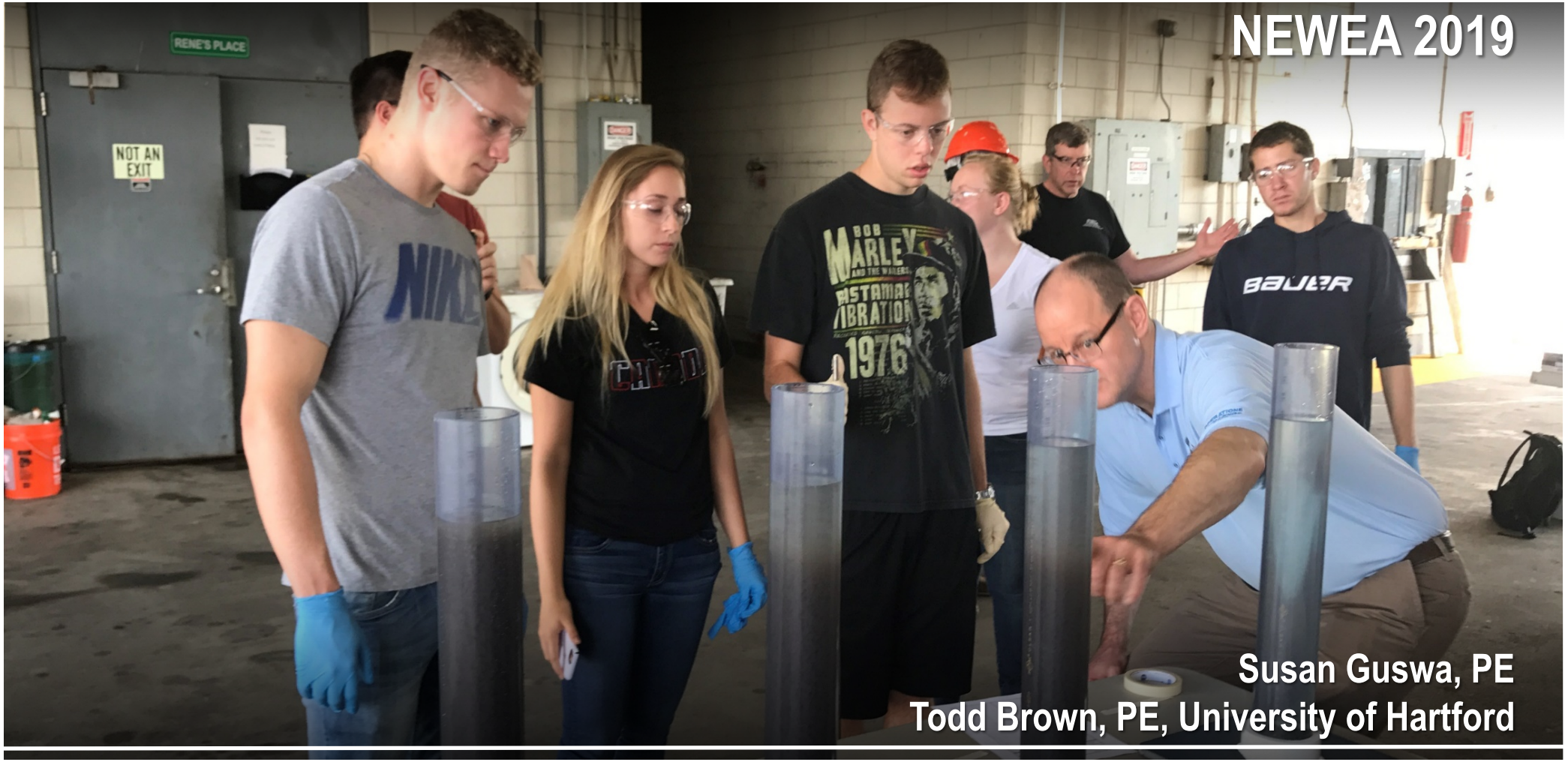
WOODARD &CURRAN

The Power of Partnering:

Present and Future Generations of Engineers and Operators Collaborate on Hands-On State Point Clarifier Analysis Training



NEWEA 2019

Susan Guswa, PE
Todd Brown, PE, University of Hartford

Genesis of the Partnership – University of Hartford

- Not a typical week-by-week lab
  - No “lab procedures”
- Semester-long, practical, hands-on project
- Wide range of topics
  - Drinking water
  - Wastewater
  - Storm water
  - Surface water or groundwater
- Learn by doing

Keys to a Successful Partnership

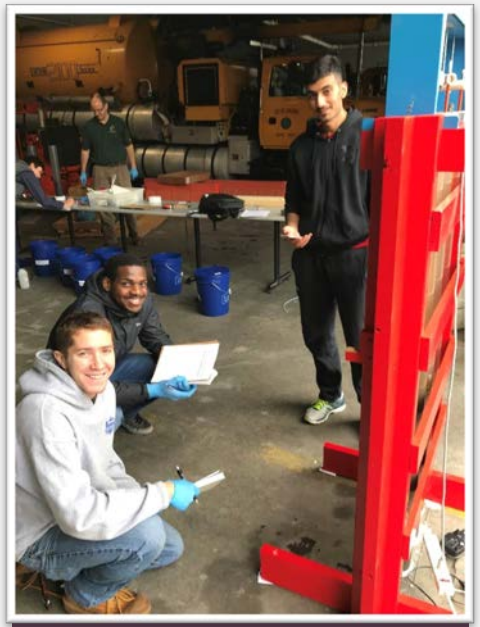
- Having a network of professionals willing to share their passion and expertise
- Unbridled enthusiasm of professor
  - If they think you are crazy, they don't argue
  - Enthusiasm is contagious
- Simple expectations
  - Respect my friends who are donating their time
  - Show me that you are learning something

The Project – Fall 2017

- Foundational lesson and demonstration experiment to students
  - Led by Paul Dombrowski, Woodard & Curran
  - Hosted by the Springfield WRRF – Mickey Nowak, Suez
- Student-led site-specific testing at 4 WRRFs and data analysis
  - Northampton, MA
  - Eastampton, MA
  - Chicopee, MA
  - Westfield, MA
- Woodard & Curran-led Training for Operators
  - Review the site-specific results
  - Reinforce fundamental concept of state point analysis for operation and optimization

