2020 ANNUAL
CONFERENCE & EXHIBIT

NEWEA
WORKING FOR WATER QUALITY

MDC

In association with
ARCADIS ch2m Brown AND Caldwell

January 29, 2020

SESSION 26
CSO/WET WEATHER 2:
PROJECTS BIG AND BIGGER IN CSO

HARTFORD METROPOLITAN DISTRICT WET WEATHER EXPANSION PROJECT PHASE 2 – NEW 200 MGD WET WEATHER TREATMENT FACILITIES

PRESENTERS – Jeff Bowers, MDC and Brian McGuire, Arcadis

Presentation Agenda

- The Metropolitan District Overview
- Project Drivers and Goals
- Wet Weather Treatment Facilities In-Depth
- SCADA Implementation
- Other Project Elements
- Questions

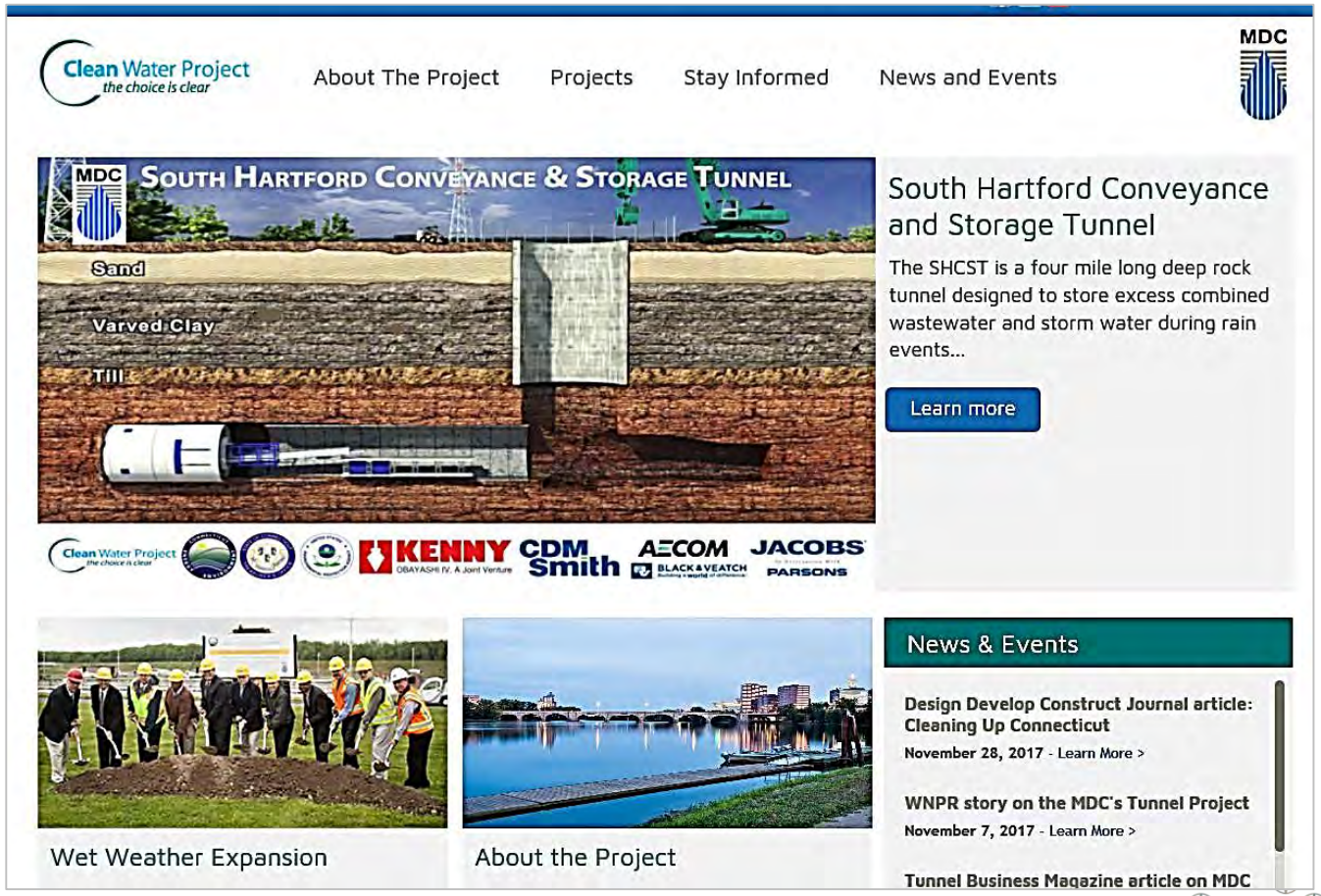
MDC Overview

- Established in 1929, first on CT River to provide sewage treatment
- Serve 8 Member Towns
  - Responsible for serving 400,000+ customers
- Full-service utility
  - Water Supply, Water Treatment, Distribution Collection, Wastewater Treatment, All support services
- All WPC facilities operate continuously, 24hrs/day, 365 days/year

