UTILITY ADVISORY BOARD
Thursday, October 16, 2014
8:00 a.m.
Grand Rapids Parking Services Conference Room
50 Ottawa NW (see map)

AGENDA

1. Approval of Minutes – October 16, 2014 (attached)

2. Public Comment on Agenda Items

3. Transformation Update
   a. Wastewater Plant Real Time Control and Stimulation (attached)

4. 2014 Rate Study Review

5. Contract Awards for October, 2014 (attached)

6. Updates:
   a. Add-To-Tax (ATT) Process
   b. E-services Launch in Utility Business Office
   c. ACSET Contract
   d. 5-Year Extension of Water/Sewer System Agreements, due 12/5/14
   e. Rate Review Sub-Committee

7. Items from Members

8. Next Meeting – Thursday, December 18 – Grand Rapids Parking Services Conference Room

9. Adjournment

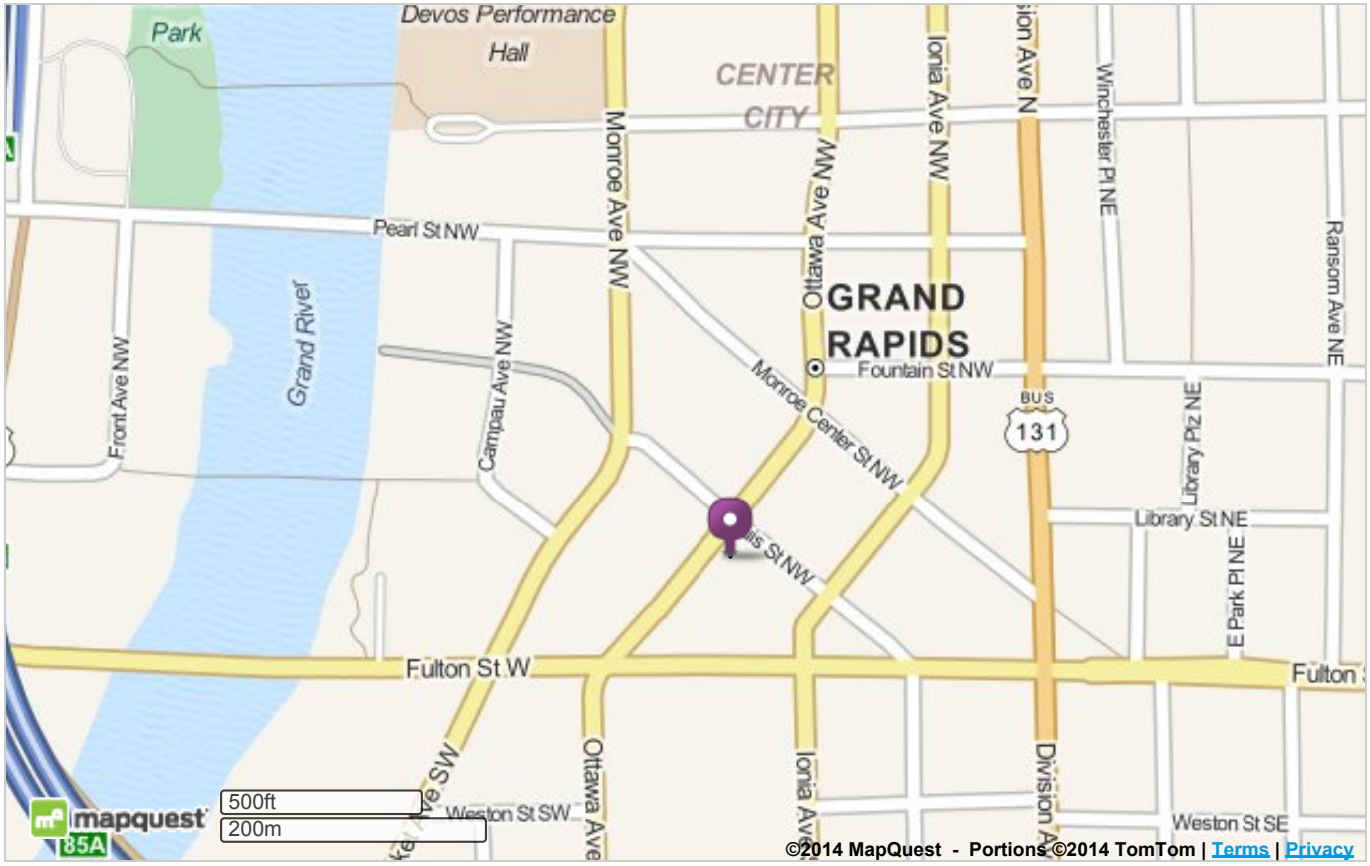
Map of:

