



## CHALLENGES IN UPGRADING THE CITY OF CHICOPEE'S LARGEST WASTEWATER PUMP STATION

### 2023 NYWEA-NEWEA Joint Spring Conference

Quinn Lonczak – Project Supervisor City of Chicopee  
Joe Popielarczyk, PE – Project Manager Tighe & Bond

# PRESENTATION AGENDA

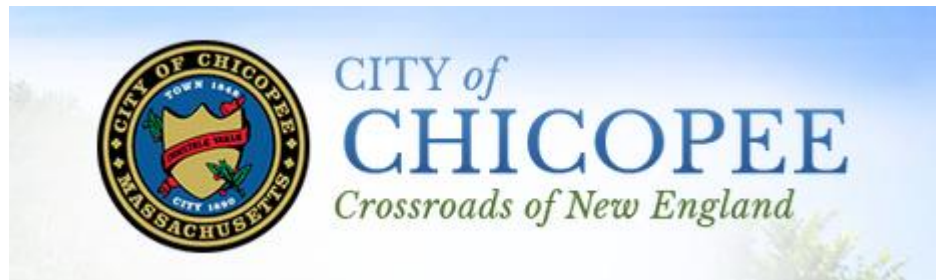
- **System Background**
- **Jones Ferry WWPS**
- **Proposed Improvements**
- **Challenges**
- **Conclusion**
- **Questions**

A detailed street map of Chicopee, Massachusetts, showing the Connecticut River, Westover Metropolitan Airport, and various highways. The text 'SYSTEM BACKGROUND' is overlaid in large red letters in the center of the map.

# SYSTEM BACKGROUND

# CITY OF CHICOPEE

- **Borders Springfield, MA**
- **30 mi. North of Hartford, 85 miles West of Boston**
- **Intersection of Interstates 90 & 91**
- **Population of 55,560 spread over nearly 24 sq. miles**
- **Sits upon both the Chicopee and Connecticut Rivers**
- **Incorporated 1848: River power – largely industrial**
- **Extensive wastewater and water infrastructure**
- **Combined sewer system - Approx. 30% remains**



# CITY OF CHICOPEE WASTEWATER SYSTEM

- **Gravity sewer mains**

- 215 miles of gravity sewer ranging in size from 4" to 72"
- Present collection system largely constructed 1950s - 1970s
- Under Consent Decree for sewer separation
- Combined sewer system with many locations separated over the past 15 years
- Over \$210,000,000 spent in CSO separation projects

- **15,756 service connections**

- 14,809 Residential
- 843 Commercial
- 15 Industrial
- 89 Other

- **Sewer force mains**

- 10 miles of sewer force mains ranging in size from 2" to 36"



# CITY OF CHICOPEE WASTEWATER SYSTEM

- **Pumping stations**

- 21 pumping stations throughout the City
- Stations capacity as large as 19 million gallons per day

- **Combined sewer overflow facility**

- Constructed in 2010
- Located adjacent to the Jones Ferry WWPS
- Works in tandem with the Jones Ferry WWPS to maximize treatment of flow through sanitary sewers during rain events