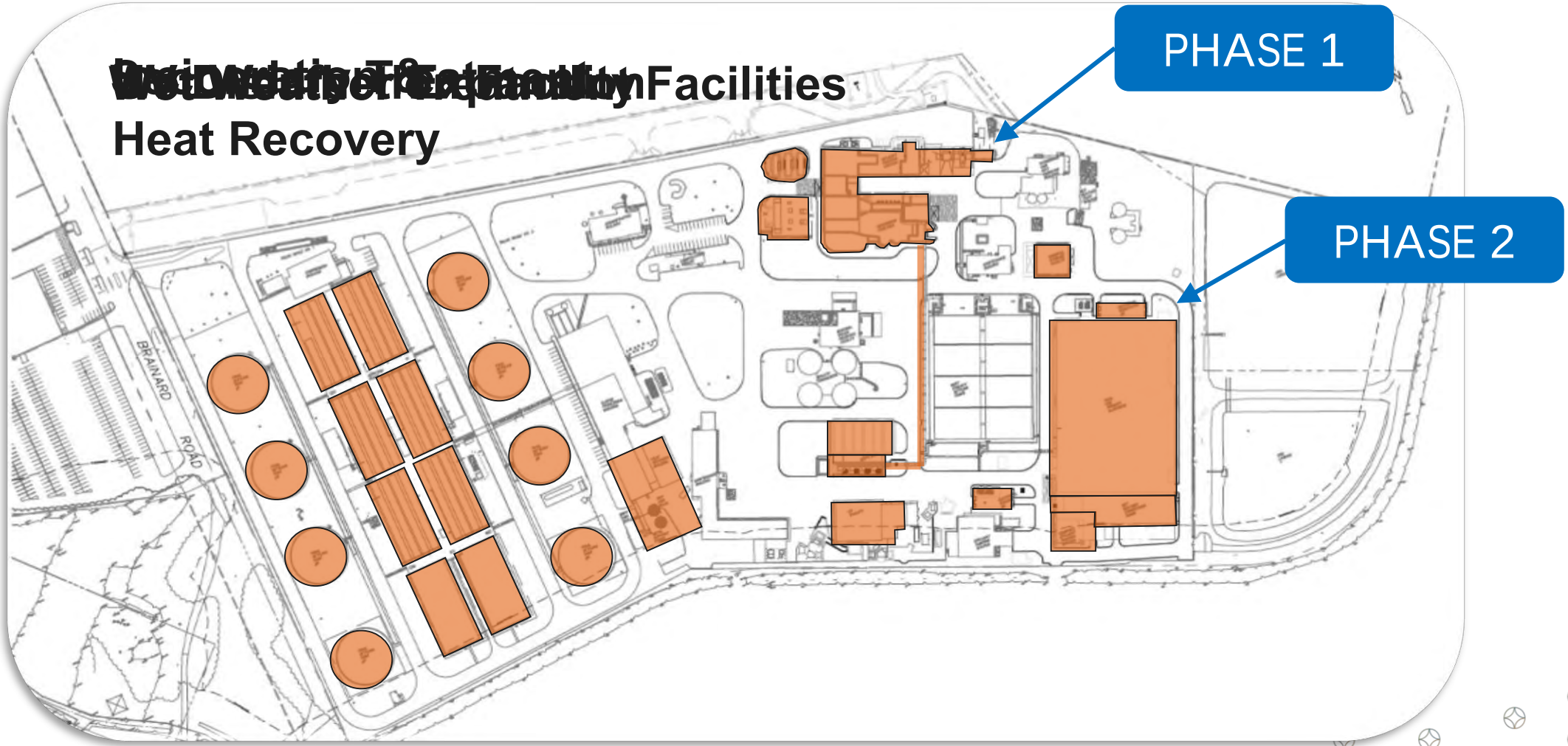
Project Driver – Clean Water Project

5 Components to the Solution:

1. Eliminate All Sanitary Sewer Overflows (SSOs)
   - Reduction of Combined Sewer Overflows (CSOs)
   - Reduction of Inflow and Infiltration (I/I)
   - Reduction of total nitrogen discharge from the wastewater treatment facilities
2. Expansion of the HWPCF Treatment Plant
3. Sewer Separation
4. Construction of South Hartford Conveyance & Storage Tunnel
5. Consolidation of Interceptor Pipes



