

Emergency Response and Restoration of the Bay Park STP in the Aftermath of Hurricane Sandy

May 13th, 2013



Agenda

- 1 Plant Location and Background
- 2 Hurricane Sandy Storm Surge
- 3 Hurricane Sandy Damage
- 4 Electrical Distribution System
- 5 Electrical Repairs
- 6 Discussion and Questions

Bay Park STP Location



Bay Park
Sewage
Treatment
Plant

Hewlett Bay

East Rockaway Channel



Bay Park STP Background

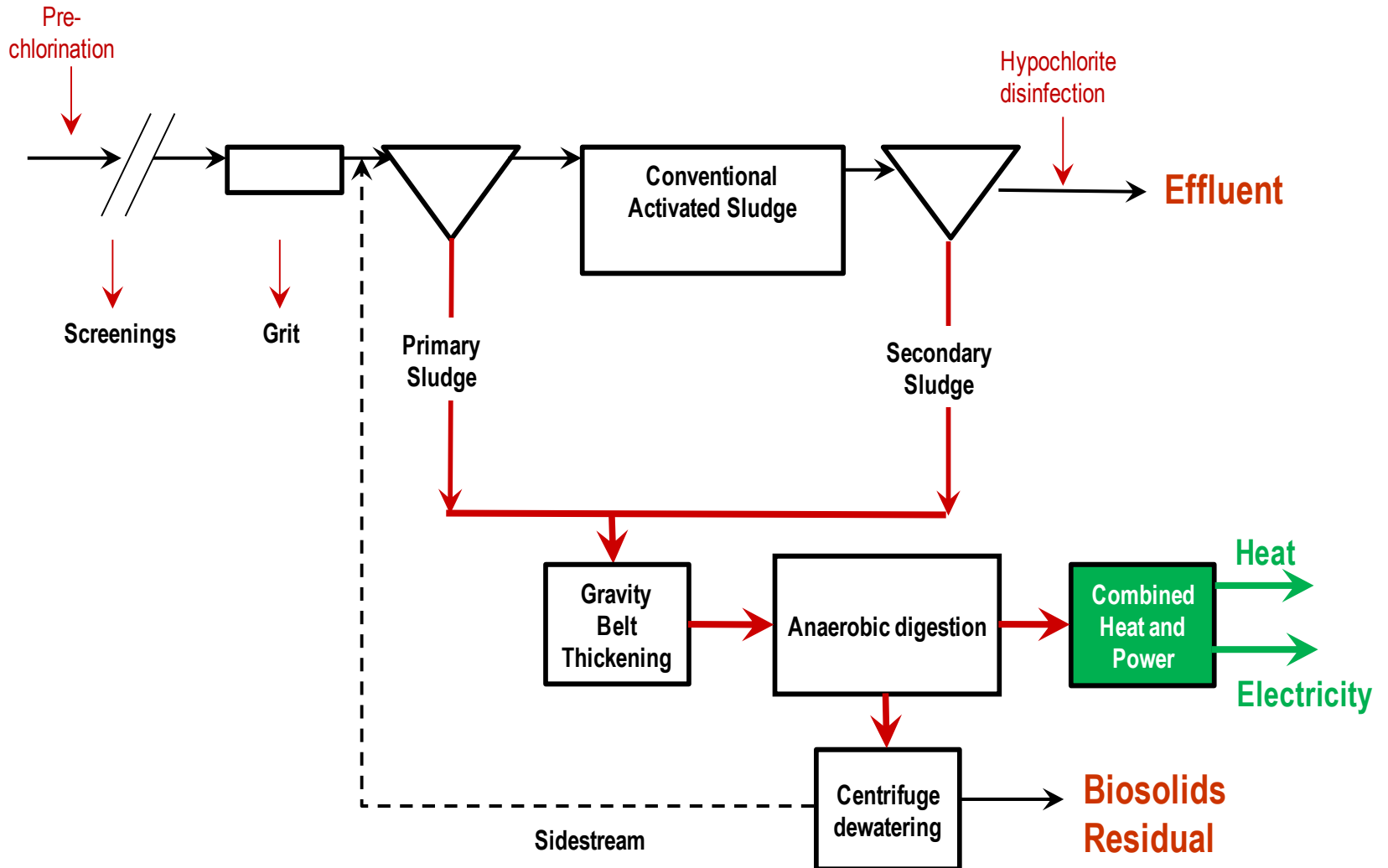
- Owned and Operated by The Nassau County Department of Public Works (NCDPW).
- 70-mgd Bay Park STP located in East Rockaway, New York. Serves a Population of 550,000.
- Conventional secondary treatment for the southwestern portion of Nassau County.
- Separate Sewer System

