

LCA Board – ACT 537 Planning Program Management

May 8, 2023

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Agenda



- Short Term ACT 537 Activity Schedule
- AECOM Prior and Current Support Summary
- Schedule & AECOM Proposal
- 2023 Key Focus
- Major Interceptor Construction Considerations
- Q&A



Three Month Look Ahead (from 4/24/23)

Final Alternatives Analysis Authorization Request (April 24, 2023) → Completed

Individual meetings with Signatories (May 2023)

Program Manager Re-authorization Request (May 8, 2023)

KISS/DEP Meeting (May 16, 2023)

May/June/July KISS Monthly Meetings → 5/4/23 KISS Meeting

May/June/July preliminary stakeholder outreach

AECOM/KISS Long Term Sewer Planning Role

EPA Administrative Order

- 2013-2016 → long term sewer planning

DEP Act 537

- 2019 → Initial re-activation of planning
- 2020 → PTP direct discharge analysis with Jacobs
- 2021 → Minor 537 authorizations
- 2022 → Program Manager (PM) authorizations
- 2023 → Continued role as PM

AECOM Role as Program Manager

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Program Management

- Coordination
- Value Engineering
- Independent Review
- Regulatory Considerations
- Integrated Findings; Reporting & Recommendations



Jacobs



Prior AECOM Act 537 PM Authorizations

Regional Act 537 Plan: Program Management Authorization Request for FY 2022

Presented to: LCA Board of Directors
February 14, 2022

LCA Board – ACT 537 Planning Program Management

June 27, 2022

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Major Deliverables to Date

Admin

- Cost Revenue Benefit (CRB) Tool (2021)
- Miscellaneous Workshops (2020-ongoing)
- 2021 Technical Report
- 2023 Technical Report (*pending delivery*)

Conveyance

- Western Lehigh Interceptor Report (2020)
- PTP Direct Discharge FM Analysis (2021)

KIWWTP

- High-rate Treatment Pilot Reports (2022)
- CFD Main Influent Pump Station Analyses (2023)

PTP

- DRBC Regulatory Assessment (2021)

Current 537 Proposal:

AECOM Program Management, 2023 Amendment

Introduction:

- Program Management, 2023 Amendment (PM)
- Prior Board Authorizations in August 2020, February 2022, June 2022

Objectives:

- Continued collaboration with LCA and partners for Act 537
- Facilitate efforts, provide coordination and critical technical insight

Scope of Work:

- Five separate tasks (separate slides to follow)

Current 537 Proposal:

AECOM Program Management, 2023 Amendment

Deliverables:

- Separate slide to follow

Schedule:

- PM services through 2023
- Micro-Tunnel Feasibility Study by October 2023

Budget estimate:

- CPA = \$445,510
- PSA = \$405,510

Proposal Scope of Work

PTP Expansion/Rehabilitation Needs (Task A)

- Additional flow and load scenario analysis
- Load shifting impact on KIWWTP
- PTP MP review

KIWWTP Coordination (Task B)

- Alternate wet weather treatment scenario analysis
- Updating KIWWTP model for load shifting analysis

Proposal Scope of Work

Conceptual Micro-Tunnel Evaluation (Task C)

- Geotechnical research
- Tunnel technology evaluations
- Horizontal alignment identification

Arcadis Coordination (Task D)

- Collaboration of modeling and overall alternative evaluations
- Assist with identification of project elimination opportunities

General Coordination (Task E)

- General program management support
- Meeting attendance
- Updating/checking cost estimates as needed

2023 AECOM Key Focus Areas

Pre-Treatment Plant (PTP)

- Significant costs identified in early 2023 associated with Master Planning
- Assess projected costs related to impacts of projected growth and asset condition at PTP
- Reduce projected treatment costs at PTP
 - Evaluate managing more high-strength load within proposed anaerobic process
 - Shift organic load around the PTP and manage at KIWWTP



