

Rehoboth Beach Ocean Outfall Project

Public Workshop
October 19, 2016



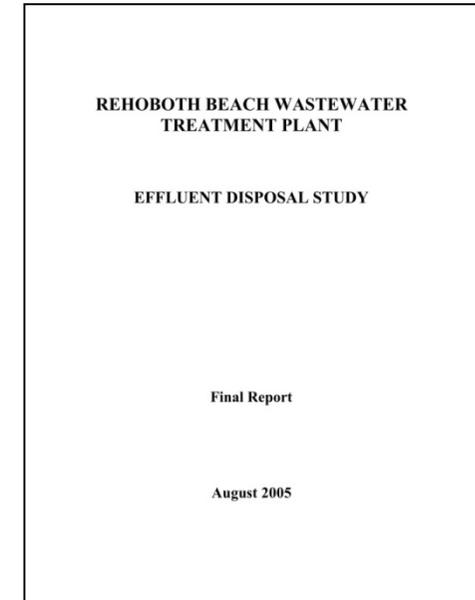
Agenda

- EIS Summary
- Record of Decision
- Project Overview/Update
- Ocean Outfall
- Force Main Alignment
- Permits
- Contacts
- Questions



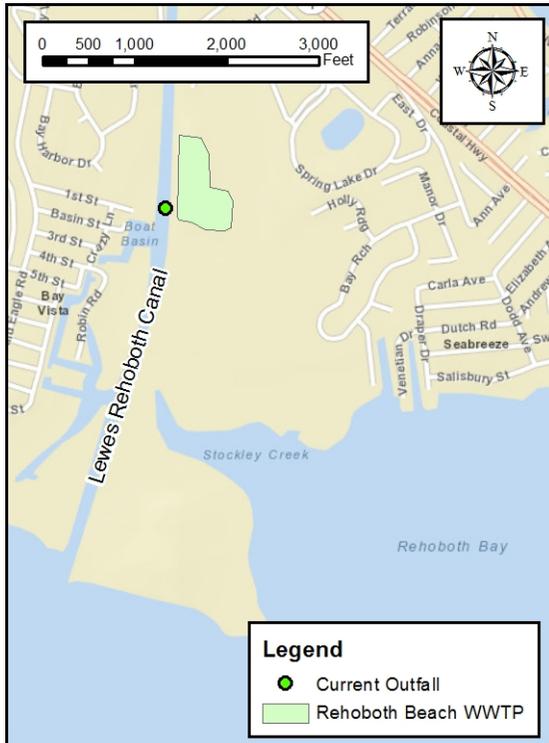
Alternatives Considered

- **Alternative 1: No Action**
Violates consent order
- **Alternative 2: Nutrient Trading**
Continued discharge to Rehoboth Bay
Insufficient trading partners
- **Alternative 3: Land Application**
Land not available for purchase or lease
- **Alternative 4: Rapid Infiltration Beds (RIBs)**
Land not available
Continued discharge of nutrients to groundwater
- **Alternative 5: Ground Water Injection (Deep and Shallow well)**
Significant risk and cost
- **Alternative 6: Ocean Outfall**
Only environmentally and economically feasible alternative