Student Teams

Team Easthampton

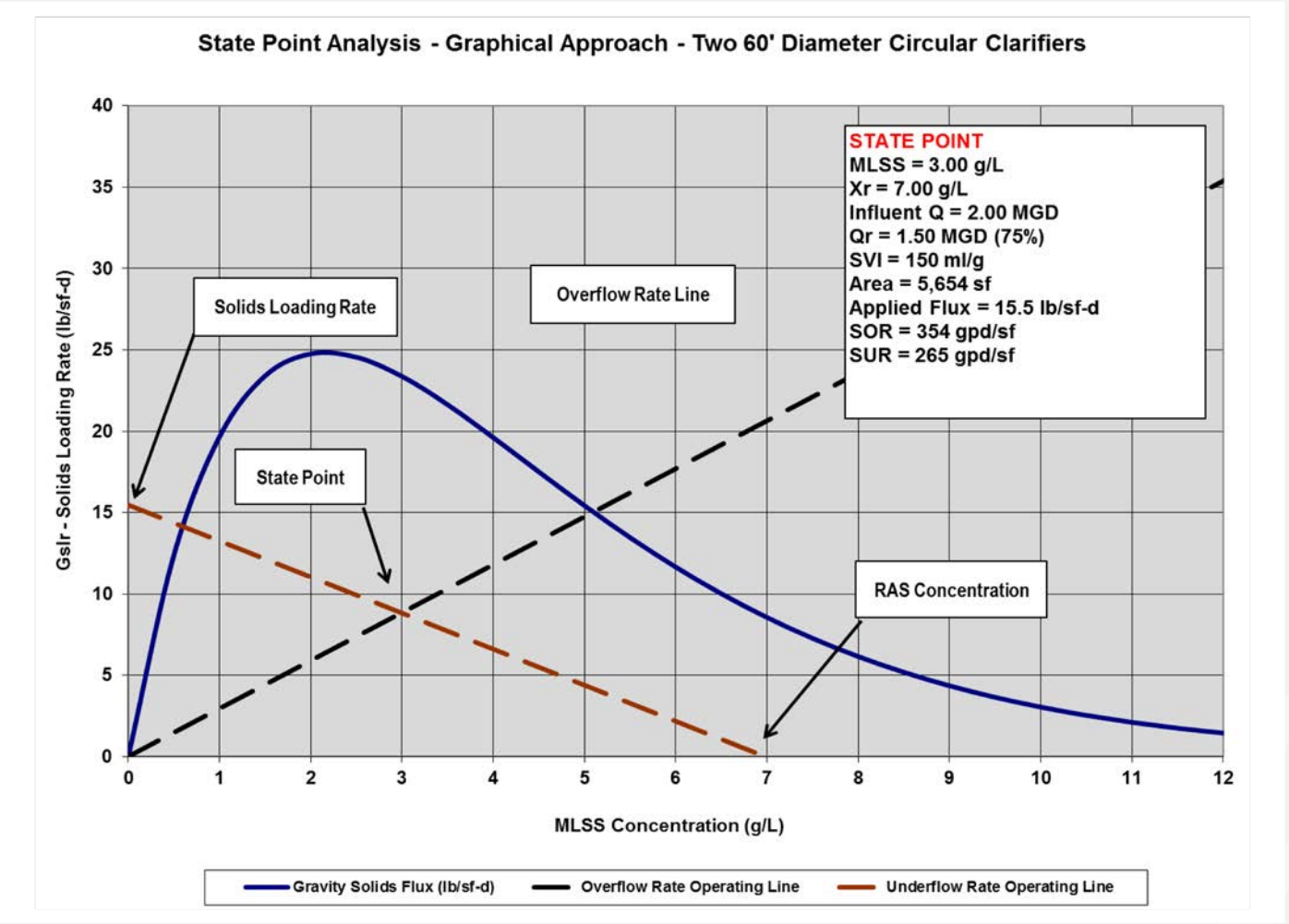


Team Chicopee

Team Westfield

Team Northampton

State Point Analysis is a Tool to Help Maximize Solids Removal in the Clarifiers

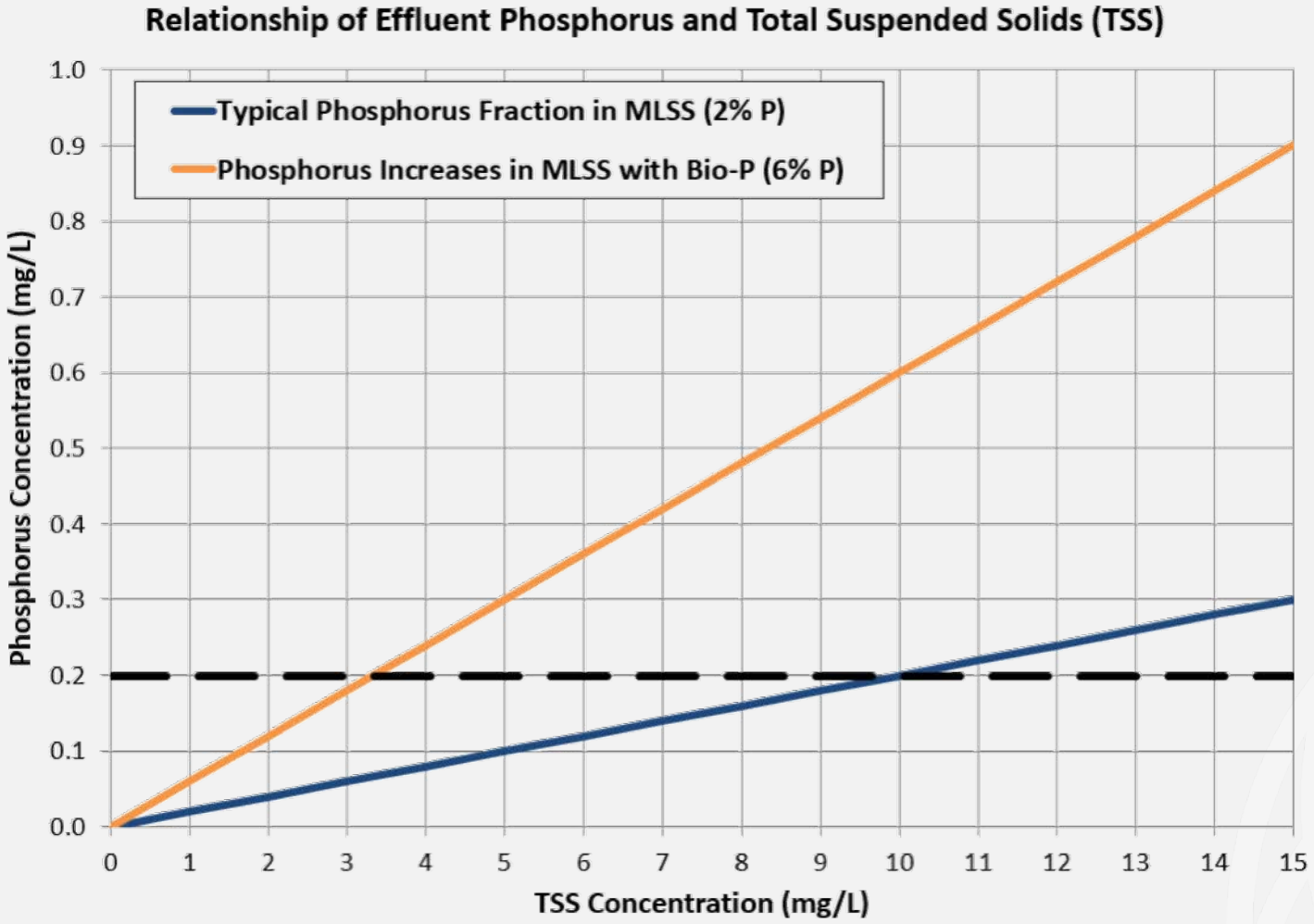


What Does This Have to Do with Phosphorus Removal?

