Appendix 5-1: BSA Operations and Maintenance Plan - 2010

THE BUFFALO SEWER AUTHORITY COMBINED SEWER SYSTEM OPERATIONS AND MAINTENANCE PLAN – 9/30/10

INTRODUCTION

The Buffalo Sewer Authority (BSA) operates under a New York State Pollution Discharge Elimination System (SPDES) permit. The permit provides limits on discharges from the BSA Bird Island Wastewater Treatment Plant (WWTP) and it establishes conditions pertaining to the operation of Buffalo's combined sewer system. Specifically, the permit implements the United States Environmental Protection Agency's (USEPA) program of "Nine Minimum Controls (NMCs) for combined sewer overflows (CSO). The New York State Department of Environmental Conservation (NYSDEC) has addressed implementation of the NMCs through their program "Best Management Practices for Combined Sewer Overflows." Many of these controls will be addressed in the Long Term Control Plan (LCTP) which is currently being updated. This document pertains to those controls which impact the BSA's Combined Sewer System operation and maintenance plan.

PROGRAM OBJECTIVE

The objective of this plan is to properly manage, operate and maintain, at all times, the parts of the collection system owned by the Authority or over which the Authority has operational control. The BSA is required to provide adequate capacity to convey base flows and maximize peak flows to the WWTP. During wet weather events, collection system operation is designed to minimize combined sewer overflows. The BSA strives towards continuing improvement of its collection system O&M program.

PROGRAM OVERVIEW

The Buffalo Sewer Authority (BSA), a public benefit corporation created in 1935 under Chapter 830 of the Public Authorities Law of New York State, is responsible for collecting, conveying and treating wastewater generated within the City of Buffalo and nearby communities. It serves approximately 500,000 users in a 110 square-mile service area. Within the City of Buffalo, the collection system is comprised of approximately 850 miles of sewers. The system contains nearly 790 miles of combined sewers and 11 pump stations. The remaining sewers are either sanitary, storm or storm overflow. When the combined sewer system receives more flow than it is capable of conveying to the treatment plant, combined sewer overflow (CSO) discharges occur to reduce the potential for street and basement flooding during storm events. The BSA has 52 permitted active CSO outfalls and approximately 241 tributary CSO regulator locations.

The BSA runs the Bird Island Wastewater Treatment Plant, the second largest wastewater treatment plant in New York State. This plant is capable of handling 360 million gallons per day (MGD) of flow through primary and secondary treatment and 563 MGD when combined with partial bypass.

The Sewer Collection System Maintenance Building is also located on Bird Island. This building houses all collection system crews, equipment and materials, the motor equipment repair shop, purchasing and all other supervisors and administration.

BSA's Operation and Maintenance program divides its crews to perform day-to-day preventive maintenance and also to respond to emergencies as they arise. Many times the two overlap when the normal maintenance routine uncovers a situation warranting additional resources.

The Director of Sewer Maintenance directs the daily operations of this department. He has the Assistant Superintendent of Sewer Maintenance under him. Each crew has a supervisor. Attachment #1 is the collection system maintenance organizational chart.

Daily operations are divided up into the following areas:

1) Car #4 is the complaint truck. There is a supervisor and a maintenance assistant in this vehicle and they respond to complaints on a 24 hour basis. Car #4 is manned seven days a week, two shifts only. Midnight to 8 am is not covered. Day and afternoon shifts are manned daily and are called out at midnight should the need arise. All other crews work on a Monday through Friday 7:30 to 3:30 day shift.
2) Three Emergency Repair Crews (ERC) who handle the day-to-day repairs of lines and appurtenances. These crews consist of a supervisor, two or three sewer construction workers (who do repair work and drive dump trucks) and a backhoe operator.
3) Two receiver crews who clean receivers and catch basins on a daily basis. These crews consist of a supervisor and one or two laborers or maintenance assistants.
4) A TV truck that responds to complaints and televises lines for preventative maintenance. A supervisor and a maintenance assistant man this truck every day. Two trucks may be called upon when we are televising lines for the Department of Public Works (DPW) streets repaving program.
5) A cleaning/flushing truck. This truck is used to clean and flush tree roots, grit and debris from the sewer lines. The large vactor/flusher is the truck we are using right now, but we also have clam trucks and a vacuum jet truck should the need arise.
6) We have a dedicated inspector to do the CSO regulator inspections and dry weather overflow reporting.
7) Many of our vehicles are outfitted with plows and spreaders to plow our facilities and help out the streets department during heavy snowfall events.

Attachment #2 is our typical daily maintenance activities by position and truck number. We have 35 people to fill 30 daily positions. When we have a full crew, we man three emergency crews (ERC 9, 10 and 11), two receiver cleaning crews, a vactor truck and a tv truck. An additional tv truck and/or vactor truck is usually sent on a daily basis. When vacations/sick time occasionally leave us with less than a full complement, we will cut one of the above crews based upon our needs for that day. Occasionally, we will send the clam truck out instead of the vactor when we are cleaning catch basins (our terminology, see Attachment #3 with pictures and our nomenclature).

We cross train our personnel so that they have familiarity with all of our equipment, and we have an extremely proactive safety program administered by our own in house safety professional.

What follows are the major elements of the BSA's Combined Sewer System Operation and Maintenance Program and a detailed discussion of each:

1) Complaint response
2) CSO maintenance and inspection
3) Prohibition of dry weather overflows
4) Pump station maintenance
5) Televising the collection system
6) Cleaning and flushing of lines
7) Tree root control
8) Receiver and catch basin cleaning
9) Sewer line rehabilitation and replacement
10) Street sweeping
11) Equipment Maintenance
12) Safety training
13) Maximizing System Capacity
14) GIS Implementation
15) Public Participation
16) Annual Review

COMPLAINT RESPONSE

The Sewer Maintenance Department receives complaints from various sources:

1.) Homeowner
2.) Mayor's 311 System
3.) Elected Officials
4.) Various City of Buffalo Departments:
    a.) Engineering
    b.) Water Department
    c.) Public Works
    d.) Police
    e.) Fire
5.) Other – utility companies, concerned neighbors, etc.

All of them ultimately go to the same two people, the dispatcher or the principal clerk, who do generate a work order for each complaint. They generally give it directly to Car #4 or a sewer inspector to investigate. Many complaints can be answered on the spot and are closed out immediately (If they do not make contact with the homeowner, an orange card is left in their door notifying them of our findings.). All others are given to the dispatcher or principal clerk who write up work orders and give

those to the Director of Maintenance or his second-in-command, the Assistant Sewer Maintenance Superintendent. They will then develop their daily work schedule for each crew based upon these work orders. All crews will then come back with closed out work orders, which are then entered on the computer by the dispatcher or the principal clerk.

The BSA publishes a 24 hour complaint hotline whereby citizens can call and lodge their complaint at any time of the day. These complaints are taken during the day time by administrative personnel at BSA who give the call to Car #4, which is the BSA's complaint vehicle or to the appropriate personnel to address the problem. On the 4-12 shift, the complaint hot line goes directly to Car #4, enabling them to address all concerns immediately. For complaints on the midnight shift, the hotline transfers the calls to the Treatment Plant Shift Superintendent, who calls in a Car #4 crew if he feels that it is necessary.

The City of Buffalo's 311 Call and Resolution Center takes complaints from 8-4 Monday through Friday. These complaints are logged in electronically there and then passed on to BSA electronically. Based upon the nature and severity of the complaint, BSA must investigate and respond in an appropriate time period – one day to dispatch inspectors out to investigate the complaint and then two to thirty days for final resolution, barring extreme circumstances, such as major snow storms. For example, street cave-ins are handled immediately, whereas a minor complaint for a curb receiver would be resolved later, but no longer than thirty days from the call. Once the complaint is resolved, that information is entered electronically at the 311 Center.

Complaints from either source are handled in the same fashion. Car #4 will go out and investigate. They can handle many of the complaints at the scene themselves. Should the complaint require immediate attention, the Car #4 supervisor will contact the Director of Sewer Maintenance to determine how the situation should be handled. If it is off hours, crews will be called in on overtime. If it is during the day shift, the director will address it based upon its criticality.

CSO MAINTENANCE AND INSPECTION

The SPDES Permit stipulates that the BSA develops a written maintenance and inspection program for all its permitted CSOs and the regulators tributary to the CSOs. The objective of the maintenance and inspection program is to ensure that no discharges occur during dry weather and that the maximum amount of wet weather flow is conveyed to the WWTP for treatment. Inspection reports documenting regular compliance with this BMP are submitted to the NYSDEC.

Within the City of Buffalo, there are approximately 241 sewer regulators tributary to 52 permitted CSOs.

The BSA has implemented a schedule of routine maintenance and inspection. The BSA inspects between 17 and 33 regulators a day, over a period of 11 days. For each regulator, the inspection report notes the date, weather, CSO to which the regulator is tributary, if the connection is open or closed, and if a dry weather overflow is observed. The CSO inspections ensures that each sewer regulator is inspected at least twice per month under the following general schedule:

Sewer Patrol Regulator Routine Inspection Schedule

Day No.	Sewer Patrol Regulator No.
1	1, 13, 23, 35, 36, 65, 67, 104, 122, 123a, 125, 126, 206a, 206b, 217, 296, 304
2	113, 114, 115, 118, 119, 120, 122, 148, 149, 150, 151, 152, 198a, 199a, 199b, 199c, 248, 249, 277, 311
3	52, 53, 54, 55, 56, 58, 59, 65, 67, 97, 97a, 128, 129, 130, 131, 132, 133, 135a, 136a, 137, 209, 279, 325
4	13, 14a, 14b, 17, 18, 19, 20, 179, 180, 181, 182, 183, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 243, 244, 245, 330, 331, 332
5	68, 69, 70, 72, 73, 74, 75, 77, 78, 79, 80, 81, 82, 84, 85, 86, 87, 88, 89, 90, 91, 92, 94, 217, 218, 314, 315, 316, 317, 318, 319, 320
6	1, 3, 4, 5, 7, 8, 9, 10, 11, 184, 185, 186, 187, 188, 189, 190, 191, 193, 195, 213, 214,215, 280
7	99, 100, 101, 103, 104, 105, 106, 106a, 123a, 123b, 123c, 124, 125, 125a, 126, 208, 307, 308, 308a, 308b, 309, 310, 328
8	107,107a, 109, 121, 211, 212, 220, 221, 222, 223, 224, 225, 226, 227, 227a, 291,292, 293, 294, 295, 322, 329
9	21, 22, 23, 24, 35, 36, 39, 42, 45a, 47, 48, 50, 51, 51a, 138, 144, 145, 146, 206a, 206b, 281, 282, 283, 296, 304, 327
10	156, 156a, 156b, 157, 175, 176, 200a, 200b, 201, 202, 203, 204, 337, 338, 339, 340, 341a, 342a, 342b, 343
11	163, 164, 165, 165a, 165b, 166, 170a, 170b, 171, 177, 178, 229, 229a, 247, 333, 334a, 334b, 335a, 335b, 336a, 336b, 345

PROHIBITION OF DRY WEATHER OVERFLOWS

The occurrence of any dry weather overflow is required to be promptly abated and reported to the NYSDEC within 24 hours. When a dry weather overflow or any problem with the system is observed,

generally by our inspector on his twice monthly rounds, it is assigned to a maintenance crew to be addressed immediately. If a dry weather overflow came in from any other source to the BSA, all personnel know that this is an emergency and the Director of Sewer Maintenance is notified immediately. He would call out an emergency crew immediately. He would make the determination to use BSA crews or an outside contractor. Sometimes because of the nature of the problem and its solution, it is best handled by an outside contractor and his equipment. This allows BSA personnel to use our equipment for daily emergency complaints.

If a dry weather overflow is observed, the inspector logs the event and then reports it to the Treatment Plant Process Control office, which then completes the non-compliance event form and notifies the NYSDEC. Emergency sewer maintenance crews are dispatched to the event to clear the blockage. Work history on the location is reviewed by the Director of Sewer Maintenance. An adjustment is made to the sewer maintenance schedule if deemed appropriate.

PUMP STATION MAINTENANCE

Monthly preventive maintenance performed at the pumping stations includes an inspection of alarm/detector- monitoring systems. This includes oxygen detection and monitoring systems and hydrogen sulfide gas alarm systems. Equipment is inspected for operational integrity, calibrated, and warning and alarm setpoints are inspected. All pumping stations are also visited on a weekly basis and after a wet weather event to inspect the station and all equipment including pumps, exhaust fans, heating systems, sumps etc. Any issues are noted and corrective work orders are generated as needed. (see Attachment #4 - BSA Preventive Maintenance Job Plans – Outlaying Stations)

The major pumping stations are monitored on a continuous basis through the SCADA system for the facility. Notification of alarm events is accomplished through the SCADA system, auto dialers and or visual alarms. Pumping station information such as pump run/alarm status, well levels, and flood alarms are monitored continuously from the wastewater facility. If an alarm, high well level, or other problem exists, treatment plant personnel are dispatched to the facility to diagnose and correct the problem. (see Attachment #5 - BSA Remote Pumping Station Monitoring).

Work orders for pumping station maintenance activities are issued and tracked through MAXIMO, the Authority's computerized maintenance monitoring system. (see attachment #4 – BSA Work Order Report)
The Authority also has pumping station maintenance activities incorporated into the operating budget and capital improvement plan. This helps to coordinate and schedule larger scale activities such as pump rehabilitation, electrical and controls, rehabilitation, and HVAC work. Pumps and other pieces of large equipment are rehabbed on a life cycle basis.

Any problems that are observed elicit a quick response from treatment plant personnel to diagnose and correct the problem. Car #4, the collection system 24 hour complaint car, is also used during off-regular shift calls.

TELEVISING THE COLLECTION SYSTEM

The BSA has two camera trucks. Each truck is staffed with a foreman and a maintenance assistant. We send out one truck every day and a second one in the fall or winter when we are televising for the Department of Public Works Paving Program or if the number of complaints is unusually high. The intent of the televising program is three-fold: complaint response televising, preventive routine annual televising, capital improvement based televising.

First, is the complaint response portion of the program. The main television crew responds to complaints of basement/sewer back-ups and/or street flooding. The camera is dispatched to televise the line in question. We generally try to send the vactor truck out with the camera truck on a complaint call, anticipating some type of blockage. The results of the camera inspection drive the next step in the process.

If no sewer problem is found, we notify the homeowner that their problem is most likely internal, and they need to engage a private plumber. If a sewer problem is identified by the camera inspection, the next step is driven by the type of problem. If it is a sewer collapse or joint separation, an Emergency Repair Crew is sent out to fix it. If it is a tree root blockage or grit or grease blockage, the vactor/flusher truck will attempt to remove the blockage immediately or, if it is not on site, it would be called out to remove the blockage.

In the event of extensive tree root infiltration, this address would be put on the list for the BSA annual tree root spraying contract.