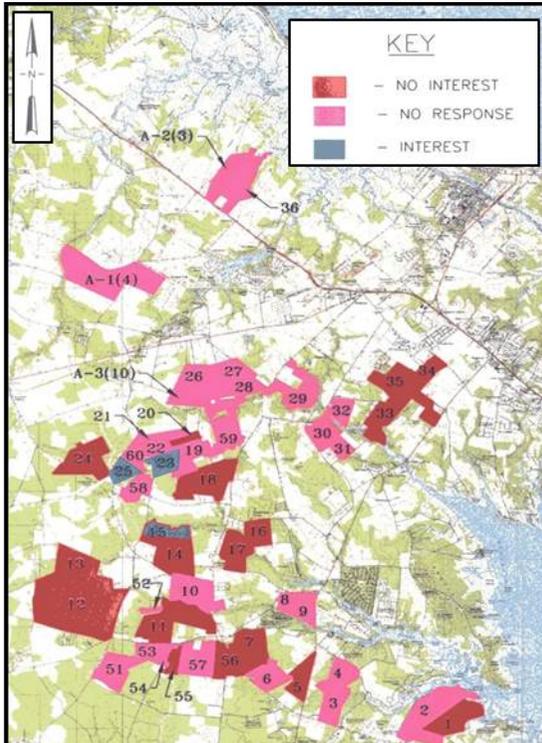


Alternatives Considered in EIS

No Action



Land Application



Ocean Outfall



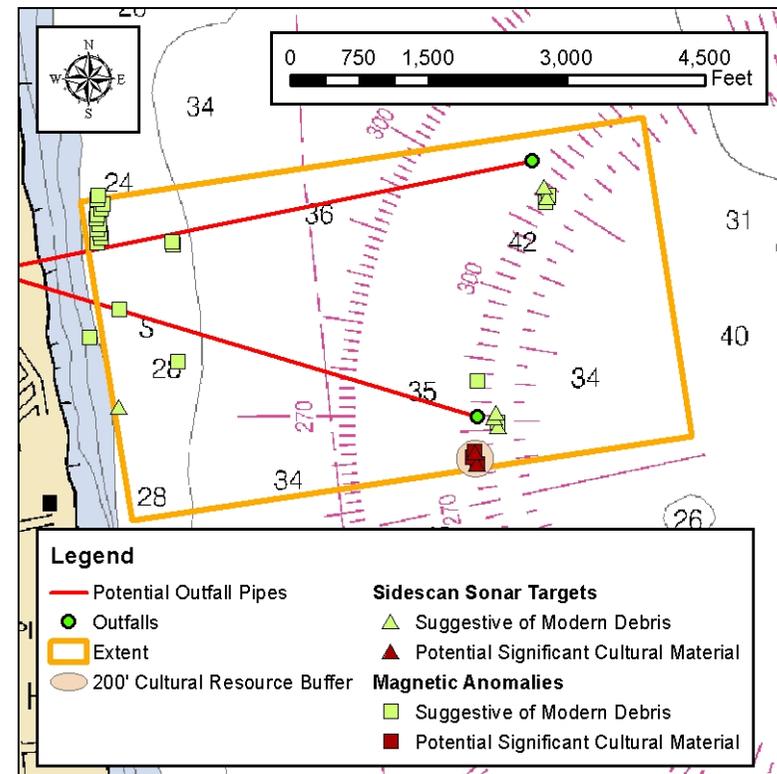
Field Studies

Soil borings

- 1500, 3000, 4500 and 6000 feet from shore
- Each drilled to a depth of 80 ft
- Results indicate high probability that directional drilling portion could extend beyond 3,000 feet

Archaeological Survey

- Magnetometer and side-scan sonar
- Most anomalies suggest debris or buoys
- Several potential targets but not near northern outfall



Physical Oceanography

Acoustic Doppler Current Profiler & Fixed CTD buoys

- Deployed at each outfall location for two 2-month periods
 - 9/2/2010 to 11/9/2010
 - 7/6/2011 to 9/12/2011
- ADCP Data recorded at 1.6 ft (0.5 m) increments
 - Current speed & direction – every 10 min
 - Wave height – every 60 min
- Conductivity, temperature, density (CTD) data recorded at three or four different depths every 10 minutes

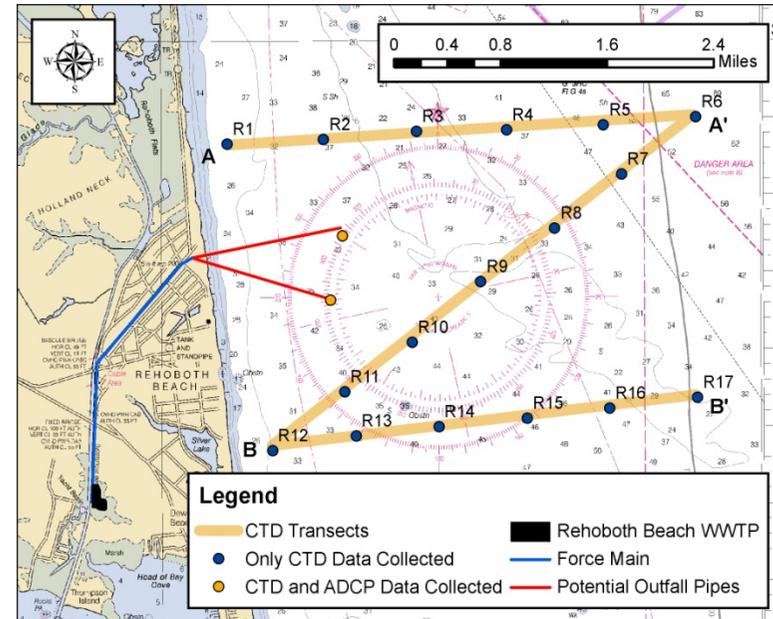


Physical Oceanography / Water Quality Data

CTD Cruises

- Conductivity, temperature, density, and salinity measured at multiple locations
- Recorded at approximately 1 ft depth increments from ocean surface to ocean floor
- Water Quality Sampling

CTD Cruise Number	Date
CTD Cruise #1	November 18, 2010
CTD Cruise #2	January 25, 2011
CTD Cruise #3	March 17, 2011
CTD Cruise #4	May 25, 2011
CTD Cruise #5	July 11, 2011
CTD Cruise #6	September 14, 2011



