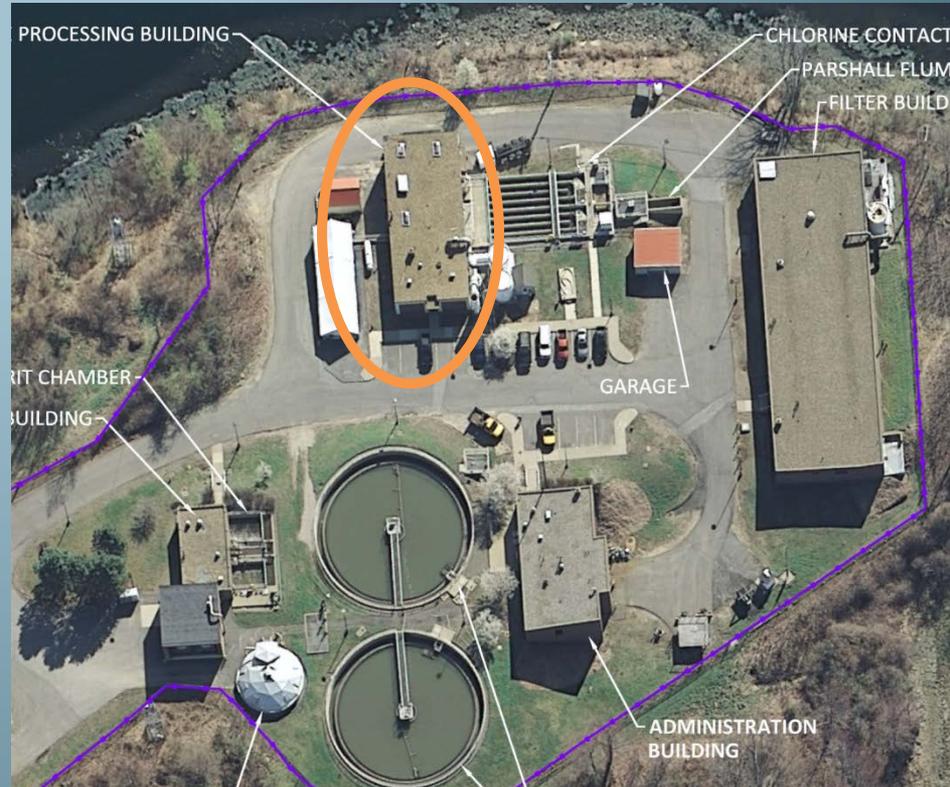
Remedial Action Plan (RAP)

- Original WWTF Building Found to Have PCBs in Paint and Caulk
 - Common in Buildings This Age
 - PCBs Leached into Concrete



Remedial Action Plan (RAP)

- Requires EPA Approved RAP
 - Special Handling
 - Contained Transport
 - Licensed Disposal Facility
 - Encapsulation
 - Long Term Monitoring of Encapsulation



OPERATIONS/LAB BUILDING

CHLORINE CONTACT BASIN



PISCATAQUA RIVER

LEGEND

 EXISTING BUILDING OR TANK

 PROPOSED BUILDING AND/OR PROCESS

AERATED GRIT CHAMBER

GRIT BUILDING

TRANSFORMER

GENERATOR

ELECTRICAL BUILDING

BIOLOGICAL AERATED FILTER (BAF)

SOLIDS BUILDING AND SECONDARY INFLUENT PUMP STATION

ODOR CONTROL

GRAVITY THICKENER

PRIMARY CLARIFIERS

HEADWORKS

ODOR CONTROL

GRAVITY THICKENER



Project Cost Estimate

Items	Cost (Million Dollars)
Primary Clarifier Project (Eng, Const, etc.)	\$1.7
Treatment Upgrade Final Design Phase	\$5.0
Construction & Contingency	\$70.4
Construction Admin & Oversight	\$6.7
Total Project Cost	\$83.8



Next Steps

- Council Bond Authorization
- Bid Period (March 10 to May 2016)
- Contract Award/NTP (July 1, 2016)
- Public Meetings
- Public Outreach
- Peirce Island Road Bridge Maintenance



Questions

