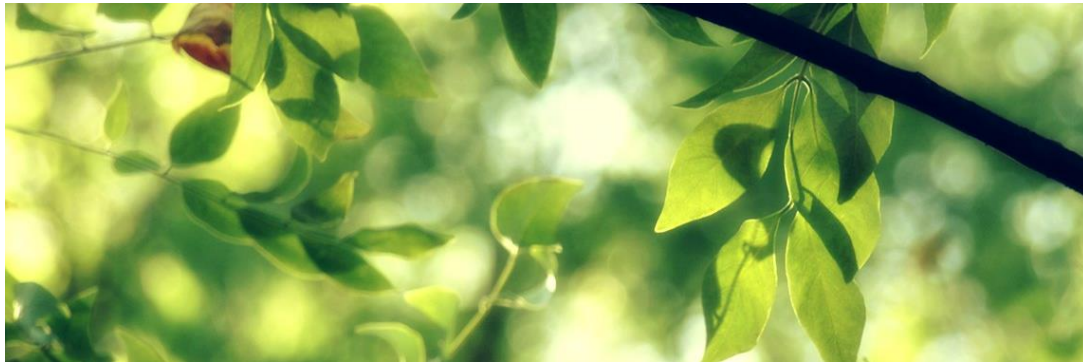




City of Mason
November 12, 2018 Council
Meeting

Wastewater Treatment Plant Planning Study

Mark Prein, P.E. and Peter Brink, P.E.