50 Ottawa Ave NW

Grand Rapids, MI 49503-2806

Notes

Enter the Parking Ramp off either Ottawa (southbound) or Ionia (northbound). Proceed to the Parking Services Office on the 1st floor of the northwest corner of the ramp.



Utility Advisory Board
October 16, 2014

1. **Call to Order:**
The meeting was called to order by Eric DeLong, at 8:00 a.m. at Grand Rapids Parking Services.

2. **Attendance:**

Members Attending:
Tim Bradshaw (alternate)
Scott Conners (alternate)
Eric DeLong
Mike DeVries
Geri Eye
George Haga
Wayne Jernberg
Pam Ritsema
Chuck Schroeder
Joellen Thompson
Ron Woods
Josh Westgate

Others Attending:
John Allen
Patty Chapman
Nancy Meyer
Nicole Pasch

Members Absent:
Mark DeClercq
Brian Donovan
Mike Lunn
Richard Robertson
Ben Swayze
Darrell Schmalzel
Toby VanEss

3. **Approval of Minutes:**
Change incent to incentivize on Page 5.

Motion 14-12: Ron Woods, supported by Joellen Thompson, moved approval of the minutes of the September 18, 2014, Utility Advisory Board meeting with one correction. Motion carried.

4. **Public Comment:** There was no public comment.

5. **Launch of 311**
MariBeth Jelks and Becky Jo Glover were introduced to talk about the launch of 311. MariBeth Jelks described the program. The entire organization is onboard with their non-emergency, routine services now. There was an audit period to be sure we were ready to launch this to the public. Final launch took place on October 1. For those

outside of the City of Grand Rapids, 616-456-3000 is the number to use rather than 311. We are marketing and doing education for the public on 311 now. This includes going to council/commission meetings in Customer Communities to make them aware of the change.

Becky Jo Glover referred members to the materials that were provided to them at the meeting. The 616-456-3200 line for Water Customer Service will remain for a time while we continue to transition. We will need to go through about 2-3 billing cycles before the change will be adopted by all communities. She reviewed the statistics to date. She noted that 41 business processes have been updated in Water as they worked through the scripts. Online bill payments are increasing and walk-ins are decreasing which is a good trend to see.

MariBeth Jelks thanked Pam Ritsema, Joellen Thompson, Nicole Pasch and other staff in the Water department for being the leaders.

Becky Jo Glover referred members to the flyer from the Utility Business Office announcing free online bill management.

Eric DeLong reported that we would have spent $1.1 million on customer service in FY14, instead we spent about $500,000. It's also really important that anyone that calls about an issue gets the same answer. Nicole Pasch indicated that her team uses the scripts too so that the customer is repeatedly getting the same answer.

He noted that if any member would like MariBeth Jelks and Becky Jo Glover for a particular date at one of their meetings, to please let him or Becky Jo know. Becky Jo also indicated that they would be happy to have members visit the 311 center.

6. <u>ACSET Report</u>

Nicole Pasch referred members to the information in the meeting materials. Based on the amount remaining, she expects that the allocation will be used up by very early in October. This is later in the year than when it was used up last year, but we still didn't make it all of the way through the year.