Hartford WPCF Overview

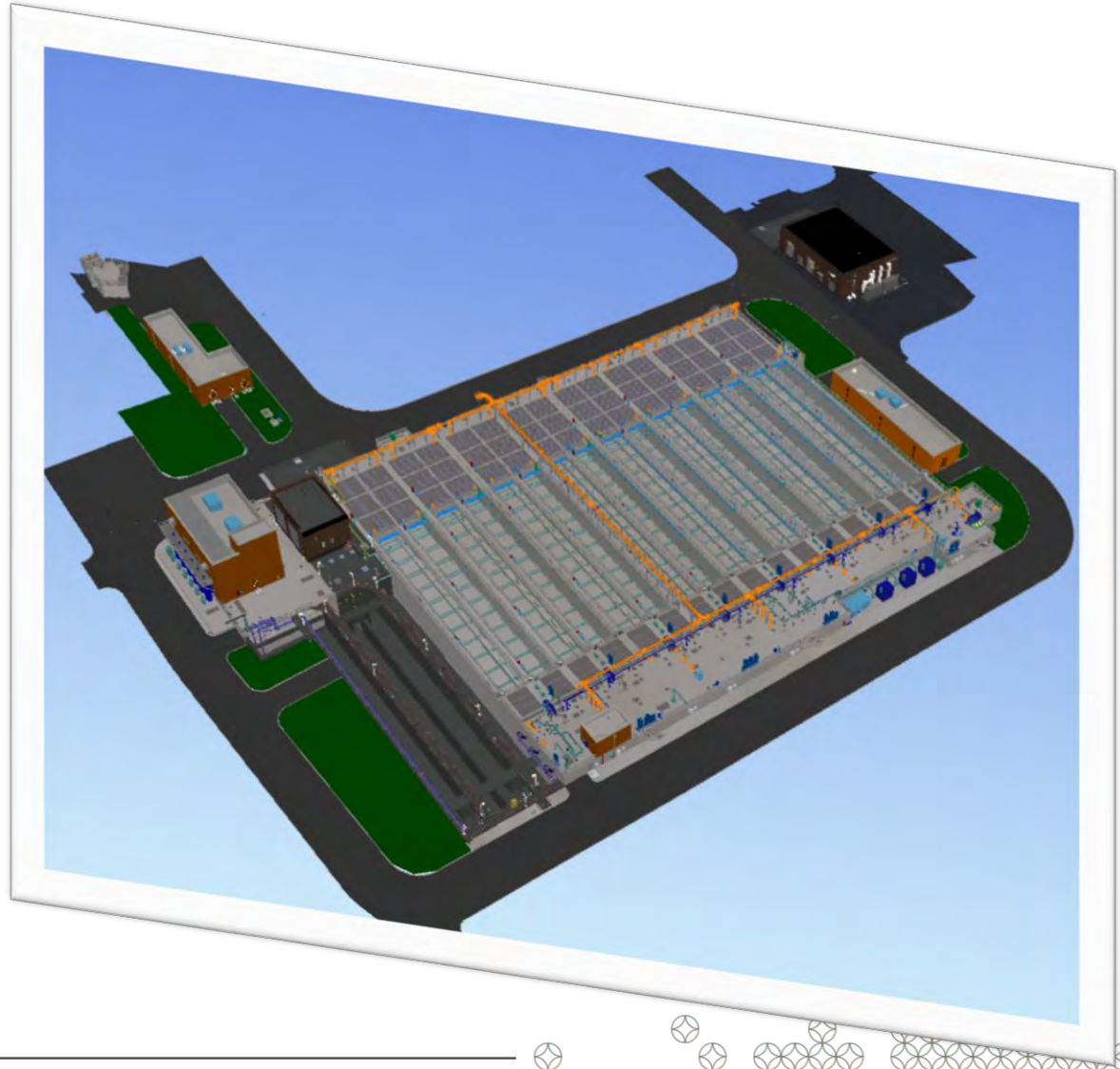


Phase 1 - Headworks Facility Expansion

- Bar Rack Facility
- Influent Pump Station
- Fine Screens and Screening Handling
- Grit Removal
- Odor Control

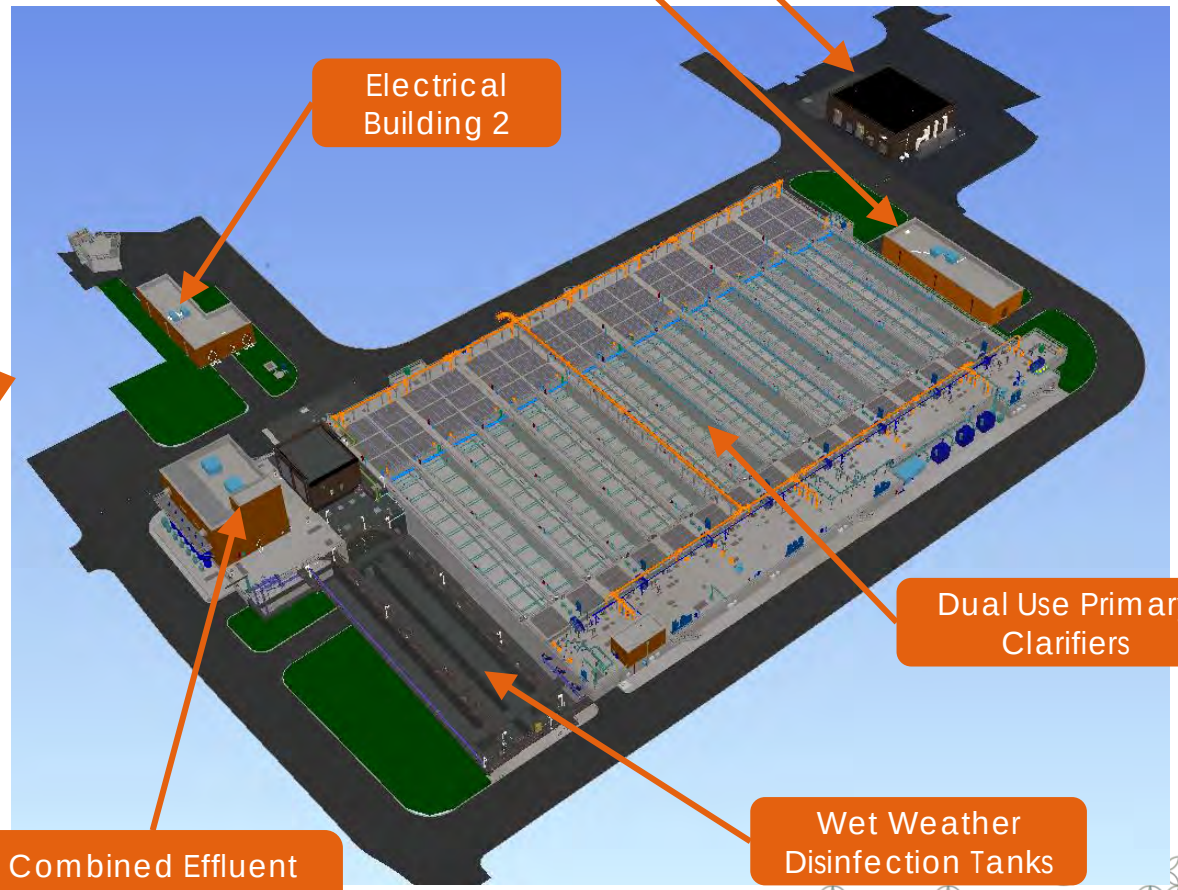
Goals Phase 2 - Wet Weather Treatment Facilities