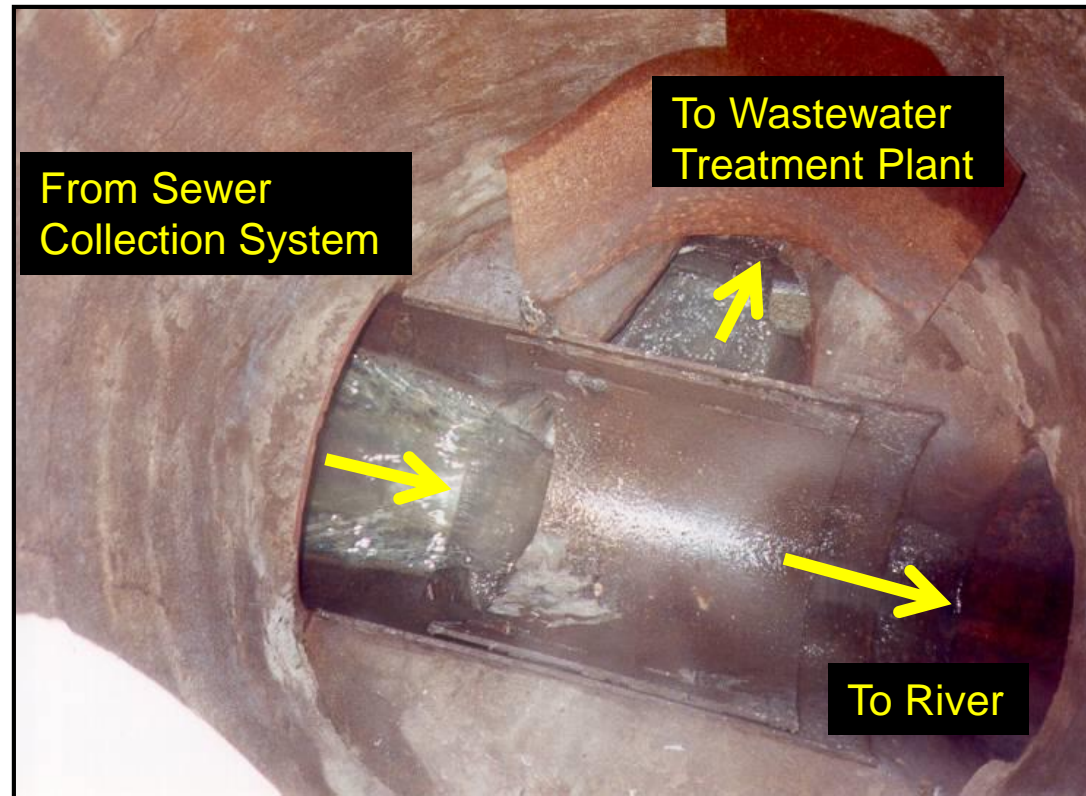
- **Water pollution control facility**

- Design capacity of 15.5 MGD
- Max full treatment capacity of 25 MGD
- Bypass capacity of 40 MGD which includes screening, grit removal, and primary treatment



# CITY OF CHICOPEE WASTEWATER SYSTEM

- **Consistent CSO separation prevented improvements to aging vertical infrastructure**
- **WWPS and WPCF Capital Improvements Plan completed in 2016**
- **Jones Ferry WWPS most critical PS in system due to capacity and connection to the Connecticut River Interceptor**



# JONES FERRY WWPS





# JONES FERRY WASTEWATER PUMP STATION

- **Constructed in 1972**
- **Sized for an ultimate capacity of 19 MGD**
- **Contributes nearly half of the peak flow to the WPCF**
- **Located adjacent to the Connecticut River**
- **Two CSO structures local to the PS**



**LOCATION MAP**  
SCALE: 1"=500'

# WHAT ARE THE ISSUES?

- Much of the PS equipment original to its construction
- Frequent pump and VFD failures and issues with MCC
- Operating at a reduced capacity leading to strain on operations staff and the CSO Facility



# WHAT ARE THE ISSUES?

- **PS receives combined sewer flow including significant grit and rags**
- **Many of the wet well slide gates inoperable making cleaning/grit removal difficult**
- **Venturi flow meter often offline or unreliable**
- **No bypass pumping connection**





**PROPOSED  
IMPROVEMENTS**

# PHASED APPROACH

- **Due to available funding, project split into phased approach**
- **Phase 1 construction from March 1, 2021 to April 8, 2022**
- **Total construction cost of \$970,000 funded through City funds**
- **Phase 2 construction started July 2, 2021 and ongoing**
- **Approximate construction cost of \$3,850,000 funded through the CWSRF Program**