Bay Park STP Overview

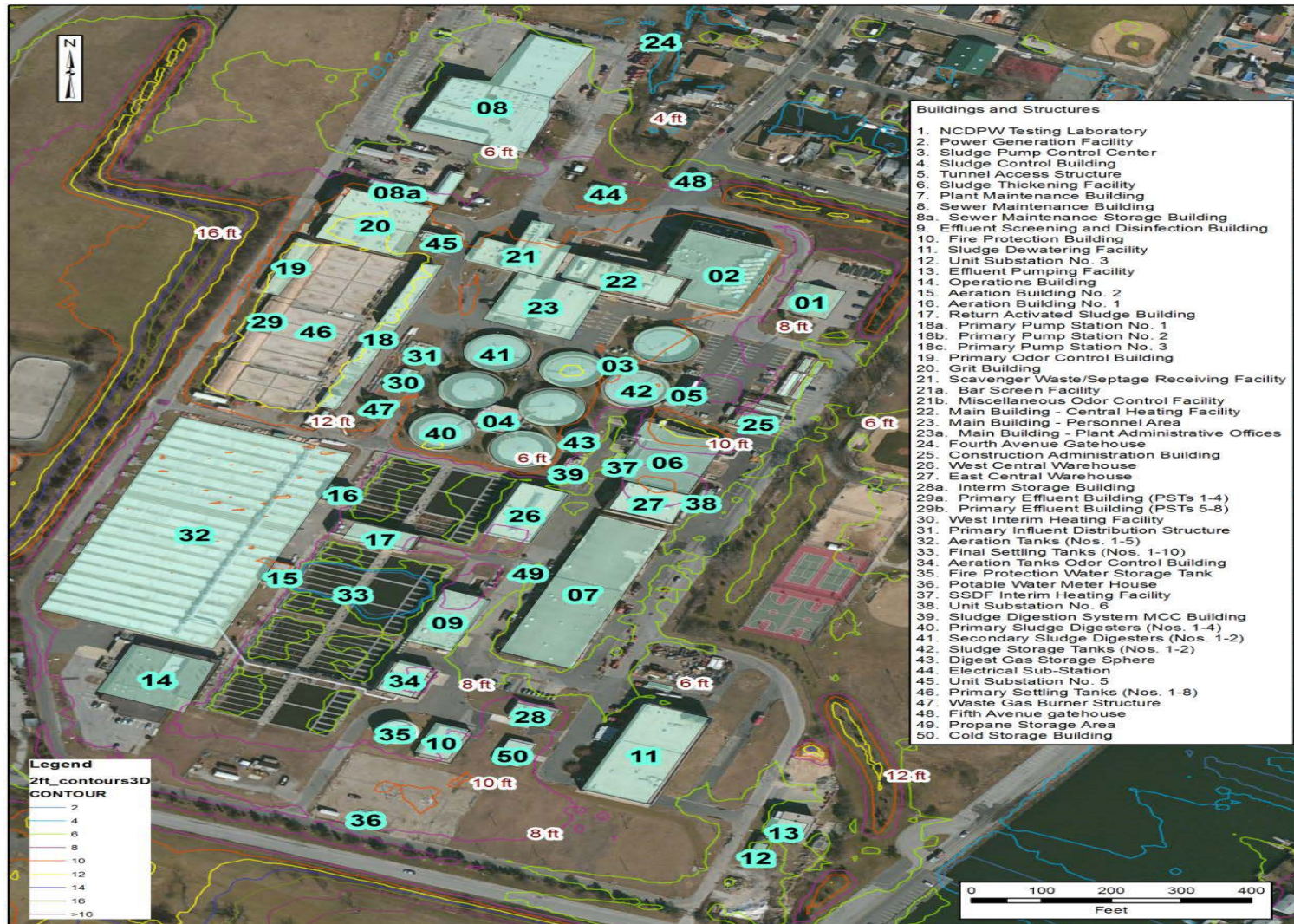


Bay Park STP

Process Flow Diagram

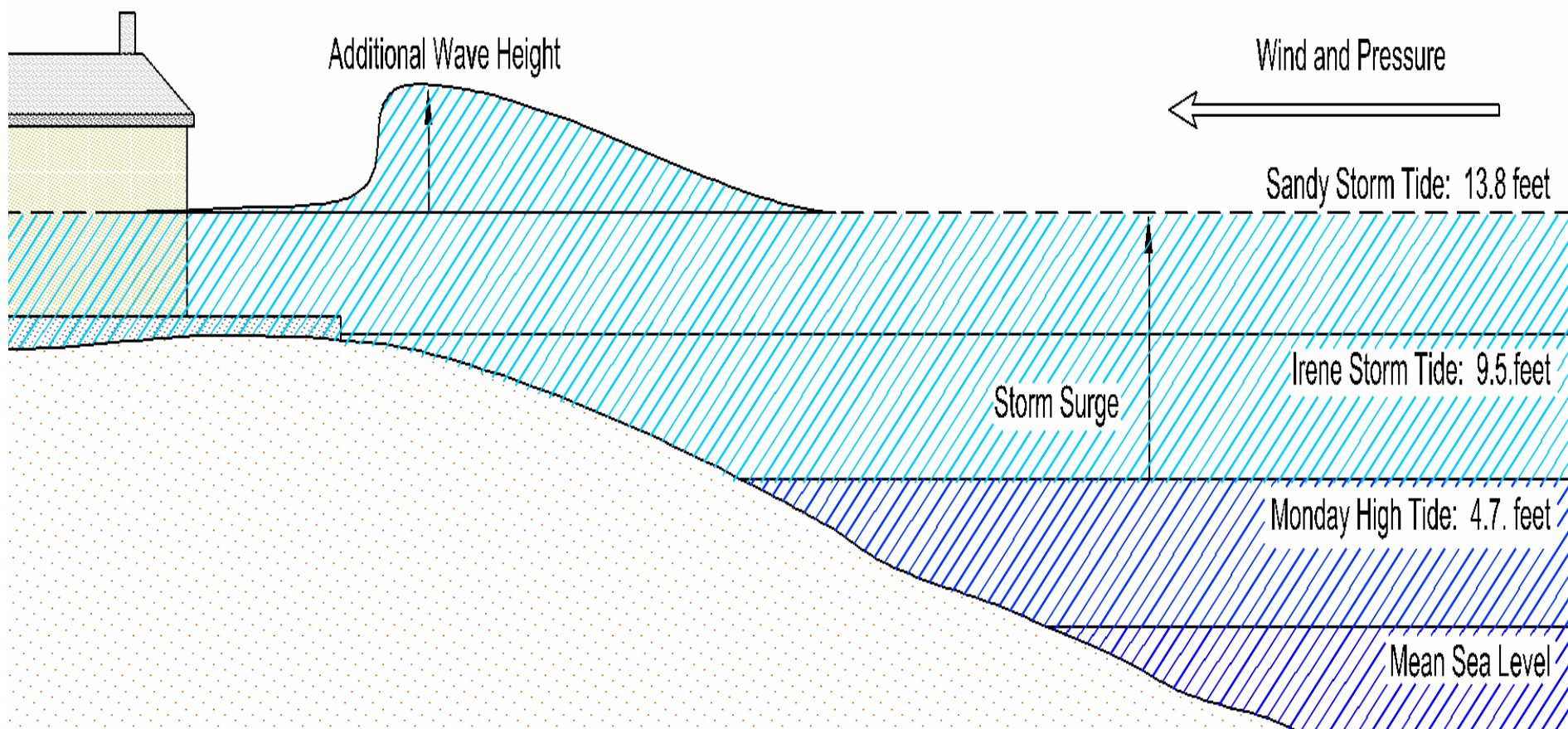


Topography & Sandy Storm Surge



Hurricane Sandy Storm Surge



New York Battery