In all of the cases above, the televising crew inspects beyond the address involved in the complaint to ensure that any problem is localized and does not run further up/down the sewer line in question.

The second element of the televising program is working in cooperation with the City of Buffalo Department of Public Works' street overlay program. Every year, the DPW provides BSA with the list of streets that they will be paving that year. In order that newly-paved streets are not torn up with sewer work, we televise these streets ahead of the actual paving. Should the sewer line need replacement or rehab work, we do this work in house or hire an outside contractor that we retain on a yearly service contract before the paving is done.

Capital improvement based televising rises somewhat from complaint response televising where an annual review of a concentrated complaint area requires further condition assessment of that section of the system. Each year, system improvement projects, which have been based on the findings of this more extensive televising effort, are added to the Capital Plan or to the root spraying program.

We do not use a rating system. If our televising operation uncovers a serious defect that could constrict flow or otherwise cause sewer back-ups, a work order is generated to fix the problem, and the problem is fixed usually within 30 days.

Based upon the number of feet that we televise a year and the general condition of our sewers, especially our larger ones, we feel that we can inspect our entire system on a 20 year cycle.

CLEANING AND FLUSHING OF LINES

Again, as with most of the maintenance work done in the collection system, the cleaning and flushing of lines is done on a proactive and a reactive basis.

The reactive or complaint response portion is the daily complaints of basement back-up and flooding. These complaints are answered immediately. As stated in the televising category above, our complaint camera truck is usually accompanied by our vactor/flusher truck whereby the line is flushed immediately.

The proactive element is the Street Paving Program, where a camera truck is sent out, usually by itself, unless we suspect debris in the lines based upon old complaint calls. Then, the flusher/vactor would accompany the camera truck. The flushing and cleaning program would follow the camera inspection. This is done on a routine basis where the debris in the line doesn't present an immediate crisis.

We generally clean and flush 10-20 miles of sewer line a year. Half of this would be the complaint side or reactive part of the program and the other half would be the routine or proactive portion.

If a job is too large or may take up too much of our time, we will engage the services of an outside contractor that we retain on a yearly service contract for just this type of work.

By following this method for cleaning and flushing we have been able to maintain the system's capacity minimizing CSO volumes.

TREE ROOT CONTROL

Tree roots are responsible for approximately 70% of our complaint calls. Sewer back-up and flooding calls are dispatched to Car#4. They investigate the nature of the complaint, and, if it is found to be tree roots, then the vactor truck crew is dispatched to clean the sewer. Televised follow-up guarantees that the blockage is removed and that the sewer is clear.

BSA also started a preventive maintenance program for tree root control. In fiscal year 2009-2010, we engaged the services of a contractor to conduct yearly tree root spraying in our sewer lines. This fall, we treated approximately 35,000 linear feet of sewer line where we had our most severe tree root problems. The contractor guarantees that the roots will die. Cleaning and flushing follow-up will be carried out in the spring and summer. This work is guaranteed for two years, with a subsequent spraying at that point that is guaranteed for an additional three years. The work we did this year accounts for roughly one third or six miles of our total tree root problem. We intend to treat a like amount over the next two years and then re-evaluate the tree root situation in year #4 to determine the total amount of tree root intrusion in our lines.

RECEIVER AND CATCH BASIN CLEANING

We have two daily receiver crews that clean receivers and catch basins. They split the City into a north and a south district and inspect/clean about 200 receivers a day. Beside their daily route, they are also

dispatched to handle complaints and emergencies such as street flooding. On high rainfall days, the director of maintenance will reassign other crews to receiver cleaning to answer flooding complaints and keep the streets clear.

Taken into account these duties and the limitations caused by weather, particularly snow, generally all of our 17,000 receivers are inspected/cleaned twice a year.

Roughly 25-30% of our receivers are hooded. On new projects or when we replace a receiver, hooded receivers are installed. Missing hoods are generally replaced as well.

Our priority catch basins are those on the roads beneath the railroad bridges in the Clinton/William/Babcock/Fillmore area. These tend to accumulate a lot of grit because of the runoff from the hills. We clean these more frequently.

SEWER LINE REHABILITATION AND REPLACEMENT

Despite the age of our sewer system, the majority of our lines are in good condition and do not need to be replaced. Our problems are more in the cave-in or spot repair category, and many of these are caused by broken water mains that wash out our lines.

Our televising program feeds us much of the information regarding the condition of our lines. Again, there is a preventive and a reactive portion of this program that dictates what the response and the course of action we take on a particular sewer line.

For emergency complaints handled on a daily basis, we rely on the camera inspection to give us an idea of the scope of the problem. If the problem is localized and the line is in good shape otherwise, then a spot repair is completed. Spot repairs are done by the three Emergency Repair Crews (ERC) and may require replacement of selected lengths of pipe. We also have been using a new pipe patch product. This is essentially a sleeve that is inserted and then blown up and sprayed with epoxy to make it adhere. This repairs joint separations and minor holes in the line.

The preventive portion of the rehabilitation and replacement program has two elements that ensure that we are keeping up with our long term capital needs. The TV inspection of lines that coincides with the City of Buffalo's yearly paving program determines our approach. If we need spot repairs, ERC crews would address this, if we need total replacement of the line, we would engage our outside contractor to complete this work.

Additionally, in cooperation with the Department of Public Works ongoing capital program to reconstruct streets, we take that opportunity to replace or upgrade our sewer mains. Improvements to our sewer system through this program provides for sewer separation. This allows for system storage and reduction in basement and street flooding and results in fewer CSO overflow events.

STREET SWEEPING

Street sweeping is not done by the BSA (except on Bird Island where we keep our own roadways swept). The Department of Public Works (DPW) handles the sweeping of city streets. Every street in the City is swept at least three times a year so as to minimize and control the collection of curbside grit and other materials. The DPW routinely provides for street sweeping in the spring and fall, to coincide with their large trash pickup program, and also once in the summer. Additionally, main streets are swept nightly in the City, as needed. The DPW street sweeping program coupled with our receiver and catch basin cleaning program ensures that a minimum of grit enters our combined sewer system. As an added factor, our catch basins are equipped with sumps, which allow for grit to settle, rather than be conveyed to our combined sewer system. These sumps are cleaned as part of the receiver cleaning program.

EQUIPMENT MAINTENANCE

We operate a fully function mechanics garage that routinely inspects all of our fleet. It is important to us to maintain or fleet in top condition in order to serve the public efficiently and effectively. Work is tracked by our Computerized Maintenance Management System (CMMS). When a problem is discovered, our mechanics review the preventive maintenance schedules and modify them if needed.

The CMMS is also used to track and purchase items for inventory. All of the stock parts and equipment for the vehicles and collection system maintenance are accounted for on the CMMS.

SAFETY TRAINING

BSA has a safety training department whose safety officer provides the following training to all Sewer Maintenance Department personnel on a yearly basis:

1) Confined Space
2) New York State Right to Know
3) Hearing Conservation
4) Competent Person Shoring and Trenching Safety
5) Workplace Violence
6) Stormwater and Spill Prevention
7) Heat and Cold Stress Safety Training
8) CPR/First Aid/AED training and certification for all supervisors

Any failure to comply with safety regulations is immediately addressed.

MAXIMIZING SYSTEM CAPACITY

BSA has committed to increase the capacity of the collection system in order to reduce CSO events. Over the past several years the BSA has reduced the number of CSO discharging into the area waterways. Most of this reduction has been accomplished by removing storm flows from the system thereby increasing the capacity of the existing system to convey sanitary waste to the treatment plant and

reduce CSO volumes. Since 1990 the BSA has eliminated 14 CSOs and has separated 20 miles of storm sewers.

CSO volumes have been further reduced by implementing projects at the treatment plant. Changing the mode of operation of the Activated Sludge system from conventional mode to step feed mode has allowed higher hydraulic loading of the secondary system which reduced wet weather use of the primary outfall by as much as forty percent.

A hydraulic constraint exists at the BSA WWTP that we are addressing to attempt to get additional flows to the secondary. The proposed improvement to be constructed is a modification to the existing wastewater channels in the primary bypass area of the WWTP and installation of a new sluice gate to allow more flow to pass through the secondary bypass (through the settled wastewater conduit). A new sluice gate would be installed in the channel, next to the existing sluice gate, to provide an additional opening for the wastewater to flow to the settled wastewater conduit. This could allow us to treat an additional 60 MGD through secondary treatment on high flow days.

The BSA is also looking at the feasibility of using high rate filtration to add higher flows to the WWTP during wet weather events. Location of the high rate filtration treatment process would be at the plant. The flows would be conveyed through a new conduit under the Black Rock Canal that would reduce overflows in the system, take some load off of the head of the plant and provide TSS and BOD removals approaching or exceeding secondary treatment requirements.

GIS IMPLEMENTATION/MONITORING

BSA has recently established an Enterprise GIS sewer application. We have input all sewer profiles and plates. Additionally, we did a field survey of all receivers and catch basins and then added these to our data base, which already included all of our control structures (weirs, orifice plates, etc.) Now that we have input all of our system information on a database, we are in the process of selecting software and hardware solutions whereby field personnel (as delineated in the attached organizational charts) will be able to document their daily work through a handheld/toughbook type of computer on a real time basis. Daily work would include: receivers cleaned/inspected, lineal feet televised, lineal feet cleaned, spot or contractor repairs, etc. This information will then be uploaded on a daily basis into our asset management system (currently a DOS system, but we will be migrating to our existing Maximo CMMS.)

PRETREATMENT PROGRAM

The Pretreatment Program administers local, state and federal regulations that affect what businesses and industries are allowed to discharge into the Authority's wastewater treatment system. The Authority's Pretreatment Program also regulates the outlying sewer districts that are connected into the Authority's sewer system.

The main goal of the Pretreatment Program is to reduce the discharge of pollutants into the Authority wastewater treatment system. Reductions of the pollutants discharged:

- Protect the health and safety of the public and the Authority's employees.
- Protect the physical integrity of the Authority's sewer system and treatment plant facilities.
- Prevent pollutants that can upset or interfere with the treatment plant's ability to process wastewater.
- Prevent pollutants from passing through the treatment process and being discharged into the Niagara River.
- Prevent limitations on sludge and ash disposal options.

The Authority's Pretreatment Program was developed and initiated in 1976 and finally approved by the EPA in 1984. The Authority has approximately 166 businesses and industries permitted to discharge wastewater. These businesses and industries account for approximately six percent of the total flow into the treatment plant and seven percent of the conventional pollutant loading that the plant treats.

The IWS is directed by the Industrial Waste Administrator and is staffed with two Legal Investigators, one Investigator, a Senior Field Technician, two Field Technicians and one Treatment Plant Operator. To insure compliance with the various regulations affecting the dischargers, the IWS routinely collects and analyzes samples from the permitted businesses and industries. Last year, the field crew collected 670 samples, and 1016 analytical tests were conducted on these samples. The results of the analysis showed that 2 industries were in significant noncompliance of their discharge limits. The violators were informed of the violation and made the necessary corrections to prevent a reoccurrence of the violation. Any failure to correct a violation could result in fines.

Another responsibility of the IWS is preparing the outlying district bills. The outlying district billing is based on flows that the districts submit to the IWS.

The IWS also investigates sewer complaints, spills and blockages and invoices the business or industry for any cost that is assessed due to the removal of the blockage.

The Industrial Waste Department has the legal authority to issue and enforce industrial discharges into our collection system. Each permit is investigated, reviewed and if approved is issued to the discharger. If system problems such as backups, blockages or dry weather overflows are attributed to an SIU, the Industrial Waste Department investigates the discharger's operation and, if it is found to be a problem, enforcement action is initiated pursuant to our Enforcement Response Plan to ensure the problem does not recur.

PUBLIC PARTICIPATION

The Authority encourages the public to participate in improving our service by having a BSA complaint line, 311 City call in, BSA Web site and participation in the CitiStat program.

As previously mentioned, the BSA complaint line is available to customers in need of service. This 24 hour line is published in the local phone books and directs off-hour phone callers to it. It allows quick dispatch of response crews to the site for a quick evaluation of the homeowner's problem.

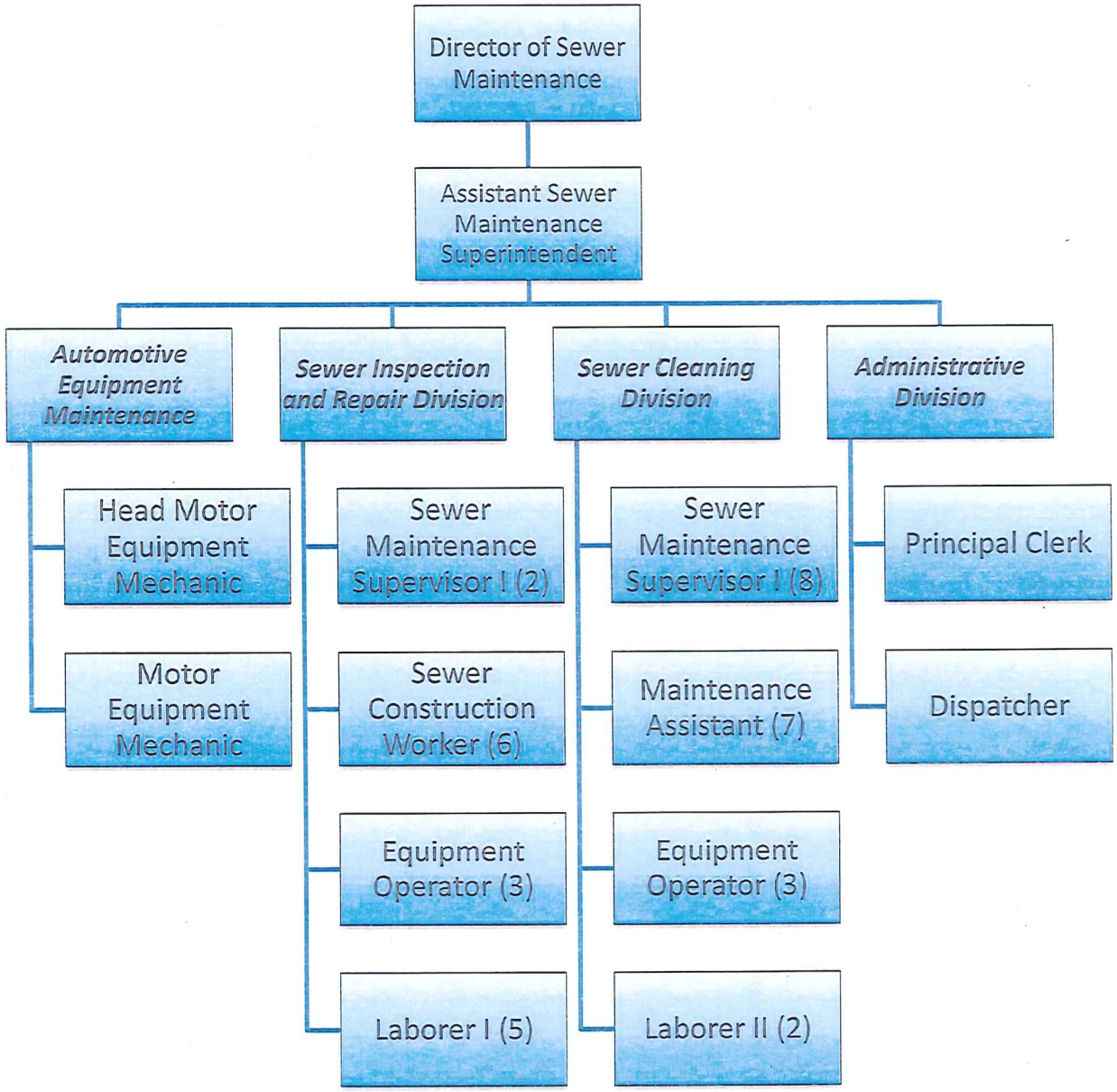
Homeowners also have available to them the City of Buffalo's 311 Call and Resolution Center.