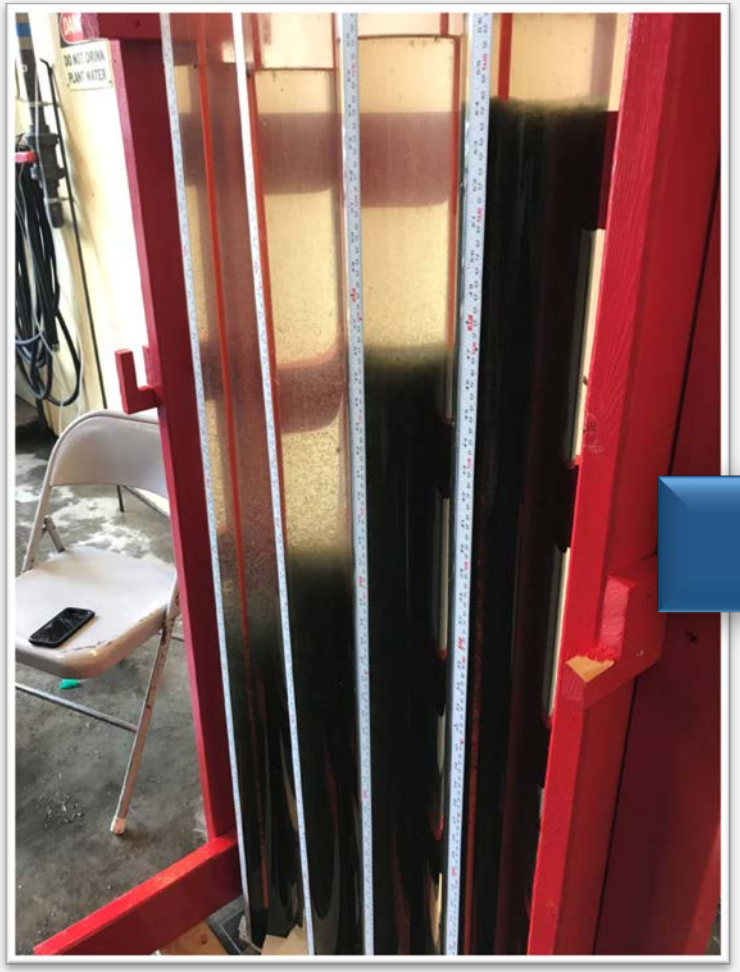
1) Make it a Solid

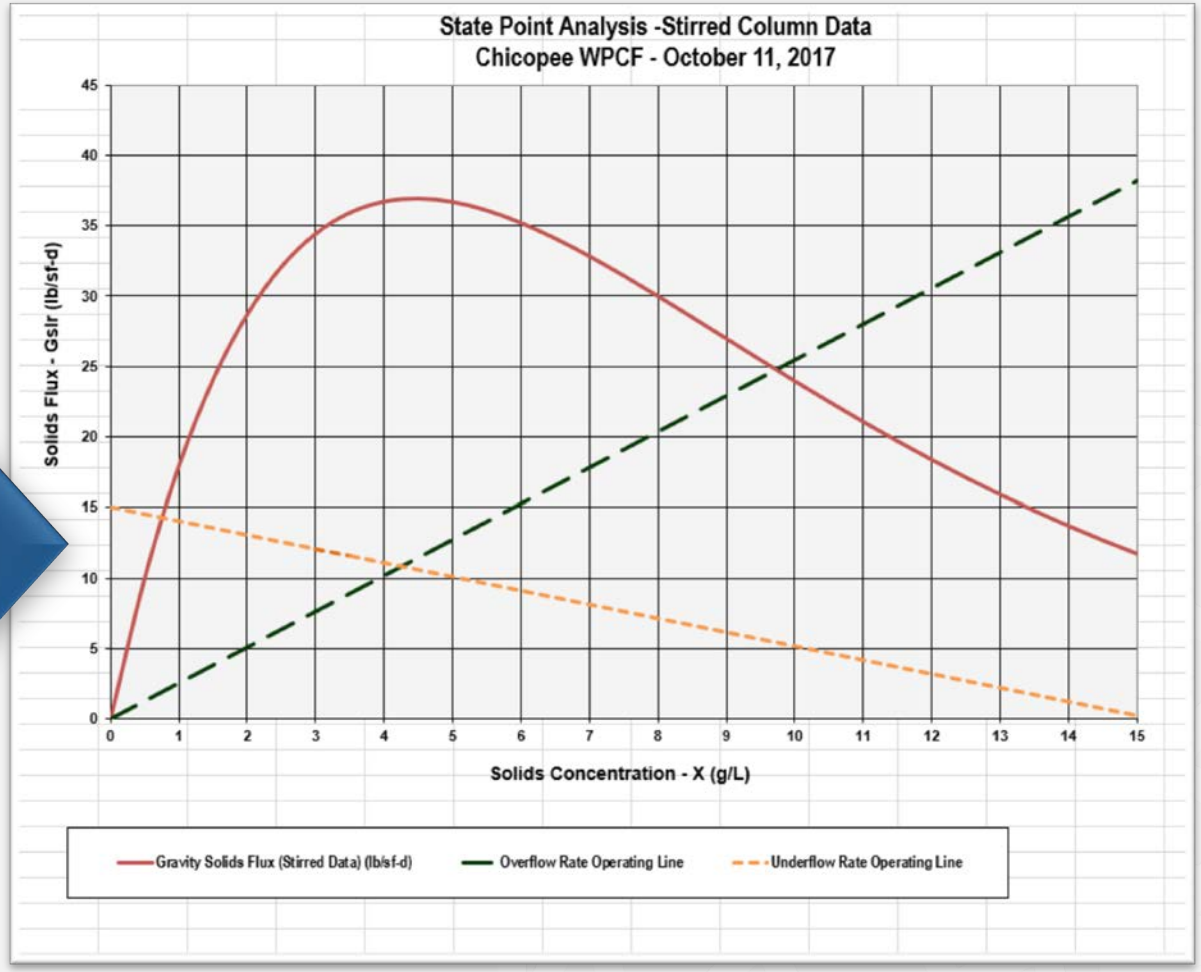
2) Remove the Solid

What Does This Have to Do with Phosphorus Removal?



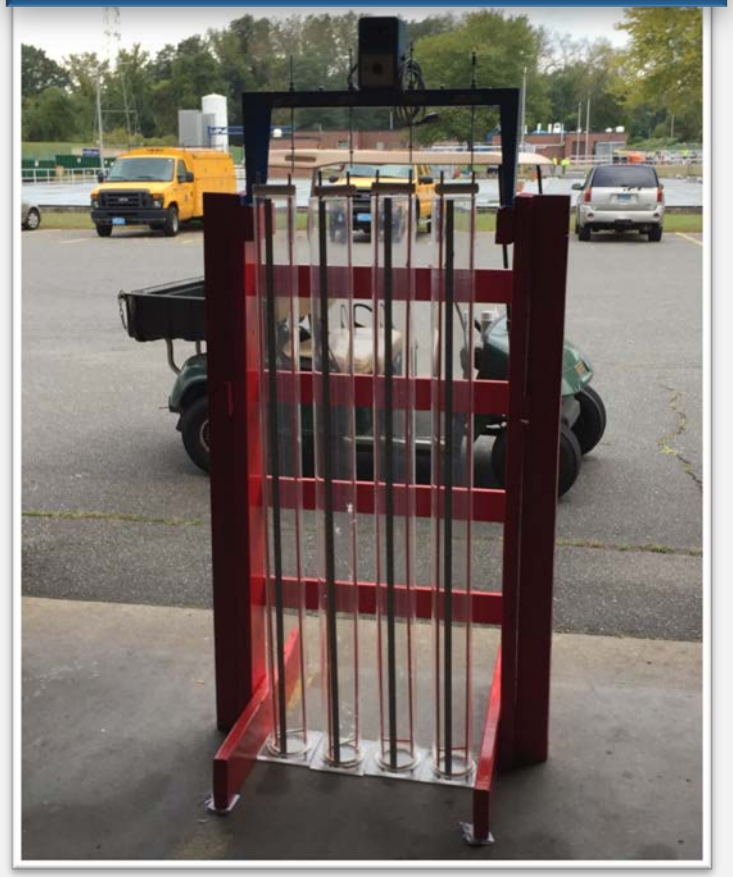
Create State Point Graph from Sludge Settling Tests