7. <u>Draft ACSET Contract Extension</u>

Ron Woods asked about the cap information in the memo. Nicole Pasch indicated that this would be addressed in the contract with ACSET. With the capping at $1000, we were helping some people pay their entire water bill rather than being able to "assist" more people with the funds. Staff worked together with ACSET to come up with a different cap setting. $500 every other year was discussed; however, Salvation Army and others were concerned that we wouldn't be providing assistance to those that truly need the help every year. We then looked at having different caps for those above and below the poverty level and settled on a cap of $250 per year if they are above the poverty level and $500 per year if they are below the poverty level.

Joellen Thompson reported that this change ties in with our other business changes. We are turning more water off now upon non-payment so we aren't seeing people get such high bills. There are the only two major changes proposed in the agreement—the change in cap and allowing us to change the terms of the agreement throughout the contract period with approval of the UAB and the ACSET Governing Board.

Pam Ritsema indicated that this agreement will need to go to City Commission and the ACSET Governing Board for approval.

George Haga asked if there are other changes in the contract. Nicole Pasch indicated that she did highlight these in the memo. She reviewed them briefly. Reporting requirements were changed slightly so that she can receive data earlier and provide it to the UAB in a timely manner. This has been worked out in conjunction with ACSET staff and they are in support of the changes as proposed.

Eric DeLong asked if UAB members were ready to approve the agreement or if it should be brought back next month.

Motion 14-13: Mike Devries, supported by Wayne Jernberg, moved approval of the proposed ACSET agreement and to recommend the same to the Grand Rapids City Commission for approval. Motion carried.

8. <u>Add to Tax Processing</u>

Nicole Pasch noted that they have been processing these. They will be transferred to the customer communities at the end of the month. Mike DeVries noted that they would like to have the information as soon as possible. Ms. Pasch can provide them with preliminary data at any time and then the final data at the end of the month.

9. Financial Reports - Operational Graphs

Geri Eye referred members to the information in the meeting materials. She indicated that billed volume for sewer for the first quarter of the year is higher than last year. The three-year average will impact this so we will actually be lower. Water is the same, only billed volume is down, but we expect the three-year average will balance this out for now.

10. <u>2014 Rate Study</u>

Geri Eye noted that the items in the packet are fee-related types of items. These fees are required to come to the board for approval or go through an Omnibus process. These include Task 29 (water service charges and sewer lateral charges); Task 30 (water fees, charges and penalties); and Task 32 (water and sewer oversizing rates). Eric DeLong asked about the costs that are set by engineering. It was indicated that these are set based on actual bid and award amounts.

Nicole Pasch discussed Task 30 changes. A meter testing fee is being set now. We discourage customers from testing their own meters. We are setting a fee for reproduction of documents for customers' bill management needs.

Wayne Jernberg reported that the tapping permit is recommended for increase as our costs have continued to escalate. Inspection permits are all going up $5 per permit.

Eric DeLong added that these will all be in the Rate Study Ordinance provided to the City Commission. The important thing to add to this information is what the difference is in each fee from the current fee—how much we are changing it.

For Task 32, Chuck Schroeder noted that he talks to vendors for quotes in order to calculate the oversizing fees for sewer. Wayne Jernberg agreed that he calculates the water fee in the same manner.

Motion 14-14: Mike DeVries, supported by Ron Woods, moved approval of the fee schedule as proposed for Rate Study Tasks 29, 30 and 30 and to recommend the same to the Grand Rapids City Commission for approval. Motion carried.

Geri Eye then referred members to the Rate Study Schedule provided on the meeting agenda. She noted that any cash contributions from communities are due on December 5 if any communities would like to do that.

11. Contract Awards

There was only one award made which was for parking at Oak Industrial Drive. We have moved additional staff to this building and are fully using the building now, and additional parking is needed. Pam Ritsema noted that we can handle all of the employee parking, but there is no room for visitors for a meeting or if we lose space to snow in the winter.

12. Updates

5-Year Extension to Partner Agreement

Ron Woods indicted that Kentwood would be taking this to their City Commission next Tuesday. Nancy Meyer indicated that others should work to have theirs approved no later than December 5 to allow time to prepare an item to be taken to the Grand Rapids City Commission at their December 16 meeting.

