Taste and Odor Improvements Project

City of Lawrence KANSAS

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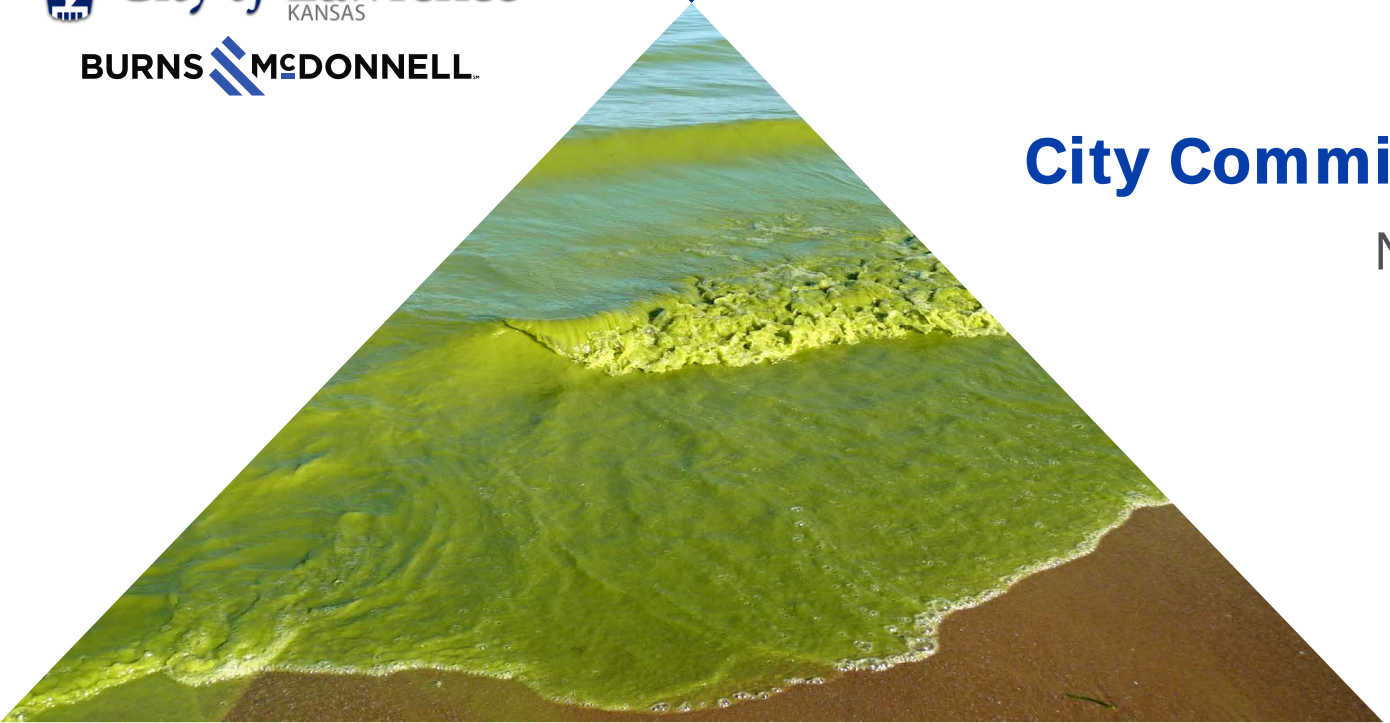