We also have a website on the internet, http://www.city-buffalo.com/Home/CityServices/BSA that shares information about the collection system and treatment plant as well as various projects that are underway. The public can view the stormwater use policy and get informed on what CSOs are.

CitiStat was started by the Mayor Brown administration as a means to share information about city government with the public and fostering public participation. Viewed on cable access channel, the Mayor and his panel host the Authority and address appropriate measures and activities necessary to meet performance standards. The panel poses questions generated by the public to the Sewer Authority management for answers. The General Manager of the Authority answers the questions with a written response and typically, visits the homeowner personally to better understand and resolve the homeowner's issue. CitiStat develops a scorecard for us in which the number of complaints is evaluated as well as the time spent closing the complaints. Mapping of the complaints is also performed and areas of high concentrations of calls are queried to see if there is an underlying resolution. Ongoing capital projects are also evaluated for their timely completion. Typical project aspects of start date, cost, design date, construction date, and startup are tracked by the scorecard. Throughout the CitiStat broadcast, contact information for the Authority is displayed. CitiStat has been very successful in helping citizens in our community better understand sewage treatment and its vital role in maintaining water quality. It also provides us with the needs of the community of which we serve.

ANNUAL REVIEW

Along with quarterly meetings each year the Authority reviews its performance over the previous twelve months. Sewer Maintenance objectives are reevaluated as staffing levels, organizational structure and the operating budget is evaluated for effectiveness. Adjustments are made to the program, as appropriate, to better position us to meet or exceed our program goals. This may be a change in our procurement cycles, a change in the organizational structure, modification of our preventive maintenance routines, addition of projects to the CIP, purchasing of new equipment etc. The results of our review help to determine our operating budget for the upcoming year as well as policy changes, as required.


Director of Sewer Maintenance
Assistant Sewer Maintenance Superintendent
Automotive Equipment Maintenance
Sewer Inspection and Repair Division
Sewer Cleaning Division
Administrative Division
Head Motor Equipment Mechanic
Motor Equipment Mechanic
Sewer Maintenance Supervisor I (2)
Sewer Construction Worker (6)
Equipment Operator (3)
Laborer I (5)
Sewer Maintenance Supervisor I (8)
Maintenance Assistant (7)
Equipment Operator (3)
Laborer II (2)
Principal Clerk
Dispatcher

ATTACHMENT #2

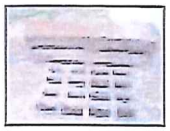
Crew	Vehicle	Foreman	Crewman	Crewman
1 Director	255A Ford Explorer	DIRECTOR OF SEWER MAINTENANCE		
2 Assistant Superintendent	298S FORD F-350 4X4 PICK-UP W/PLOW	ASSISTANT SEWER MAINTENANCE SUPERINTENDENT		
0 Office		PRINCIPAL CLERK	DISPATCHER	
4 Sewer Complaints(Fri-Tues)	277S 2008 FORD PICKUP W/ TOOL BOX	SEWER MAINTENANCE SUPERVISOR I	MAINTENANCE ASSISTANT	
4 Sewer Complaints(4-12)	277S 2008 FORD PICKUP W/ TOOL BOX	SEWER MAINTENANCE SUPERVISOR I	MAINTENANCE ASSISTANT	
4 Sewer Complaints(Tues-Sat)	277S 2008 FORD PICKUP W/ TOOL BOX	SEWER MAINTENANCE SUPERVISOR I	MAINTENANCE ASSISTANT	
8 Mechanics Truck	256S 2003 F-350 4 X 4 PICK-UP	HEAD MOTOR EQUIPMENT MECHANIC	MOTOR EQUIPMENT MECHANIC	
9 ERC	209S F700 Dump Truck		SEWER CONSTRUCTION WORKER	
9 ERC	272S 2007 New Holland Backhoe #272-S		EQUIPMENT OPERATOR	
9 ERC	174S CREW CAB	SEWER MAINTENANCE SUPERVISOR I	SEWER CONSTRUCTION WORKER	
10 ERC	210S F700 Dump Truck		SEWER CONSTRUCTION WORKER	
10 ERC	259S Backhoe Loader - 259S - 2005		EQUIPMENT OPERATOR	
10 ERC	284S Truck (284-S)	SEWER MAINTENANCE SUPERVISOR I	SEWER CONSTRUCTION WORKER	
11 ERC	234D F800 Dump Truck		SEWER CONSTRUCTION WORKER	
11 ERC	214S Loader Backhoe		EQUIPMENT OPERATOR	
11 ERC	285S Truck (285-S)	SEWER MAINTENANCE SUPERVISOR I	SEWER CONSTRUCTION WORKER	
21 South-East Receiver	294S FORD F-450 DUMP TRUCK	SEWER MAINTENANCE SUPERVISOR I	LABORER II	
22 North-West Receiver	295S FORD F-450 DUMP TRUCK	SEWER MAINTENANCE SUPERVISOR I	LABORER II	
34 Impact Team	158S Crew Cab	MAINTENANCE ASSISTANT		
38 TV Truck	260S TV TRUCK	SEWER MAINTENANCE SUPERVISOR I	MAINTENANCE ASSISTANT	
52 Vactor Truck	246S INTERNATIONAL VACUUM JET	MAINTENANCE ASSISTANT	EQUIPMENT OPERATOR	
53 Small Plow Salter Truck	291S FORD F-450 Plow Truck w/Salt Spreader	EQUIPMENT OPERATOR		
54 Vactor Truck	299S Combination Sewer Cleaner	MAINTENANCE ASSISTANT	EQUIPMENT OPERATOR	
37 TV Truck	237S TV Van #52	SEWER MAINTENANCE SUPERVISOR I	MAINTENANCE ASSISTANT	
42 Super Sucker	231D Super Sucker			
19 Clam Truck	218S Clam Truck			
Portable 2 Inspection	228E Van	CHIEF SEWER CONSTRUCTION INSPECTOR		
Portable 4 Inspection	286E FORD ESCAPE	SEWER CONSTRUCTION INSPECTOR		
Portable 5 Inspection	239S F-150 Pick Up	SEWER CONSTRUCTION INSPECTOR		
Portable 6 Inspection	287E FORD ESCAPE	SEWER CONSTRUCTION INSPECTOR		
5 Sewer Patrol	281D 2008 Ford F-150 Pick-Up Truck (281-D)	SEWER CONSTRUCTION INSPECTOR		
35 Inspection	245E Chevy Van	SEWER CONSTRUCTION INSPECTOR		
Portable 7 Inspection	240S F-150 Pick Up	SEWER CONSTRUCTION INSPECTOR		
35 Inspection	216S Pick Up			
Not Assigned	258S 2005 International 7600 SBA 6 X 4			
Not Assigned	241S F-150 Pick Up			

Steel Street Receivers

"DARK"

Theodore Dark & Co. Foundry

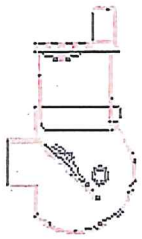
"DARK"



Filmore Foundry

"O'BRIEN"

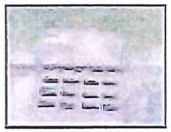
Thomas O'Brien Foundry



Steel Street Receivers
Cross Sectional View

2 X 2 Special Catch Basin

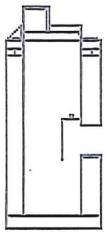
"McCONNELL"



Washington Iron Works

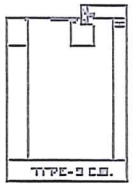
"McCONNELL"

Filmore Foundry

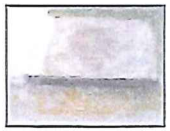


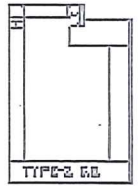
2 X 2 Special Catch Basin
Cross Sectional View

4 X 4 Catch Basin



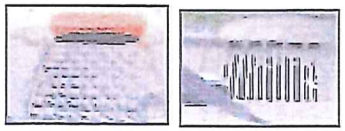
Cross Sectional View





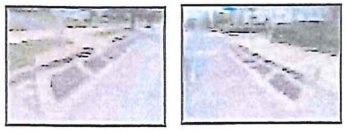
Cross Sectional View

"STATE RECEIVER"



Steel Street Receivers
W/ Reticuline or Slotted Grating

"STATE CATCH BASIN"



Large Special Structures

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSAQ Amherst Quarry Pump Station

Location:
Equipment: HSGALM01 Hydrogen Sulfide Gas Alarm System
Scheduled PM: OUTIT301 inspect Amherst Quarry H2S gas alarm system — Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule

100	inform plant operations of maintenance activity
110	inspect equipment for operational integrity
120	chk warning and alarm set points, adjust as needed
130	calibrate zero & span,use calibration gas standard
140	adjust as required
150	check audio and visual signaling devices
200	check SCADA system point for proper function
210	CLEAN AREA WHEN FINISHED
500	submit CWO if any irregularities are discovered

Location:
Equipment: CGAHMB01 Combustible Gas Alarm System
Scheduled PM: OUTIT401 inspect Hamburg Street Gas Alarm System — Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule

100	inform plant operations of maintenance activity
110	inspect equipment for operational integrity
120	chk warning and alarm set points, adjust as needed
130	calibrate zero & span,use calibration gas standard
140	adjust as required
150	check audio and visual signaling devices
200	check SCADA system point for proper function
210	CLEAN AREA WHEN FINISHED
500	submit CWO if any irregularities are discovered

Location: PSAQ Amherst Quarry Pump Station
Equipment:
Scheduled PM: PMOUT100 inspect Amherst Quarry weekly — Frequency: 7 DAYS

PM Job Plan: CKSTAAMH : inspect weekly and report

50	travel time
100	ensure all locks are functioning properly
125	inspect grounds for hazards & overgrowth
150	ensure integrity of fence and gate
175	ensure Station lighting is functional
200	check for exposed conduit or cable
225	inspect 4" discharge drain
250	inspect 16" common discharge drain
275	inspect 4" discharge valve
300	inspect Kennedy hand valve
325	inspect Rototech valve
350	inspect back flow preventer
375	check exhaust fans operational integrity
400	check sump pumps and floats

425 inspect heating system seasonally
600 ensure telephone is operational
625 submit CWO if any irregulartities are discovered

Location: PSAQ Amherst Quarry Pump Station
Equipment:
Scheduled PM: PMOUT300 inspect Amherst Quarry after rain storm and report Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report
100 inspect station after rain storm
625 submit CWO if any irregulartities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSBS Babcock Street Pump Station

Location: PSBS Babcock Street Pump Station
Equipment:
Scheduled PM: PMOUT110 inspect Babcock Pump Station weekly Frequency: 7 DAYS

PM Job Plan: CKSTABAB : inspect weekly & report

50	travel time
100	ensure all locks are functioning properly
125	inspect grounds for hazards & growth
150	ensure integrity of fence and gate
175	ensure Station lighting is functional
200	check for exposed conduit or cable
225	inspect 12" common discharge drain
250	check exhaust fans integrity
275	inspect sump pump and floats
300	check heating system seasonally
600	ensure telephone is operational
625	submit CWO if any irregularities are discovered

Location: PSBS Babcock Street Pump Station
Equipment:
Scheduled PM: PMOUT340 inspect Babcock St. Pump Station after rain storm Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report

100	inspect station after rain storm
625	submit CWO if any irregulartities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSHM Hamburg Street Pump Station

Location:
Equipment: DETO201 Oxygen Detection and Monitoring System
Scheduled PM: OUTIT005 inspect Hamburg Station O2 detection system Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule

100	inform plant operations of maintenance activity
110	inspect equipment for operational integrity
120	chk warning and alarm set points, adjust as needed
130	calibrate zero & span,use calibration gas standard
140	adjust as required
150	check audio and visual signaling devices
200	check SCADA system point for proper function
210	CLEAN AREA WHEN FINISHED
500	submit CWO if any irregularities are discovered

Location:
Equipment: HSGHMB01 Hydrogen Sulfide Gas Alarm System
Scheduled PM: OUTIT006 inspect Hamburg Station H2S gas alarm system Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule

100	inform plant operations of maintenance activity
110	inspect equipment for operational integrity
120	chk warning and alarm set points, adjust as needed
130	calibrate zero & span,use calibration gas standard
140	adjust as required
150	check audio and visual signaling devices
200	check SCADA system point for proper function
210	CLEAN AREA WHEN FINISHED
500	submit CWO if any irregularities are discovered

Location:
Equipment: HSGHMB01 Hydrogen Sulfide Gas Alarm System
Scheduled PM: OUTIT302 inspect Hamburg Station H2S gas alarm system Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule

100	inform plant operations of maintenance activity
110	inspect equipment for operational integrity
120	chk warning and alarm set points, adjust as needed
130	calibrate zero & span,use calibration gas standard
140	adjust as required
150	check audio and visual signaling devices
200	check SCADA system point for proper function
210	CLEAN AREA WHEN FINISHED
500	submit CWO if any irregularities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Location:
Equipment: DETO201 Oxygen Detection and Monitoring System
Scheduled PM: OUTIT501 inspect Hamburg Station O2 detection system — Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule

100	inform plant operations of maintenance activity
110	inspect equipment for operational integrity
120	chk warning and alarm set points, adjust as needed
130	calibrate zero & span,use calibration gas standard
140	adjust as required
150	check audio and visual signaling devices
200	check SCADA system point for proper function
210	CLEAN AREA WHEN FINISHED
500	submit CWO if any irregularities are discovered

Location:
Equipment: BRDELE03 Instrumentation Panel Annunciator
Scheduled PM: OUTIT601 inspect Hamburg Stat. instrument panel annunciator — Frequency: 30 DAYS

PM Job Plan: OUTIT001 : Inspection Instrumentation

100	ensure operational integrity
200	submit CWO if any irregularities are discovered