E-Services Launch in the Utility Business Office

Nicole Pasch referred members to the information provided regarding the launch. They are hoping that people will opt for paperless billings. She noted that she can provide a login to customer communities if they would like to help customers with this or customers can just be directed to call 311. She noted that one benefit is the quick turnaround with the confirmation email.

Rate Review SubCommittee

Eric DeLong reported that he thinks this group has gotten to a point where we can start writing up recommendations now. We will be bringing these forward to UAB

hopefully at the December meeting. He thinks we should be able to significantly reduce the cost of connections and make our costs more comparable to well and septic.

13. Updates from Members

Sewer Main Damaged
Joellen Thompson reported that a contractor crushed a sewer main late yesterday. There were some sewer flows to deal with overnight. The break is repaired and everything is back to normal. We are doing an after event review and determining what additional actions need to be taken. To our knowledge, no homes were impacted.

Energy Efficiency Rebate Received
Chuck Schroeder introduced Patty Chapman and reported that we received an electrical rebate of over $56,000 for an energy efficiency project. Ms. Chapman described the project. She reported that the ZAPS monitors for e-coli and other things in real time. It allows us to adjust real time as well. This is a real advantage. Since the beginning of this year, we have been able to have dosages lower than we ever have before which is a real cost savings as well. ZAPS is tied into our SCATA system so the adjustments are automatically made by the system. Geri Eye noted that the rebate will be apparent in the next rate study as a direct offset to the rates. It is too late to be in this year's rate study.

WWTP Superintendent
Chuck Schroeder reported that a new WWTP Superintendent has been hired and will be starting soon.

Water Field Operations Superintendent
Joellen Thompson reported that they have just hired a new Water Field Operations Superintendent as well.

Caledonia Agreement
Chuck Schroeder reported that the Caledonia agreement has come to a halt as they ran into bidding and construction issues. They are currently working with Attorney Dick Wendt to extend the deadlines out a year.

Coordination of Developments
Scott Conners indicated they are working to model some water configurations now. They are also discussing with the Development Center how to coordinate various developments. He thinks this may be a good topic for the UAB to discuss. Mr. Conners and Pam Ritsema will work more on this.

LMFP Chlorine Gas System
John Allen reported that they are finishing a transfer of their chlorine gas system at the Lake Plant. This conversion will reduce the storage of hazardous materials and the training needed to support the use of these materials. We are one of the last to still use

chlorine gas. Eric DeLong noted that we should let the Township and emergency responders know once this is complete.

Metro Health
Mike DeVries reported that a building permit came in yesterday for the Metro Health building. This includes an urgent care facility which will move toward being a full emergency room.

GR Township Developments
Starting next year, the interchange at 196 and Cascade Road may change dramatically. Also, a 10-acre site is being looked at for development. Other than that they expect to see a lot of small, in-fill developments and don't expect many larger ones.

14. Next Meeting

The next meeting of the Utility Advisory Board is scheduled for Thursday, November 20, at Grand Rapids Parking Services Office.

15. Adjournment

The meeting was then adjourned.