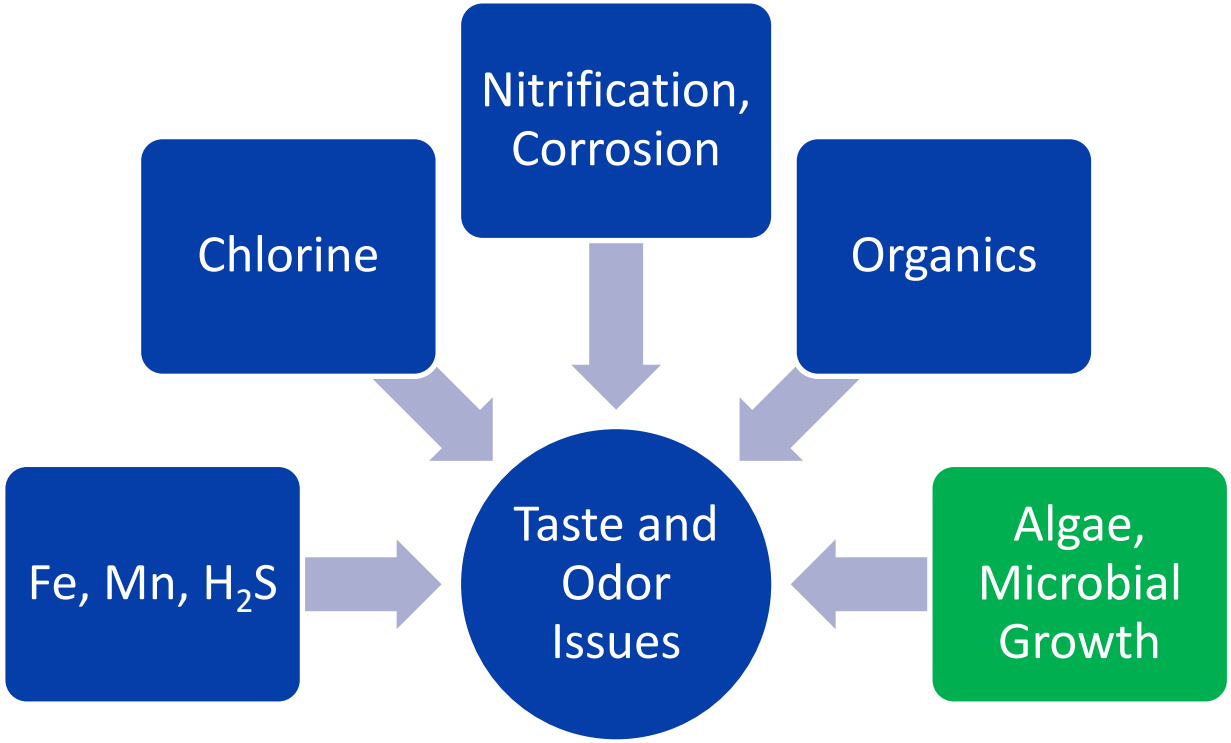
City Commission Meeting

November 10, 2015

Presentation Outline

- Causes of T&O in Drinking Water
- T&O Events in Lawrence
- Project History
- Project Funding
- Process Evaluation and Improvements
- Project Timeline
- Future Phases

Causes of T&O in Drinking Water



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Cyanobacteria

- Blue-green algae
- Most common T&O compounds:
  - Geosmin
  - MIB
- Algal Toxins
  - Potential health concerns
  - Most common: Microcystins

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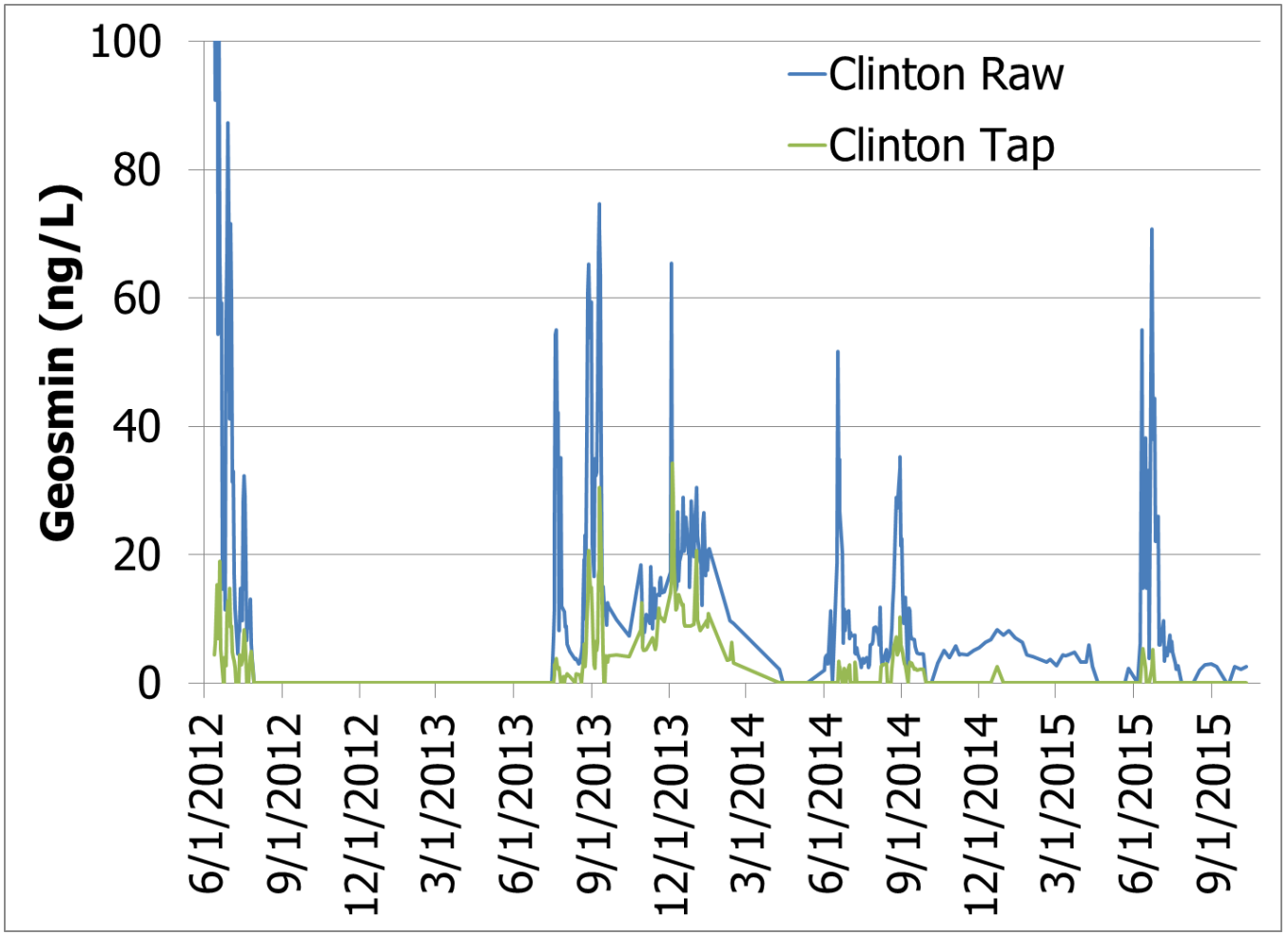
MIB and Geosmin