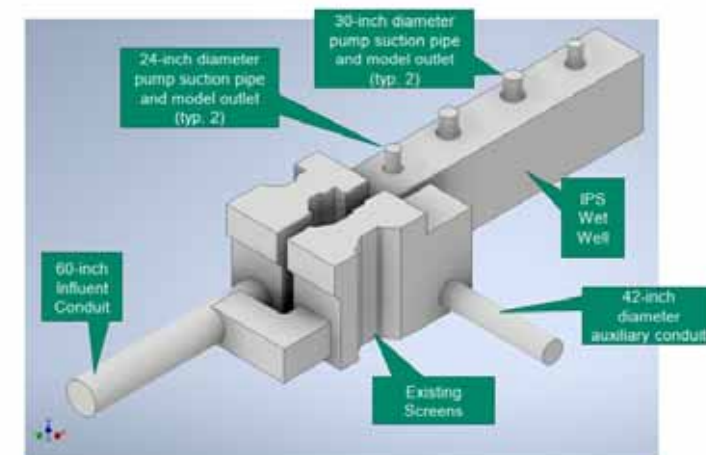
KIWWTP – Main Influent PS

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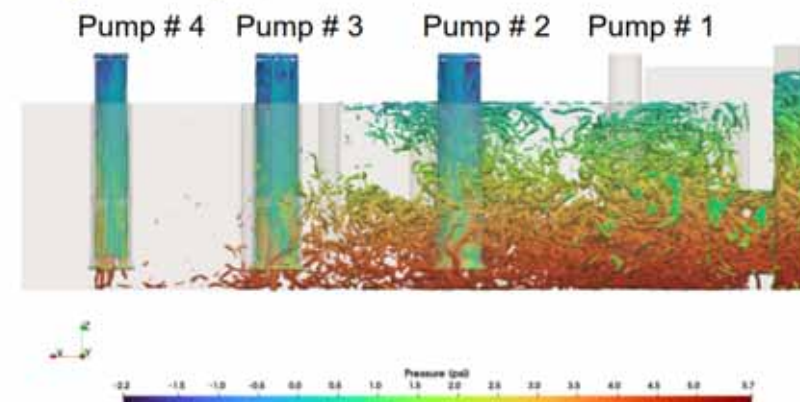
- Future Influent PS Needs Identified
- Support Improvement Considerations at KIWWTP
- Computational Fluid Dynamic Modeling of Retrofits to Exist Main PS