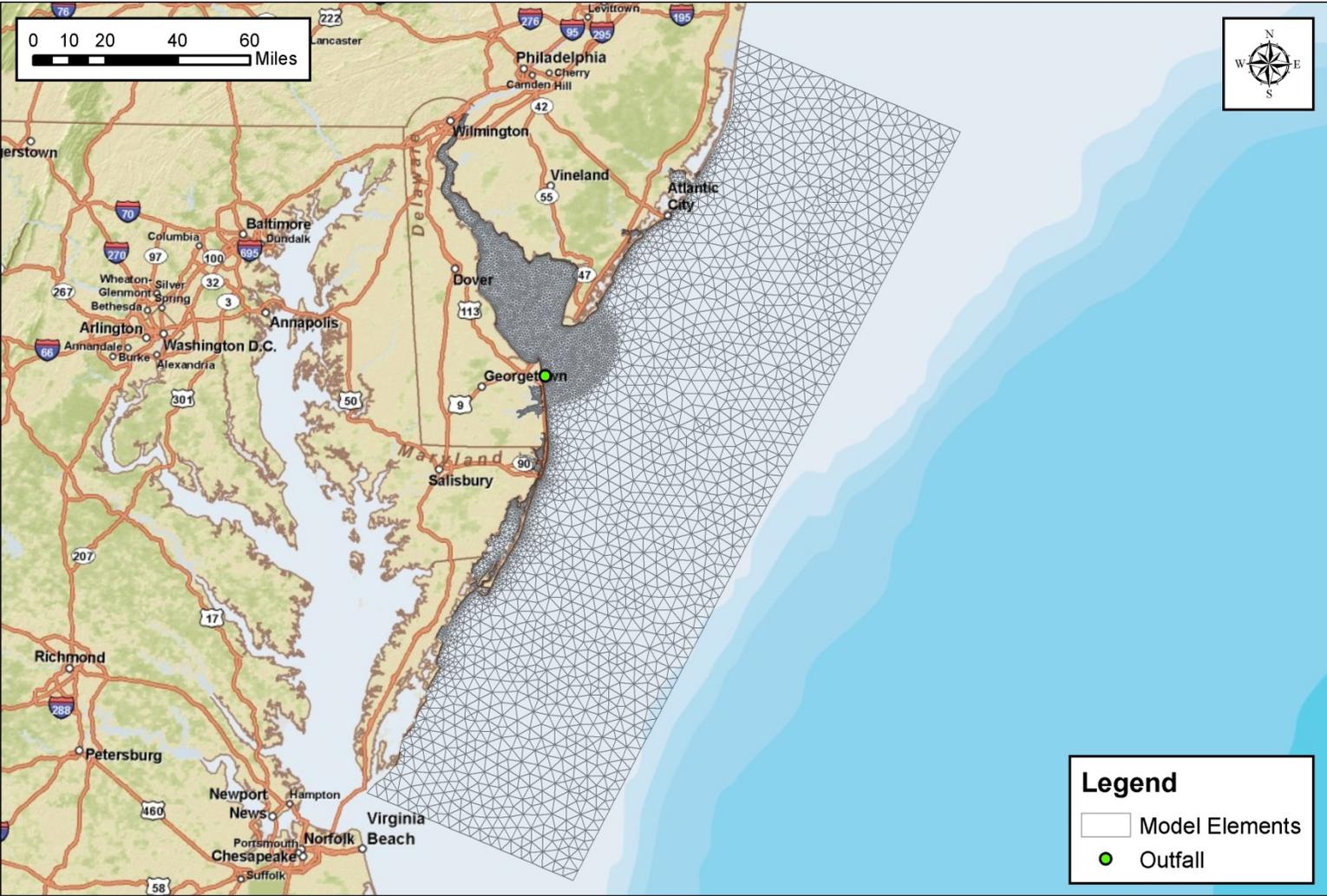
Ocean Modeling

Two types of modeling

- Near-field – Rate at which effluent dilutes at the point of discharge
- Far-field – Fate of the effluent as it migrates away from the zone of initial mixing and dissipates
- Plume dispersion models calibrated to actual ocean circulation patterns and ambient meteorological conditions



Far Field Model – Modeling Domain



Dilution Required During Normal Plant Operation

Parameter	Background Level ¹	Plant Effluent ²	Dilution Required
BOD, 5-Day (mg/L)	5.08	2.80	None
Enterococcus (cfu/100mL)	0.17	2.70	1:17
Total Nitrogen, (mg/L)	0.37	6.20	1:17
Total Phosphorus, (mg/L)	0.06	0.30	1:6
TSS -Residue, Nonfilterable (mg/L)	16.2	5.4	None

Notes:

¹ Average of samples taken from three different depths at each outfall site in November 2010 and June 2011.

² Performance data based on January 2007 – July 2010. Annual average flow for reported period was 1.1 mgd.



Dilution Required During Worst Case Scenario

Failure of the Disinfection and Filtration Processes

Parameter	Water Quality Standard ¹	Plant Effluent ²	Dilution Required
Enterococcus (cfu/100mL)	35 (geometric mean)	2.2 x 10 ³	1:62

Notes:

¹ Surface Water Quality Standards (amended July 11, 2004).

² Compiled from numerous sources, see report Chapter 9.



Near Field Modeling

Nine different cases were modeled

- Case 000 (Base Case) – Preliminary design modeled as a linear diffuser with low ambient currents. Worst mixing performance under a non-stratified receiving environment
- Case 001 to 003–Increasing ambient currents. **Case 003 is the most frequent current condition**
- Case 004 – Moderate stratification
- Case 005 – Larger diffuser with twice the length of base case
- Case 006 – Moderate wind of 5 m/s
- Case 007 – Increasing vertical density stratification
- Case 008 – Increasing vertical density stratification and large ambient currents