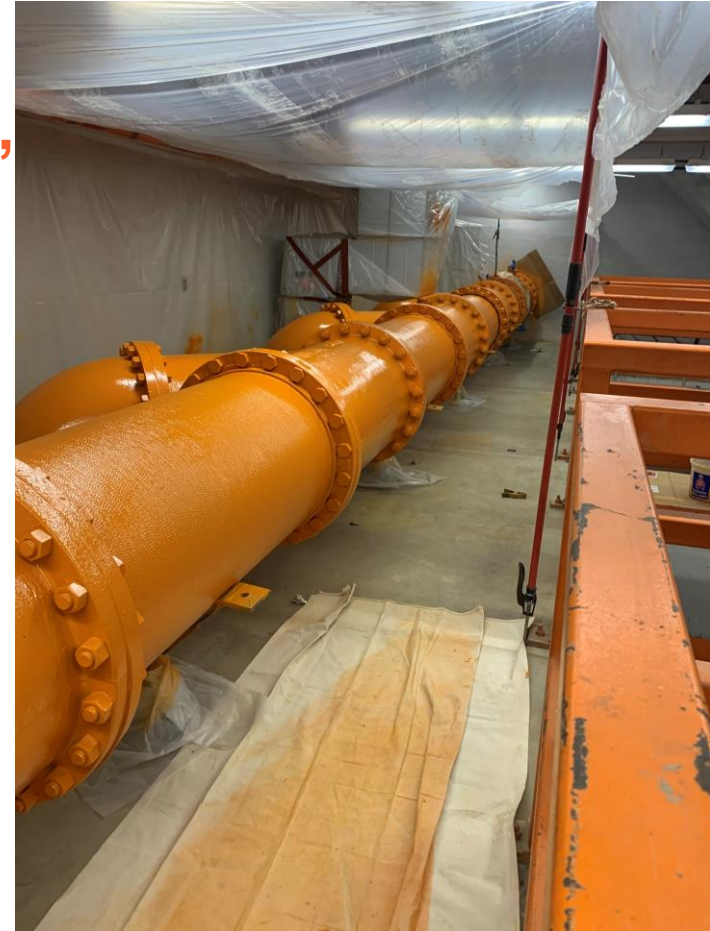
# PHASE 1 IMPROVEMENTS

- Replace pump 1, piping, valves, level controls, and sewage grinder
- Replace lights and diesel generator
- Replace wet well HVAC system and complete various structural improvements



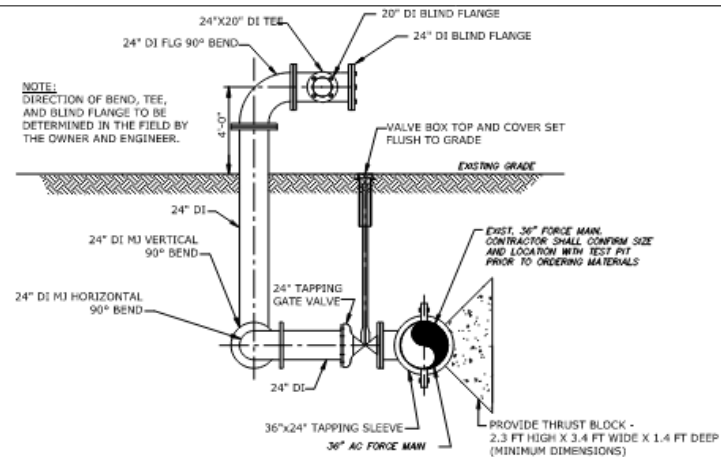
# PHASE 2 IMPROVEMENTS

- Replace pump 2-4, remaining piping and valves, and flow meter
- Provide new second sewage grinder, replace bubbler level control, wet well channels, slide gates, and add three motorized slide gates and manual stop gates
- Replace MCC, ATS, electric service, and provide gas detection system
- Replace remaining HVAC system, complete various plumbing and structural improvements including new grating and handrails