- Gravity conveyance from Primary Treatment to Secondary and Wet Weather treatment Systems
- Treatment Facilities with capacity to handle 200 MGD
- Expanded and Innovative “Dual Use” Primary Treatment System
- Maximizing flow to Secondary Treatment during Wet Weather Events
- Expansion of discharge capabilities
  - Maximize gravity flow

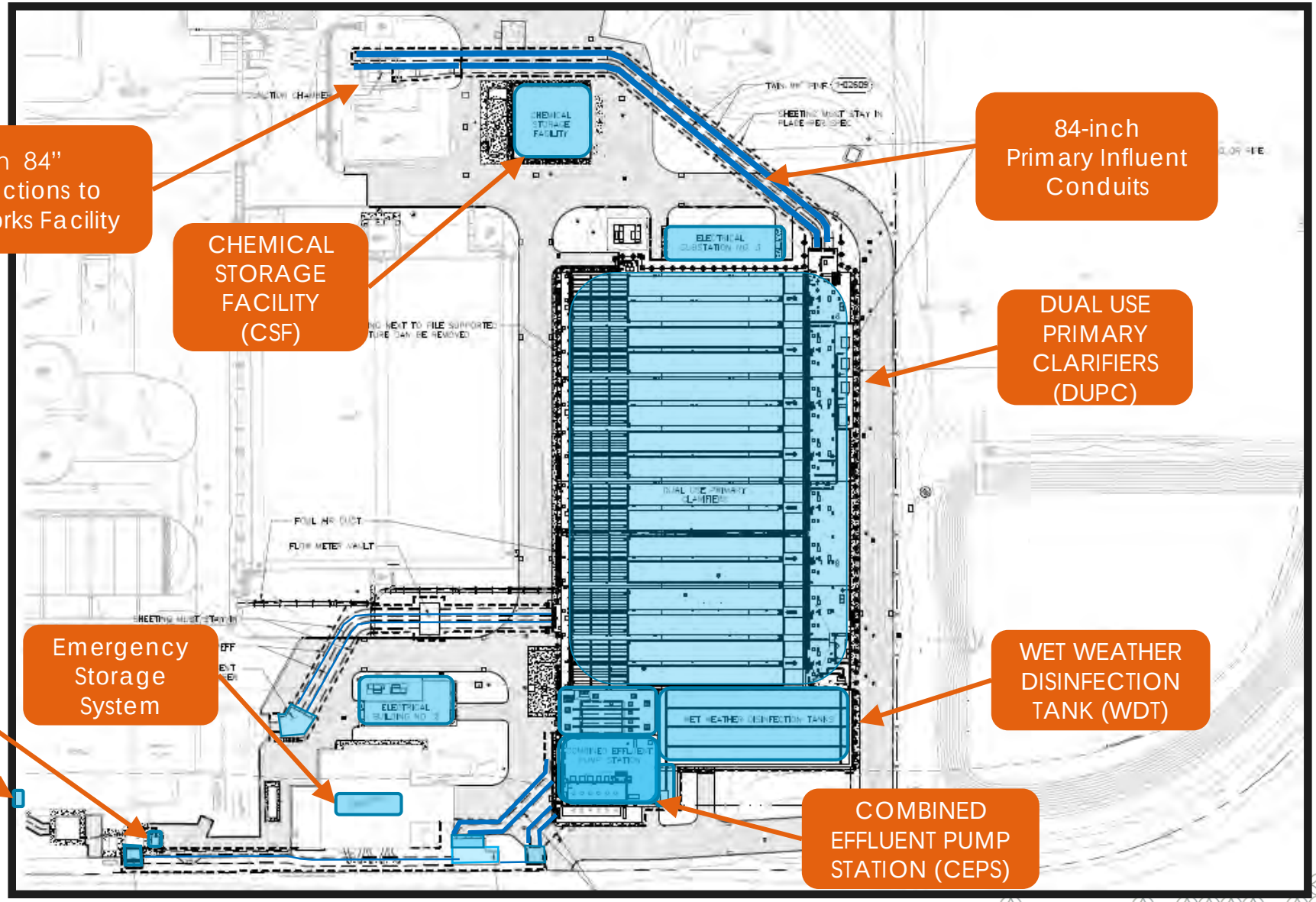


Phase 2 - Contract 2012-21

- 200 MGD Primary Treatment Capacity
- 110 MGD Wet Weather Treatment Capacity
- 200 MGD Combined Plant Effluent / Wet Weather Flow Pumping and Gravity Discharge Capability