Test Equipment

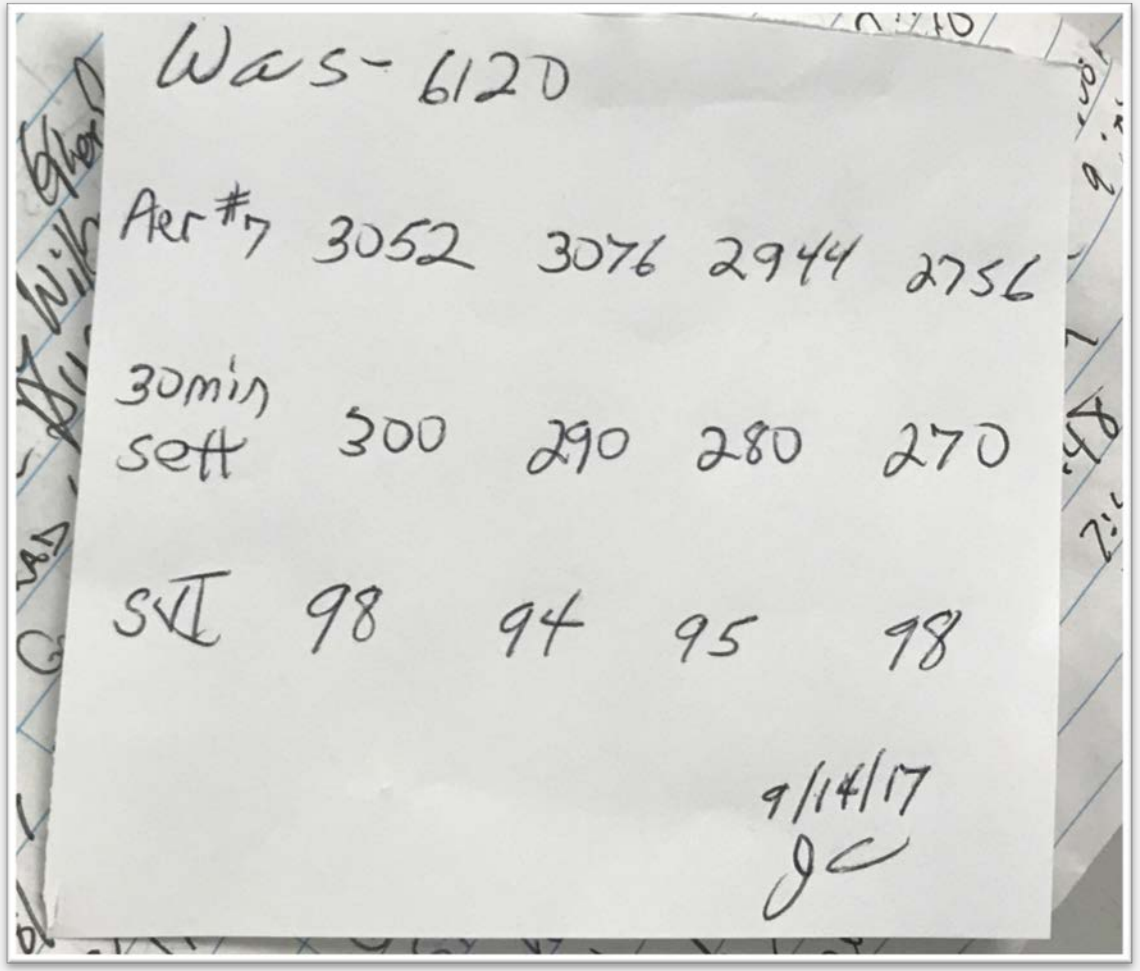
5-ft Column Arrangement with Stirrers



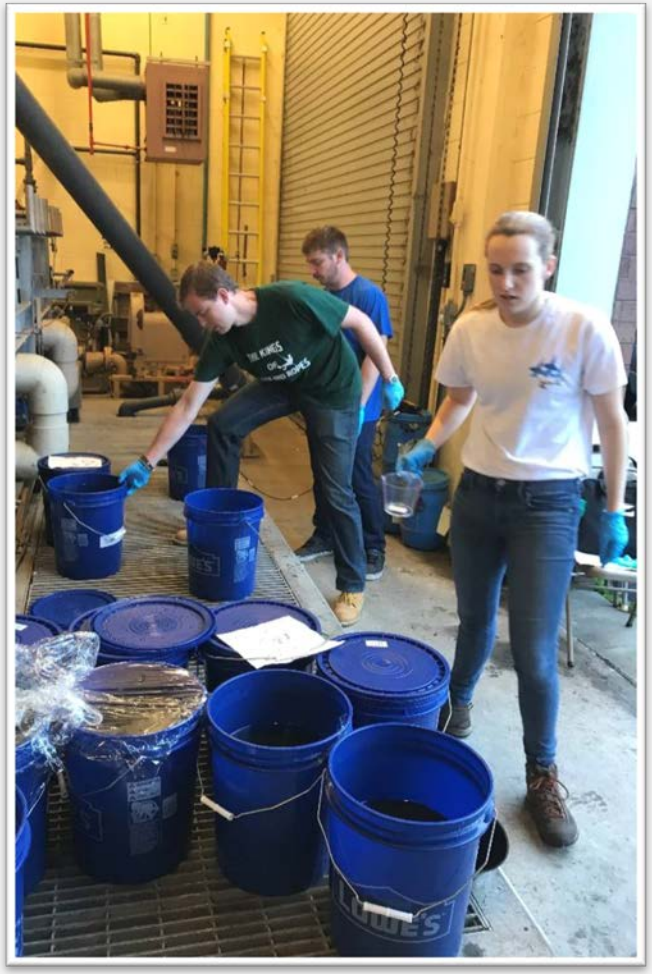
2-ft Columns without Stirrers

Collect RAS, MLSS, SE Samples

Record SVI and TSS of MLSS & RAS



Create Eight Samples of Various Concentrations



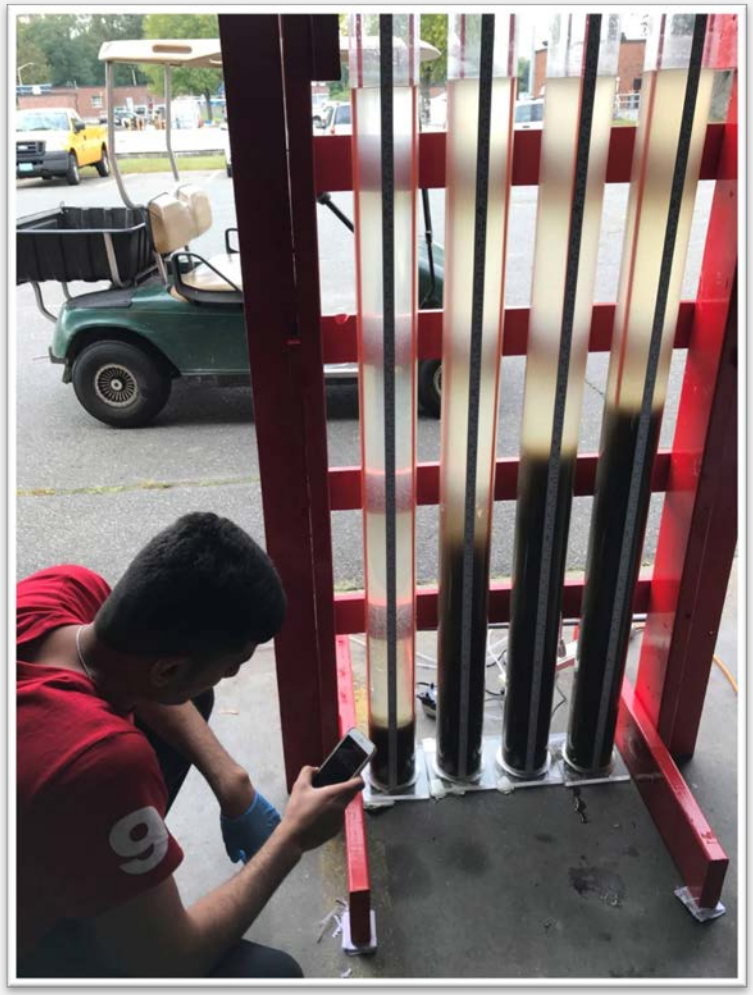