3D CAD Model Images (Isometric View) – Slide 1

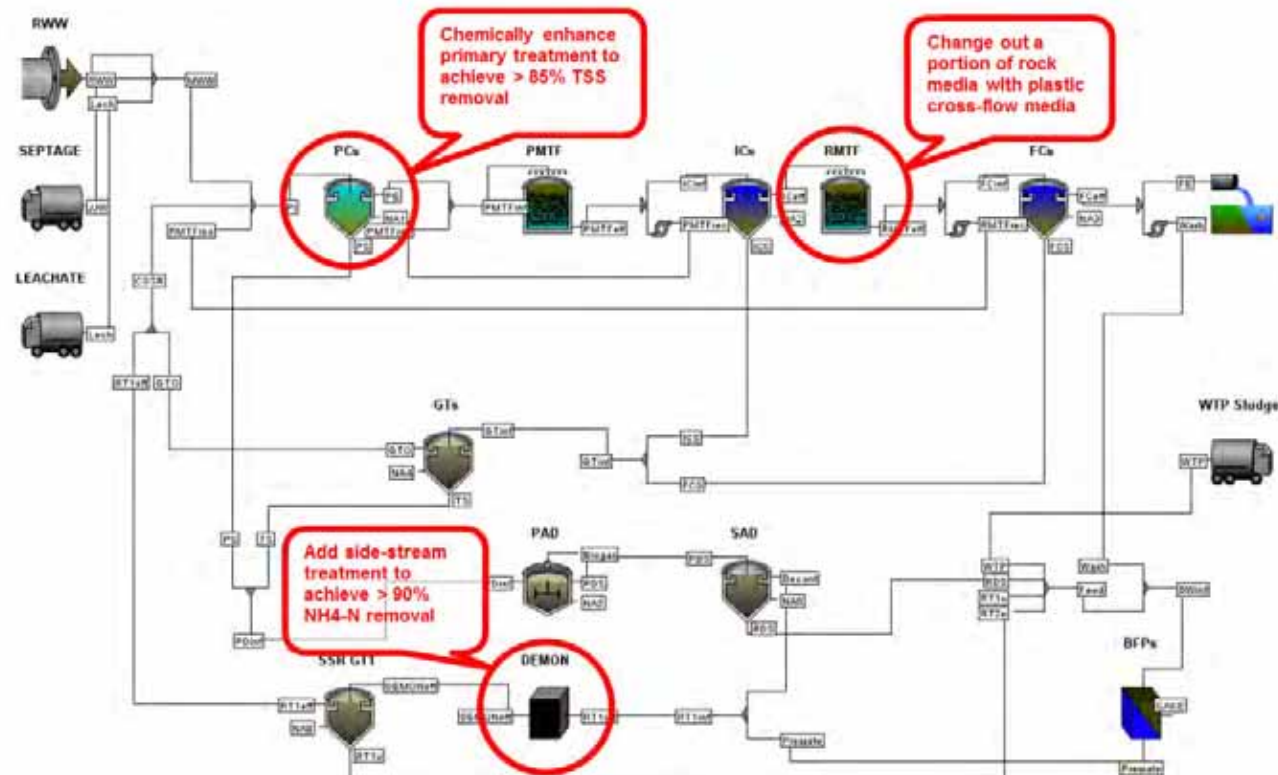


CFD Results – Baseline, Isosurface of Vortices, Threshold of 250, Colored by Pressure (psi)



KIWWTP – Process Modeling

- Process modeling of implications of sending more organic load to KIWWTP.
- Leverage model prepared in 2016 for additional simulations
- Assess needs to manage additional organic load at KIWWTP and maintain compliance



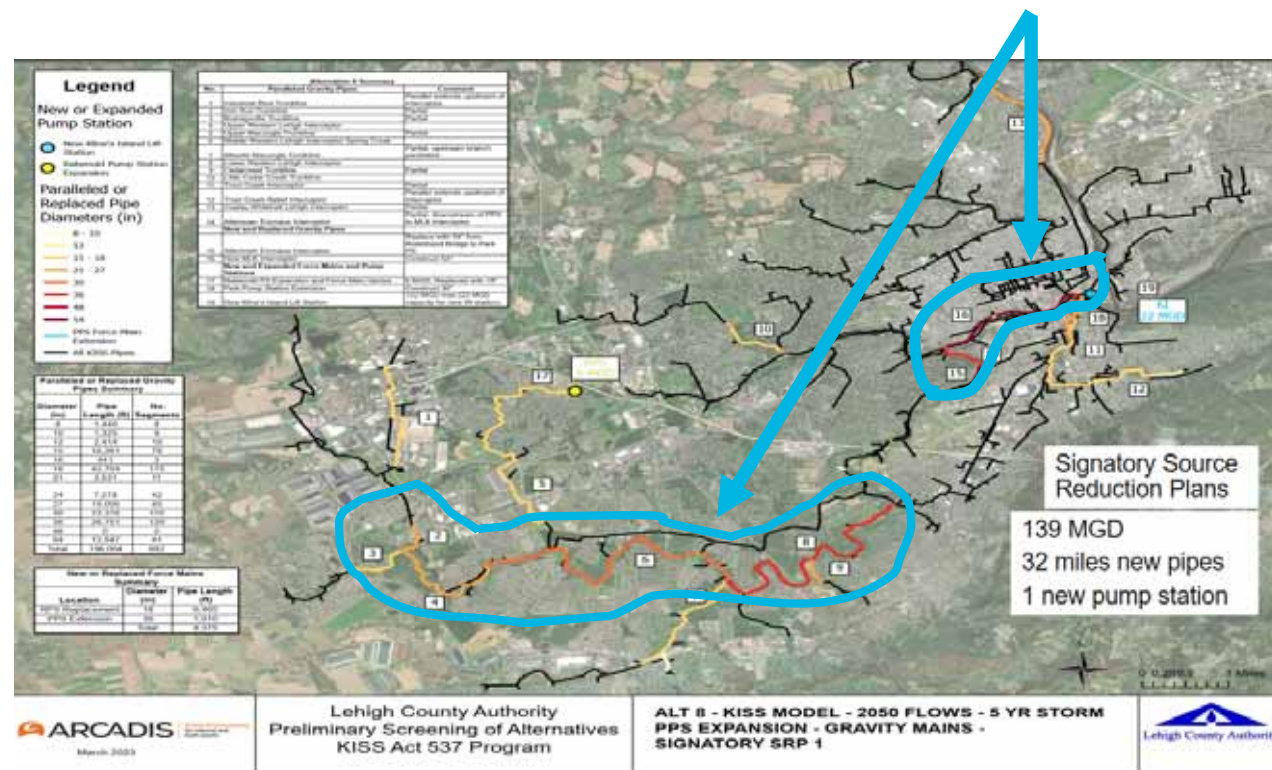
GPS-X layout of the upgraded Kline's Island WWTP