Process Flow Stream



Dual Use Primary Clarifiers

Dual use refers to the ability for the clarifiers to operate under different modes

- Mode 1 – Dry Weather
- Mode 2 – Wet Weather
- Mode 3 - Chemical Enhanced Primary Treatment (CEPT)
- 8 Primary Rectangular Clarifiers
  - Total Area: 75,000sq ft
  - SOR of 1,200 gpd/sq ft at 90 MGD

Dual Use Primary Clarifiers

Dry Weather Mode

Wet Weather Mode

Dual Use Mode

- Addition of Coagulant (ferric or alum) to influent
  - 1 – 2 minute contact time
  - Dose of 20 – 50 mg / L
- Addition of Flocculant (polymer) to forebay
  - Dose of 0.5 – 1.5 mg/L

Dual Use Primary Clarifiers

- 3 Channel Mixing Blowers (2,500 scfm/blower)
- 2 Chemical Feed Blowers (120 scfm/blower)

Dual Use Primary Clarifiers

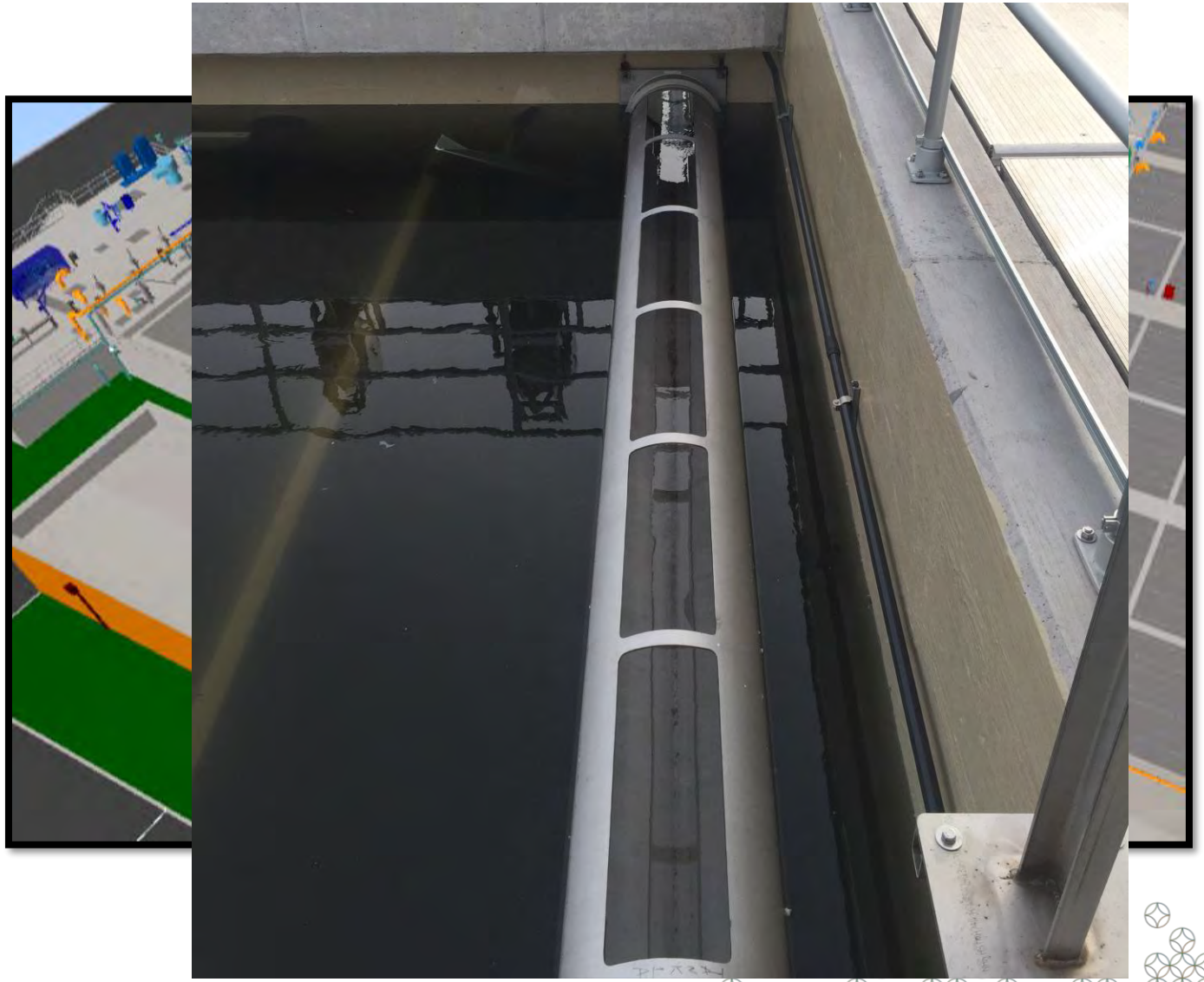
- 12 Rotary Lobe Pumps (570 gpm/pump)
- 12 Sludge Grinder
- 2 Clarifier Drain Pumps (1600 gpm/pump)
- 6 Gallery Sump Pumps