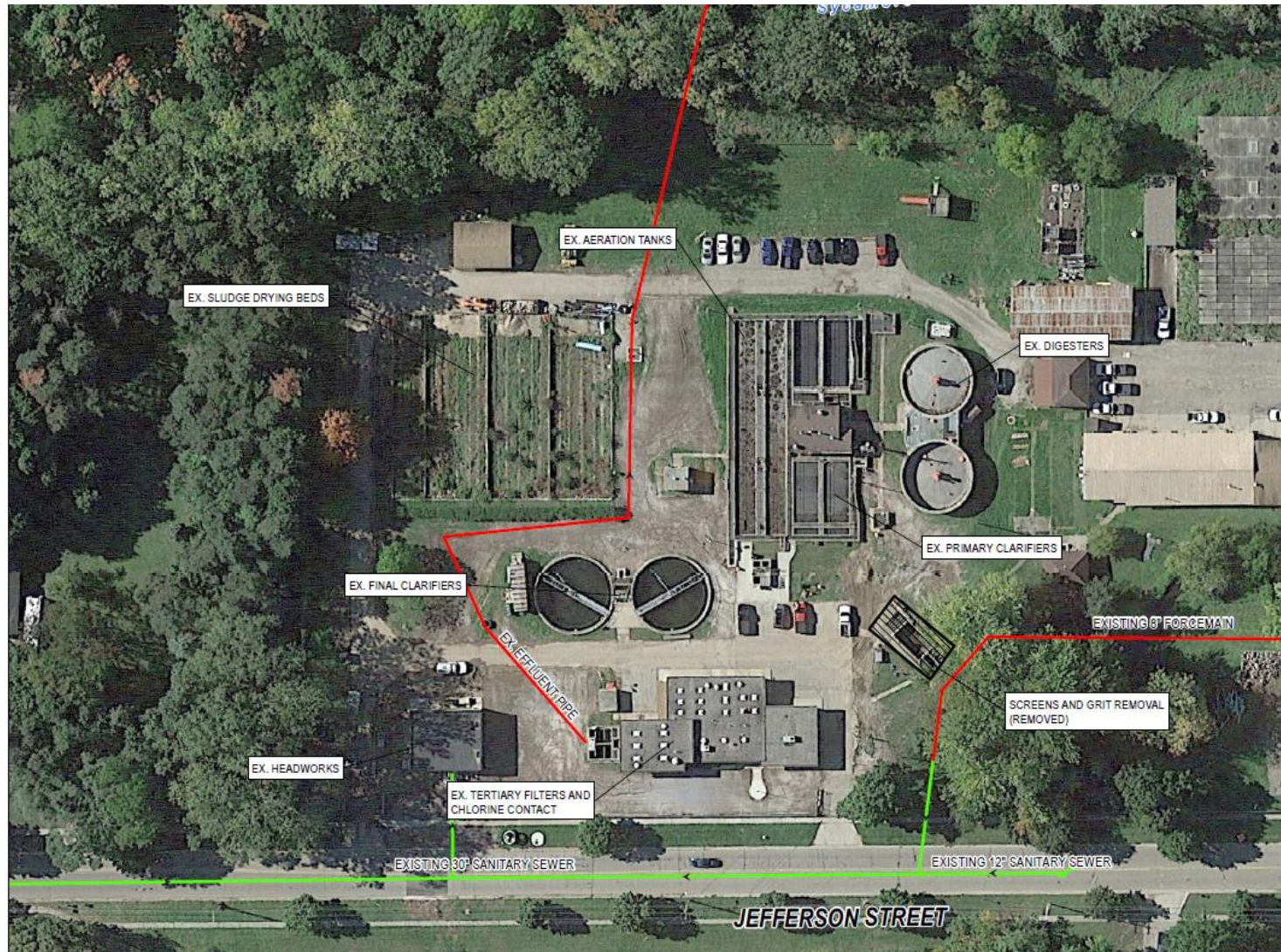
Prein&Newhof



Purpose of Study

- Review Condition and Capacity of Existing WWTP
- Identify Needs to Treat Current and Future Flows
- Compare Options for Needed Improvements
- Review Potential Locations for an Upgraded WWTP
- Address Requirements of the 2011 MDEQ Administrative Consent Order

History





Evaluation of Existing System

- 40 to 60 year old equipment beyond typical lifespan
- Elevation of treatment units not high enough to allow flow through plant without pumping multiple times
- Flood Issues
- Not sized for peak flows (1.5 MGD capacity vs. 6 to 7 MGD flows)
- Clarifiers and Aeration Tanks undersized per the 10 States Standards
- Aeration Tanks can not maintain target level of oxygen during certain days in the summer

Flood Issues







Improvements Needed

- Reduce Peak Flows
- Construct New Treatment Units that allow for flow by gravity to discharge
- Update structures and treatment methods to efficiently handle flows for next 20 years while minimizing maintenance costs
- Have flexibility to handle higher strength wastewater in the future



Options Reviewed

- Actively Reduce infiltration and inflow/provide equalization
- Upgrade Existing Treatment Units
- New Treatment Processes
 - Conventional Activated Sludge
 - Oxidation Ditch
 - Sequencing Batch Reactor
 - Membrane Bioreactor
 - Moving Bed Bioreactor/IFAS
- Tertiary Filters – Leave Space for Future

