CITY OF SOUTH HAVEN
WASTEWATER TREATMENT PLANT
HEADWORKS AND PUMP STATION PROJECT

2018 MWEA
ANNUAL CONFERENCE
ACKNOWLEDGMENTS

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INTRODUCTION

- South Haven Wastewater Treatment Plant (WWTP)
  - Original Construction in 1933
  - Most structures were constructed in 1963
  - Minor revisions completed between 1990 - 2008

- WWTP Currently Serves City of South Haven plus portions of South Haven Township, and Casco Township. Service area population 9,000+/-

- Major Vacation Resort Destination
SERVICE AREA

- Main LS Service Area – Yellow
- Firm Capacity 6 MGD
- Wells LS Service Area – Blue
- Firm Capacity 3 MGD
- Approx. 80 / 20 Flow Split
LOCATION
MASTER PLAN STUDY

- Wastewater Treatment Master Plan Study (2009)
- Study covered two possibilities
  - Oxidation Ditch with Rehab exist plant
  - New plant at remote site:
    - Remote Pumps
    - New headworks grit and fine screens
    - Oxidation Ditch
    - Disc Filters
    - This option was deemed too costly
  - Process for Existing Plant:
    - New headworks pumps grit and fine screens
    - Expanded secondary
    - Centralized Pump Station that could be redirected to a new site in the future
    - Correct hydraulic profile issues
MASTER PLAN CONCLUSION

- **Recommendations**
  - Consolidate Main Pumping Stations (Wells and Main)
  - Increase Hydraulic Capacity with additional Aeration Tanks and Clarifiers
  - Improve Biosolids Handling – Additional Storage, Mechanical Thickening
  - Address high flows
    - Collection system rehab
    - I&I study
    - Meanwhile store high flows for treatment until high flows are addressed
MAIN LIFT STATION
MAIN LIFT STATION
MAIN LIFT STATION
WELLS LIFT STATION
WELLS LIFT STATION
PROJECT OBJECTIVES

- Develop Pump Station for Long Term Use
- Wet Weather Flows - Pump and Store 25 Yr. 24 Hr. Event
  - Daily Flows 0.6 MGD – 2 MGD
  - Peak Flow Rate 12 MGD
- Provide Fine Screening of All flows
- Improve Grit Removal
  - Currently a Detritor
  - Add a Teacup
Rains cause diluted wastewater to dump into the Black River in South Haven. (WWMT Matt Loughrin)
SITE PLAN
HEADWORKS BUILDING

SOUTH HAVEN HEADWORKS
CONSTRUCTION
CONSTRUCTION
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CONSTRUCTION
FIRST TEST

- February 20 – 21: 4”+ Rain and Snow Melt
- Discharged to Detention Area for 2+ days
- Stored 1.2 MG
- Control Valves operated manually
IT WORKED!
IT WORKED!
IT WORKED!

- Hydraulic Stress Test
- Varied Maximum Flow Rate from 6 – 8 MGD
- Treatment
- % Removals dropped, Recovered quickly to meet Permit Requirements
LESSONS LEARNED

- High Flow Pumps faulted one after the other.
- Based on Pump Curve, Pumps non-overloading.
- Manufacturer sized belts conservatively, pumps produced above curve.
- Limited Number of Alarms
- Temporarily limit max speed in VFD, replaced belts and sheaves to match design.
LESSONS LEARNED
WHERE’S THE GRIT?

- Split flow approx. 50/50 between grit tanks – large disparity

- Causes
  - Classifier Bedding
  - Grit Tank not running
    - E-Stop
    - “Grit Pump”
  - Not accurate to compare volume of washed Grit from Teacup to Detritor
LESSONS LEARNED
MULTIPLE CONTRACTORS
LESSONS LEARNED
POOR SOILS

- 4,800 cyds of excavated soil could not be used for pipe backfill from other project.
- Expensive to haul off to landfill.
- Saved $60,000+/- by creating landscaping berms around the south side of the detention area.
LESSONS LEARNED
POOR SOILS
LESSONS LEARNED
POOR SOILS
LESSONS LEARNED
VFD FAULT

- Pumps in operation for 3 months
- Overcurrent fault from VFD
- Turns out one of the motor leads was not taped.
- Problem happened before but wiggled the flexible conduit and it went away
- Eventually discovered and resolved
ADDITIONAL IMPROVEMENTS
DIGESTER MIXING

- Existing Gas Perth Mixer
- Condensate piping ran through the Boiler Room
- Pressurized condensate piping had leaked several years prior and caused an explosion
- Replaced with Linear Motion Mixer and eliminated all interior gas piping
ADDITIONAL IMPROVEMENTS
DIGESTER CLEANING

- Clean and Inspect the Primary and Secondary Digester
- Current Operation - Overflow from Primary to Secondary, land apply out of the Secondary. Only use drying beds in an emergency.
- Cleaning estimated at 32 hours
- Actual 94.5 hours
FUTURE ISSUES - AERATION CAPACITY

- Two small breweries proposed for the City
- Aeration capacity concerns in Summer months
- Recommendations:
  - Replace Diffusers and Clean the Aeration Tanks
  - Replace Blowers and add DO Control
  - Add Biosolids Storage Tank
AERATION DIFFUSER REPLACEMENT
THANK YOU! ANY QUESTIONS

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