Core Conveyance Areas



- Support with Final Alternative Analysis
- Source Reduction and Conveyance Needs
 - Critical PADEP meeting 5/16/23
- PSOA Finding: Need for Little Lehigh Interceptor Improvements (in MLK drive)
 - Installation approaches
 - Need more understanding around Micro-tunnelling approach
- WLI Improvements vs. Additional by-pass Wet Weather Pump around

Final Alternative Analysis Focus Areas



AECOM Upcoming Deliverables

- Coordination with other consultants
- Evaluation of final screening of alternatives
- Refinement of wet weather scenarios
- Micro-tunneling Conceptual Evaluation Report
- Vetting technical evaluations (PTP, KIWWTP, Conveyance)
- Technical Memo for process modeling evaluations
- Permitting support PADEP and DRBC
- Conduct Risk-Register Workshop
- Compilation of updated opinions of probable construction
- Maintenance of Act 537 program schedule
- Revenue Tool Evaluations
- Documentation of key findings, decisions, and analyses completed for future inclusion in Act 537 Plan

PTP

Conveyance

KIWWTP

Administration Support

Large Interceptor Constructability Considerations

Non-Financial Considerations

– Construction challenges

- Dewatering needs
- Interceptor depths
- Rock
- Utilities
- Stream crossings

– Permitting

- Impact to sensitive stream corridors
- PADEP / DRBC
- Easement Requirements
- PNDI and Historical Considerations