# BYPASS PUMPING

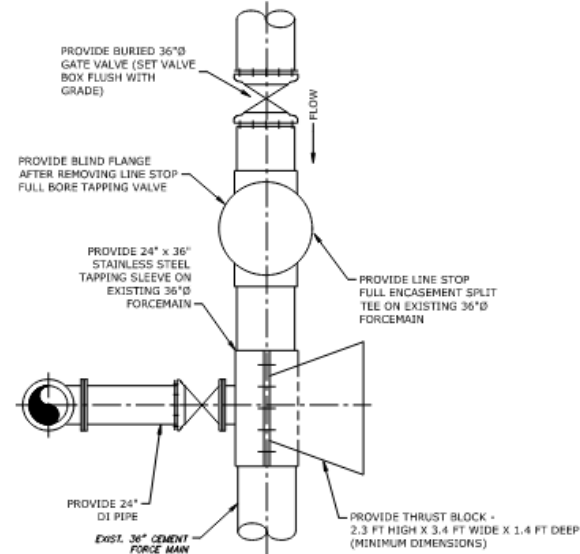
- As a result of Phase 2 improvements, bypass pumping required
- No bypass pumping connection and therefore included as part of the project
- Connected to 36-inch asbestos cement force main



**BYPASS PUMPING CONNECTION DETAIL**  
NO SCALE

**NOTES:**

1. PROVIDE RESTRAINED JOINTS FOR ALL PIPE AND FITTINGS.
2. CONTRACTOR TO FIELD VERIFY DIMENSIONS OF SEWER FORCE MAIN AT BYPASS PUMPING TAPPING SLEEVE AND LINE STOP LOCATIONS. SIZE TAPPING SLEEVE AND LINE STOP TO MATCH.
3. THRUST BLOCK DIMENSIONS ARE NOTED ABOVE.





# BYPASS PUMPING CONNECTION INSTALLATION

- 36"x24" tapping sleeve and valve connection
- 24"x20" tee at grade for bypass connections
- Install new pipe section and 36" isolation valve utilizing temporary line stop
- Permanent slide gate provided on wet well influent for future use while bypassing PS



# CHALLENGES



# PROJECT PHASING

- Project split into two phases due to available funds
- At time of Phase 1 bid, PS only had 2 reliable pumps
- Phase 2 expedited out to bid as soon as funding available
- Coordination challenges between projects and contractors
- Phase 1 and Phase 2 had same general contractor which helped but all different sub contractors



# WORK SEQUENCING AND EQUIPMENT PROCUREMENT

- Certain equipment difficult to procure (VFDs, generator, control panels, pumps, etc.)
- Sequencing work including bypass pumping implementation challenging