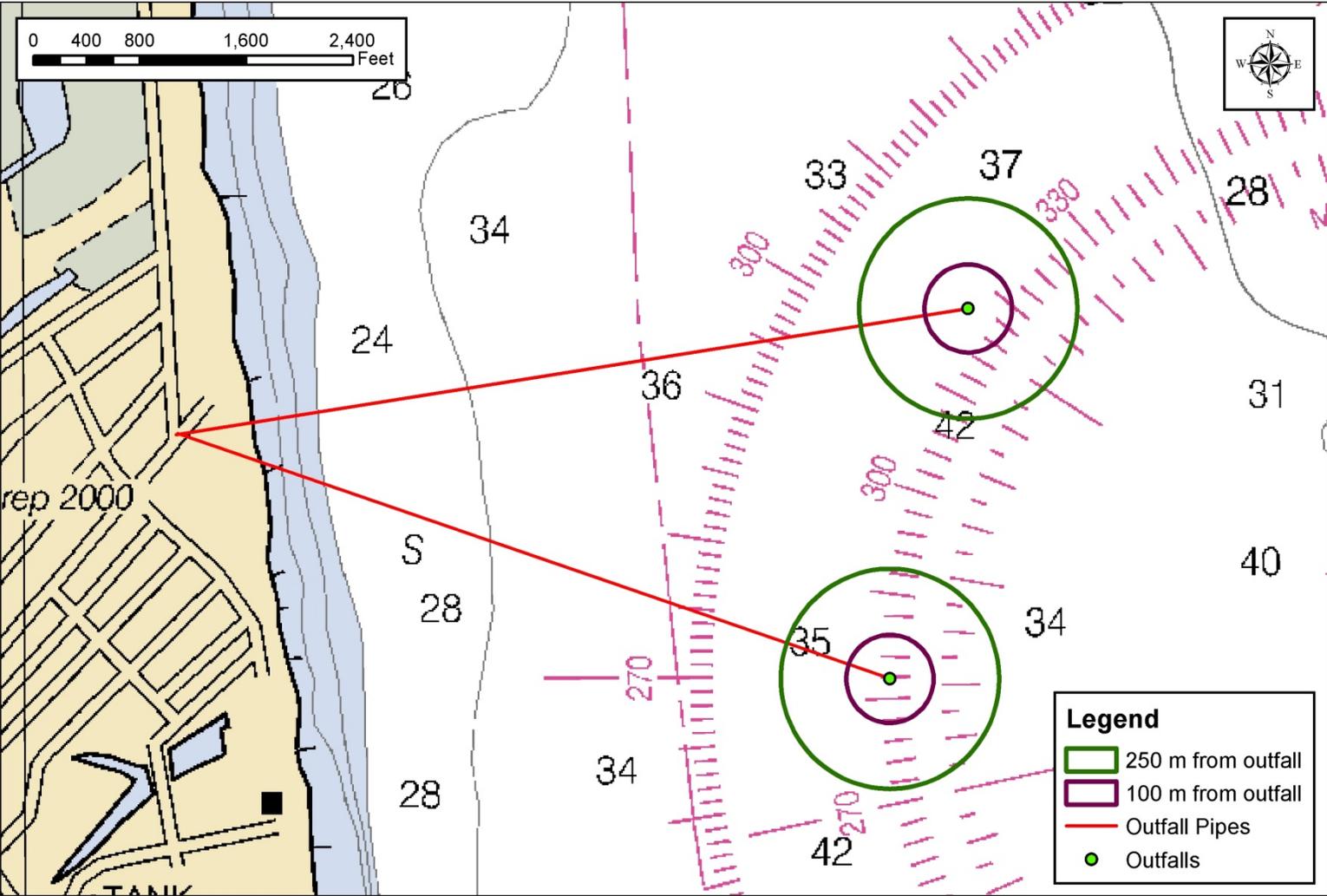


Near Field Modeling

Run Scenario	Distance to end of Near Field Region	Dilution at end of NFR (1:D)	Terminal height of plume above ports
Case 000	66 m / 217 ft	250	Rise to surface
Case 001	Undefined	360 at 10 m (33 ft)	Rise to surface
Case 002	62 m / 203 ft	630	Rise to surface
Case 003	62 m / 203 ft	930	Rise to surface
Case 004	43 m / 141 ft	141	4.39 m / 14.4 ft
Case 005	88 m / 289 ft	442	Rise to surface
Case 006	66 m / 217 ft	250	Rise to surface
Case 007	119 m / 390 ft	82	1.69 m / 5.5 ft
Case 008	220 m / 722 ft	89	1,27 m / 4.2 ft

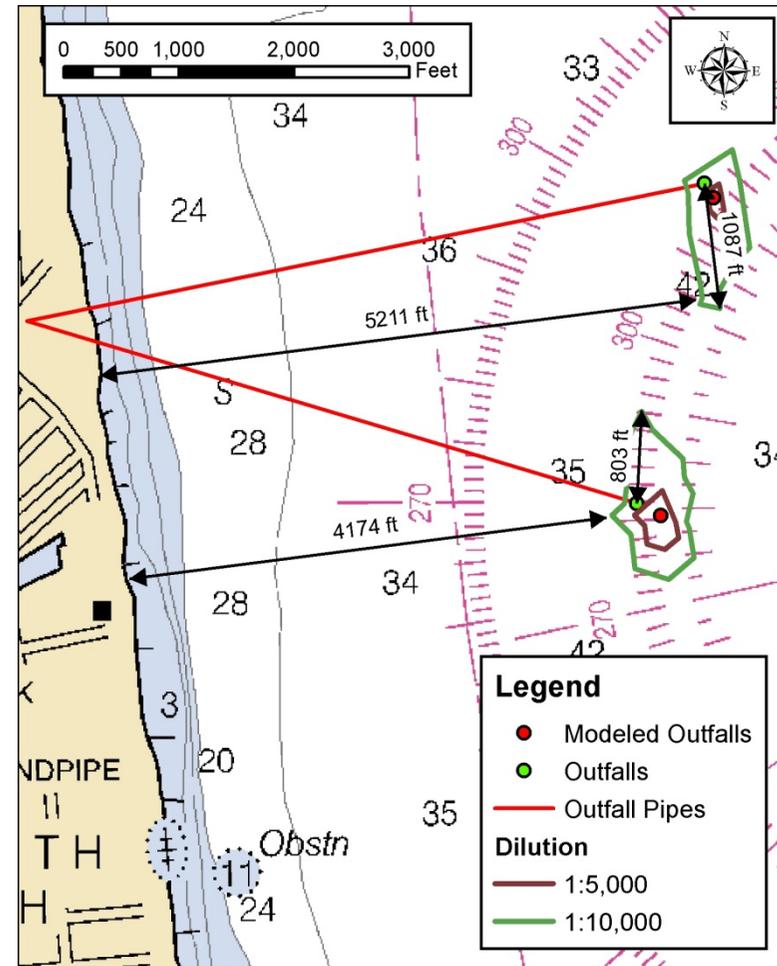


Near Field Modeling



Far Field Modeling

	RBWWTP Effluent Conc.	Conc. at 1:5,000 Contour	Conc. at 1:10,000 Contour	Ocean Background Conc.
BOD (mg/L)	2.8	0.0006	0.0003	5.08
TSS (mg/L)	5.4	0.0011	0.0005	16.17
TN (mg/L)	6.2	0.0012	0.0006	0.37
TP (mg/L)	0.3	0.0001	< 0.0001	0.06
DO (mg/L)	8.6	0.0017	0.0009	not measured
Enterococcus (Colonies/100 mL)	2.70	0.0005	0.0003	0.17



Modeling Conclusions

Conclusion

- Dilution of effluent during normal WWTP operations to background concentrations (1:17 dilution required) achieved within initial zone
- Dilution of worst case effluent to water quality standards (1:62 dilution required) achieved within the initial zone
- 1:10,000 dilution achieved within 1,000 feet of outfall