Dual Use Primary Clarifiers

FRP Effluent Troughs

Primary Scum

- 16 Motorized Dipping Weirs
- 4 Submersible Chopper Pumps (600 gpm/pump)

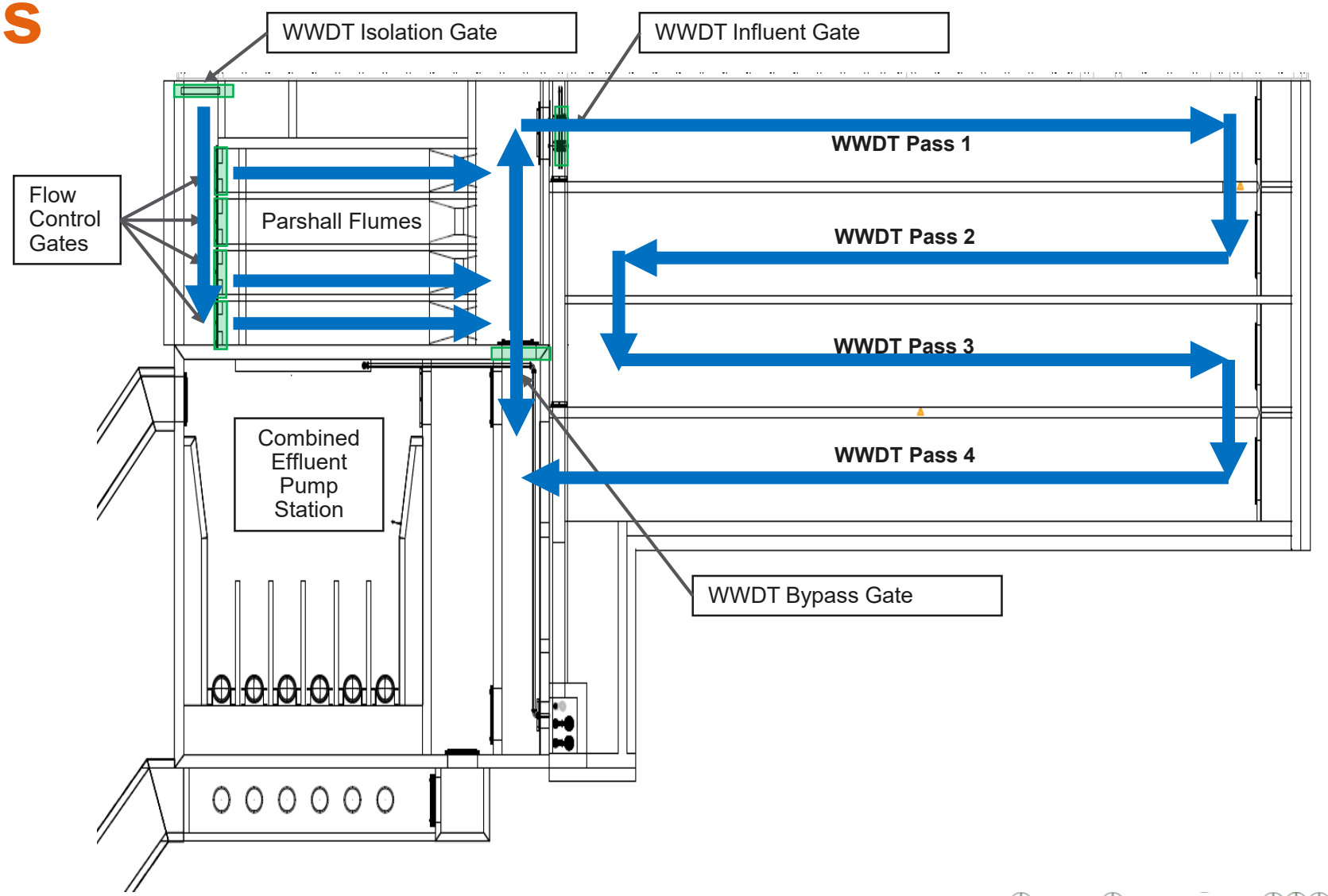


Chemical Storage Facility

- FRP Storage Tanks
  - 3 Coagulant 12,000 gal each
  - 2 Polymer 2,000 gal each
- 3 Coagulant Feed Pumps
- 2 Polymer Blending Units
- 1 Polymer Transfer Pump
- 4 Chemical Sump Pumps
- Air compressor

Flow Control Gate and Parshall Flumes

- 4 motor operated slide gates
- 4 Parshall Flumes
- 2 Discharge paths based on season
  - Disinfection through WWDT Influent Gate
  - Bypass through WWDT Bypass Gate