/nlm

MEMORANDUM
CITY OF GRAND RAPIDS

DATE: November 17, 2014

TO: Utility Advisory Board Members

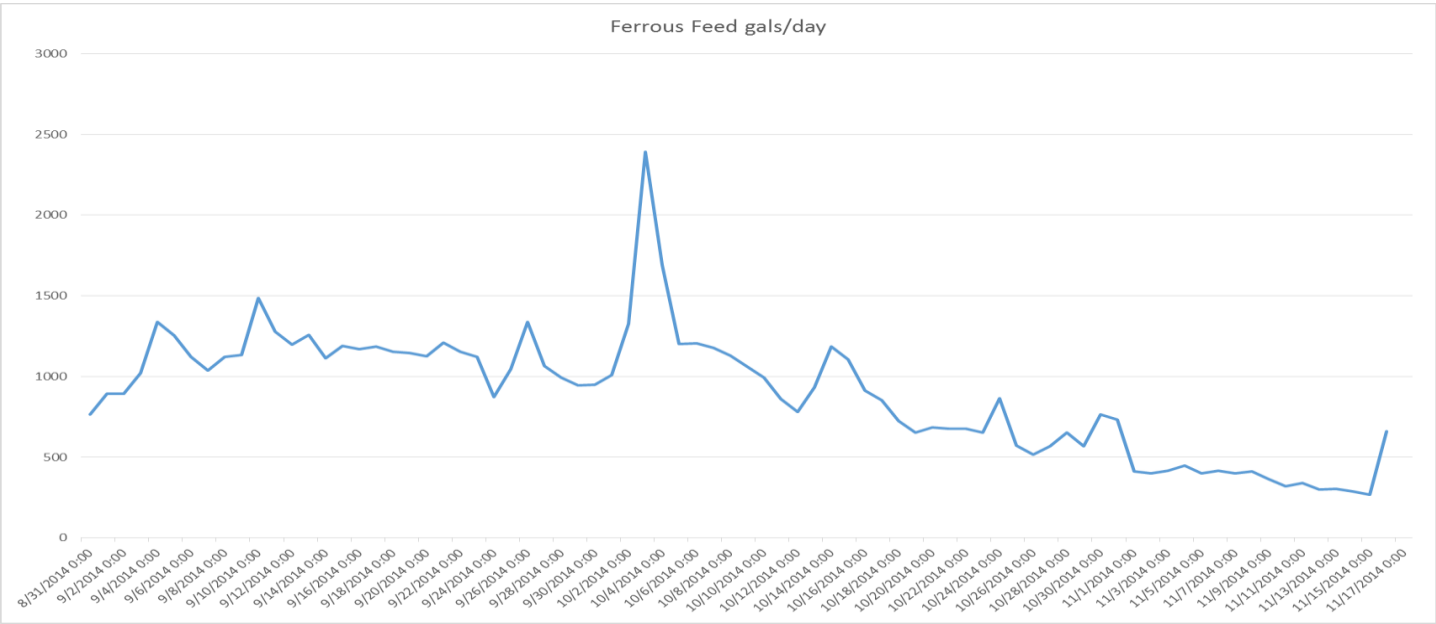
FROM: Mike Lunn – Environmental Services – ESD – 456-3914

SUBJECT: Wastewater Plant Real Time Control and Stimulation

The City Commission and City Manager have tasked all departments with being on “Leading Edge of Innovation”. In 2013, Grand Rapids (GR) began investing in real-time control processes to evaluate effectiveness. The UAB has approved;

- Partnering with HACH to become the first in North America to implement its real time nitrogen control system. The results were an electrical usage reduction of about 700,000 kwH annually.
- Purchase of first generation Zero Angle Photon Spectrometers (ZAPS) which utilize Hybrid Multispectral Analysis (HMA) to provide real time analysis of several parameters including *E.Coli* which when used to control Ultraviolet Disinfection resulted in an electrical usage reduction of about 700,000 kwH annually. It should be noted that as far as we can discern, the Grand Rapids WWTP is the first in the world to utilize this type of control for Ultraviolet Disinfection.

The ZAPS units also provide Volatile Fatty Acid (VFA) analysis every two minutes. VFA’s are required for biological phosphorus (BioP) removal to occur. Recently the ESD has revised the control algorithm for Ferrous Chloride feed to automatically adjust based on VFA levels. Preliminary data suggests that this enhanced control method will reduce ferrous costs 30-50% ($15,000-$20,000). Ferrous Chloride currently is $0.13 lb/Fe delivered and in the past approached $0.50 lb/Fe. During the metal crisis it was expected to reach $0.78 lb/Fe delivered. This control method has been in use for about two weeks.



The GR WWTP was the first to…

To increase the usage of real-time, ESD has brought together a team to refine the real-time controls implemented to date and evaluate the implementation of additional controls. The partners include:

Primodal Inc. to develop the stimulation utilizing IFAK Simba Stimulation Software. IFAK Simba was selected as it has the ability to test and develop Programmable Logic Controller (PLC) based control loops. A list of the project team is attached. The scope of work includes evaluation of data quality, stimulation development and calibration, control evaluation, and staff training. Part of the work will include sampling location evaluation which Evangelina Belia from Primodal is part of a **Water Environment Federation (WEF)** group developing updated guidelines for. The cost for these services is expected to be in the $250,000 range.