Environmental Consequences

Alternatives Investigated

- No Action
- Land Application
- Ocean Outfall



Investigated short and long term impacts to the :

- Physical environment
- Biological environment
- Human environment
- Cumulative impacts



Rehoboth Beach EIS Public Hearing

Summary of Findings

- Both land application and ocean outfall are protective of human health and the physical and biological environment under all conditions
- Environmental Impacts, where present, are temporary and can be mitigated
- Preferred alternative is the ocean outfall



Record of Decision (ROD)

Record of Decision – January 2015

- Issued by Delaware Department of Natural Resources and Environmental Control Press release dated January 2015:
 - ***“DNREC moves City of Rehoboth Beach wastewater disposal financing forward and agrees to a new discharge removal deadline”, following the Record of Decision (ROD) and concurring with the assessment by the City of Rehoboth Beach that, “....the ocean outfall is the only alternative that assures 100 percent of nutrients from the Rehoboth treatment plant are eliminated from the Inland Bays watershed.”***
- ***Outfall Construction to be complete June 1, 2018***



Ocean Outfall Projects

Outfall Pipe & Diffuser

- 24-inch outfall pipe from the staging area to the outfall diffuser, 6,000 ft away
- Located at end of outfall pipe, 6,000 ft offshore

Force Main

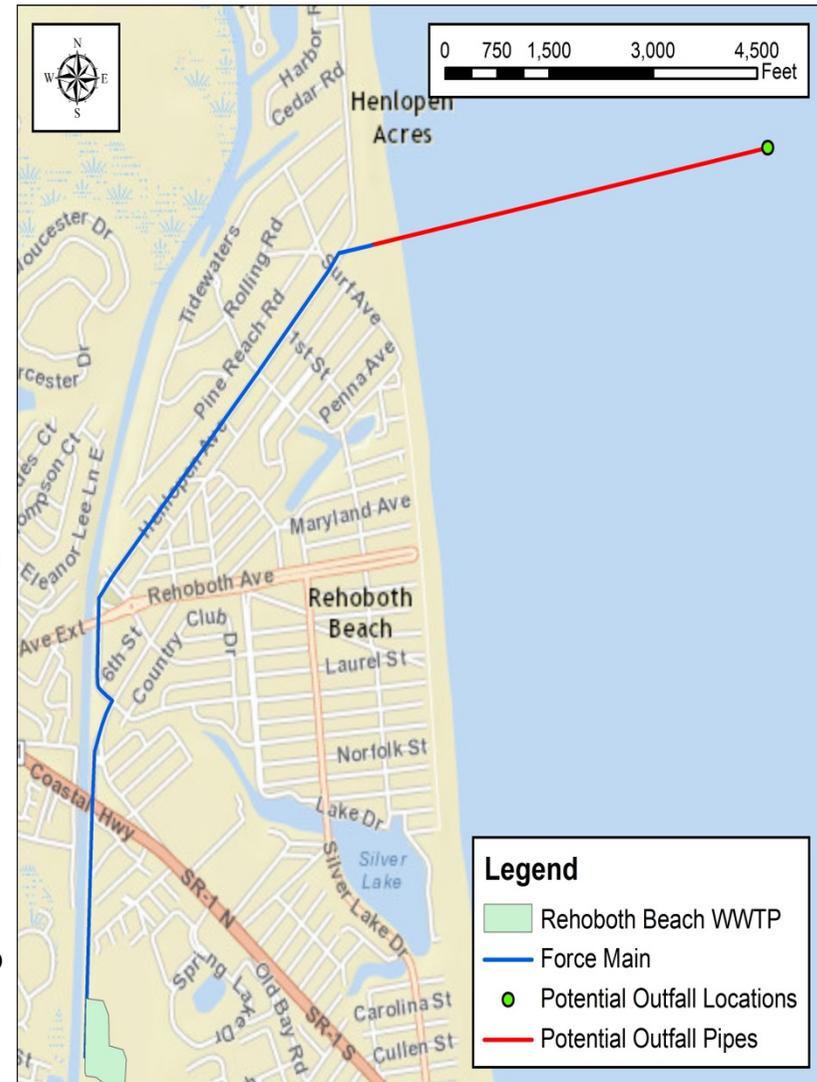
- Force main from the RBWWTP to the outfall staging area (approximately 11,400 ft)