Wet Weather Disinfection Tank Hypochlorite Storage and Feed

- 2 FRP Storage Tanks
  - 7,000 gal each
- 3 Metering Pumps
- 1 Transfer Pump
- 2 sample pumps
- 2 sump pumps
- 2 Cl Analyzers
- Air compressor
- 4 Mixers

Wet Weather Disinfection Tank

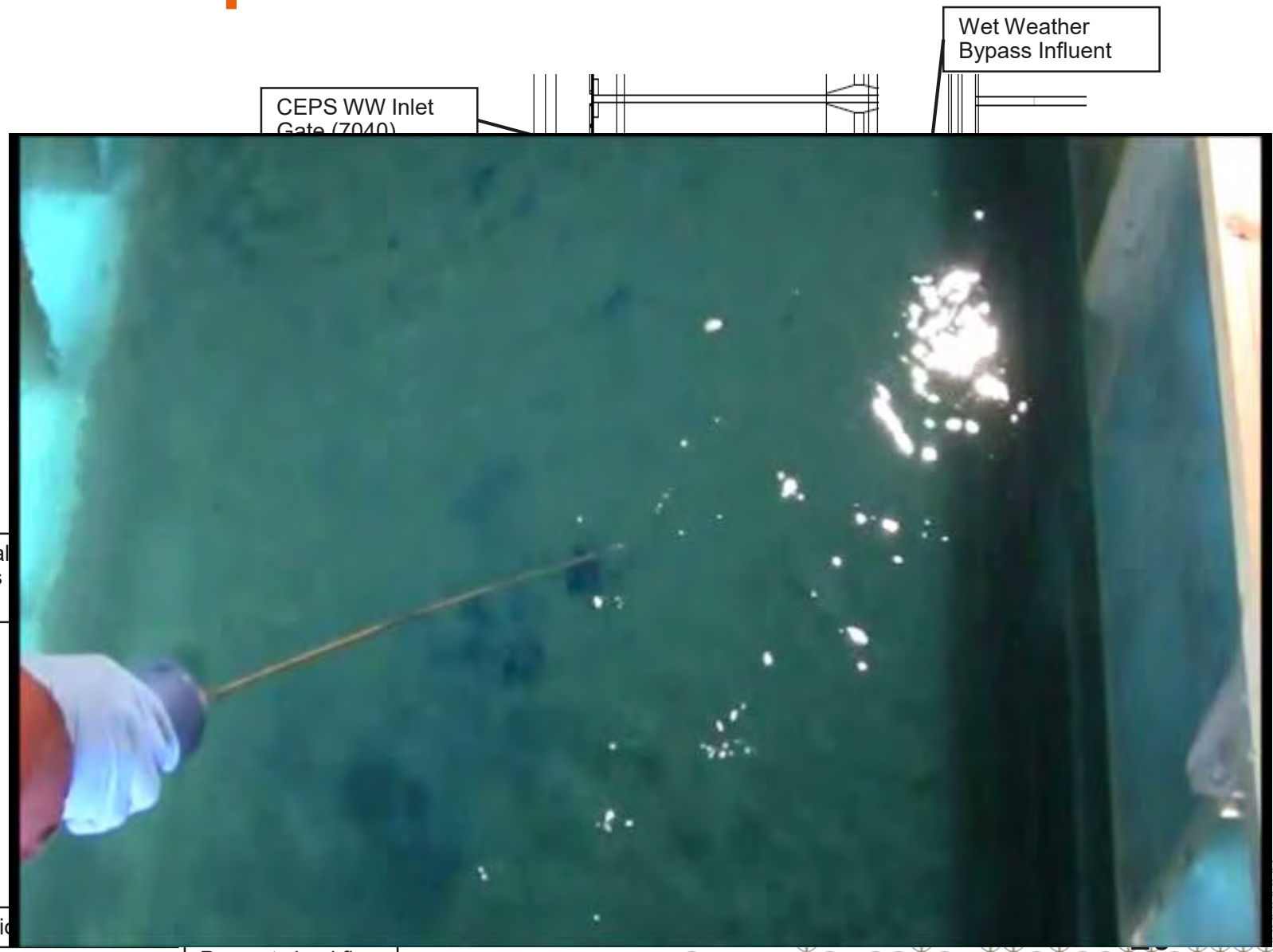
- Seasonal Operation
- 110 mgd (4.82 m^3/s) capacity
- Four passes - 16′ W x 165′ L
  (six passes for future flow)
- 10-minute chlorine contact time,
  10 mg/L design dosing rate, 5 mg/L dosing rate during CEPT operation of DUPC
- 2 sample pumps and Chlorine analyzers
- 4 Passes
  - 16′ wide & 173′ long
- 4 Flushing Gates
- Dewatering Pumps
  - 2 - 4,300 gpm/pump
  - 1 - 100 gpm/pump

Combined Effluent Pump Station

- Design Flow
  - Current 200 mgd (8.76 m3/s)
- Design River Level: Elevation 0-32 feet (500-year Flood)
- 6 pumps: 5 Duty, 1 Standby – 40 mgd (1.75 m3/s) each