- Sensory evaluation varies significantly between populations and repeated tests
- City of Lawrence Goal: 5 ng/L or less

Odor Threshold Concentration (ng/L)	Source
6	Young et al., 1996
4	Ito et al., 1988
4 (trained), 12 (untrained)	Sano, 1988
6-10	Rashash et al., 1997

Events in Lawrence



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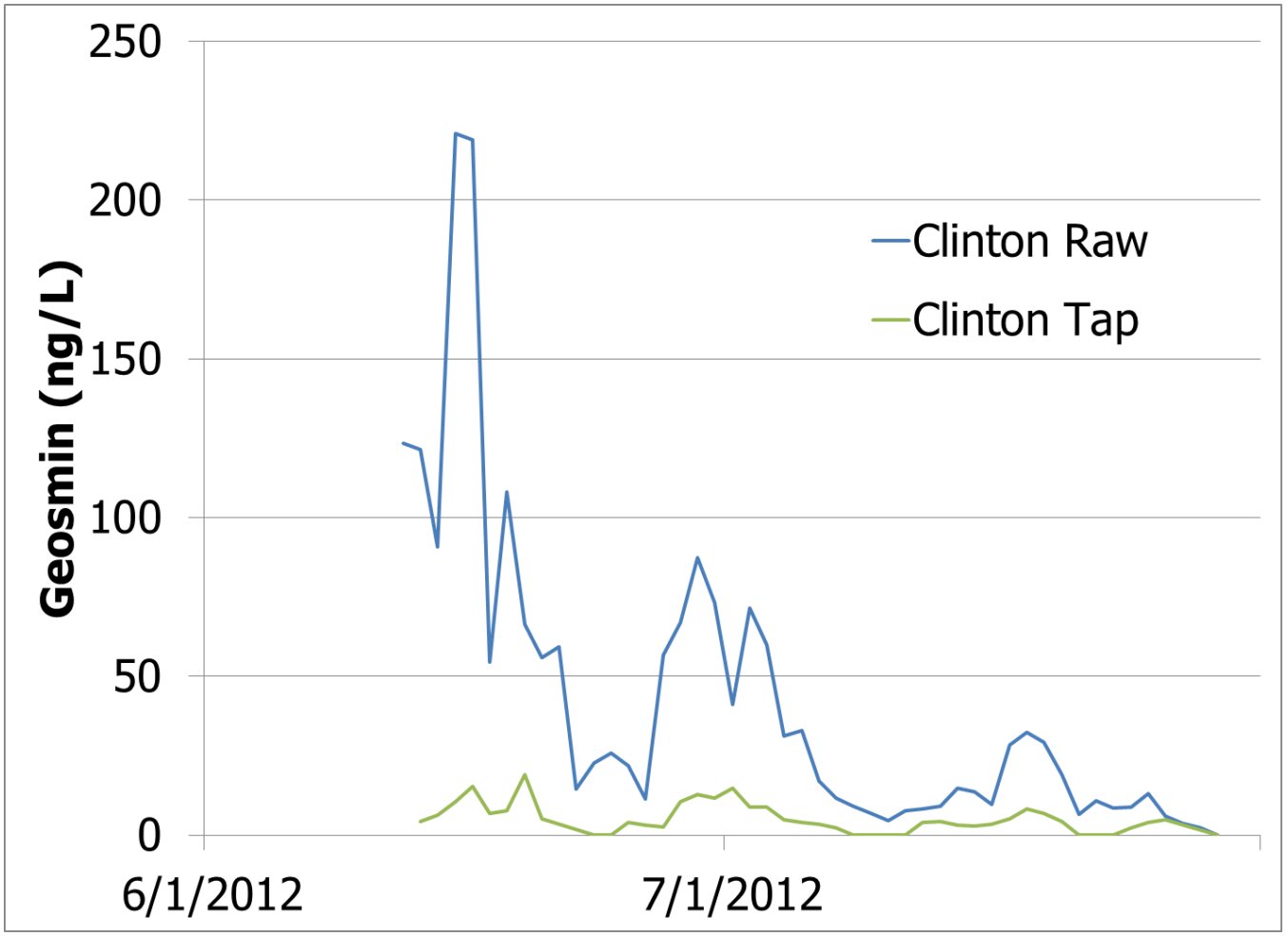
2012 Event