Pump Station

- New effluent pump station located at the RBWWTP

WWTP Reliability Upgrades

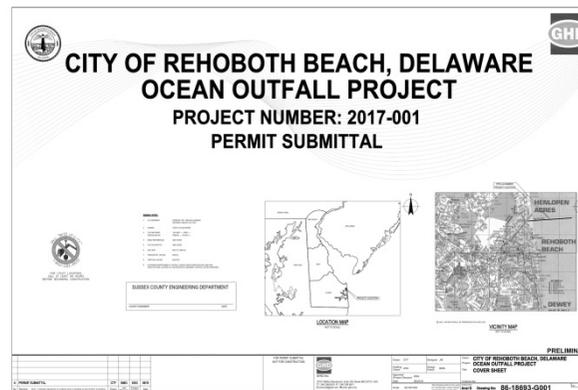
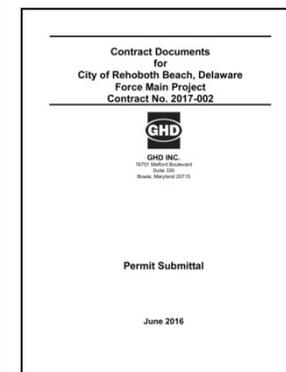
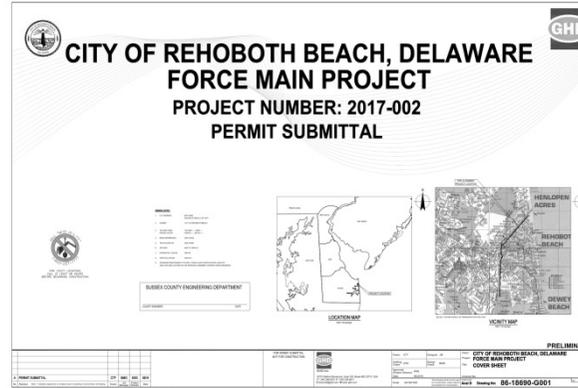
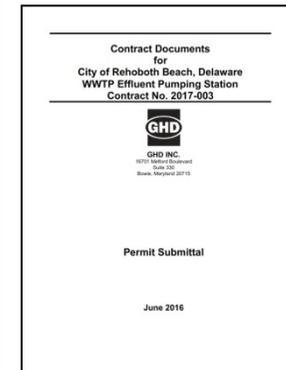
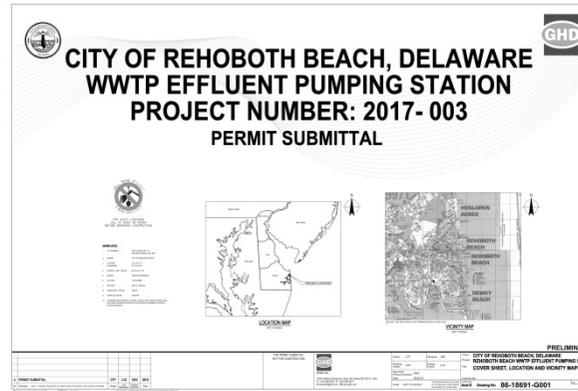
- Various upgrades at the Rehoboth WWTP



Ocean Outfall – Project(s) Updates

Status

- 90% Design Complete
- All local, state and federal permits submitted
- Draft NPDES Permit Received
- Permitting Phase
- Plant Reliability Upgrades



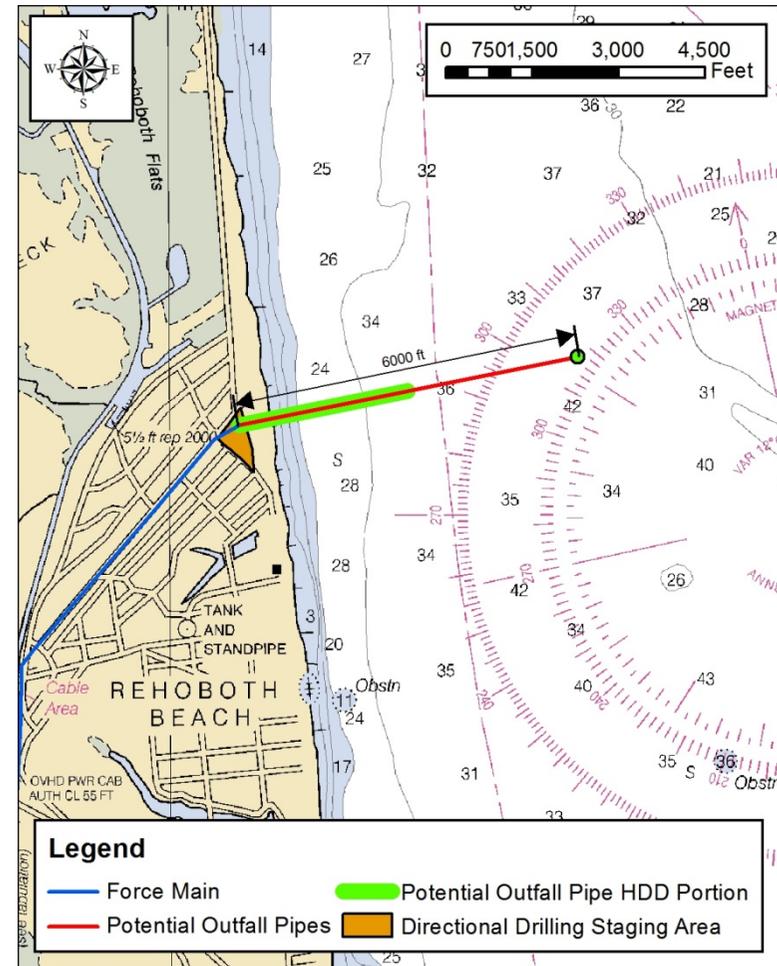
Ocean Outfall

Proposed Ocean Outfall

- 24-inch diameter pipe extending 6,000 linear feet from the Deauville Beach access parking lot
- Terminates with diffuser

Construction Methods

- 3,000 feet or more of pipe will be directionally drilled
- Directional drilling maximized to minimize environmental impact
- Remainder open cut excavation and backfill