Location: PSHM Hamburg Street Pump Station
Equipment:
Scheduled PM: PMOUT120 inspect Hamburg Pump Station weekly — Frequency: 7 DAYS

PM Job Plan: CKSTAHMB : inspect weekly & report

50	travel time
100	ensure all locks are functioning properly
125	inspect grounds for hazards & overgrowth
150	ensure integrity of fence and gate
175	ensure Station lighting is functional
200	check for exposed conduit or cable
225	inspect 36" common discharge drain
250	check exhaust fans operationally integrity
275	check sump pumps and floats operationally
300	check heating system operationally
325	check operational integrity of compressor
600	ensure telephone is operational
625	submit CWO if any irregularities are discovered

Location: PSHM Hamburg Street Pump Station
Equipment:
Scheduled PM: PMOUT320 inspect Hamburg Pump Station after rain storm — Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report

100	inspect station after rain storm
625	submit CWO if any irregulartities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSKF Kelly Island "F" Pump Station

Location: PSKF Kelly Island "F" Pump Station
Equipment:
Scheduled PM: PMOUT130 inspect Kelly Island "F" Station weekly Frequency: 7 DAYS

PM Job Plan: CKSTAKIF : inspect weekly & report

50	travel time
100	ensure all locks are functioning properly
125	inspect grounds for hazards & overgrowth
150	ensure integrity of fence and gate
175	ensure Station lighting is functional
200	check for exposed conduit or cable
225	inspect 12" common discharge drain
250	check operationally integrity of exhaust fans
275	check operational integrity of sump pumps & floats
300	check operation of heating system seasonally
325	check operational integrity of compressor
600	ensure telephone is operational
625	submit CWO if any irregularities are discovered

Location: PSKF Kelly Island "F" Pump Station
Equipment:
Scheduled PM: PMOUT370 inspect KI "F" Pump Sta. after rain storm & report Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report

100	inspect station after rain storm
625	submit CWO if any irregulartities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSKS Kelly "S" Pump Station

Location:
Equipment: ELEMTRKS ELECTRIC METER AT KELLY "S" FOR NATIONAL GRID
Scheduled PM: ELEMT110 read Kelly "S" Pump Station electric meter monthly — Frequency: 30 DAYS

PM Job Plan: RELEMT100 : read electric meter monthly

100	Travel time.
110	Read electric meter.
120	Record reading on card from National Grid
130	Record reading on this OP Work Order.
140	Mail card from National Grid
150	Submit CWO if any irregularities are discovered.

Location:
Equipment: CGAKS01 Combustible Gas Alarm System
Scheduled PM: OUTIT402 inspect Amherst Quarry gas alarm system — Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule

100	inform plant operations of maintenance activity
110	inspect equipment for operational integrity
120	chk warning and alarm set points, adjust as needed
130	calibrate zero & span,use calibration gas standard
140	adjust as required
150	check audio and visual signaling devices
200	check SCADA system point for proper function
210	CLEAN AREA WHEN FINISHED
500	submit CWO if any irregularities are discovered

Location: PSKS Kelly "S" Pump Station
Equipment:
Scheduled PM: PMOUT140 inspect Kelly Island "S" Station weekly — Frequency: 7 DAYS

PM Job Plan: CKSTAKIS : inspect weekly & report

50	travel time
100	ensure all locks are functioning properly
125	inspect grounds for hazards & overgrowth
150	ensure integrity of fence and gate
175	ensure Station lighting is functional
200	check for exposed conduit or cable
250	inspect back flow preventer
275	check operational integrity of exhaust fans
300	check operational integrity of sump pumps & floats
325	check operation of heating system seasonally
600	ensure telephone is operational
625	submit CWO if any irregularities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Location: PSKS Kelly "S" Pump Station
Equipment:
Scheduled PM: PMOUT390 inspect Kl "S" Pump Sta. after rain storm & report Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report
100 inspect station after rain storm
625 submit CWO if any irregulartitles are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSKX Kelly Island "X" Pump Station

Location: PSKX Kelly Island "X" Pump Station
Equipment:
Scheduled PM: PMOUT150 inspect Kelly Island "X" Station weekly Frequency: 7 DAYS

PM Job Plan: CKSTAKIX : inspect weekly & report

100	travel time
125	ensure all locks are functionng properly
150	inspect grounds for hazards & overgrowth
300	ensure integrity of fence and gate
350	ensure station lighting is functional
375	check for exposed conduit or cable
400	ensure telephone is operational
425	inspect 16" common discharge drain
450	check operational integrity of exhaust fans
475	check operational integrity of sump pumps & floats
500	check operation of heating system seasonally
800	submit CWO if any irregularities are discovered

Location: PSKX Kelly Island "X" Pump Station
Equipment:
Scheduled PM: PMOUT380 inspect KI "X" Pump Sta. after rain storm & report Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report

100	inspect station after rain storm
625	submit CWO if any irregulartities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSNM Niagara Metering Station

Location: PSNM Niagara Metering Station
Equipment:
Scheduled PM: PMOUT170 inspect Niagara Metering Station weekly Frequency: 7 DAYS

PM Job Plan: CKSTANIA : inspect weekly & report

50	travel time
100	ensure all locks are functioning properly
125	inspect grounds for hazards & overgrowth
150	ensure integrity of fence and gate
175	ensure Station lighting is functional
200	check for exposed conduit and cable
600	ensure telephone is operational
625	submit CWO if any irregularities are discovered.

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSSB South Buffalo Pump Station

Location:
Equipment: BRDINST6 Instrumentation Panel Annunciator
Scheduled PM: OUTIT013 inspect South Buffalo instrument panel annunciator — Frequency: 30 DAYS

PM Job Plan: OUTIT001 : Inspection Instrumentation
- 100 ensure operational integrity
- 200 submit CWO if any irregularities are discovered

Location:
Equipment: DETO203 Oxygen Detection and Monitoring System
Scheduled PM: OUTIT014 inspect South Buffalo O2 detection system — Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule
- 100 inform plant operations of maintenance activity
- 110 inspect equipment for operational integrity
- 120 chk warning and alarm set points, adjust as needed
- 130 calibrate zero & span,use calibration gas standard
- 140 adjust as required
- 150 check audio and visual signaling devices
- 200 check SCADA system point for proper function
- 210 CLEAN AREA WHEN FINISHED
- 500 submit CWO if any irregularities are discovered

Location:
Equipment: HSGSOU01 Hydrogen Sulfide Gas Alarm System
Scheduled PM: OUTIT015 inspect South Buffalo H2S gas alarm system — Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule
- 100 inform plant operations of maintenance activity
- 110 inspect equipment for operational integrity
- 120 chk warning and alarm set points, adjust as needed
- 130 calibrate zero & span,use calibration gas standard
- 140 adjust as required
- 150 check audio and visual signaling devices
- 200 check SCADA system point for proper function
- 210 CLEAN AREA WHEN FINISHED
- 500 submit CWO if any irregularities are discovered

Location:
Equipment: CGASOU01 Combustible Gas Alarm System Electrical Panel
Scheduled PM: OUTIT016 inspect South Buffalo combustible gas alarm system — Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule
- 100 inform plant operations of maintenance activity
- 110 inspect equipment for operational integrity
- 120 chk warning and alarm set points, adjust as needed
- 130 calibrate zero & span,use calibration gas standard
- 140 adjust as required

150 check audio and visual signaling devices
200 check SCADA system point for proper function
210 CLEAN AREA WHEN FINISHED
500 submit CWO if any irregularities are discovered

Location:
Equipment: HSGSOU01 Hydrogen Sulfide Gas Alarm System
Scheduled PM: OUTIT303 inspect South Buffalo H2S gas alarm system Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule
100 inform plant operations of maintenance activity
110 inspect equipment for operational integrity
120 chk warning and alarm set points, adjust as needed
130 calibrate zero & span,use calibration gas standard
140 adjust as required
150 check audio and visual signaling devices
200 check SCADA system point for proper function
210 CLEAN AREA WHEN FINISHED
500 submit CWO if any irregularities are discovered

Location:
Equipment: DETO203 Oxygen Detection and Monitoring System
Scheduled PM: OUTIT503 inspect South Buffalo O2 detection system Frequency: 30 DAYS

PM Job Plan: OUTIT002 : Alarm/Detector Instrumentation PM Schedule
100 inform plant operations of maintenance activity
110 inspect equipment for operational integrity
120 chk warning and alarm set points, adjust as needed
130 calibrate zero & span,use calibration gas standard
140 adjust as required
150 check audio and visual signaling devices
200 check SCADA system point for proper function
210 CLEAN AREA WHEN FINISHED
500 submit CWO if any irregularities are discovered

Location: PSSB South Buffalo Pump Station
Equipment:
Scheduled PM: PMOUT160 inspect South Buffalo Pump Station weekly Frequency: 7 DAYS

PM Job Plan: CKSTASBP : inspect weekly & report
50 travel time
100 ensure all locks are functioning properly
125 inspect grounds for hazards & overgrowth
150 ensure integrity of fence and gate
175 ensure Station lighting is functional
200 check for exposed conduit or cable
225 ensure water meter operational
250 inspect back flow preventer
275 check operational integrity of exhaust fans
300 check operational integrity of sump pumps & floats
325 check operation of heating system seasonally

600 ensure telephone is operational
625 submit CWO if any irregularities are discovered

Location: PSSB South Buffalo Pump Station
Equipment:
Scheduled PM: PMOUT310 inspect S. Buffalo Pump Station after rain storm Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report
100 inspect station after rain storm
625 submit CWO if any irregulartities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSTF Tifft Farms Pump Station

Location: PSTF Tifft Farms Pump Station
Equipment:
Scheduled PM: PMOUT180 inspect Tifft Farms Pump Station weekly Frequency: 7 DAYS

PM Job Plan: CKSTATFT : inspect weekly & report

50	travel time
100	ensure all locks are functioning properly
125	inspect grounds for hazards & overgrowth
150	ensure integrity of fence and gate
175	ensure Station lighting is functional
180	check operation of all wastewater and sump pumps
190	check operational integrity of scum ejector
200	check for exposed conduit or cable
225	check operation of any station compressors
250	check operational integrity of exhaust fans
300	check operation of heating system seasonally
600	ensure telephone is operational
625	submit CWO if any irregularities are discovered

Location: PSTF Tifft Farms Pump Station
Equipment:
Scheduled PM: PMOUT360 inspect Tifft Farms Sta. after rain storm & report Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report

100	inspect station after rain storm
625	submit CWO if any irregulartities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSWF Waterfront Village Pump Station

Location: PSWF Waterfront Village Pump Station
Equipment:
Scheduled PM: PMOUT200 inspect Waterfront Village Pump Station weekly Frequency: 7 DAYS

PM Job Plan: CKSTAWFV : inspect weekly & report

50	travel time
100	ensure all locks are functioning properly
125	inspect grounds for hazards & overgrowth
175	ensure Station lighting is functional
200	check for exposed conduit or cable
225	check operational integrity of exhaust fans
250	check operational integrity of sump pumps & floats
275	check operation of heating system seasonally
600	ensure telephone is operational
625	submit CWO if any irregularities are discovered

Location: PSWF Waterfront Village Pump Station
Equipment:
Scheduled PM: PMOUT350 inspect Waterfront VillageStation after rain storm Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report

100	inspect station after rain storm
625	submit CWO if any irregulartities are discovered

Buffalo Sewer Authority
Preventive Maintenance Job Plans
Outlaying Stations

Preventive Maintenance for: PSWP Walden Heights Park Pump Station

Location:
Equipment: GASMTR06 GAS METER AT WALDEN HTS FOR NATIONAL FUEL GAS
Scheduled PM: GSMTR106 read Walden Heights gas meter monthly — Frequency: 30 DAYS

PM Job Plan: RDGSMT100 : read gas meter monthly

100	Travel time.
110	Read gas meter.
120	Record reading on card from National Fuel.
130	Record reading on this OP Work Order.
140	Mail card from National Fuel Gas.
150	Submit CWO if any irregularities are discovered.

Location: PSWP Walden Heights Park Pump Station
Equipment:
Scheduled PM: PMOUT190 inspect Walden Heights Station weekly — Frequency: 7 DAYS

PM Job Plan: CKSTAWLD : inspect weekly & report

50	travel time
100	ensure all locks are functioning properly
125	inspect ground for hazards & overgrowth
150	ensure integrity of fence and gate
175	ensure Station lighting is functional
200	check for exposed conduit or cable
300	check operational integrity of generator
600	ensure telephone is operational
625	submit CWO if any irregularities are discovered

Location: PSWP Walden Heights Park Pump Station
Equipment:
Scheduled PM: PMOUT330 inspect Walden Heights Station after rain storm — Frequency: 1 DAYS

PM Job Plan: CKSTAARS : inspect station after rain storm and report

100	inspect station after rain storm
625	submit CWO if any irregulartities are discovered

Buffalo Sewer Authority

Remote Pumping Station Monitoring

PUMPING STATIONS ON SCADA	Well Level	Pump Status (on/off)	Pump Discharge Pressure	Pumping Station Flow	Pump Speed	Flood Alarm	Intrusion Alarm	Power Failure
South Buffalo	X	X	X	X	X	X	X	
Hamburg Street	X	X	X	X		X	X	
Kelly Island "S"	X	X	X	X		X	X	
Kelly Island "X"	X	X	X	X		X	X	
Amherst Quarry	X	X	X	X		X	X	
Babcock Street	X	X	X	X		X	X	

PUMPING STATIONS ON DIALER								
Waterfront Village						X		X
Walden Heights						X		X

Local Visual Alarm								
Kelly Island "F"						X		
Tift Farms						X		

BUFFALO SEWER AUTHORITY
WORK ORDER REPORT

Work Order Number: 2009008024

Description: **inspect Amherst Quarry H2S gas alarm system**

Reported By: JSTEPHENS

Target Start Date: 04-Jun-2009
Target Completion Date: 04-Jun-2009 Estimated Duration: 4.00 hours
Status Code: WSCH Status Date: 04-Jun-2009
Report Date: 04-Jun-2009

Location: **Basement, Pump building**
PSAQ0202 In Pump Building, Amherst Quarry
In Pump Building, Amherst Quarry
At Amherst Quarry Pump Station
Equipment: HSGALM01 **Hydrogen Sulfide Gas Alarm System**
part of
Equipment Serial #: BSA Fixed Asset #:
SCADA Tag:
SCADA Point:

Lead Craft	Work Type	Priority	GL Account	Supervisor
ORLO0482	PM	3	00420106443301	ORLO0482

Work Plan Operations:
100 inform plant operations of maintenance activity
110 inspect equipment for operational integrity
120 chk warning and alarm set points, adjust as needed
130 calibrate zero & span,use calibration gas standard
140 adjust as required
150 check audio and visual signaling devices
200 check SCADA system point for proper function
210 CLEAN AREA WHEN FINISHED
500 submit CWO if any irregularities are discovered

___ CLEANED WORK AREA WHEN FINISHED

Date Completed _____ Completed By _____ Supervisor _____

Appendix 5-2: BSA Wet Weather Operating Plan - 2007

WET WEATHER OPERATING PLAN

BUFFALO SEWER AUTHORITY
WASTEWATER TREATMENT FACILITY

BUFFALO, NEW YORK

JUNE 2000
Revised August 2007

MALCOLM PIRNIE, INC. **June 2000**

BUFFALO SEWER AUTHORITY
WET WEATHER OPERATING PLAN

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

This manual contains wet weather operating guidelines for the Buffalo Sewer Authority's (BSA) Bird Island Wastewater Treatment Plant (WWTP). The Buffalo Sewer Authority WWTP serves the City of Buffalo and several neighboring communities including entire areas or parts of the Towns of Cheektowaga, Lancaster and West Seneca and the Villages of Sloan, Lancaster and Depew. The WWTP provides preliminary, primary and secondary treatment to all dry weather flow entering the sewer system. The wastewater collection system in the City of Buffalo is a combined sewer system which collects both wastewater and storm water. During wet weather events, when storm water flow enters the combined sewer system, permitted combined sewer overflows can occur which discharge to the Niagara River, the Lake Erie Basin, the Buffalo River, Cazenovia Creek, Scajaquada Creek, Cornelius Creek and Black Rock Canal.