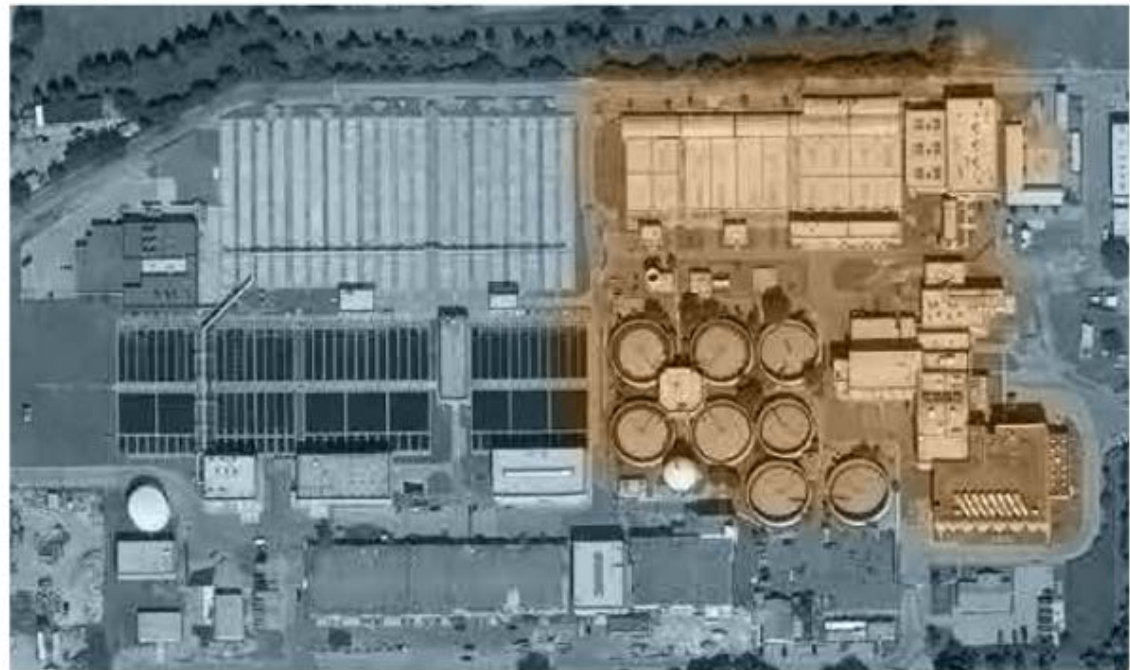


Hurricane Sandy Damage



Bay Park STP Flood Zones

-  Basement and Tunnel Flooding due to Surcharged Storm and Plant Drain Systems
-  3 - 7 foot Tidal Surge above ground Elevation