Collect Sample for TSS Analysis

Fill and Mix Sampling Columns

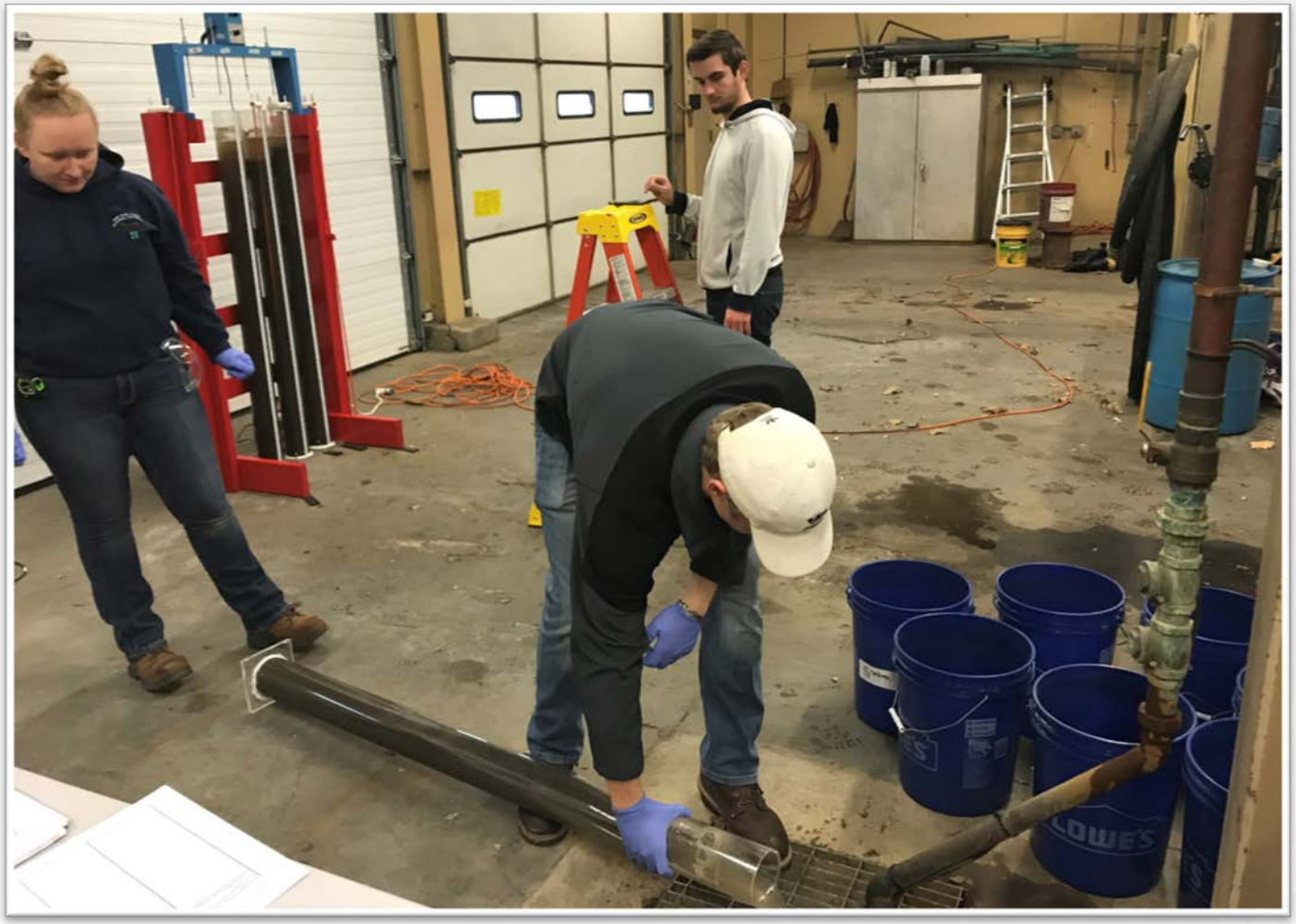
Watch it Settle…

Low MLSS concentrations
will settle faster
High MLSS concentrations
will settle slower

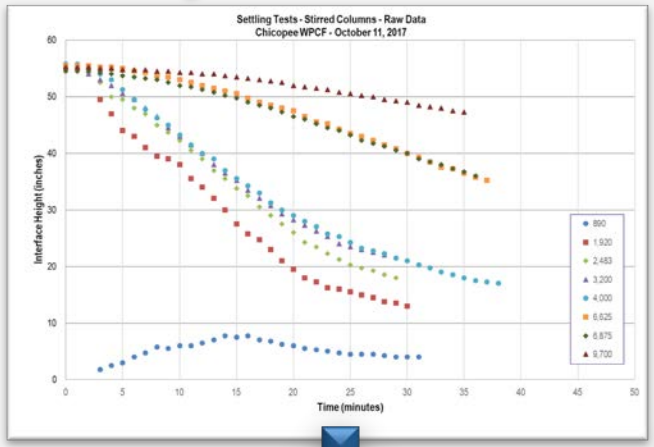
Measure Height of Interface @ 1-Minute Intervals