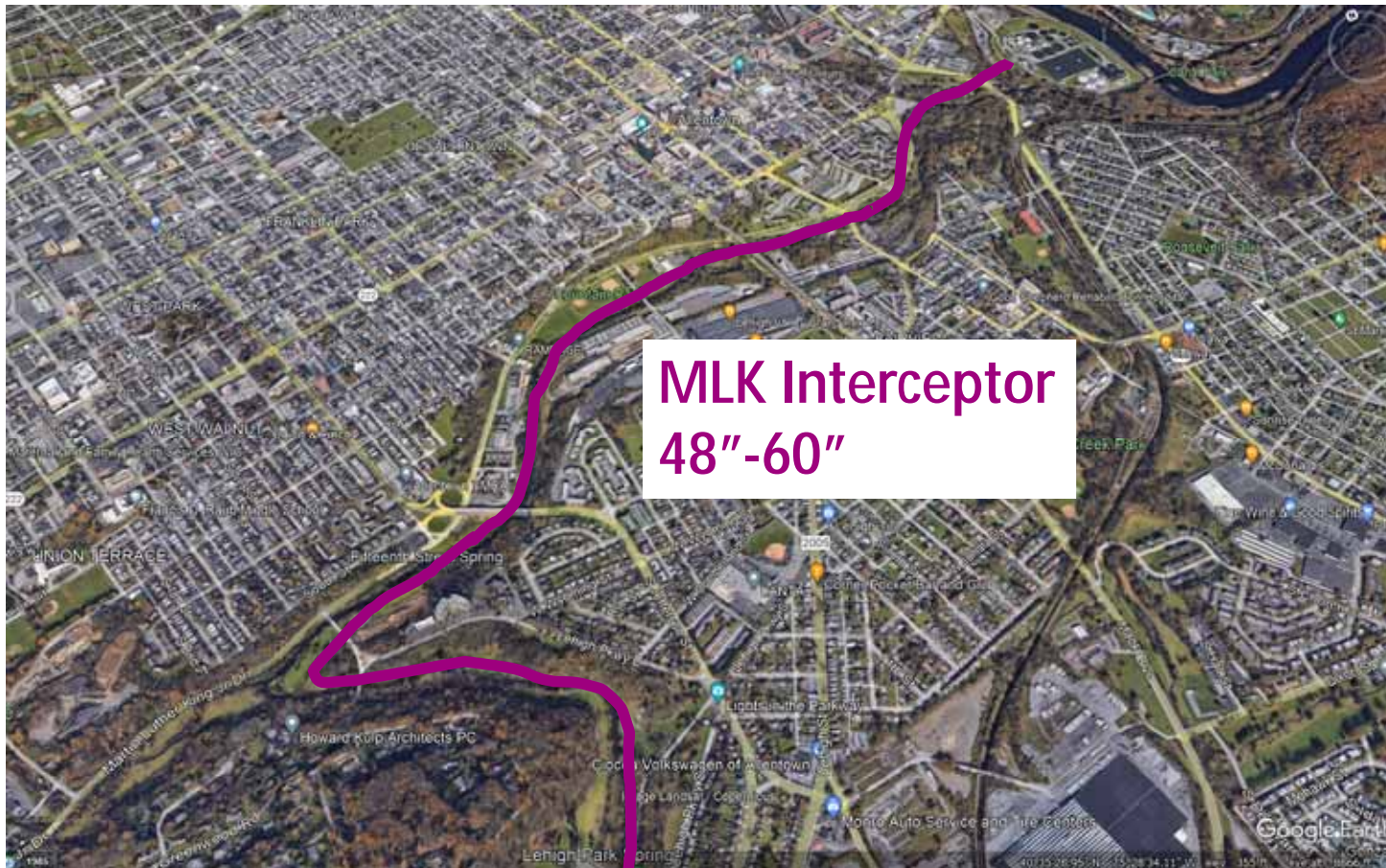
– Community drivers

- Impact to recreational corridors / parkways
- Traffic impacts with piping alignments
- Road crossings



Core Conveyance Area – Little Lehigh Interceptor

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Large Diameter Interceptor Open Cut Construction

Anticipated Construction Challenges in the MLK Drive Vicinity of Project:

- Deep Trenches
- Adjacent private & public utilities
- Shallow groundwater
- Shallow rock pinnacles
- Significant Traffic Control
- Proximity to the public



Large Diameter Interceptor Open Cut Construction

Close coordination with stakeholders:

- Electrical – Design in place for sheet piling installation & cost estimate
- Natural Gas – utility requirements, leak surveys
- PennDOT / City – Meetings during permitting and liaison during construction
- Public Information / Presentations



Large Diameter Interceptor Open Cut Construction

Resolve technical issues:

- Tight sheeting and shoring
- Instrumentation
- Project specific blasting spec based on input from utility companies and blasting Contractors
- Comprehensive de-watering specification
- Extensive borings to map rock



Traditional Tunneling vs. Microtunneling



Traditional Tunneling:

The primary support is installed from the tail end of the Tunnel Boring Machine (TBM)