1.1 PLAN SCOPE

Under the terms of the BSA's State Pollutant Discharge Elimination System (SPDES) Permit dated July 1, 1999, the BSA must develop and submit a wet weather operating plan to the New York State Department of Environmental Conservation (NYSDEC) by July 1, 2000. The SPDES permit identifies three components of the plan:

- Description of procedures to operate unit processes to treat flows while not appreciably diminishing effluent quality or destabilizing treatment upon return to dry weather operation.
- Evaluation of procedures and facilities necessary for controlling peak flows through the primary and secondary treatment processes.
- Identification and evaluation of the disinfection needs and chlorine residuals for Outfall 001.

This document includes the first two plan elements and begins to address the third element listed in the SPDES permit. Specifically, this wet weather-operating plan identifies the procedures and facilities necessary for controlling peak flows through the WWTP (critical components) and describes current procedures for operating these

facilities. An initial evaluation of primary clarifier disinfection during partial treatment mode was conducted during the Wet Weather Capacity Study.

The BSA is in the midst of an ongoing program of facility upgrade and improvement. To date, this program has focused on the WWTP with the installation of fine bubble aeration equipment, construction of a new grit facility, refurbishment an modifications to the anaerobic digesters, startup of new dewatering equipment, development of Standard Operating Procedures and the installation and subsequent expansion of supervisory control and data acquisition (SCADA) systems. BSA considers the wet weather operating plan to be a dynamic document subject to future updates and modifications pending the findings and capabilities provided by other ongoing BSA work efforts. Additional information on the scope and schedule of BSA's planned improvement program is presented in Section 1.3.

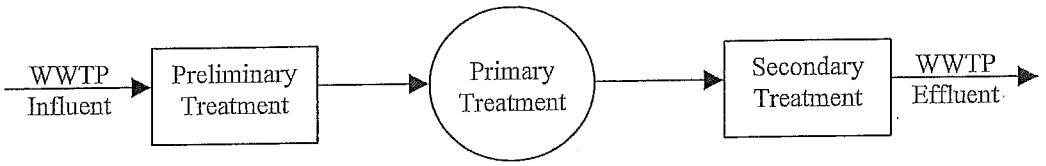
1.2 GOALS

The BSA Bird Island WWTP is operated to achieve the general goals of:

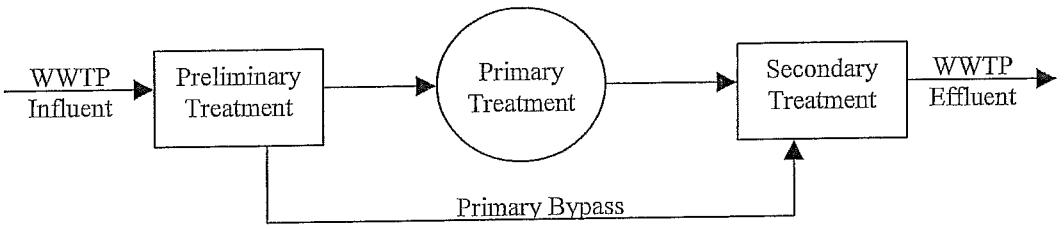
- Maximizing flow to the WWTP without jeopardizing WWTP performance.
- Maximizing flow receiving secondary treatment without causing a process upset.
- Protecting the water quality of receiving streams by meeting the SPDES permit.

To achieve these goals, the Bird Island WWTP can operate in one of three different modes:

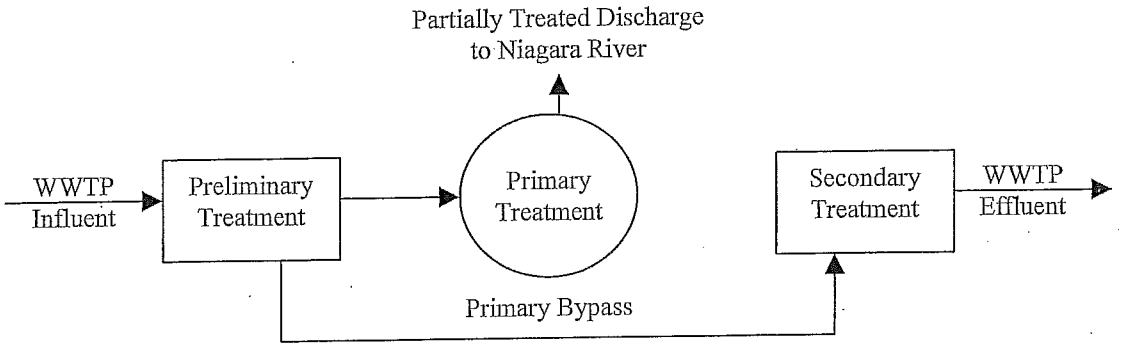
- Normal Mode: Used when the plant influent flow is less than or equal to 160 million gallons per day (mgd). All flow receives preliminary, primary and secondary treatment.



- Primary Bypass Mode: Used when the plant influent flow exceeds the capacity of the primary clarifiers, which is typically 160 mgd with all units in service. All flow receives preliminary treatment. Flows up to 160 mgd receive primary treatment. Flows in excess of 160 mgd bypass the primary clarifiers and join with the primary clarifier effluent flow to receive secondary treatment. All flow receives secondary treatment. This mode of operation is provided because the secondary treatment capacity of the Bird Island WWTP exceeds the primary treatment capacity.



- Partial Treatment Mode: Used when the plant influent flow exceeds the capacity of the secondary treatment system. All flow receives preliminary treatment. Flows up to the capacity of the secondary treatment system bypass the primary clarifiers and receive secondary treatment. Flows in excess of the secondary treatment capacity, pass through the primary clarifiers and are chlorinated prior to discharge to the Niagara River. In this treatment mode, in addition to functioning as sedimentation tanks, the primary clarifiers function as chlorine contact tanks for the flow not receiving secondary treatment.



The SPDES permit identifies goals of 450 mgd for flow receiving preliminary treatment and up to a minimum of 300 mgd through secondary treatment. BSA is attempting to operate the WWTP to achieve the specific goals for flow receiving preliminary treatment and secondary treatment as listed in the SPDES permit. However, the BSA considers these figures to be target values subject to modification based upon actual plant operating experience at these flows along with the observed performance of the collection system during wet weather events.

1.3 FACILITY UPGRADES

As previously stated, the BSA considers the wet weather operating plan to be a dynamic document subject to future updates and modifications. It is also subject to the findings and capabilities provided by other ongoing BSA work efforts at the WWTP and in the collection system. Planned improvements at the WWTP will further improve WWTP reliability and efficiency during wet weather events. Ongoing work efforts include:

Bird Island WWTP

- Implementation of the supervisory control and data acquisition (SCADA) system at the Bird Island Wastewater Treatment Plant and at key pumping stations. Currently, SCADA provides monitoring and control capability for most of the plant's wastewater treatment processes. Installation of initial SCADA equipment for monitoring and limited control of the existing solids handling processes was completed in May 2000. The solids handling SCADA system was recently expanded to include monitoring and control capabilities for all major solids handling unit operations including digesters 1 through 4 and centrifuge operation.

- A new grit pista system was installed in 2005. The twelve former grit collection channels were modified into six channels to maintain flow velocities to the new grit building now located north of our administration building. Eight vortex grit chambers and four belt conveyors were installed to transfer grit to four grit hoppers. Two diversion conduits were constructed around the existing Administration Building to provide headworks capacity of 600 mgd to flow through the new grit removal system.

- Improvements to the secondary system include the installation of new return activated sludge pumps, new waste activated pumps, and new final effluent supply pumps. New towbro collection systems have been installed in all 16 of the final clarifiers.

- During partial treatment events, a hydraulic bottleneck has been identified at the primary bypass butterfly control valves. The Authority has raised the weir at outfall 01A by approximately 5.5 inches to encourage additional flow through the butterfly valves allowing additional primary effluent to receive secondary treatment.

- The Authority is also evaluating a mode change in the secondary system from conventional plug flow to step feed in order to accommodate higher hydraulic loading of the secondary system at lower solids loading rates on the final clarifiers.

- The Authority intends to continue to pursue improved primary removals during wet weather flows by installing a baffle system in one of the primary clarifiers in order to beneficially change the velocity profile of the clarifier and improve the removal efficiencies through improved settling. A full scale pilot test is currently underway. An installation contract of a baffle in one primary clarifier has been awarded. Installation is anticipated by the end of the 2007 calendar year.

- Solids handling improvements. The Solids Handling Study completed in January 2000 identified improvements for the thickeners, digesters, dewatering and incineration. Implementation of these improvements along with additional SCADA capabilities is ongoing.

- In November of 2006 upgrades on four anaerobic digesters were completed. Upgrades include the cleaning of the four digesters, replacing the digester covers, adding high rate mixing pumps and mixing nozzles into each digester, cleaning of the sludge heat exchangers, modifying the hot water systems, adding new gas detection and digester gas monitoring instrumentation, adding automated feed and withdraw valves. Connection of the instruments to SCADA enabled automatic feeding and withdraw of sludge to the digesters, control of mixing pumps, monitoring of sludge flows to and from, cover heights, temperatures and gas flows. Connection to the SCADA system allowed the facility to shift from manual operation of the digestion process to remote operation.

- In January 2006, a new dewatering centrifuge was started. The centrifuge allowed production of a drier sludge cake resulting in a more consistent incinerator feed rate at lower moisture levels. Less moisture in the incinerator reduced stress related to evaporation reducing breakdowns and the need to

operate two incinerators. Like the digesters, the centrifuge is also monitored from the SCADA system. Consistent, reliable operation of the centrifuge allows for remote operation of the dewatering process.

- The Authority intends to upgrade an incinerator in order to increase its capacity, improve emissions and equipment reliability, allowing improved effectiveness in maintaining the solids processing demands of the facility.

Collection System

- Update and application of the BSA's Storm Water Management Model (SWMM) to analysis of wet weather flows in the collection system. The BSA has installed flow measurement and sampling equipment throughout the collection system to support analysis of wet weather events using the SWMM model.

- Development of the combined sewer overflow (CSO) abatement plan in accordance with the Phase I Long Term Control Plan (LTCP) requirements specified in the United States Environmental Protection Agency's (USEPA) CSO Policy. The BSA's LTCP was submitted to the DEC and is currently awaiting DEC approval.

- Reduction in the number of active permitted CSOs from 58 to 53. These include Outfalls 030,034,041,043 and 045.

- Design of a floatable control facility for the Hamburg Drain CSO #017.

- Conduct a sewer separation study for the Cazenovia Creek CSO #035

- Evaluate alternative technologies to treat the Cornelius Creek, CSO #055 overflow such as Densedeg and Actiflow.

The wet weather-operating plan has been developed using a framework that supports inclusion of the findings from these ongoing work efforts. The specific procedures described in this plan are those currently in place for wet weather operation of the wastewater treatment plant.

2.0 CRITICAL COMPONENTS

In accordance with NYSDEC guidance, critical components are defined as processes that can significantly affect treatment of wet weather flow or can be significantly affected by wet weather flow. The BSA has identified the unit processes listed in Table 2-1 as the critical components of the Bird Island WWTP. For each unit process listed in Table 2-1, a specific wet weather operating objective is cited. These critical components are the unit processes for which operating guidelines are presented in Section 3.0.

TABLE 2-1

Buffalo Sewer Authority
Wet Weather Operating Plan
Critical Components – Bird Island Wastewater Treatment Plant

Unit Process	Wet Weather Operating Objective
Bar Racks	Maintain unrestricted flow through the bar racks. Prevent blockages.
Raw Wastewater Pumps	Sequence pump start/ stop and adjust speed of running variable-speed pumps to minimize hydraulic surges to downstream unit processes. Coordinate and communicate pump operational changes with settled wastewater pump station.
Screens	Prevent blinding of screen(s) that requires raw wastewater pump shutdown to clear.
Grit Removal	Maintain number of grit chambers in service as dictated by flow.
Plant Influent Flow Meters	Provide flow data essential to decision(s) to enter primary bypass or partial treatment mode of operation.
Primary Clarifiers	In normal or primary bypass mode of operation, remove settleable solids and floatables. In partial treatment mode, serve as the chlorine contact tank.
Diversion Channels	Provide headworks capacity of 600 mgd. Directs flow through the grit removal system

TABLE 2-1 (continued)

Buffalo Sewer Authority
Wet Weather Operating Plan
Critical Components – Bird Island Wastewater Treatment Plant

Unit Process	Wet Weather Operating Objective
Gate Chambers and Bypass Chlorination	Sequence opening/closing of river gates and Gate No. 17 to minimize hydraulic surges.
Settled Wastewater Pumps	Sequence pump start/ stop and adjust speed of running variable-speed pumps to minimize hydraulic surges to the activated sludge process. Coordinate and communicate pump operational changes with aeration station.
Activated Sludge Process	Manage settled wastewater flow distribution, sludge blanket levels and return activated sludge flows to avoid solids washout.
Effluent Chlorination	Provide adequate disinfection contact time by matching number of in-service contact tanks with plant flow. Maintain target chlorine residual.
Sludge Thickening	Maintain desired sludge float characteristics given varying ratio of primary to waste activated sludge.
Sampling and Samplers	Collect and analyze samples from Outfalls 001, 01A and 002 in accordance with the SPDES permit. Collect and analyze process control samples as necessary to control process operation. Refer to Appendix A1 for a Summary of the Buffalo Sewer Authority SPDGS Permit Limits. Refer to Appendix A-2 for Standard Operating procedures for sampling at Outfalls 001 and 01A.