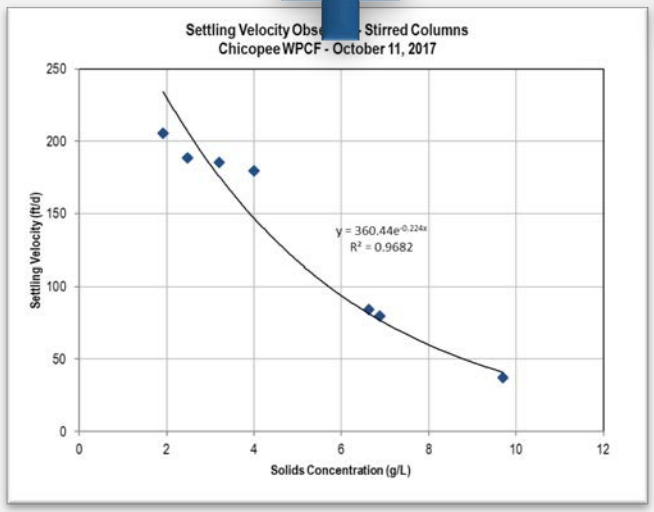


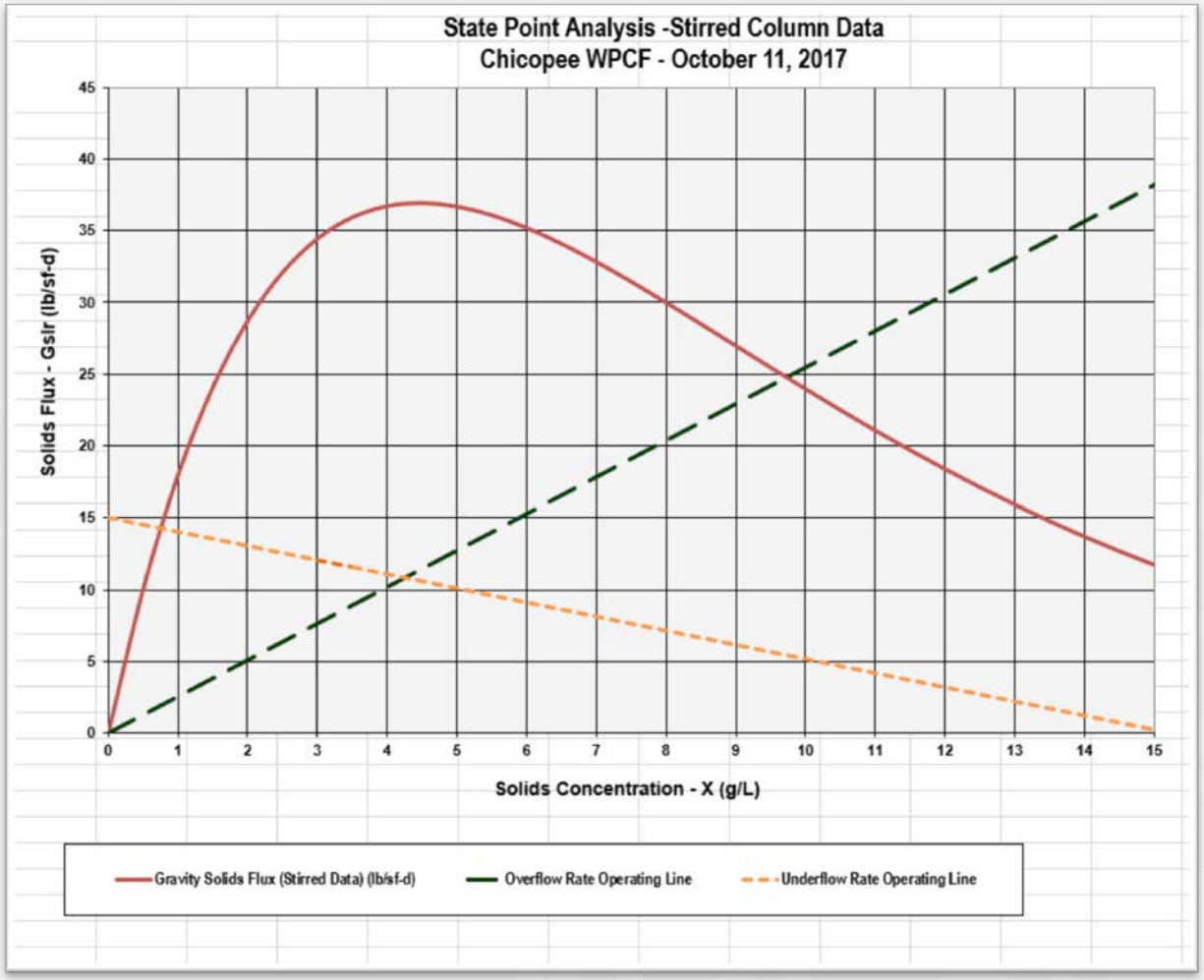
Cleanup!