Review of Treatment Options



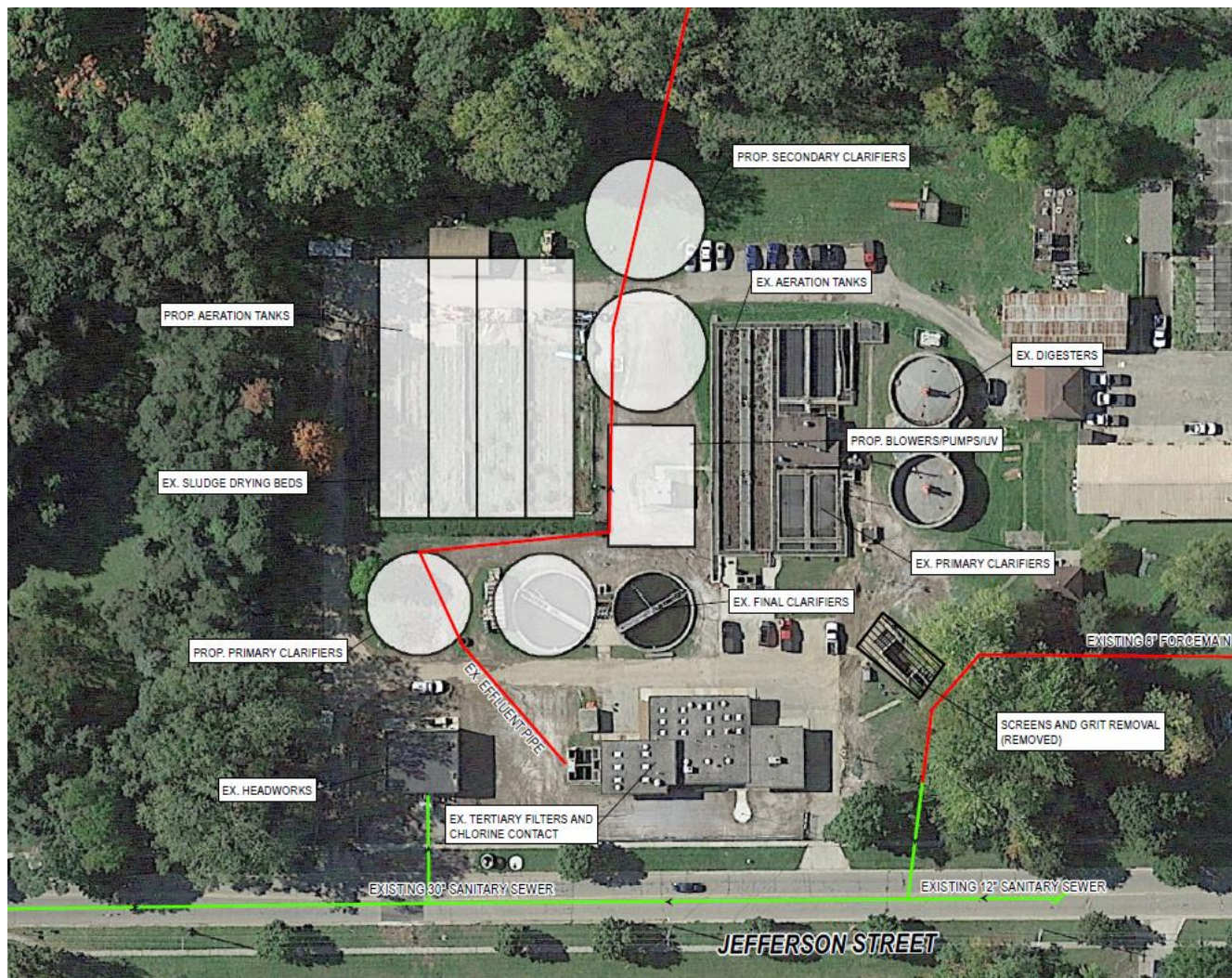
Summary of Options

Rank	Process	Total Estimated Construction Costs	Total Estimated 20-yr Present Value	Advantages	Disadvantages
1	Conventional Secondary Treatment	\$13,000,000	\$13,600,000	Low Op Cost, Sim. Ex., Improved Nutrient Removal	Larger footprint than some options
2	Moving Bed Bioreactor/IFAS	\$13,200,000	\$14,600,000	Smaller footprint better treatment of higher loadings	Operation is more complex than Conventional Secondary
3	Oxidation Ditch	\$12,300,000	\$13,100,000	No blowers or diffusers to replace/maintain, lower cost	Does not provide equivalent redundancy with any one channel out of service
4	SBR	\$12,400,000	\$13,400,000	No primary or secondary clarifiers needed. No RAS pumps needed.	All treatment depends on one treatment unit and automatic cycling of stages of batch, high flow discharge
5	Membrane Bioreactor	\$15,700,000	\$18,000,000	No secondary clarifiers required	Finer screening required, energy intensive, does not handle ex. peak flows, Highest Capital Cost



Recommendations

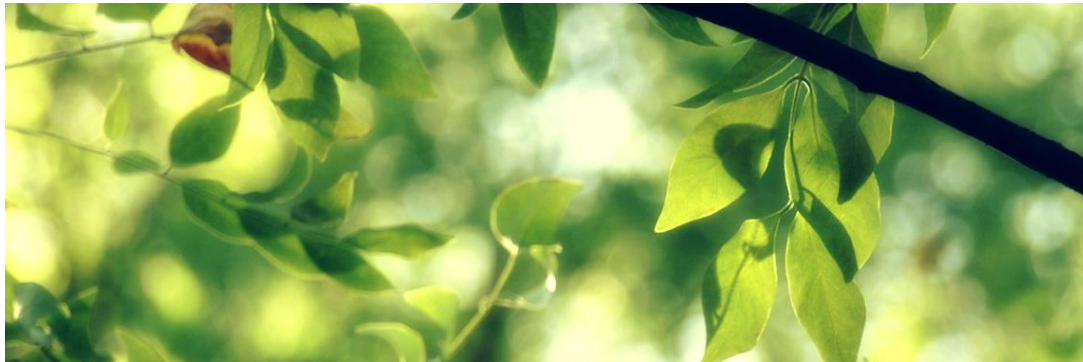
- Conventional Activated Sludge
 - New primary clarifiers, aeration tanks, secondary clarifiers
 - New Blower/Solids Handling/UV Disinfection Building
 - Optimized aeration and anoxic zones to promote nutrient removal with lower input power
 - Ability to retrofit with attached growth for higher strength waste
 - Best combination of reliability, capital cost, operation and maintenance cost
- Location – With careful staging/planning and dealing with MDEQ Floodplain staff, recommend constructing on existing property





Next Steps

- Solids Handling Study
- Determine Funding Source
 - City Wastewater Funds
 - State Revolving Fund
 - Rural Development Loan
- Phased Projects vs. Single Project
- Design/Bidding



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