3.0 WET WEATHER OPERATING GUIDELINES

Wet weather operating guidelines are presented in this section for each of the critical components of the Bird Island wastewater treatment plant. These guidelines outline tasks to be performed before, during and after a wet weather event. The wet weather operating guidelines are intended to serve as a quick reference during a wet weather event. The reader is referred to the BSA's published standard operating procedures and operations and maintenance manuals for more detailed discussion.

The wet weather operating guidelines are subject to periodic revision as the BSA continues implementation of a SCADA system and planned upgrades to several unit processes.

SECTION 1 - Bar Racks

1.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Bar Racks	3 – influent gates 2 - bar racks 2 - wet wells

1.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Supervisor	Operator	All three influent gates normally maintained in the open position. Only closed to isolate equipment for repair.
Shift Supervisor	Operator	Check screenings hoppers. If full, write maintenance work order requesting hoppers be emptied in dumpster located in Screen and Grit building.
Shift Supervisor	Operator	Both bar racks in automatic operation making one run per hour consisting of three cycles per run.
Shift Supervisor	Operator	Monitor status of over travel alarms. Reset or notify shift supervisor, as appropriate.
Shift Supervisor	Operator	Visually inspect equipment. Confirm that cleaning rake is meshing with the bar rack.

SECTION 1 Bar Racks (continued)

During Wet Weather Event		
Shift Supervisor	Operator	Monitor collection of screenings. Look for deviations in well level between the East and West wells. Visually inspect for differences in head across the bar racks.
Shift Supervisor	Operator	Increase schedule of runs and/or cycles or place cleaning rakes in continuous operation, as necessary.
Shift Supervisor	Operator	Monitor flows.
Shift Supervisor	Operator	Visually inspect equipment. Confirm that cleaning rake is meshing with the bar rack.
Shift Supervisor	Operator	If a severe blockage of the bar racks occur, reverse flow through the racks to clear the obstruction.
After Wet Weather Event		
Shift Supervisor	Operator	Monitor collection of screenings. Reduce schedule of runs and/or cycles as necessary to return to normal operating set points.
Shift Supervisor	Operator	Write maintenance work order requesting full hoppers be emptied in dumpster located in Screen and Grit building.
Shift Supervisor	I&E, Millwright	Repair any items that failed.

WHY DO WE DO THIS?
Protect downstream raw wastewater pumps from damage by large objects.
WHAT TRIGGERS THE CHANGE?
High flow rates.
WHAT CAN GO WRONG?
Cleaning rake over travel/overload. Cleaning rake does not mesh with bar rack and rides over collected screenings. Metal fatigue/failure of scraper blade that clears cleaning rake. Control failure. Power failure. Overflowing screenings hoppers.

SECTION 2 - Raw Wastewater Pumps

2.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Raw Wastewater Pumps	2 – variable speed pumps (120 mgd at max speed) 2 – dual speed pumps (60 mgd at low speed; 120 mgd at high speed) 2 – single speed pumps (120 mgd) 6 – pump discharge valves

2.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Supervisor	Operator	Normal operation of the wet well requires holding between a 10 to 13 foot level. The wet well high level alarm is set at 15 feet and the low level alarm is set at 8 feet.
Shift Supervisor	Operator	Raw Pump #3 or #4 (variable speed) is running in manual. To run in automatic, the variable speed pump has to be in remote and a pump sequence has to be chosen at the SCADA workstation. The pump speed set point is a wet well elevation of 11.5 feet. The speed set point, wet well high level alarm and low level alarm are adjustable by the shift supervisor.

SECTION 2 Raw Wastewater Pumps (continued)

During Wet Weather Event		
Shift Supervisor	Operator	As the well rises the variable speed pump increases to 100%. The flow increases from 50 mgd to 120 mgd.
Shift Supervisor	Operator	If the well continues to rise to 13 feet, notify primary, settled wastewater and aeration before starting a second pump. The required number of grit chambers must be online before a pump is added. If the wet weather event is characterized by a rapid increase in well levels and flow, go directly to a high-speed pump. For a less severe event, it may be possible to go to a low speed pump as the second pump on. Check that the corresponding screenings channel gates, both upstream and downstream, are fully open and the corresponding screen machine is started, and an additional grit chamber is added before starting the pump. With a second high-speed pump the flow ranges from 170 mgd to 240 mgd With a second low speed pump, the flow ranges from 120 mgd to 200 mgd. (bypassing of the primaries will occur. Monitor channel level in screen room below outfall 01A)
Shift Supervisor	Operator	When adding pumps, try to balance the number of pumps drawing from the East and West wells.
Shift Supervisor	Operator	If the well continues to rise to 13 feet, notify primary, settled wastewater and aeration before adding a third high-speed pump. Check that the corresponding screenings channel gates, both upstream and downstream, are fully open and the corresponding screen machine is started, and an additional grit chamber is added before starting the pump. The flow ranges between 290 mgd to 360 mgd. (Partial Treatment will be entered. Monitor channel level in screen room below outfall 01A))
Shift Supervisor	Operator	If the well continues to rise to 13 feet, notify primary, settled wastewater and aeration before adding a second variable speed pump, making sure that both variable speed pumps are running at the same speed. Check that the corresponding screenings channel gates, both upstream and downstream, are fully open and the corresponding screen machine is started, and an additional grit chamber is added before starting the pump. The flow ranges between 340 mgd to 480 mgd. (Plant will be in Partial Treatment. Diversion Channels will be added. Monitor channel level in screen room below outfall 01A)

Shift Supervisor	Operator	If the well continues to rise to 13 feet, notify primary, settled wastewater and aeration before adding a fifth pump on high speed, making sure both variable speed pumps are running at the same speed. . Check that the corresponding screenings channel gates, both upstream and downstream, are fully open and the corresponding screen machine is started, and an additional grit chamber is added before starting the pump. The flow ranges between 460 mgd to 600 mgd. (Plant will be in Partial Treatment. Diversion Channels in service. Monitor channel level in screen room below outfall 01A)
Shift Supervisor	Operator	As the well drops to 10 feet and both variable speed pumps are at minimum speed, notify primary, settled wastewater and aeration before stopping the fifth pump.

After Wet Weather Event

Shift Supervisor	Operator	As the well drops to 10 feet and the variable speed pumps are at minimum speed, notify primary, settled wastewater and aeration before stopping the second variable speed pump.
Shift Supervisor	Operator	As the well drops to 10 feet and the variable speed pumps are at minimum speed, notify primary, settled wastewater and aeration before stopping the third pump.
Shift Supervisor	Operator	As the well drops to 10 feet and the variable speed pump #3 or 4 is at minimum speed notify primary, settled wastewater and aeration before stopping the second pump and switch to pump # 1 or 6 on low speed.
Shift Supervisor	Operator	As the well drops to 10 feet and the variable speed is at minimum speed, notify primary, settled wastewater and aeration before stopping pump #1 or 6(low speed).
Shift Supervisor	I&E, Millwright	Repair any failures. Investigate pump trip outs.

WHY DO WE DO THIS?

Minimize hydraulic surges to the secondary system, maximize the flow to the treatment plant while maximizing the storage capacity in the collection system and minimizing the use of CSOs. Optimize energy usage.

WHAT TRIGGERS THE CHANGE?

High flows trigger the change.

WHAT CAN GO WRONG?

Power failure. Pump fails to start. Pump not available because downstream screen is out-of-service. Pump kicks out. Screens blind necessitating pump shutdown. The sluice gates at discharge of grit channels may freeze.

SECTION 3 - Screens

3.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Screens	6 – mechanical screens 4 - conveyor belts 2 - screw compactors

3.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Supervisor	Operator	Make sure the number of screens in operation matches the number of in-service raw wastewater pumps.
Shift Supervisor	Operator	Make sure the rake mechanism operates automatically in timer mode.
Shift Supervisor	Operator	Make sure compacted screenings drop to floor and are loaded into dumpster.
Shift Supervisor	Operator	Inspect screens and channels for availability. Check conveyors and screw compactors.
During Wet Weather Event		
Shift Supervisor	Operator	Place additional screening units in service prior to start of additional raw wastewater pumps. Start screen in local to clear any debris in the channel. Return to auto mode once pump is running and screen is clear.
Shift Supervisor	Operator	Adjust timer settings for rake mechanism as necessary to remove screenings accumulation. Put rakes in continuous run mode if screenings loading is heavy.

Shift Supervisor	Operator	Monitor in-service screens to be sure they are not blinded.
Shift Supervisor	Operator	Inspect the conveyor belts to be sure they are collecting the screenings. Inspect discharge chutes from screw compactors for plugging.
After Wet Weather Event		
Shift Supervisor	Operator	Take screening units and/or conveyors out-of-service as raw wastewater pumps are stopped.
Shift Supervisor	Operator	Load accumulated screenings into dumpsters. Contact contractor to remove full dumpsters.
Shift Supervisor	Operator	If a screen has blinded and debris has accumulated ahead of the screen, then clean out channels.
Shift Supervisor	I&E, Millwright	Repair any failures.

WHY DO WE DO THIS?
Remove objects, usually floatables, larger than 0.75inch from the wastewater stream that could interfere with operation of downstream process equipment.
WHAT TRIGGERS THE CHANGE?
Starting additional raw wastewater pumps.
WHAT CAN GO WRONG?
Blinding of mechanical screen requires pump shutdown to clear. If channel water level is too high, rake will not cycle (motor submergence not allowed). Screw compactor over torques. High load on rake causes broken shear pin. Overflow will occur at Outfall 01A when the raw wastewater pump wet well elevation reaches 27 feet.

SECTION 4 - Diversion Channel

4.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Diversion Channel	3 – channels (east, west and bypass) 1 - piping system to deliver FE to bypass 3 – sets of stop logs 1 – stop log storage vault 7 – motor operated sluice gates

4.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Supervisor	Operator	Determine when to put in or take out diversion channels by flow or channel height.
Shift Supervisor	Operator	Monitor flows and screen room channel heights.
Shift Supervisor	Operator	Add RAW wastewater pumps and grit chambers as needed.

SECTION 4 Diversion Channel (continued)

During Wet Weather Event		
Shift Supervisor	Operator	Add diversion channels as needed by flow of approximately 390 mgd or to avoid flowing out 01A when level of channel in the screen room exceeds 14 ft, open gates 2, 3, 1, 4, and 7. .
Shift Supervisor	Operator	Increase schedule of runs and/or cycles or place cleaning rakes in continuous operation, as necessary.
After Wet Weather Event		
Shift Supervisor	Operator	As flows and channel levels decrease, close gates 2, 3, 1, 4, and 7.
Shift Supervisor	Operator	Pump down diversion channel.
WHY DO WE DO THIS?		
To maximize flow to the treatment plant.		
WHAT TRIGGERS THE CHANGE?		
High flow rates.		
WHAT CAN GO WRONG?		
Equipment malfunctions such as a gate not responding or loss of a RAW wastewater pump. Grit chambers can fail.		

SECTION 5 - Grit Removal

5.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Grit Removal	6 - grit channels 2 - diversion channels 8 - vortex grit pista chambers 4 - conveyor belts 4 - dumpsters

5.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Supervisor	Operator	Make sure the number of chambers in service is adequate as required by the influent flow (i.e., 1 for every 50-60 MGD). Note: grit chambers must be added prior to starting additional RAW pump
Shift Supervisor	Operator	Place diversion channels in service as flow and screen room channel heights dictate.
Shift Supervisor	Operator	Continue checking grit chambers for plugging.
Shift Supervisor	I&E, Millwright	Check all mechanical equipment. Make any necessary repairs.
During Wet Weather Event		
Shift Supervisor	Operator	Monitor in-service grit channels to be sure the collection systems are working. Make sure the screw conveyors are working.
Shift Supervisor	Operator	Regularly inspect grit hoppers for plugging.
After Wet Weather Event		
Shift Supervisor	Operator	Take grit chambers out of service as flow dictates. When taking chambers out of service, run purge cycle.

SECTION 5 - Grit Removal (Continued)

Shift Supervisor	Operator	Clean floors in grit room around belts, chambers, and dumpsters.
Shift Supervisor	Operator	Contact contractor to remove full dumpsters.
Shift Supervisor	Operator	If a grit channel has plugged, clean out the channel.
Shift Supervisor	Operator	Repair any failures.
Shift Supervisor	Operator	Record weight of disposed screenings and grit from contractor invoice.

WHY DO WE DO THIS?
Protect downstream moving mechanical equipment and pumps from abrasion and accompanying abnormal wear. Prevent accumulation of grit in aeration tanks and sludge digesters that can result in loss of usable volume.
WHAT TRIGGERS THE CHANGE?
Starting additional raw wastewater pumps.
WHAT CAN GO WRONG?
Plugging of pumps or lines, loss of mechanical seals. Loss of grit conveyors.

SECTION 6 - Plant Influent Flow Meters

6.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Plant Influent Flow Meters	2 - magnetic flow meters
Diversion Channel Flow Meters	2 – ultrasonic flow meters
Primary Influent Flow Meters	2 – ultrasonic flow meters

6.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Supervisor	Operator	Make sure flow meters operate properly.
Shift Supervisor	Operator	SCADA provides continuous monitoring and recording of flows.
Shift Supervisor	I&E, Outside Contractor	Calibrate meters at least annually.
During Wet Weather Event		
Shift Supervisor	Operator	Monitor flows recorded by SCADA.
After Wet Weather Event		
Shift Supervisor	I&E	Make any necessary repairs.

SECTION 6 Plant Influent Flow Meters (continued)

WHY DO WE DO THIS?
Plant influent flow measurement is critical to decision on when to begin primary bypass or partial treatment.
WHAT TRIGGERS THE CHANGE?
If all four primary clarifiers are in service, primary bypass begins when the plant influent flow exceeds 160 mgd. With one or more primary clarifiers out-of-service, primary bypass may begin at a lower flow. Partial treatment begins when plant influent flow exceeds the treatment capacity of the secondary system.
WHAT CAN GO WRONG?
Meter(s) lose calibration.
WHY DO WE DO THIS?
Plant influent flow measurement is critical to decision on when to begin primary bypass or partial treatment.

SECTION 7 - Primary Clarifiers

7.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Primary Clarifiers	4 - clarifiers 4 - skimmer arms & collector arms 2 – scum pit level sensors 6 – sludge grinders 6 – progressive cavity sludge pumps 1 – sludge flow meter

7.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Supervisor	Operator	Monitor flow rates to primaries.
Shift Supervisor	Operator	Periodically look at sample from bleeder line(s) to observe sludge characteristics.
Shift Supervisor	Operator	Ensure scum removal system is operating properly.
Shift Supervisor	Operator	Check skimmer and collector operation.
Shift Supervisor	Operator	If plant influent flow exceeds the capacity of the in-service primary clarifiers, then begin primary bypass mode of operation. Flows greater than the primary clarifier capacity will bypass primary clarifiers and go directly to settled wastewater pump station.
Shift Supervisor	Operator	Operate primary sludge pumps according to the schedule for normal operation (plant influent flow < secondary treatment capacity).
Shift Supervisor	Operator	Check sludge pump flow rates. Report any problems or abnormalities.
Shift Supervisor	Operator	Backflush any tanks as they plug.
Shift Supervisor	I&E, Millwright	Repair any malfunctions or equipment out of service.