HDD - Deauville Beach Parking Area



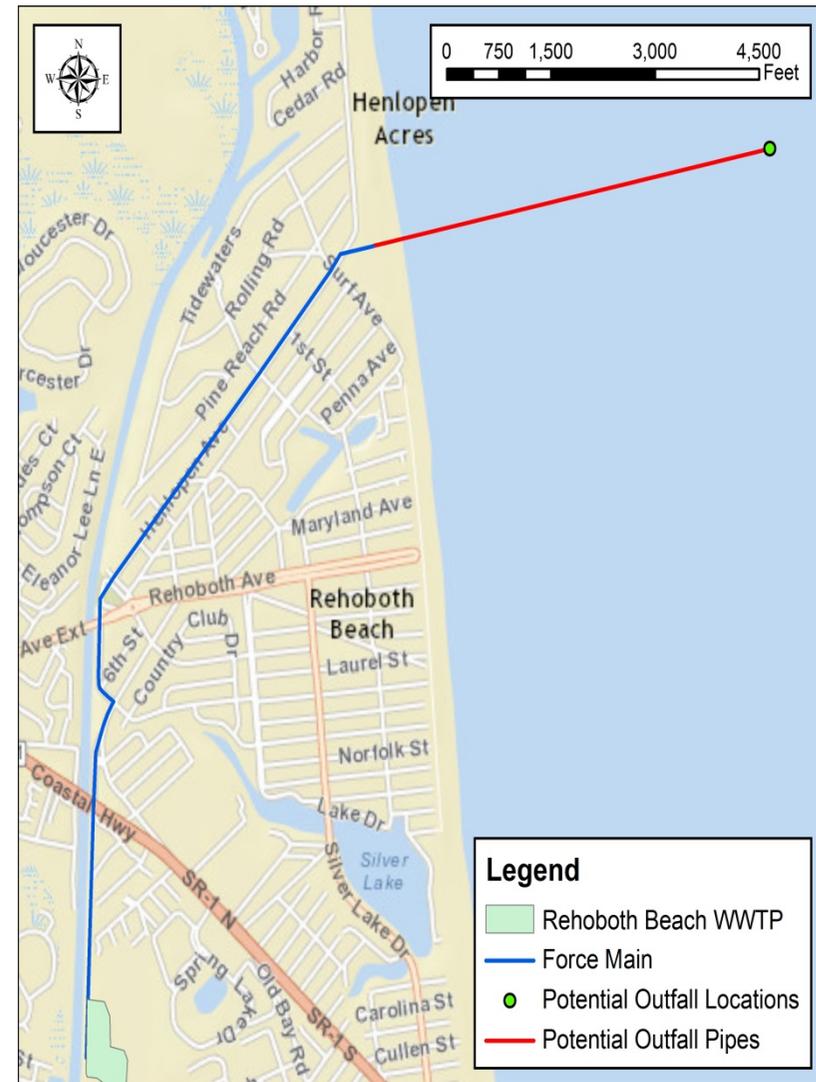
Effluent Force Main

Proposed Force Main Alignment

- 11,400 linear feet long, 24-inch diameter
- Will predominately follow existing utilities and right of ways

Construction Methods

- Combination of open cut, jack and bore



Henlopen Avenue



Rehoboth Avenue / Canal Street



Coastal Highway (State Rd 1)



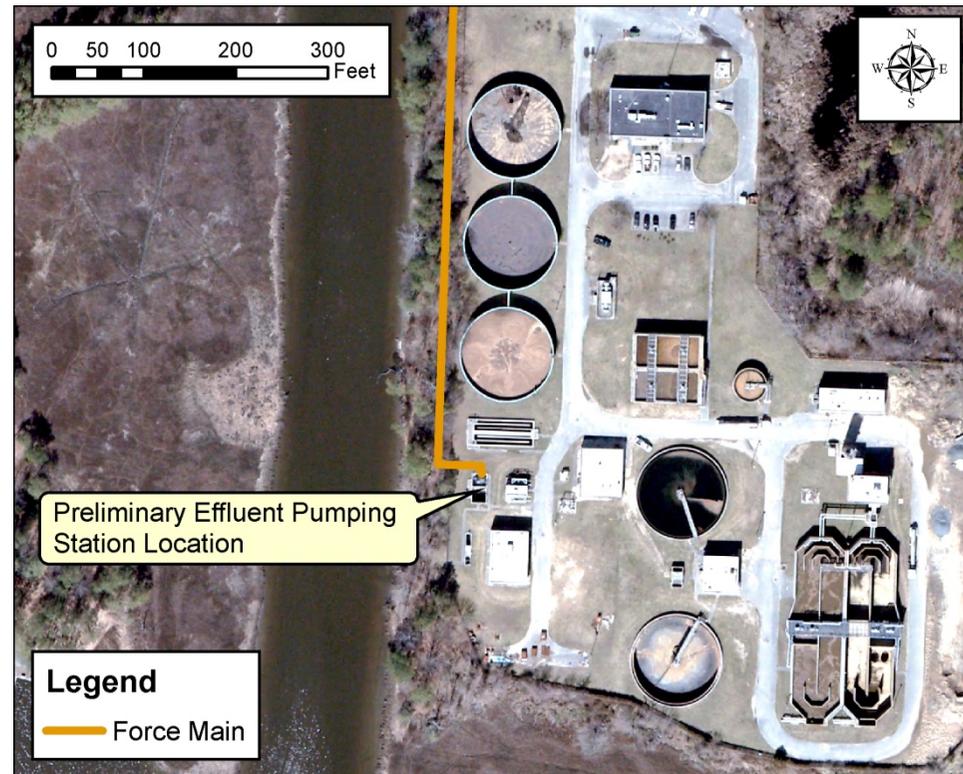
Roosevelt Street



Effluent Pump Station

Effluent Pumping Station

- Will be within site limit of existing WWTP – no expansion or land acquisition required
- Preliminary plan – new wet well tank with multiple variable speed drive pumps



Construction Permits

Permit	Ocean Outfall	Force Main	Pump Station	Status	Review Time
NPDES	✓*	✓*	✓*	Submitted, under review	3 months
USACE	✓*	✓*		Submitted, review pending 90% drawings, NPDES, and delegated agencies	2 weeks
Coastal Barrier	Not within CBRS Unit				
Coastal Zone Act	Exempt – municipal treatment				
Coastal Zone Management Federal Consistency	✓*	✓*	✓*	Ready to be submitted	1 month (assumed)
Wetlands and Subaqueous Lands Permit	✓			Requires 90% drawings	1 month (assumed)
Coastal Construction	✓			Requires 90% drawings	1 month (assumed)
Delegated Agency Review <ul style="list-style-type: none"> • NMFS • US FWS • State Historic/ Cultural Affairs • Natural Heritage Program 	✓*	✓*	✓*	To be submitted within next month	1 month
Grading / ESC	✓	✓	✓	Requires 90% drawings	1 month (assumed)
DeIDOT Utility Permit App.		✓		Requires 90% drawings	1 month