ZAPS Technologies and their local representative, **Hamlett Engineering,** who provides the ZAPS units which provide the real time. We continue to work with ZAPS to improve the unit and sampling techniques. Letter of support is attached.

Tetra Tech, the designer of all the major plant processes, will provide some support for the project at no cost. If designs or major work is required to implement a specific control, they may seek to be compensated for the work.

This additional investment will likely have less than a two to three year payback and greatly improve process control at the WWTP.

Mike Lunn
ESD Manager

List of Selected Projects

Project manager: Evangelina Belia, Primodal Inc.
Project: MSDGC modelling support (QA/QC)
Plant location: Cincinnati, OH
Client: Metropolitan Sewer District of Greater Cincinnati (MSDGC) (Primodal contracted through Malcolm Pirnie / Arcadis).

The Metropolitan Sewer District of Greater Cincinnati (MSDGC) has developed calibrated process models and operator interfaces several of its treatment plants. The model and interface development was executed by Hazen & Sawyer and Hydromantis. The models will be used by the Engineering and the operations teams of MSDGC. Primodal is providing advice to MSDGC on the model objectives, model reliability and applicability. Primodal is also providing QA/QC services on the delivered models. The process models will be used for a wide variety of tasks such as future planning for wet weather and nutrient removal, aeration control, general operations assistance, and upgrade design.

Project manager: Evangelina Belia, Primodal Inc.
Project: Modelling the Dan Region WWTP
Plant location: Tel Aviv, Israel
Client: Mekorot Water Co. Ltd.

The Dan Region WWTP is unique in its significance to Israel's water supply. The plant produces very high quality effluent that is used for aquifer re-charge and irrigation. Mekorot Water Co. Ltd. has decided to use a mathematical model to investigate the impact of planned future upgrades. These upgrades will add a full sludge treatment chain to the existing plant including primary sedimentation. In addition, Mekorot wanted to investigate the potential for operational optimisation and cost reduction at the Dan Region WWTP. The main objectives of this project were to develop a dynamic, calibrated model for the Dan Region WWTP; to use the plant model to investigate the planned upgrades, potential operational energy savings, optimise plant operations (oxidation ditch rotor control) and finally to use the model for general knowledge acquisition and operational support.

Project manager: Evangelina Belia, Primodal Inc.
Project: Modelling the Psyttalia WWTP
Plant location: Athens, Greece
Client: Hydroelectrica Ltd.

Psyttalia WWTP serves the greater metropolitan area of Athens, Greece and is located on a dedicated island off the coast of Attica. The plant has a design flow of 1,000,000 m^3/d and includes liquid and solids treatment lines. Hydroelectrica Inc. serves as special advisor to the owner (the Greek water authority, EYDAP). They wanted to use a mathematical model to investigate options for the optimisation of the treatment plant as well as alternatives for future

upgrades including the implementation of enhanced biological phosphorus removal. The project involved the development of a calibrated model and the implementation of this model to investigate current operational problems as well as their resolution. A second objective involved the investigation of future expansions to improve effluent quality and be able to meet future TN and TP effluent standards.

Project manager: John Copp, Primodal Inc.
Project: Modelling the Coleshill Wastewater Treatment Facility
Plant location: England, UK
Client: Severn Trent Water (STW)

The Coleshill STW is located in the metropolitan area of Birmingham UK and treats the waste of several hundred thousand people. The load to the facility is mostly domestic but there are various trade inputs and is subject to irregular wet weather. Severn Trent Water (Technology and Development) wanted to investigate options for upgrading the aeration system efficiency and wanted to use a process simulation model to investigate options to achieve this goal.

The aim of this project was to develop a comprehensive model of the aeration system including probe locations, sensor signal delays, actuator response and delay, changes in transfer efficiencies due to changes in airflow, busmain pressures and valve positions. The developed model was able to predict oxygen demand as measured, as well as the response of the valves, and busmain pressure changes. The model identified bottlenecks in the system as well as control authority problems in the existing control system design and was subsequently used for optimisation of the existing system to make the system more responsive and more efficient to run.