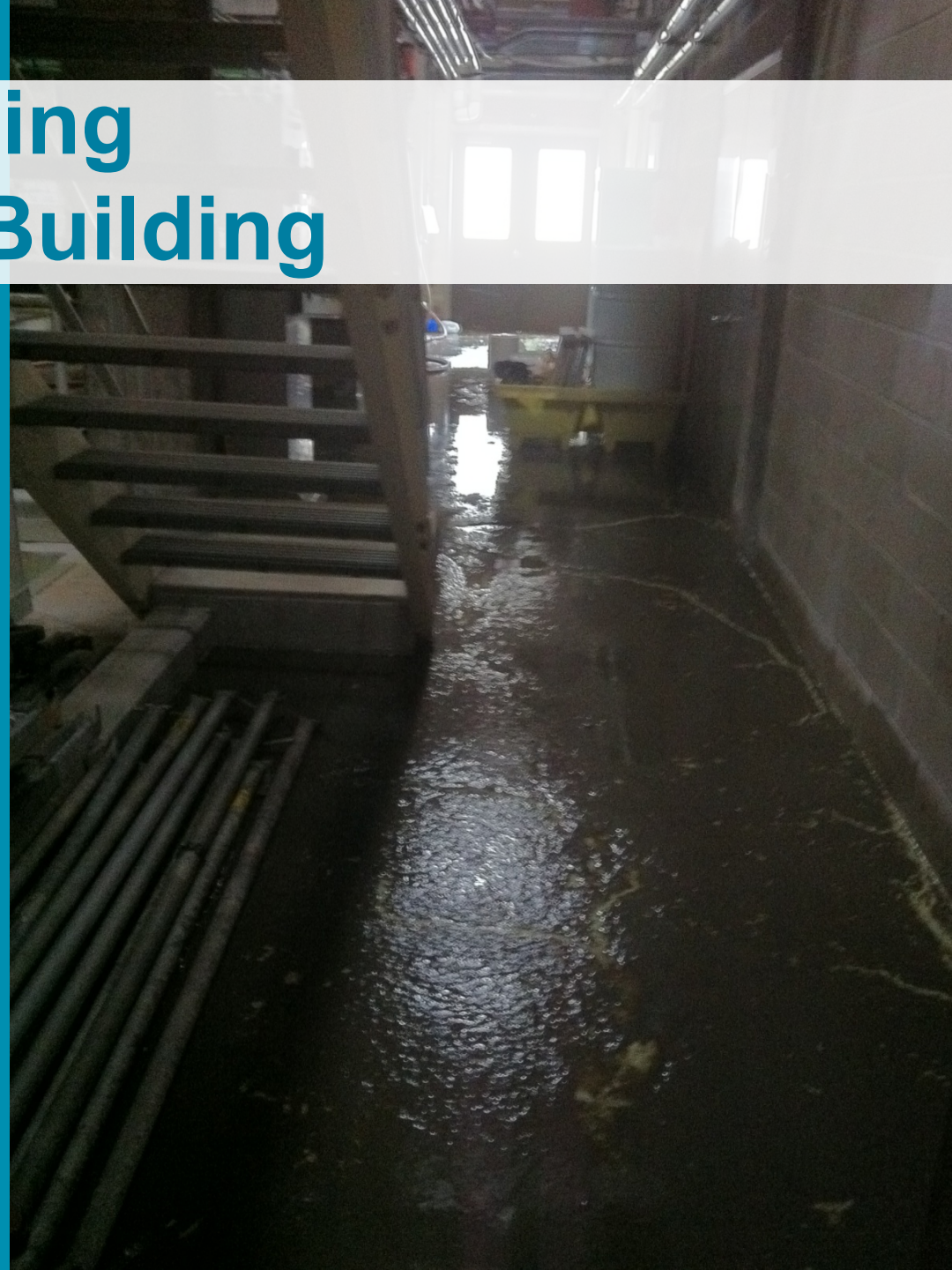
First High Tide Looking North



First High Tide Looking East



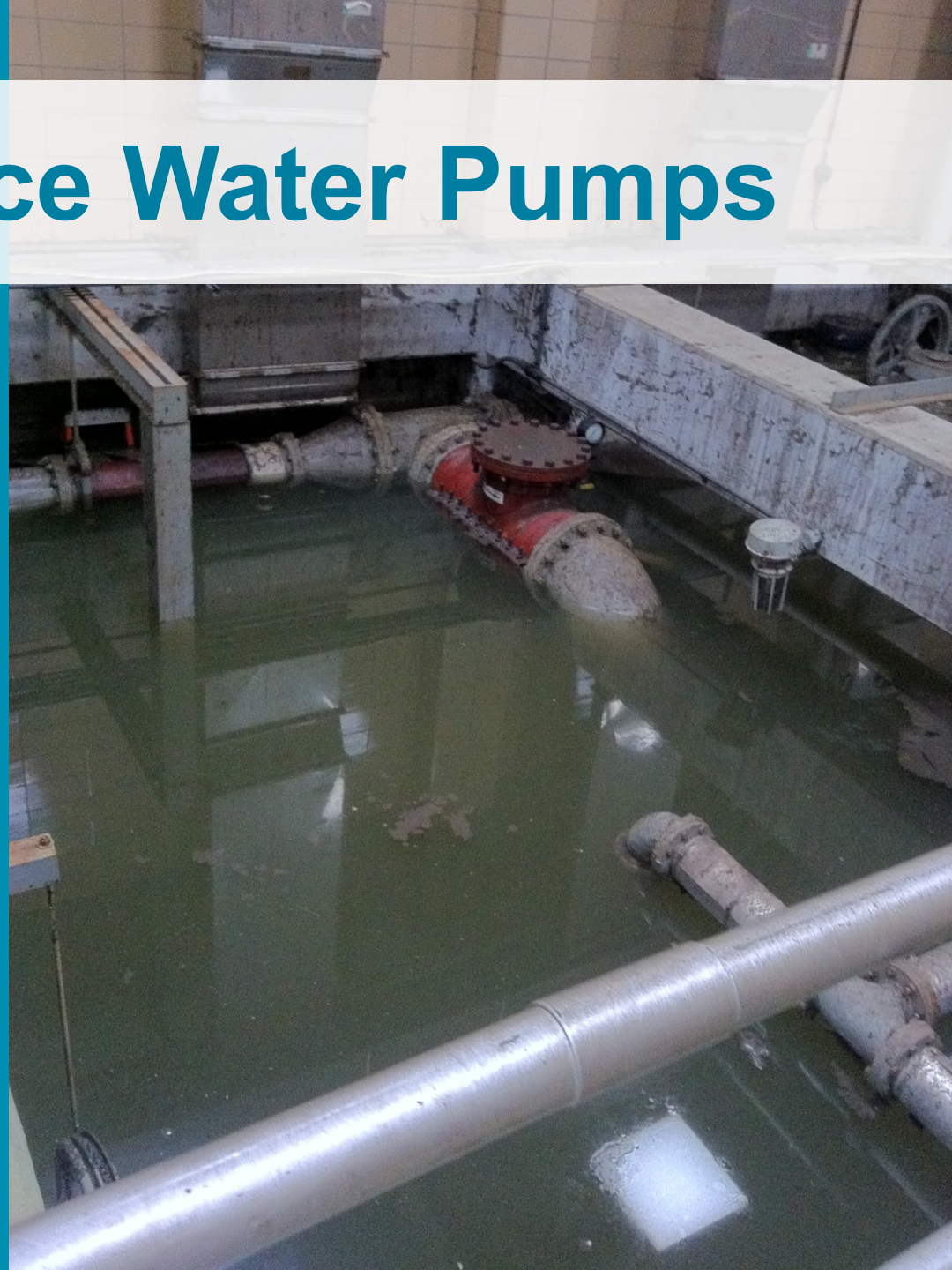
Effluent Screening & Disinfection Building