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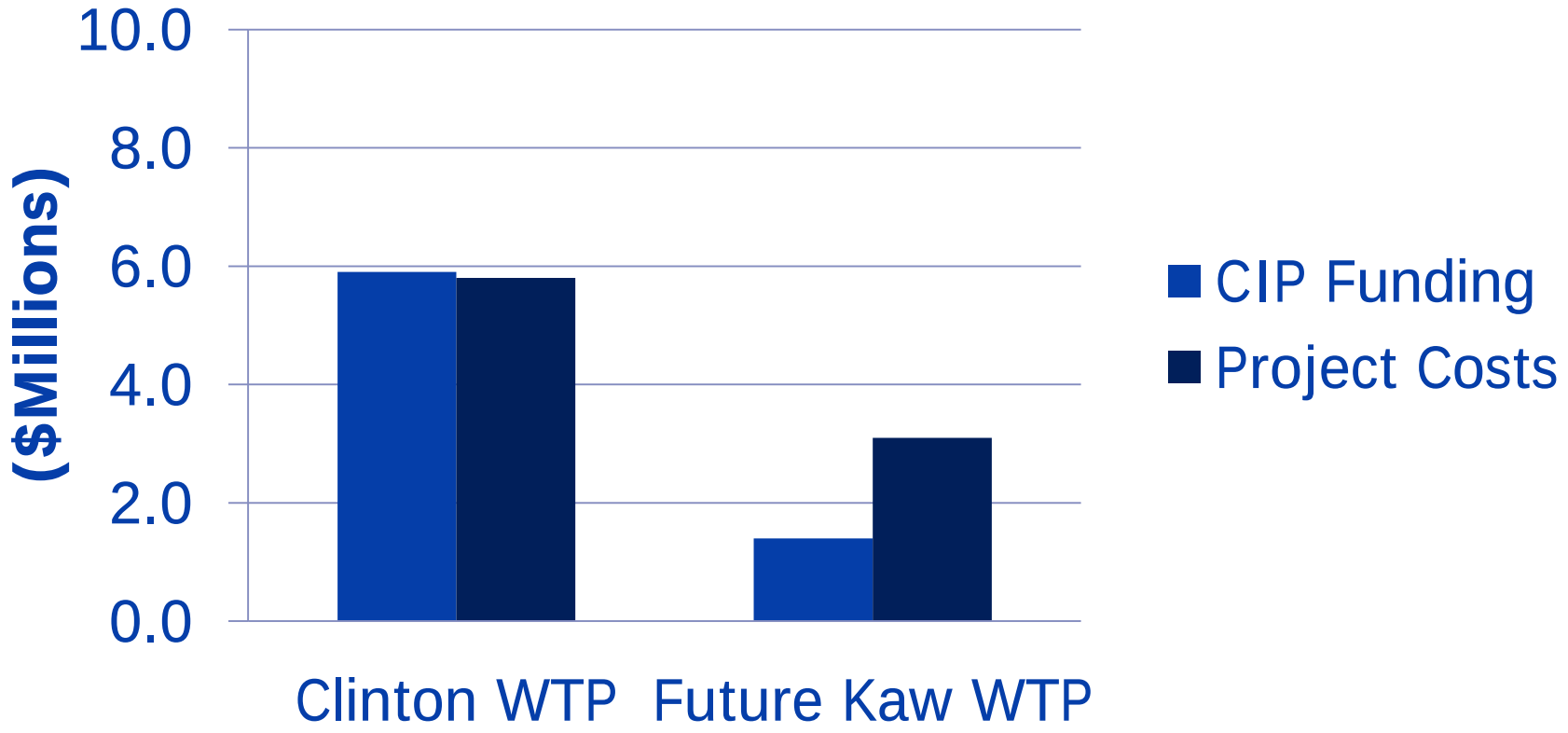
City Commission Authorizations