Project manager: John Copp, Primodal Inc.
Project: Strongford Storm Modelling
Plant location: England, UK
Client: Severn Trent Water (STW)

The Strongford Wastewater Treatment Plant (WWTP) treats domestic wastewater from two main areas; Newcastle under Lyme and the southern part of Stoke on Trent. The plant has occasionally exceeded its BOD permit during storm flows. The goal of this project was to investigate the reasons for these failures using the existing process model, provided by Severn Trent.

However, a new model of the Strongford WWTP was developed. A storm profile constructed from Strongford flow data and real storm concentration data from a UK municipal wastewater treatment plant was incorporated in the layout. The storm profile also included a first flush event. Unequal flow splitting of the SAS centrate and unequal influent flow splitting during rain events were coded into the model and simulated. The modelling work suggested that the BOD compliance issues could be the direct result of flow splitting issues and the overloading of one of the trains during storm events. With equalised flow splitting the model suggested that the plant could cope with the simulated storm and could cope with untreated digester centrate even during a storm.

Project manager: Jens Alex, ifak
Project: NoNitriNox
Plant location: Germany
Client: BMBF, FKZ: 033WA003A

The project aims to describe and to model the potential production of greenhouse gases like N_2O or the potential release of nitrite from waste water treatment plants as result of control concepts

aiming at energy minimization. The developed model will be used to analyze and develop control concepts aiming on minimization of effluent loads including GHG emissions and nitrite and to minimize energy consumption at the same time. The project plans to verify models, to implement models into simulation software allowing typical engineers to more properly plan process operation and control. The method will be tested for two wastewater treatment plants

Project manager: Jens Alex, ifak
Project:
Plant location: Germany
Client: Lippeverband

Two treatment plants (WWTP Hamm, WWTP Dorsten) were modelled and calibrated. These studies included the analysis of energy efficiency, options for improvements of the control system and the analysis of the load situation.

Project manager: Oliver Schraa, inCTRL (at the time of the project working for Hydromantis Inc.)
Project: Royce SRT Controller Algorithm
Plant location: Various
Client: Royce Technologies, New Orleans, LA, USA

The project objective was to develop a sludge retention time (SRT) controller for Royce Technologies. This included the development of signal processing and fault detection algorithms, dynamic SRT calculations, and a robust PID controller algorithm with integral windup protection and bounds on the variations in the waste flow. The controller was tested using process simulation with a number of test plants and its performance was verified at full-scale at a number of Royce pilot testing sites. Assistance was provided with controller commissioning at a variety of full-scale sites in the U.S. and the U.K including those with intermittent time-based wasting strategies.

Project manager: Oliver Schraa, inCTRL (at the time of the project working for Hydromantis Inc.)
Project: Design of DO Control System
Plant location: Collingwood, Ontario, Canada
Client: Collingwood WPCP

The project involved the development of a dissolved oxygen (DO) control system for a two-train, 25,000 m^3/d activated sludge process at the Collingwood WPCP in Ontario, Canada. A multi-layer cascade control concept was used where PID controllers were used to control DO concentrations by manipulating the set points of air flow rate controllers that manipulated the set points of air flow control valve positioners. The control system also included blower header pressure control employing the most-open valve concept. The blower inlet valves and the number of blowers operating were modulated by the controller to maintain the header pressure at its set point. A control system narrative was developed and the controller was commissioned on-site.

Project manager: Oliver Schraa, inCTRL (at the time of the project working for Honeywell Hi-Spec Solutions)
Project: Real-Time Optimization System
Plant location: Plock, Poland

Client: Petrochemia Plock Refinery

The project involved the development of a real-time optimization (RTO) system for the Petrochemia Plock oil refinery in Poland. The objective of the RTO system was to determine optimal set points for the lower-level model-predictive control system for the refinery. The RTO system used steady-state models as its time trajectory was long-enough to justify a steady-state analysis. On-line data was used to provide the models with the latest information and a sequential quadratic programming algorithm was used to find the optimal operating point. The refinery process included chemical reactors and separation processes such as distillation columns. Mathematical models of hydrocracker and hydrotreater processes were developed specifically for the project. The overall refinery model (including reactors and distillation columns) was developed and deployed on-site at the refinery. A data reconciliation module was developed as part of the optimization system to ensure that the data were reliable and obeyed mass and energy balances.