Effluent Service Water Pumps

Cooling Water for
Generators

Process Water for
Thickening and
Dewatering



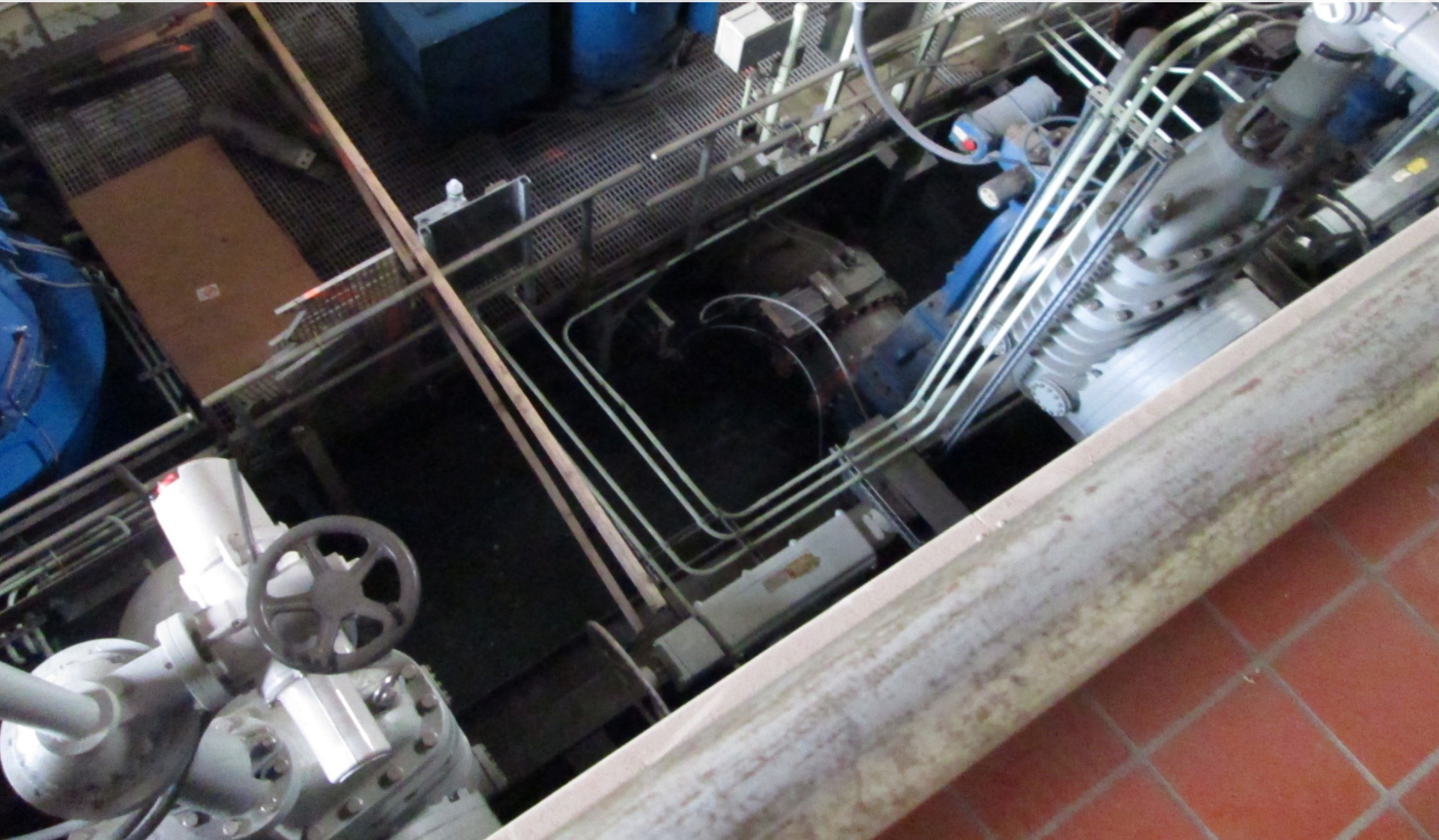
Main Building Basement Areaway



Galleries & Tunnels



Raw Sewage Pump Station



Raw Sewage Pump Station



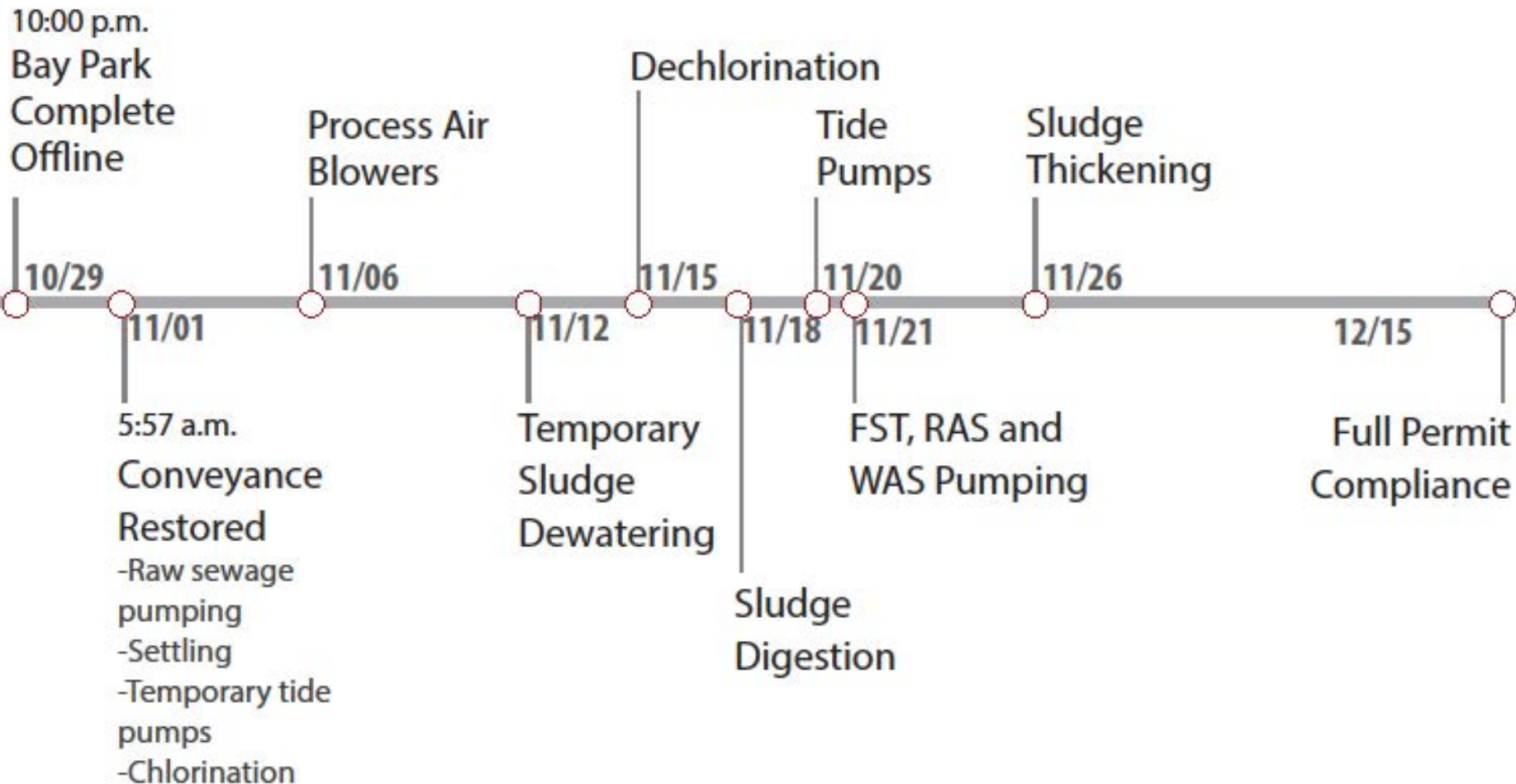
The Morning After Sandy





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Emergency Repair Timeline



Electrical Distribution System

- The Bay Park STP operates its own Power Generation Facility
- Average power is 5500kW
- Four Generators rated at 3600kW, 2,400V, 3 phases, 60Hz each
- Fueled by diesel, natural gas and digester gas.
- Power is distributed via underground duct banks through unit substations, switchgear, motor control centers (MCCs), distribution panels, and lighting panels.