During Wet Weather Event		
Shift Supervisor	Operator	Monitor plant influent flows. If desirable, change mode of primary sludge pump operation change from normal to partial treatment timer cycle when partial treatment mode is entered.
Shift Supervisor	Operator	In partial treatment, monitor primary influent flow.
Shift Supervisor	Operator	Periodically look at sample from bleeder line(s) to observe sludge characteristics. Look for air in sludge pump discharge. May be indication of plugged tank.
Shift Supervisor	Operator	Check PSF to Thickener flow meter. Change can indicate possible problems.
Shift Supervisor	Operator	Check flow rates from primary sludge pumps.
Shift Supervisor	I&E, Millwright	Repair equipment failures as needed.
After Wet Weather Event		
Shift Supervisor	Operator	Monitor plant influent and primary influent flows.
Shift Supervisor	Operator	Periodically look at sample from bleeder line(s) to observe sludge characteristics. Look for air in sludge pump discharge. May be indication of plugged tank.
Shift Supervisor	Operator	Return primary sludge pump timer cycle to normal mode when plant exits partial treatment mode.
Shift Supervisor	Operator	Take any plugged tanks out of service for clean out.
Shift Supervisor	I&E, Millwright	Repair any failures.

WHY DO WE DO THIS?
In normal or primary bypass mode of operation, the primary clarifiers remove settleable solids and floatables from up to 160 mgd of wastewater flow prior to secondary treatment. In partial treatment mode, in addition to removing settleable solids and floatables, the primary clarifiers function as chlorine contact tanks treating flows in excess of the secondary treatment capacity prior to discharge to the Niagara River.
WHAT TRIGGERS THE CHANGE?
Plant influent flows exceed secondary treatment capacity.
WHAT CAN GO WRONG?
Plugging of sludge withdrawal lines. Failure of sludge pump(s). Failure of collectors.

SECTION 8 - Bypass & Partial Treatment

8.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Gate Chamber No. 1	6 - sluice gates
Gate Chamber No. 2	2 - butterfly gates 1 - sluice gate
Outfall Structure	2 - sluice gates
Partial Treatment Chlorination	2 – 396 gph sodium hypochlorite pumps 2 – 3,000 gallon sodium hypochlorite storage tanks

8.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Supervisor	Operator	Make sure all gates are operational
Shift Supervisor	Operator	Check on sodium hypochorite levels and pumps.
Shift Supervisor	I&E, Millwright	Make any necessary repairs.
During Wet Weather Event		
Shift Supervisor	Operator	When the plant influent flow exceeds the primary clarifier capacity, enter primary bypass mode. Maintain Gate No. 20 in the fully open position. Gate No. 17 is fully open, Butterfly gates No. 15 and 16 are operated to control the primary influent flow to the primary clarifier capacity. Flows in excess of the primary clarifier capacity bypass primary treatment via gates No. 15 and 16.
Shift Supervisor	Operator	If the plant influent flow exceeds the secondary treatment capacity, then enter partial treatment mode.
Shift Supervisor	Operator	Manually start sodium hypochlorite feed pumps and monitor chlorine residual.

Shift Supervisor	Operator	Modulate butterfly gates No. 15 and 16 so that secondary treatment capacity is not exceeded.
Shift Supervisor	Operator	Begin opening river gates No. 18 and 19 and closing gate No. 17.
Shift Supervisor	Operator	Approximately 15 minutes after initiating open/close sequence, balance flows to secondary system and partial treatment by modulating butterfly gates No. 15 and 16.
Shift Supervisor	Operator	Sample and analyze the discharge through the outfall structure in accordance with the SPDES permit.
Shift Supervisor	Operator	Monitor and record the flow receiving partial treatment.
After Wet Weather Event		
Shift Supervisor	Operator	When the plant influent flow drops below the capacity of the secondary treatment system, initiate return to primary bypass mode.
Shift Supervisor	Operator	Manually turn off the sodium hypochlorite pumps.
Shift Supervisor	Operator	Close river gates No. 18 and 19 and open gate No. 17.
Shift Supervisor	Operator	Begin adjusting butterfly gates No. 15 and 16 to balance flows to the primary clarifiers and secondary treatment. Flows in excess of the primary clarifier capacity will continue to bypass primary treatment.
Shift Supervisor	Operator	When the plant influent flow is less than the primary clarifier capacity, return to Normal Mode. Gate No. 20 is in the fully open position, gate No. 17 is fully open, butterfly gates No.15 & 16 are fully closed and the river gates No. 18 & 19 are fully closed.
Shift Supervisor	Operator	Check on sodium hypochlorite levels and pumps.

WHY DO WE DO THIS?
Minimize flow spikes to the secondary system. Maximize flow to the secondary system. Maximize the flow to the treatment plant, providing primary treatment for a part of the combined sewer flows, thus minimizing the overflows in the collection system.
WHAT TRIGGERS THE CHANGE?
Primary bypass mode is triggered when plant influent flows exceed 160 mgd. Partial treatment mode is triggered when plant influent flows exceed secondary treatment capacity.
WHAT CAN GO WRONG?
Sodium hypochlorite pump failure. Valve/gate failure.

SECTION 9 - Settled Wastewater Pumps

9.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Settled Wastewater Pumps	4 - variable speed pumps (120 mgd at maximum speed) 1 - constant speed pump (120 mgd) 2 - wet wells

9.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Supervisor	Operator	Normal operation of the wet well requires holding between a 19 to 24 foot level. SWW pumps will be started based on an increase in flow as measured by the plant influent flow meters or on the wet well reaching a high alarm level. The high alarm level can be adjusted at the SCADA workstation by the shift supervisor.
Shift Supervisor	Operator	At flows below 140 mgd, one variable speed pump is running. A second variable speed pump is added when flow exceeds 140 mgd or the well level reaches 24.5 ft. When another pump is called to run, the operator must notify Aeration that another pump is being put into service. The pump speed is adjusted to maintain the wet well level set point of 22 feet. The wet well level set point can be adjusted at the SCADA workstation by the shift supervisor.

SECTION 9 - Settled Wastewater Pumps (continued)

During Wet Weather Event		
Shift Supervisor	Operator	When in automatic mode, select pump sequence on whether both wet wells or only one wet well is available.
Shift Supervisor	Shift Supervisor	Notify SWW operator when Partial Treatment Mode is activated.
Shift Supervisor	Operator	Raw wastewater pump operator will notify settled wastewater pump station operator when a raw wastewater pump is added. When flow measured by plant influent flow meters exceeds 140 mgd or the well level exceeds 24.5 feet, the next pump in sequence should be started. When another pump is called to run, the operator must notify Aeration that another pump is being put into service
Shift Supervisor	Operator	When flow measured by the plant influent flow meters exceeds 250 mgd or the well level exceeds 24.5 feet, the next pump in the sequence should be started. When this pump is called to run, the operator must notify Aeration that another pump is being put into service./
Shift Supervisor	Operator	No more than three settled wastewater pumps should be operated on full speed at any one time.
After Wet Weather Event		
Shift Supervisor	Operator	When the plant influent flow drops below 230 mgd or the well level drops below 17.5 feet, the third pump should be stopped. The remaining two pumps will increase in speed to maintain the flow. The operator notifies Aeration the third pump is shutting down.
Shift Supervisor	Operator	When the plant influent flow drops below 125 mgd or the well level drops below 17.5feet, the second pump should be stopped. The operator notifies Aeration the second pump is shutting down.
WHY DO WE DO THIS?		
Minimize hydraulic surges to the secondary system. Maximize the flow to the treatment plant while maximizing the storage capacity in the collection system and minimizing the use of CSOs. Optimize energy usage.		
WHAT TRIGGERS THE CHANGE?		
Starting additional raw wastewater pumps (up to a maximum of three pumps).		
WHAT CAN GO WRONG?		
Pump fails to start. Power failure. Too high a well level (27 feet) will overflow primary tank weir.		

SECTION 10 - Activated Sludge Process

10.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Aeration	16 - influent flow control valves 16 - influent magnetic flow meters 2 - influent channels 16 - aeration tanks 16 - dissolved oxygen probes 16 - air flow transmitters 16 - air flow control valves 2 - 3,000 hp blowers 2 - 5,000 hp blowers 6 - MLSS channels
RAS/WAS Pumping	16 - RAS magnetic flow meters 16 - RAS flow control valves 2 - RAS wet wells 6 - RAS well level monitors 6 - RAS pumps rated at 40 mgd @ 26 ft TDH 4 - WAS pumps rated at 700 gpm @ 40 ft TDH Check this
Secondary Clarification	16 - secondary clarifier influent gates 16 - secondary clarifiers 16 - skimmer arms and collector arms 16 - secondary clarifier effluent gates 16 - sludge blanket level monitors 16 - telescopic sludge flow control valves 9- scum pumps

10.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Superintendent	Operator	Make sure all available clarifiers are in service.

Shift Superintendent	Operator	SCADA monitors sludge blankets in clarifiers. Maintain target blanket level of 0-1 foot. Check collector arms in clarifiers.
Shift Superintendent	Operator	SCADA monitors dissolved oxygen levels in the aeration tanks. Adjust blower inlet guide vane position as needed to maintain DO setpoint.
Shift Superintendent	Operator	Monitor settleability characteristics and sludge quality
		Automatic-remote control of flow distribution to aeration tanks and secondary clarifiers
Shift Superintendent	Operator	Inspect scum beaches
Shift Superintendent	Operator	SCADA monitors WAS flow rate. Flow rate set to maintain target MCRT. SCADA controls pump speed to maintain flow setpoint.
Shift Superintendent	Operator	SCADA monitors RAS flow rate. Flow rate typically set at 40 % of SWW flow. Add second RAS pump if needed to maintain flow setpoint.
Shift Superintendent	Operator	Monitor SWW flow (sum of aeration tank influent flow meters). Communicate with SWW station on number of pumps in service and anticipated addition of pumps.
During Wet Weather Event		
Shift Superintendent	Operator	Adjust flow distribution to aeration tanks and final clarifiers as necessary to control influent and effluent channel levels and balance flows.
Shift Superintendent	Operator	SCADA continues to monitor sludge blanket levels in the clarifiers.
Shift Superintendent	Operator	Adjust the telescopic valves to control blanket level and RAS wet well levels. If necessary, reduce flow to clarifier(s) with excessive blanket depth.
Shift Superintendent	Operator	Monitor RAS flow rate. Maintain target return rate. Add second pump if necessary to maintain target return rate.
Shift Superintendent	Operator	Monitor effluent quality from the secondary clarifiers

Shift Superintendent	Operator	Monitor SWW flow (sum of aeration tank influent flow meters). Communicate with SWW station on number of pumps in service and anticipated addition of pumps.
After Wet Weather Event		
Shift Superintendent	Operator	Return control of flow distribution to automatic-remote .
Shift Superintendent	Operator	Return control of RAS pump speed to SCADA.
Shift Superintendent	Operator	SCADA monitor DO levels. Manual DO readings are taken with a hand held meter twice per shift. Adjust blower inlet guide vane as needed to maintain setpoint.
Shift Superintendent	Operator	Monitor SWW flow (sum of aeration tank influent flow meters). Communicate with SWW station on number of pumps in service and anticipated shutdown of pumps.
Shift Superintendent	Operator	Adjust telescopic valves for blanket control in clarifiers, and RAS wet well levels. SCADA continues to monitor sludge blanket levels in the clarifiers.
_WHY DO WE DO THIS?		
Provide process stability. Avoid solids washout. Minimize hydraulic and loading surges. Optimize energy usage. Optimize operating costs.		
WHAT TRIGGERS THE CHANGE?		
Increasing pump delivery from in-service settled wastewater pumps and/or starting additional settled wastewater pumps.		
WHAT CAN GO WRONG?		
Solids washout. Poor flow distribution to aeration tanks and/or secondary clarifiers. Imbalance of sludge blankets. Instrument failure. Pump failure. Ice build-up on clarifier collector arms. Telescopic valve failure.		

SECTION 11 – Effluent Chlorination

11.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Effluent Chlorination	4 – influent gates 4– chlorine contact tanks rated at 90 mgd, each 4 – final effluent ultrasonic flow meters 3 – 5,000 gallon sodium hypochlorite storage tanks 1 – tank level monitor 3 – 528 gph metering pumps

11.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Superintendent	Operator	Make sure chlorine contact influent gates are operational. Typically, two chlorine contact tanks in service.
Shift Superintendent	Operator	Check on levels of sodium hypochlorite. If necessary, request delivery.
Shift Superintendent	Operator	Check pumps for proper operation.
Shift Superintendent	I&E, Millwright	Make any necessary repairs.
Shift Superintendent	Operator	Monitor chlorine residual with Hach kits every hour on the hour.
During Wet Weather Event		
Shift Superintendent	Operator	Monitor pump feed rate.
Shift Superintendent	Operator	Run Hach test to determine chlorine residual levels in final effluent. Adjust pump speed and/or stroke length as necessary to maintain target residual. Increase frequency of chlorine residual measurement as necessary to control feed pumps.

Shift Superintendent	Operator	As SWW flow increases, increase the number of chlorine contact tanks in service. Keep a minimum contact time for disinfection.
After Wet Weather Event		
Shift Superintendent	Operator	Reduce number of chlorine contact tanks in service as the SWW flow decreases.
Shift Superintendent	Operator	Monitor chlorine residual in final effluent. Adjust pump speed and/or stroke length, as needed, to meet target residual. In case of pump failure, the ability to feed by gravity is available.
Shift Superintendent	Operator	Check on levels of sodium hypochlorite. Request delivery, if necessary.
Shift Superintendent	Operator	Clean contact tanks, if necessary.
Shift Superintendent	I&E, Millwright	Make any necessary repairs.
WHY DO WE DO THIS?		
Maintain adequate disinfection in accordance with SPDES permit requirements.		
WHAT TRIGGERS THE CHANGE?		
Increasing pump delivery from in-service settled wastewater pumps and/or starting additional settled wastewater pumps.		
WHAT CAN GO WRONG?		
Deteriorating effluent quality and/or solids washout resulting in increased chlorine demand. Difficulty maintaining target residual with rapidly varying flow and effluent quality. Floatables interfere with ultrasonic flow measurement.		