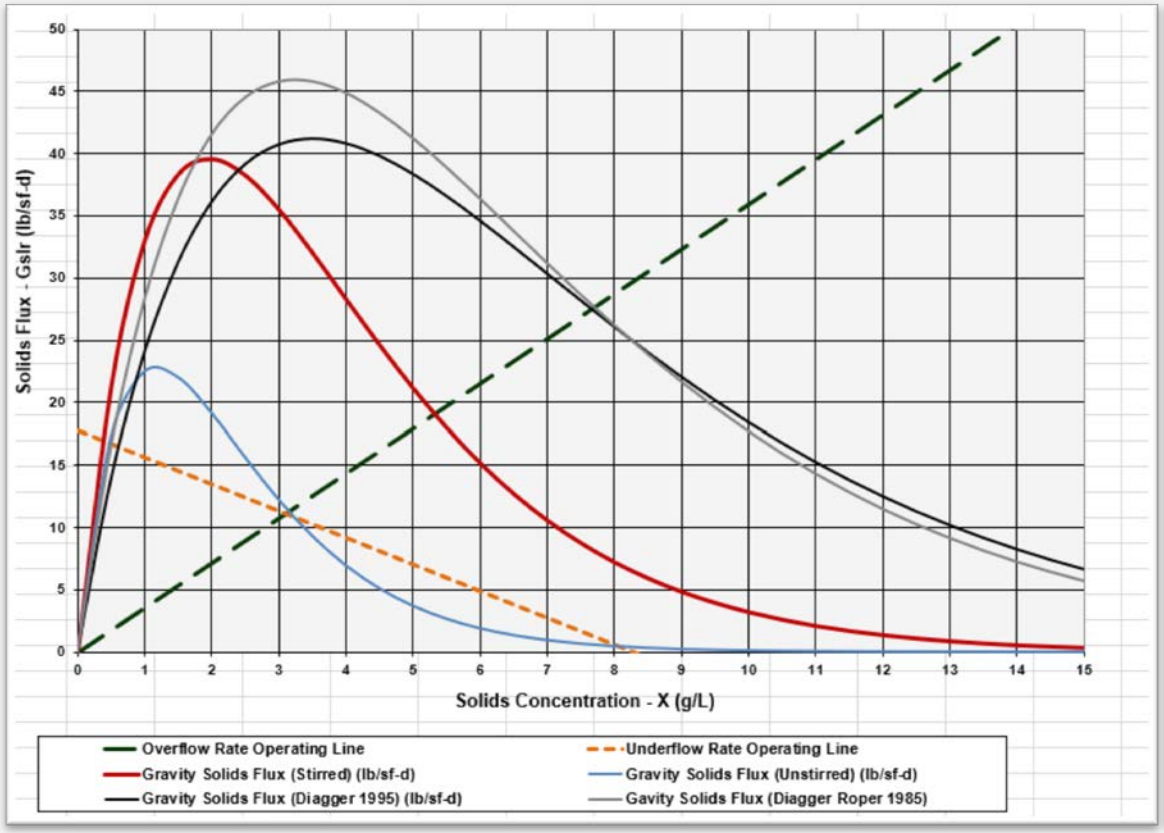
Analyze the Data

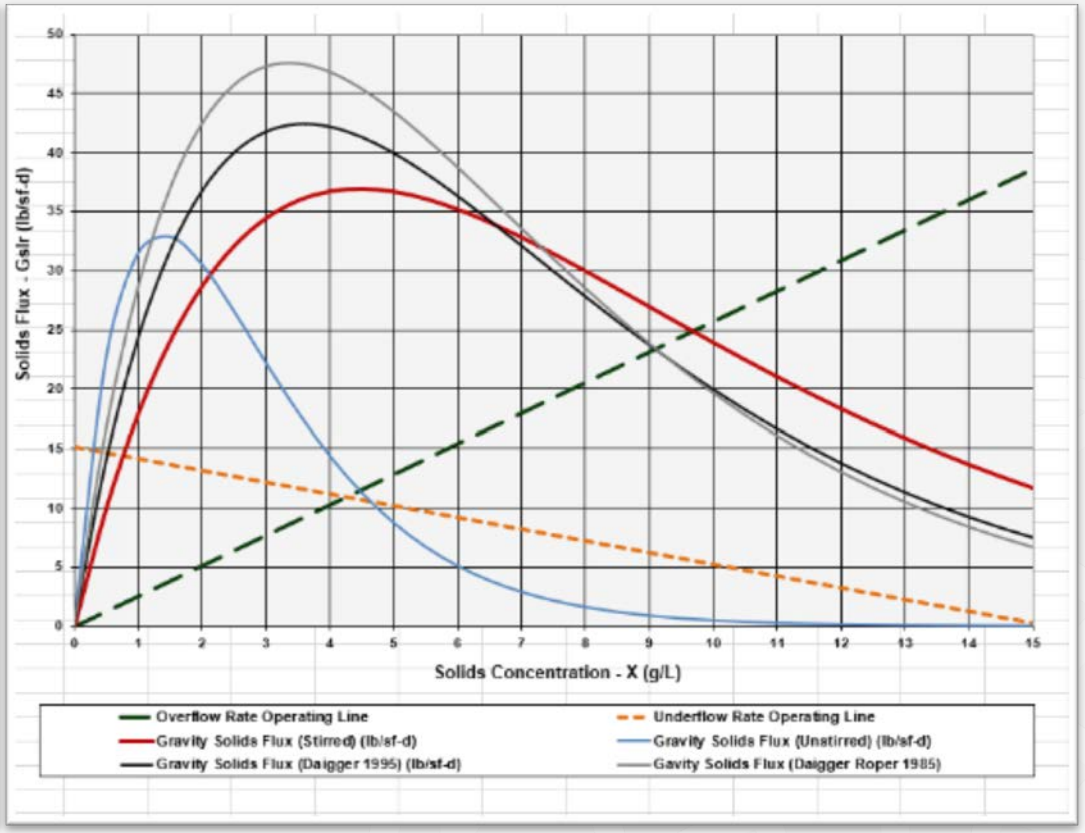






Lessons Learned and Conclusions



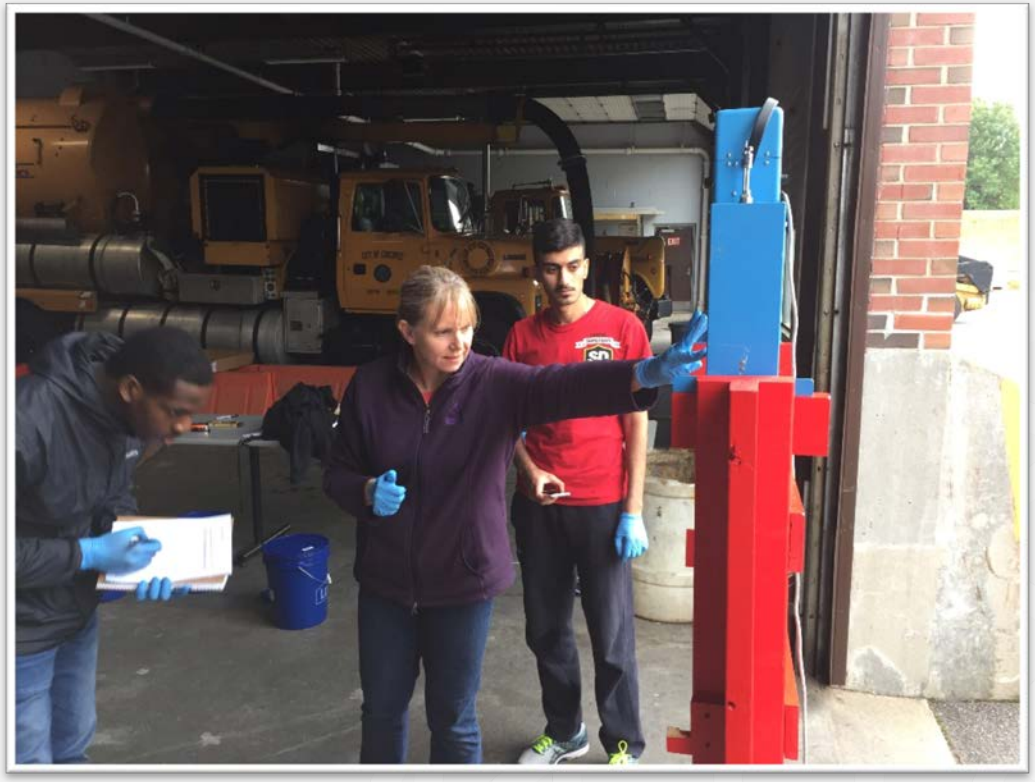


Outcomes/Lessons Learned: Operator/Engineer Perspectives

- Application of theory to practice
- Reinforced the importance of clarifier operation
  - Especially as WRRFs increase MLSS and associated solids loading to the clarifiers to push the performance to remove more nitrogen
  - To manage wet weather flows
  - To target lower effluent TSS to meet phosphorus limits

Outcomes/Lessons Learned: Operator/Engineer Perspectives

- Reinforced the beneficial synergy that comes from design and operations professionals working together and building a common understanding
- You're never too old to learn
- Students have a lot of energy



Outcomes/Lessons Learned: Student Perspective

- Engage in hands-on experience for the students
- Create networking opportunities
- Introduce next generation of engineers and operators to the State Point tool – fundamental concept for activated sludge
- Encourage the next generation of WRRF professionals to continue to innovate in partnership to solve the water quality challenges facing our communities

Student Feedback

- **Sarah**: “It was good to learn about ways that facilities can improve performance at low cost. I also liked the hands on aspect of the large column settling tests and creating different solids concentrations.”

- **Samantha**: “The State Point Analysis lab gave me greater understanding and familiarity with the terminology we were using in the classroom by providing me with the opportunity to apply it in a hands on context.”

Thank You Partners and Your Teams!

- Suez/Springfield – Mickey Nowak
- Northampton, MA – Jim Zimmerman
- Eastampton, MA – Carl Williams
- Chicopee, MA – Mike Williams
- Westfield, MA – Jeff Gamelli
- Woodard & Curran –
  Paul Dombrowski, Sue Guswa