- 8/21/12 – RFP for Engineering Services to prepare T&O study
- 12/3/12 – Negotiate with Burns & McDonnell for T&O study
- 3/12/13 – Engineering Services Agreement with Burns & McDonnell for $137,128
- 5/20/14 – Negotiate Supplemental Agreement for Phase 1 Process Improvements Design and CPS
- 10/14/14 – Supplemental Agreement with Burns & McDonnell for $1,260,880

Project Funding and Estimated Costs



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Alternatives Evaluated Clinton WTP

- No action
- Process Improvements
  - Physical
  - Chemical
- Advanced Oxidation
  - Ozone/Peroxide
  - UV/Peroxide

Phase 1: Process improvements selected – lowest present value

Phase 2: Advanced oxidation

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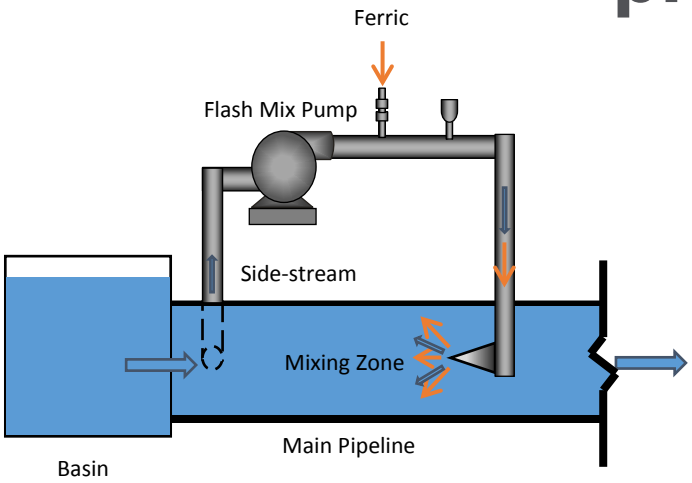
Physical Improvements

Key: increase effectiveness of existing processes

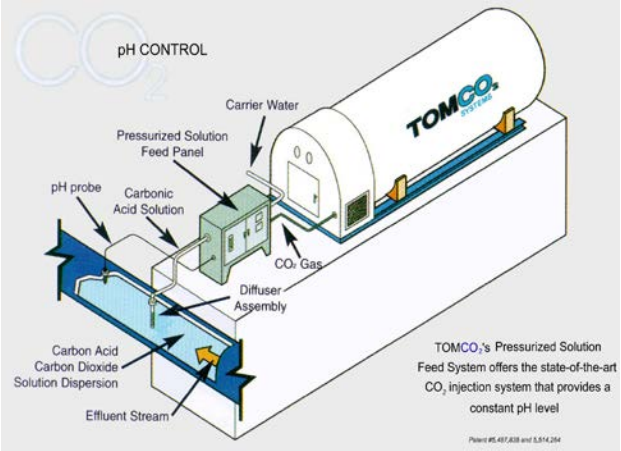


RAPID MIX

TUBE SETTLERS

Chemical Improvements

Key: streamline operation and reduce chemical costs



CARBON DIOXIDE

LIQUID LIME

FERRIC

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Benefits to the City of Lawrence

- Improved coordination of chemicals
- Reduction of chemical usage (lime, polymer, coagulant)
- Improved DOC removal
- Increased T&O removal
- Laid groundwork for additional processes if needed in the future
- Public relations