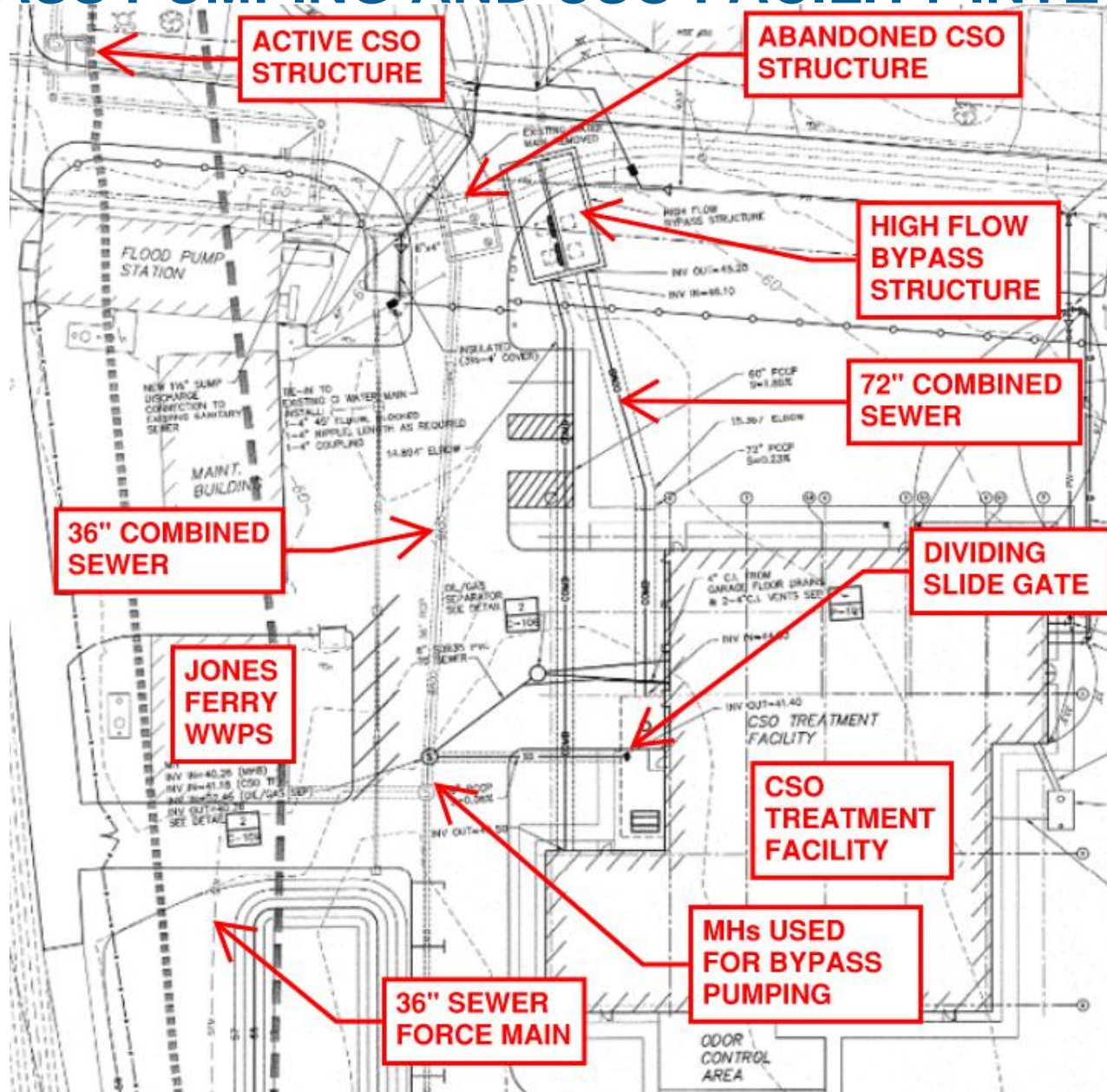


# BYPASS PUMPING AND CSO FACILITY INTEGRATION

- **Bypass pumping system designed around ultimate capacity of 19 MGD**
- **Included four sound attenuated diesel driven pumps**
- **Each pump provided with own level indicating device and controller**



# BYPASS PUMPING AND CSO FACILITY INTEGRATION



# BYPASS PUMPING AND CSO FACILITY INTEGRATION

- **Non bypass operation of the CSO Facility utilizes PS wet well level to control dividing slide gate**
- **As PS wet well level rises, slide gate begins to shut sending flow to CSO Facility**
- **During bypass pumping operations, revised CSO Facility programming integrated to shut slide gate sooner to prevent untreated flow discharge**
- **Difficult to balance due to available bypass pumping wet well storage causing additional effort on operations staff at the CSO Facility**

# BYPASS PUMPING AND CSO FACILITY INTEGRATION

- Bypass pumping manholes: 200 gallons/ft storage
- PS wet well: 5,600 gallons/ft storage
- Difficult to maintain consistent pumping system
- Coordination with MassDEP to utilize CSO Facility for storage/treatment
- System forced to respond immediately to flow surges during wet weather





**CONCLUSION**



# CONCLUSION

- System hydraulics made bypass pumping very challenging
- CSO Facility utilized frequently during wet weather
- Project nearing completion with major equipment replaced between phases of project
- Bypass pumping provisions provided in future shutdown needed



A row of industrial pumps is shown in a facility. The pumps are grey with blue accents and are mounted on concrete bases. A large orange pipe is visible on the left side of the image. The word "QUESTIONS?" is overlaid in large yellow text across the center of the image. The background shows a ceiling with orange structural elements and a skylight.

**QUESTIONS?**