Project manager: Leiv Rieger, inCTRL (at the time of the project working for EnviroSim Associates Ltd.)
Project: Model-based aeration systems design - case study Nansemond WWTP
Plant location: USA
Client: HRSD

A simulation project was conducted for HRSD's Nansemond WWTP to evaluate the savings potentials for different aeration control strategies based on ammonia and DO measurements. Special emphasis was placed on modeling and analyzing plant constraints including blower minimum and maximum capacities, diffuser specifications, and mixing requirements. The results show a significant savings potential with ammonia- and/or DO-based aeration control strategies. Detailed modeling of the air distribution system allowed the design of a control concept tailored to the Nansemond plant. Feed-forward ammonia control was only active at low temperature (12 °C) and did not significantly lower effluent ammonia peaks. Therefore feed-forward control was not selected for full-scale implementation as it could not justify the additional investment and O&M costs against improved effluent quality or reduced risk.

Project manager: Leiv Rieger, inCTRL
Project: Model-based aeration systems design – continuously fed SBRs
Plant location: Sweden
Client: Manufacturer

A simulation project was conducted for an international equipment provider to evaluate the savings potentials for different aeration control strategies based on ammonia and DO measurements. One specific objective was to find highly efficient control strategies able to deal with over-sized blowers. A critical point was to control operation of parallel SBRs including switching air between two reactors with minimal over-shooting of DO concentrations. The control model included blower, NH_x, DO, airflow control loops and controls to switch between normal operation and storm modes. The energy consumption was modelled by detailed equipment models taking lower efficiencies in lower air or water flow regions into account. The results show a significant savings potential with ammonia-based aeration control strategies, however, part of the potential savings were counter-balanced by running the equipment in less efficient flow ranges.

Water/Sewer UAB Report
October 2014

Project Name	Contractor	Award Date	Substantial Completion Date	Final Completion Date	Water Fund Authorized NTE Amt	Sewer Fund Authorized NTE Amt	Est. Year for Rates	Integrated (Y/N)
Eastside Combined Sewer Overflow Control (CSO) Program-Certification of Sanitary Sewer Tributary to Eastside CSO Outfalls 110, 104, and 109 and Wastewater System Modeling	Black & Veatch Ltd.	7/8/14	N/A Design	N/A Design		$ 485,000.00	Design - With Project In-Service	Non-Integrated (GR)
Design Engineering Services in connection with Eastside Combined Sewer Overflow (CSO) Control Progam-Contract Nos. 26C and 28 (portions of Phase IV)	Black & Veatch Ltd.	9/9/14	N/A Design	N/A Design		$ 442,000.00	Design - With Project In-Service	Non-Integrated (GR)
Water Main Replacement in Richmond Street from 300' to 100' west of Muskegon Avenue; from 50' east of Muskegon Avenue to Seward Avenue and from Broadway Avenue to 200' east of Turner Avenue, and Resurfacing of Richmond Street from Alpine Avenue to 200' east of Turner Avenue (INCREASE)	Nagel Construction, Inc.	10/7/14	11/6/14	7/15/15	$ 48,000.00		2015	Non-Integrated (GR)
Improvements to the South Clearwell at the Lake Michigan Filtration Plant (INCREASE)	Horizon Brothers Painting Corp.	10/28/14	11/26/14	5/15/15	$ 85,000.00		2016	Integrated
Water Main in Maynard Avenue from Veteran's Memorial Drive to 3,250 feet North of Veteran's Memorial Drive (Financing Agreement)	(City of Walker)	10/28/14	Spring 2015	Summer 2015	$ 545,000.00		2016	Non-Integrated (WALK)