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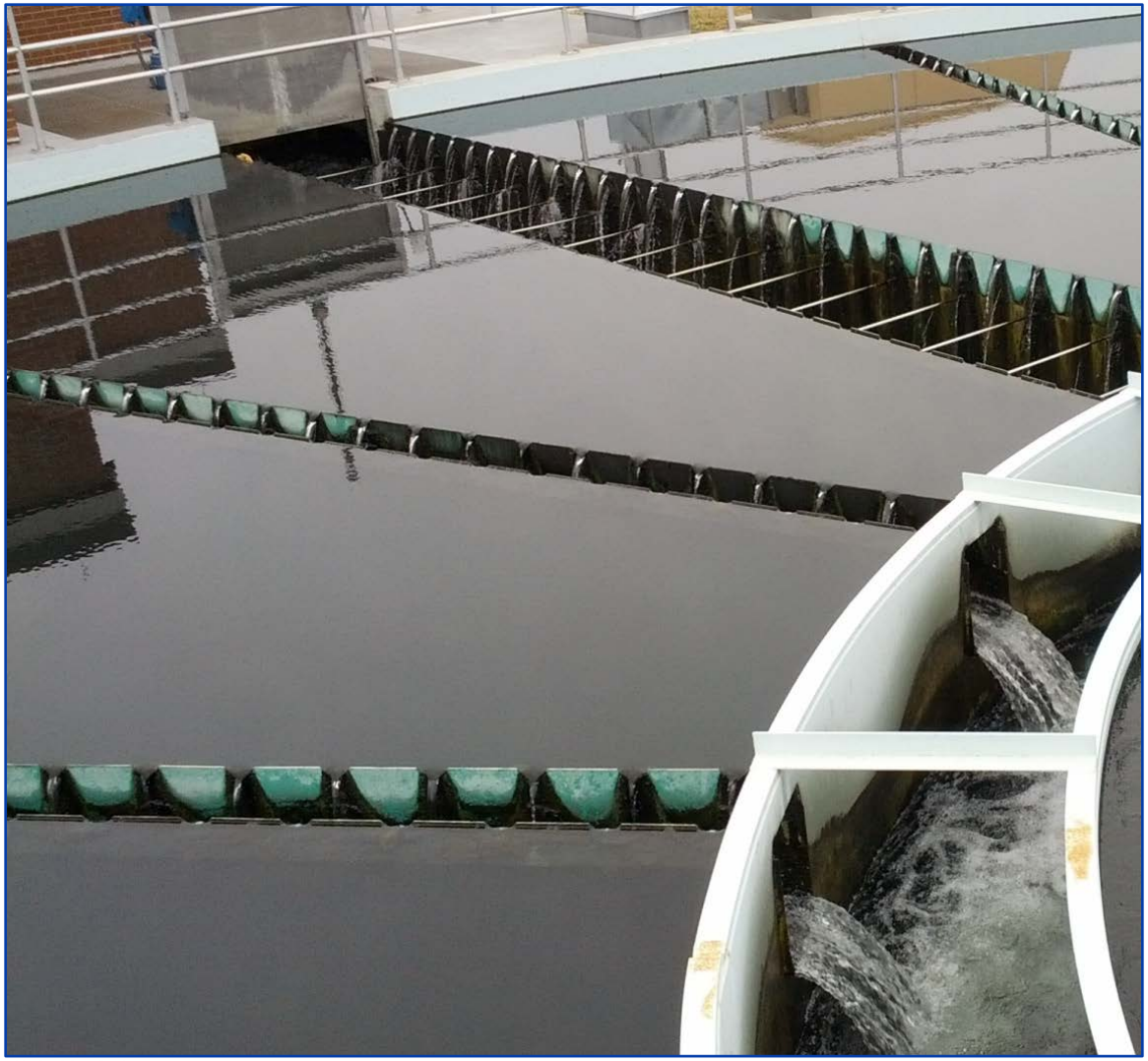
Project Timeline

- 11/10/15 – Set Bid Date
- 12/1/15 – Pre-Bid Conference
- 12/15/15 – Bid Opening
- 1/5/16 – Award Bid
- 2/1/16 – Notice to Proceed
- 1/31/17 – Project Completion

Future Phases

- Kaw WTP Phase 1 Improvements – Future CIP
  - New Lime Slaker System, Chemical Room Painting
- Clinton and Kaw WTP Phase 2 Advanced Oxidation Improvements – To Be Determined
  - Regulatory or T&O Event Based
  - Clinton WTP – UV Peroxide or Ozone Oxidation
  - Kaw WTP – Ozone Oxidation
  - Phase 1 Improvements Increase Cost Effectiveness of Phase 2 Improvements

Questions?



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