* One permit to cover multiple contracts

Ocean Outfall – Permit Submissions to Date

Task	Date
Wetlands and Subaqueous (State)	6/17/16
Coastal Construction (State)	6/17/16
Coastal Zone Management Federal Consistency (State)	6/17/16
DeIDOT Utility (State)	6/28/2016
USACE Individual (Federal)	7/8/2016
Sussex County Sediment and Stormwater (Preliminary) (County)	7/25/2016
Construction of Wastewater Collection and Conveyance Systems (State)	7/29/16
USACE Rivers and Harbors Act (Federal)	8/22/2016
NPDES (State)	9/28/2010



General Schedule

Task	Date
Public Workshop	October 19, 2016
Public Hearing	November 15, 2016
Permit Issued to City	February 20, 2017
Bid Advertisement	April 28, 2017
Notice to Proceed	August 16, 2017
Mobilization	October 1, 2017
Outfall Construction Completion	April 30, 2018



WWTP Reliability Upgrades

Project Phasing

- Phase 1 – Effluent Filtration and Clarification Upgrade
- Phase 2 – Plant Reliability Improvements



Phase 1 - Filtration System

The proposed equipment was first recommended in the PER

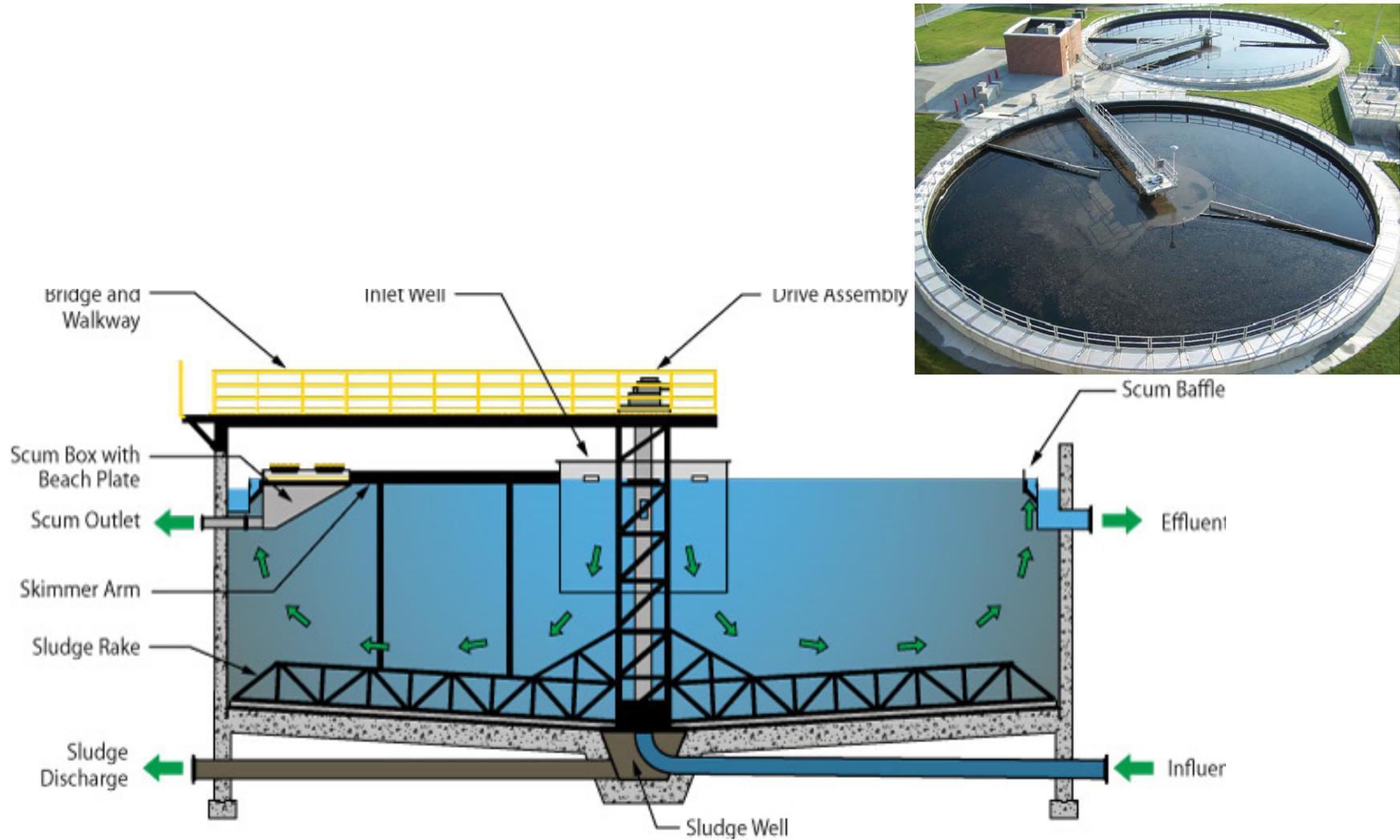
The new equipment will fit into the existing microscreen tanks

The new system will fit into the existing hydraulic profile and operate by gravity

The existing system was rated at 35-microns, however, in its current condition it provides minimal filtration. The New equipment will have a 10-20-micron rating.



Phase 1 – Clarifier Internal Modifications



Phase 2 - Wastewater Treatment Plant

Phase 2 – Plant Reliability Improvements

- Rehab Preliminary Treatment Facility
- Painting of Emergency Storage Tanks
- Rehab of Oxidation Ditches
- Rehab of disinfection system
- Replace activated sludge pumps, sludge transfer pumps, and plant drain pumps
- Upgrade secondary scum system
- New automated chemical feed system for alkalinity addition
- Replacement of main Switchgear assembly (and new Electrical Building)
- Installation of new Emergency Generator
- Rehab of HVAC and architectural components for various buildings
- Construction of new Maintenance Building
- Construction of new Sludge Dewatering Building

Schedule

- 30% Complete
- July 2017
- NTP 9/1/2017





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