Microtunneling:

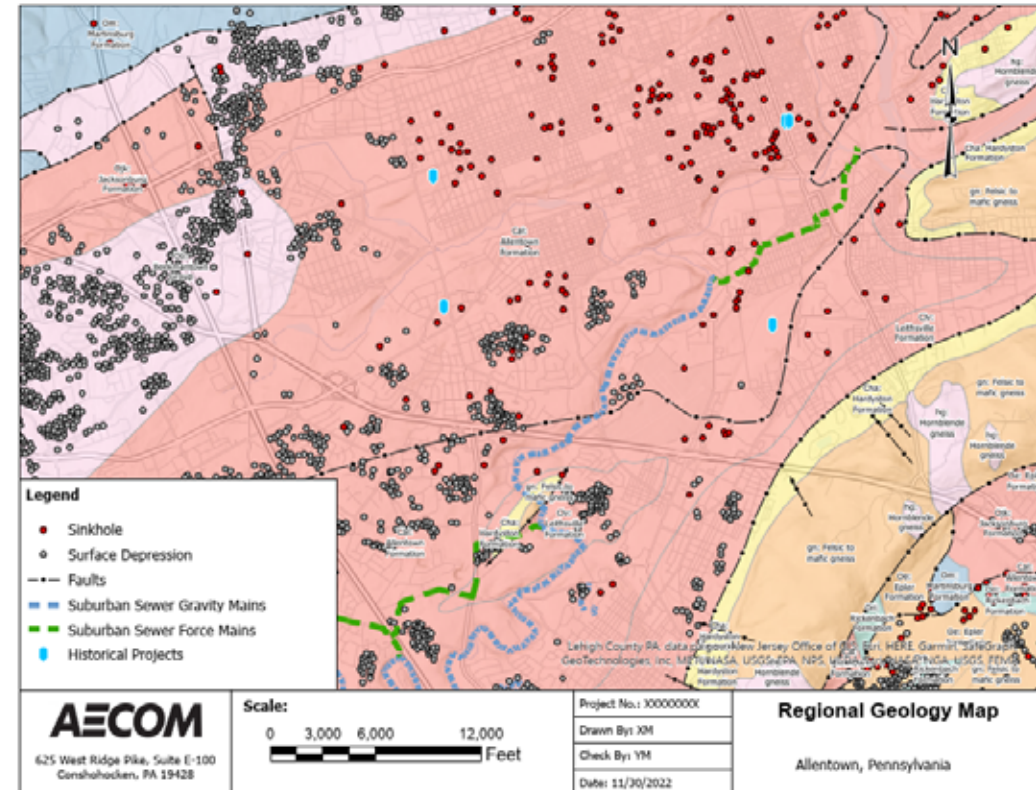
The ground support in the form of pipes are installed into the jacking shaft

Microtunneling – MT



Micro-tunnel Feasibility Scope

- Research background available data – (geotechnical information, environmental conditions, property information)
- Conduct site walk to review constructability considerations and potential shaft locations
- Screen potential construction methodologies (micro-tunneling and pressurized, closed-face soft ground tunneling)
- Identify potential jacking and receiving pit (or launch and receiving shaft) locations; staging laydown area requirements; pipe material requirements; constraints anticipated for the new pipe installation.
- Develop both a preliminary gravity and force main alignment alternatives and connections to the existing LCA conveyance system at terminal ends
- Prepare Cost Estimates



McLoughlin Point WWTP - Harbor Crossing and Outfall

- New WWTP for City of Victoria, BC
 - Ocean Outfall installation via Rock Micro-tunnel
 - 1-mile length



McLoughlin Point WWTP Outfall

- Rock Microtunnel to Clear Intertidal Zone
 - Hard granitic bedrock
 - Specially designed slurry Tunnel Boring Machine (TBM) with rock disk cutters
- Permalok® or Welded Steel Pipe
- Corrosion protection -polyurethane lining & exterior epoxy coating



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