Electrical Distribution System

- The Long Island Power Authority (LIPA) provides service rated at 3750kVA
- Provides minimal standby power in the event the Power Generation Facility is not available.
- Supplementing the LIPA service, the plant has three 1,000kW, 2400V, 60Hz diesel powered Caterpillar emergency standby generators.



Auxiliary Caterpillars



Electrical Distribution System

- Power Generation Facility's four main engines to the 2400V Main Switchgear.
- Power is Distributed throughout the Plant at 2400V.
- Six (6) Unit Substations which step down the voltage to the equipment utilization voltage of 480V, 3-phase.
- 2400V Switchgear in the Operations Building - PA Blowers.



Electrical Distribution System Assessment

- Lower Portions of Electrical Equipment was submerged.
- Evidence of Saltwater intrusion and corrosion.
- 1600 amp Circuit Breakers
- Vertical and Grounding Bus Bars
-
- 120V Transformer Cooling Fans
- Lighting Transformer
- Control Panels
- Duct bank system



Bldg 10

MCC damaged 2.5ft Seawater



Unit Substation 5



Unit Substation 4 -

Evidence of seawater infiltration through internal conduit



Final Clarifier Collector LCS



Saltwater Corrosion

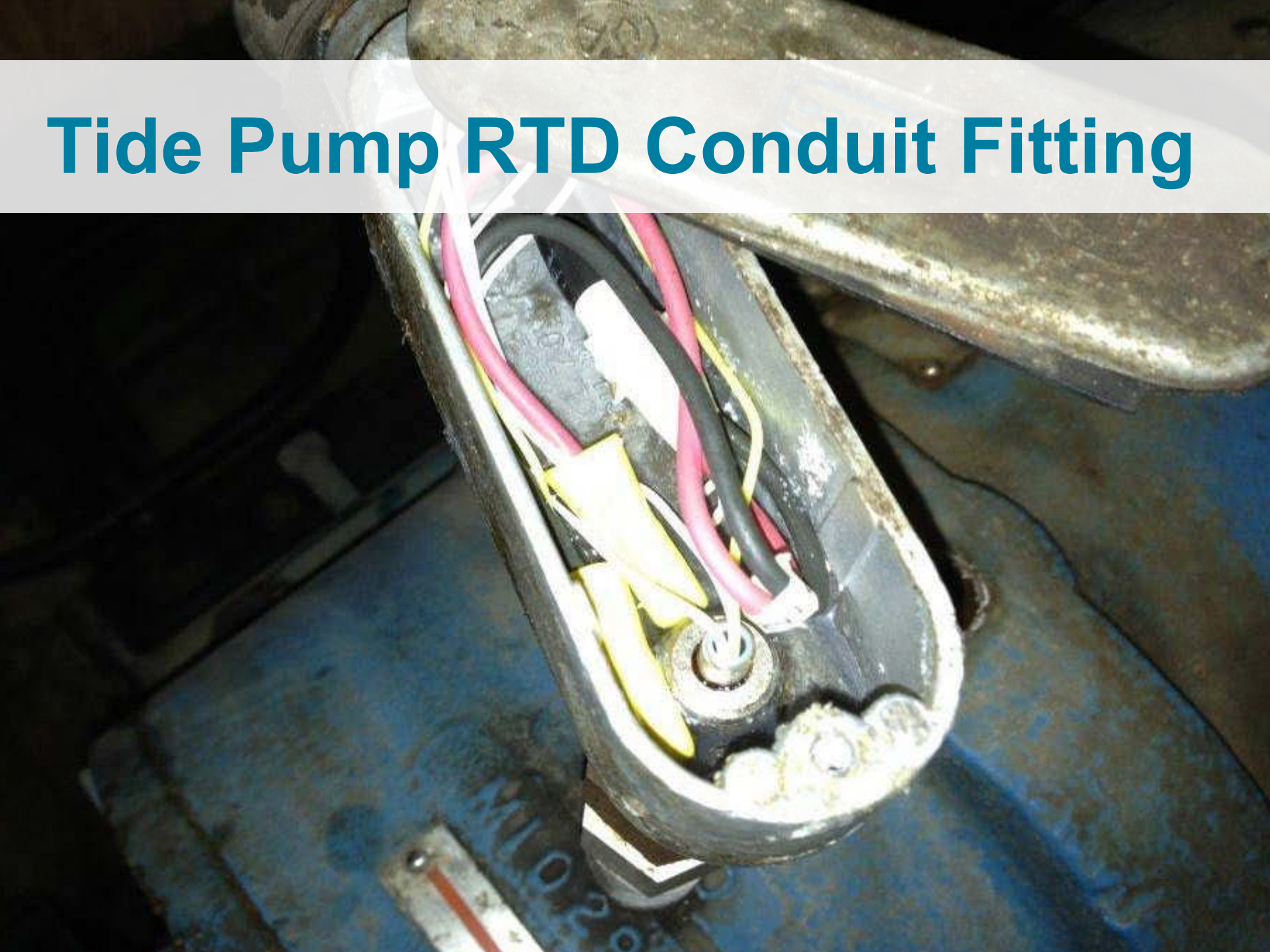


Raw Sewage Pump RTD Panel



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Tide Pump RTD Conduit Fitting



Polymer Feed Pump



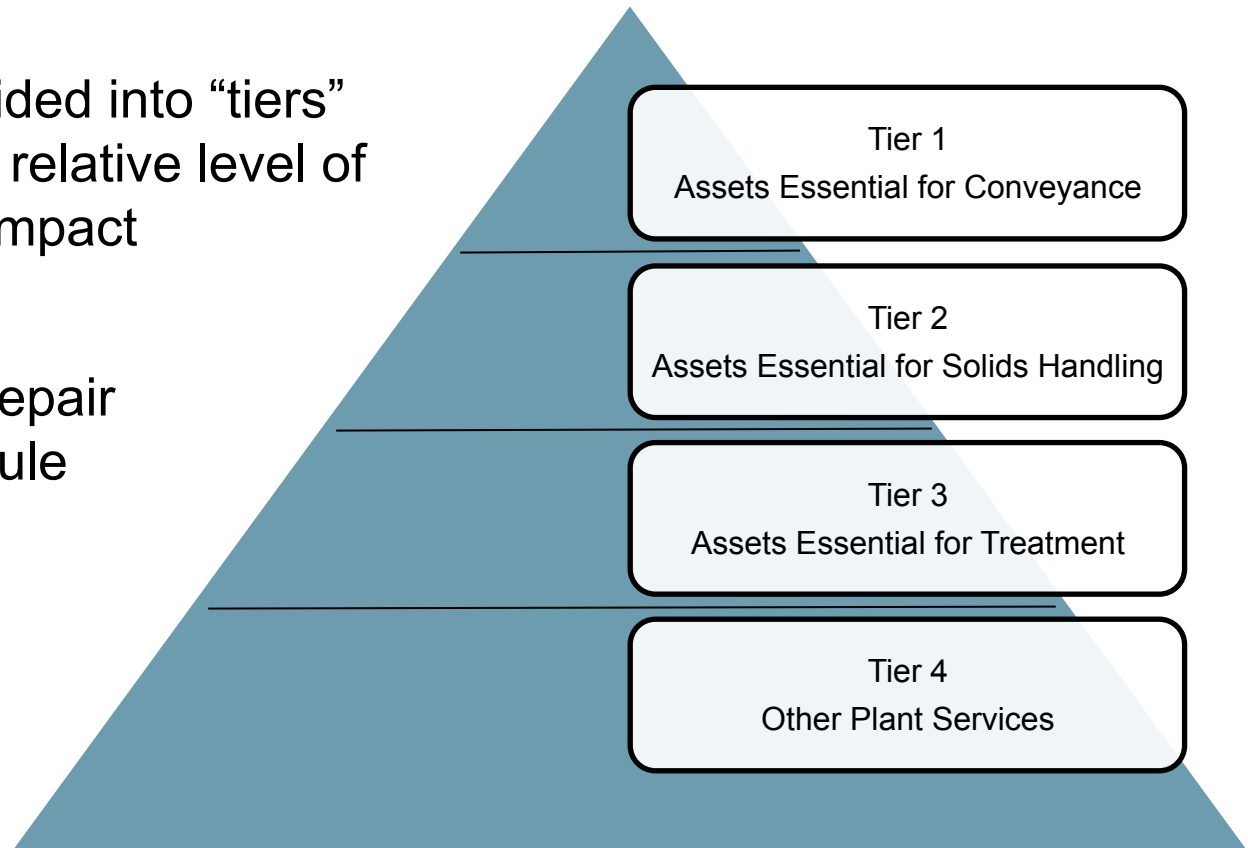
Electrical System Emergency Repair

- De-terminated and Grounded all Power Cables
- Implemented Stringent LOTO Procedure (1 –Key)
- Installed Necessary Temporary Systems
- Cleaned, Heated and Dried All Substations and MCCs
- Megger Tested all Power and Control Cable
- Bypassed Damaged Instrumentation and LCSs (Established SOPs)
- Cleaned and Baked Motors
- Purchased Replacement Motors
- Replaced Cables or Ran Temporary Feeds

Decision Making Process

Assets are divided into “tiers” based on their relative level of criticality and impact

Replace or Repair
Cost & Schedule



Temporary Generators



Temporary Generators



Temporary Tide Pumps



Temporary Sludge Dewatering



Final Clarifier Collector and Scum Drives



DISCUSSIONS and QUESTIONS