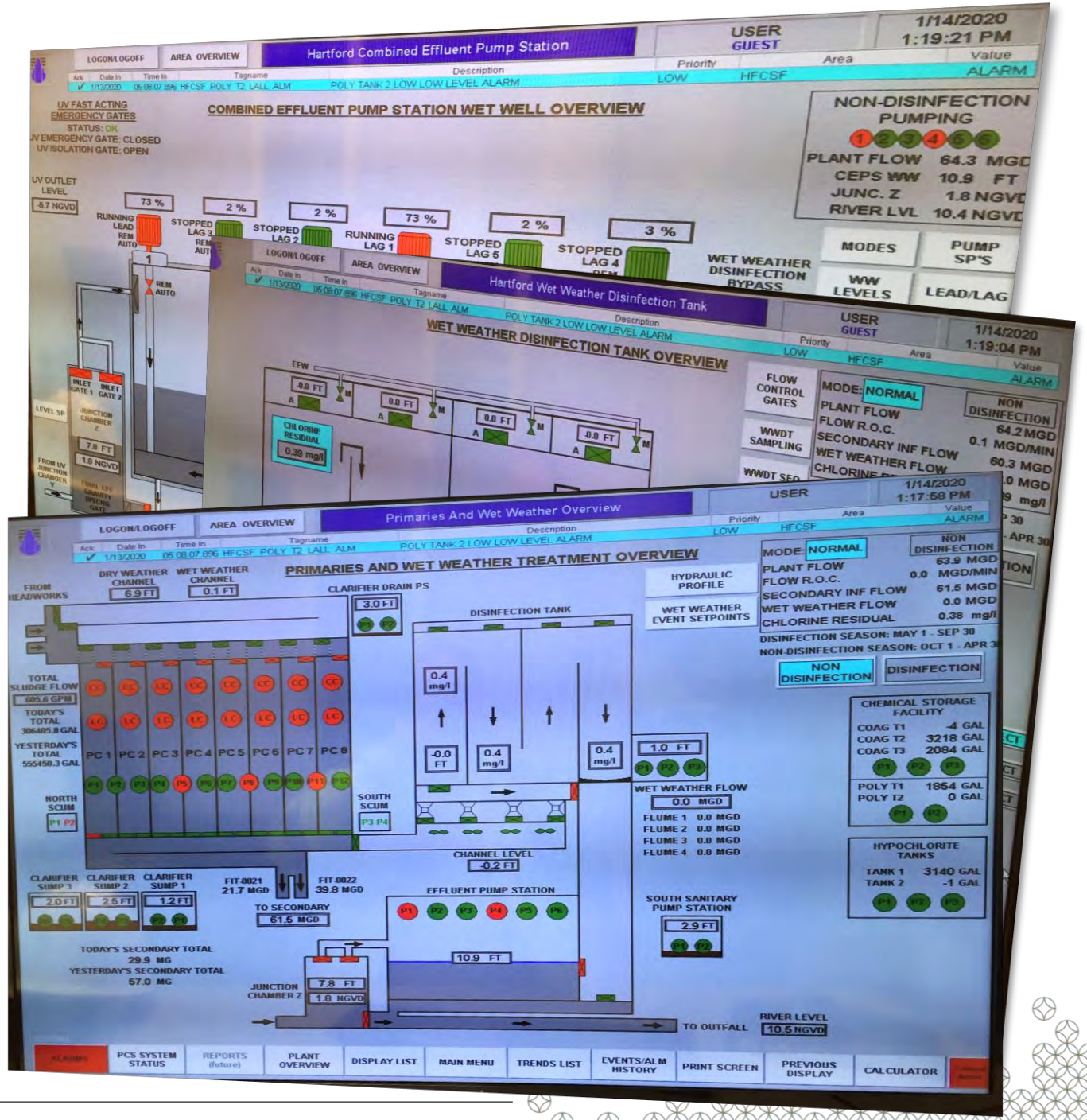
Combined Effluent Pump Station

- Wet Weather Gravity Flow
- Combined Final Effluent and Wet Weather Flow
- Physical Modeling
  - Flow distribution to pump suctions
  - Flow patterns, free and subsurface vortex formation and swirl
  - Assure satisfactory performance, based on the Hydraulic Institute Standards, ANSI/HI 9.8-1998 (HIS) acceptance criteria.



SCADA Implementation

- Operator/Maintenance Personnel Workshops
- Control Strategy Development
  - Master Wet Weather
  - High Rate Disinfection
  - CEPT Strategies
  - Effluent Discharge
- Desktop Simulation/ Demonstration
- Facility “off-line” testing
- Facility “on-line” testing



Other Project Elements – eOM & CMMS

- System O&M Manuals
- Normal/Routine Procedures (SOPs)
- Process Design Criteria
- Operator Log Entries
- Troubleshooting
- Training Documents
- Record Drawings
- Equipment Lists
- Control Descriptions

Tablet & Phone Accessible

Acknowledgements

Questions?

Contact Information

Brian McGuire
Project Civil Engineer
Arcadis
Middletown, CT
Brian.McGuire@arcadis.com
860-503-1451

Jeff Bowers
Plant Manager
MDC
Hartford, CT
J.Bowers@themdc.com
860-278-7850 x3548