SECTION 12 - Solids Handling: Thickeners

12.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Air Flotation Thickeners	10 – D.A.F. thickeners 10 – air/water tanks 10 – Sludge Pumps 10 – Screw conveyers 10 – Upper collector arms 10 – Lower collector arms

12.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Superintendent	Operator	Typically, four (4) DAF's in service. Co-thickening primary and waste activated sludge.
Shift Superintendent	Operator	Check polymer day tank and metering pumps.
Shift Superintendent	Operator	Check sludge blanket – too heavy or too light? Adjust skimmer speed, polymer and/or air as needed.
Shift Superintendent	Operator	Check bottom collector daily. If necessary, run flights and screw collector. Check sample line for quantity and quality of solids.
During Wet Weather Event		
Shift Superintendent	Operator	Monitor sludge entering the DAF. Make adjustments to maintain 5% or better, solids. Adjust skimmer speed, polymer and/or air as needed.
Shift Superintendent	Operator	Run Rise Test to have a 7-inch rise per 16 to 21 seconds. Adjust as needed.

After Wet Weather Event		
Shift Superintendent	Operator	Continue to monitor the thickeners; maintain 5% or better, solids. As the rate drops adjust the polymer, air, collection rates accordingly.
Shift Superintendent	Operator	Add thickeners as necessary to handle additional solids collected in primary clarifiers.
WHY DO WE DO THIS?		
Maintain target thickened solids concentration with varying ratio of primary to waste activated sludge.		
WHAT TRIGGERS THE CHANGE?		
Entering partial treatment mode.		
WHAT CAN GO WRONG?		
Failure of upper/lower collector mechanism. Plugged polymer day tank. Rotameters require cleaning. Excess solids in subnatant can clog float in retention tanks. Loss of air supply.		

SECTION 13 - Sampling

13.1 Unit Processes and Equipment List

UNIT PROCESS	EQUIPMENT
Sampling	1 - Plant influent composite sampler 1 - Plant effluent automatic composite sampler

13.2 Wet Weather O & M Practices

WHO DOES IT?		WHAT DO WE DO?
SUPERVISORY	IMPLEMENTATION	
Before Wet Weather Event		
Shift Superintendent	Operator	Check automatic sampler units for proper operation. Sampler on, sample not overflowing.
Shift Superintendent	Operator	Replace automatic composite sample jugs at midnight.
Shift Superintendent	Operator	Take manual hourly composite samples as a backup to the automatic sampler.
Shift Superintendent	Operator	Repair old tubing, bad sample suction lines.
Shift Superintendent	Operator	Partial treatment sample bottles for Outfalls 001 and 01A are kept at the Shift Superintendent's office. If a set of bottles is not at Sludge Pump and/or Main Pump, then call the Shift Superintendent for bottles. Additional sample bottles can be found in the labeled refrigerator in the Administration Building foyer.
During Wet Weather Event		
Shift Superintendent	Operator	Monitor operation of automatic samplers.
Shift Superintendent	Operator	If plant goes into partial treatment, Collect grab samples at Outfall 001 and plant influent according to SPDES permit requirements. Outfall 001 sample collected at weirs of in-service primary tanks. Plant influent bacteriological sample collected from N-con sampler.

Shift Superintendent	Operator	Take first partial treatment (Outfall 001) samples 3 hours after the bypass valves are opened. If the bypass event lasts less than 3 hours, take samples before going out of partial treatment. Take a sample every 4 hours after the first sample has been taken until partial treatment ends.
Shift Superintendent	Operator	Analyze a portion of Outfall 001 sample for total residual chlorine using a Hach colorimeter and record results.
Shift Superintendent	Operator	Operator labels and dates samples from Outfall 001 and plant influent. Operator fills out chain of custody. Operator informs Shift Supervisor that samples have been taken. Deliver samples to the laboratory. Sign chain of custody sheet.
Shift Superintendent	Operator	If Outfall 01A is activated, take sample at sink in the inlet room. A single grab sample once per event is required. Operator labels and dates samples. Operator fills out chain of custody. Operator informs Shift Supervisor that samples have been taken. Deliver samples to the laboratory. Sign chain of custody sheet.
Shift Superintendent	Operator	Normal business hours of the laboratory are 8 am – 4 pm Monday through Friday. After business hours or when no laboratory personnel are available, the samples should be left in the refrigerator in the Administration Building foyer and the chain of custody sheet in the mail slot labeled Partial Treatment Chain of Custody forms.
Shift Superintendent	Operator	If samples are collected between 4 pm and 1 am on a weekday or between 12 noon and 1 am on a weekend or holiday, the shift supervisor is responsible for calling in a chemist to set up the laboratory analyses.
After Wet Weather Event		
Shift Superintendent	Operator	Check automatic sampler units for proper operation.
Shift Superintendent	Operator	Repair old tubing, bad sample suction lines.
WHY DO WE DO THIS?		
Monitor water quality of discharges to the Niagara River via Outfalls 001, 01A and 002.		
WHAT TRIGGERS THE CHANGE?		
Sampling at Outfall 001 is initiated when the plant enters partial treatment mode. Sampling at Outfall 01A is initiated when an overflow occurs at this location.		
WHAT CAN GO WRONG?		
Power failures. Plugged sample lines. Emergency back up is manual collection and compositing of samples.		

A list of contacts who can provide advice or assistance during a wet weather event is presented in Table 4-1.

TABLE 4-1

Buffalo Sewer Authority
Wet Weather Operating Plan

LIST OF CONTACTS

Agency	Title	Contact Information
Municipal		
Buffalo Sewer Authority Wastewater Treatment Plant Foot of West Ferry Street 90 West Ferry Street Buffalo, NY 14213	James Keller, Jr. Treatment Plant Superintendent	883-1820 (ext. 201) Cell phone 432-6058 Email: jkeller@sa.ci.buffalo.ny.us Home: 687-1389
	Roberta L. Gaiek, P.E. Treatment Plant Administrator	883-1820 (ext. 208) Cell phone 982-9483
	Angel Rivera Superintendent of Mechanical Maintenance	883-1820 (ext. 217) Cell phone 432-6059
	Gary Aures Associate Chemist Laboratory Director	For sampling, follow standard operating procedures. For emergencies, contact: Gary Aures: Home: 826-8220 Pager: 774-4506

TABLE 4-1 (continued)

Buffalo Sewer Authority
Wet Weather Operating Plan

LIST OF CONTACTS

Regulatory NYSDEC 270 Michigan Avenue Buffalo, NY 14203	 Robert Smythe Environmental Engineer I	 851-7070
Emergency [1] Follow the listed notification sequence in the event a worker, outside contractor or visitor requires emergency care.	 Call 911 Call both guard houses Call both bridges Call the Shift Superintendents	 Call 911 South Guard House – ext. 224 North Guard House – ext. 223 (If guard house extension is busy, press *21). West Ferry Street 851-5689 International 876-5670 Ext. 221/222 Pager no. 774-4501/774-4502 Cell phone 913-4246 Call on two-way radio
Services Bison (NaOCI supplier) Allied National Fuel Gas National Grid Quackenbush Company, Inc. 495 Kennedy Road Cheektowaga, NY 14227 Ferguson Electric 321 Ellicott Street Buffalo, NY 14203	 Dave Sydor Jack Sturm Dispatch 614-3385 or 3386 Larry Szalay Angelo Veanes	 895-2707 614-3333 Weekend 614-3333 #1 1-800-444-3130 1-800-867-5222 894-4355 852-2010

Notes:
1. Additional resources include the laboratory Chemical Hygiene Plan.

APPENDIX A-1

BUFFALO SEWER AUTHORITY SPDES PERMIT LIMITS

Buffalo Sewer Authority SPDES Permit Limits – Effective 7/1/2004

Final Effluent Discharge # 002

Conventional Pollutants:

Parameter	Frequency	Limit		Type
Flow	12 mo rolling avg	180 MGD		Continuous
BOD	30 d ave	30 mg/L	45,000 #/d	1/d 24 hr comp
BOD	7.d ave	45 mg/L	67,500 #/d	1/d 24 hr comp
TSS	30 d ave	30 mg/L	45,000 #/d	1/d 24 hr comp
TSS	7 d ave	45 mg/L	67,500 #/d	1/d 24 hr comp
Fecal Coliform	30 d GM	200/100ml		1/day grab
Fecal Coliform	7 d GM	400/100ml		1/day grab
PH	6 grabs/day	6.0 – 9.0		6/d grab
Chlorine Residual	6 grabs/day	2.0 mg/L daily max (no min)		6/d grab
Settleable Solids	6 grabs/day	0.3ml/L daily ave		6/d grab
Phosphorus	30 d ave	1.0 mg/L as P		1/d 24 hr comp
Ammonia	30 d ave	monitor, mg/L as NH3		1/mo 24hr comp
Nitrogen, TKN	30 d ave	monitor, mg/L as N		1/mo 24hr comp
Temperature	6/d grab	monitor		6/d grab

Notes:

Influent and Effluent sampling on all above except Fecal coliform, chlorine residual and phosphorus. Effluent values shall not exceed 15% of inflect values for BOD and TSS (pounds) for flows up to 180 MGD. (85% removal)

Pending development and approval of the Wet Weather Operating Plan (7/1/2000), the permittee shall attempt to use outfall 002 exclusively for all discharges up to a minimum of 300MGD.

Toxic Pollutants

Effluent Parameter	Frequency	Limit	Type
Phenol, Total	2/month	36.6 lbs/d	24 hr comp

Special Monitoring Requirements:

Quarterly influent and effluent scan for priority pollutants.

A one time, short-term, high-intensity monitoring program for Mercury consisting of sampling on 3 consecutive operating days. Results should be expressed in both concentration and mass.

Review and evaluation of the monitoring results may result in permit revisions to include additional monitoring requirements and/or effluent limitations.

Action Level Requirements (Type 1)

Effluent Parameter	Frequency	Limit	Type
Aniline	2/mo	30.0 lbs/d	24 hr comp

If action limits are exceeded, permit shall undertake a short-term high-intensity monitoring program for at least three operating days. If high levels are confirmed, the permit may be reopened for consideration of revised action levels or effluent limits.

Action Level Requirements (Type 2)

Effluent Parameter	Action level
Cadmium (T)	30.0
Chromium (T)	21.3
Copper (T)	42.1
Copper (dissolved)	monitor
Lead (T)	66.2
Nickel (T)	43.8
Zinc (T)	389.2
Zinc (dissolved)	monitor
Cyanide (T)	90.0
Bis (2-ethylehexyl) Phthalate	16.7

Minimum monitoring requirements are 2 samples/month, 24 hour composite. Results shall be reported in lbs/day.
If discharges of any substances exceed their respective action level:

1. **For four of six consecutive samples, or**
2. **For tow of six consecutive samples by 20% or more, or**
3. **For any 1 sample by 50% or more**

The permittee must undertake a short-term high-intensity monitoring program for at least three consecutive operating days. If levels higher than the action limits are confirmed, the permit may be reopened for consideration of revised action levels or effluent limits.

Toxicity Testing Program – Tier 1 Acute Test

Effluent toxicity testing (48 hr EC50 and 48 hr LC50 in % effluent for both a vertebrate and invertebrate specie) shall begin 4 years from the effective date of the permit (7/99) and last for one year. A final decision regarding additional monitoring and/or implementation of a toxicity reduction evaluation will be made by the DEC based on the results of the one year of testing.

Secondary Treatment By-Pass 001

Routine Monitoring Requirements

Parameter	Frequency	Type	Location
Flow, MG	Continuous	recorder/totalizer	Effluent
BOD, 5-day mg.L	1/event	Comp	Effluent
TSS mg/L	1/event	Comp	Effluent
Fecal Coliforms/100ml	1/event	grab	Influent and Effluent
Oil and Grease	1/event	grab	Effluent
Sett. Solids	1/event	grab	Effluent
Chlorine residual	1/event	grab	Effluent

Pending approval of the WWOP, all flows to the headworks capacity and not passed through 002 shall be passed through 001.
Flow shall be continuously recorded and totalized. Flow reported shall be the total discharged for the calendar month.
BOD and TSS samples shall be composites of grab samples, one taken every four hours.
Grab samples shall be taken every 4 hours during each event.

Headworks By-Pass 01A

Routine Monitoring Requirements

Parameter	Frequency	Type	Location
Flow, MG	1/event	estimated	Influent
BOD, 5-day mg/L	1/event	grab	Effluent
TSS mg/L	1/event	grab	Effluent
Oil and Grease	1/event	grab	Effluent
Sett. Solids	1/event	grab	Effluent

This outfall is for emergency use only.

APPENDIX A-2

STANDARD OPERATING PROCEDURES
BSA TREATMENT PLANT SAMPLING PROGRAM

Buffalo Sewer Authority Laboratory
Standard Operating Procedures
Part 6.0 – BSA Treatment Plant Sampling Program

SOP No.	Revision No.	Effective Date	Page
SA-EMERG	2	AUG 23 2006	Page 1 of 3

Title: Sampling Procedure for Emergency Disruption of Service

Reviewed and Approved By:	Signature	Date
G. Aures/Author	Gary J. Aures	8/23/06
D. Glab/QA Coordinator	Deborah M Glab	8/23/06
G. Aures/Lab Director	Gary J. Aures	8/23/06
Reviewed By:		
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issued to master By: Deborah M Glab
QA Coordinator

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6.1.1 Scope and Application

This procedure applies to an emergency situation where a disruption of service has occurred. A disruption of service is defined as any set of circumstances that result in a loss of flow to the secondary treatment plant outflow 002. The sampling plan that is outlined here applies to wastewater flows through the overflow outfall 01A or through bypass outfall 001.

6.1.2 Worst Case Scenario

Loss of electrical power with discharge of chlorinated raw sewage through overflow outfall 01A (Screen Room)

6.1.2.1 Sampling

6.1.2.1.1 Hourly grabs. One gallon of chlorinated raw sewage in one gallon plastic bottle.

6.1.2.1.2 Every two hours take an additional sample for bacteriological analyses in bacti bottle.

6.1.2.2 Analyses

6.1.2.2.1 **Operator**
Hourly chlorine residual.

6.1.2.2.2 **Laboratory**
- *Hourly* pH, Settleable Solids.
- *Every two hours*, fecal coliform.
- *Every four hours*, take two liters from gallon container and preserve for Grease and Oil analyses.
- *Composite per event*, not to exceed 24 hours, analyzed for BOD and total suspended solids.

6.1.3 Second Worst Case Scenario
Primary treatment only and discharge of chlorinated primary effluent through bypass outfall 001.

6.1.3.1 Sampling

6.1.3.1.1 Hourly grabs. One gallon of chlorinated raw sewage in one gallon plastic bottle.

6.1.3.1.2 Every two hours take an additional sample for bacteriological analyses in bacti bottle.

6.1.3.1.3 Every four hours take a bacteriological sample at Main Pump.

6.1.3.2 Analyses

6.1.3.2.1 **Operator**
Hourly chlorine residual.

6.1.3.2.2 **Laboratory**

- *Hourly* pH, Settleable Solids.
- *Every two hours*, fecal coliform.
- *Every four hours*, take two liters from gallon container and preserve for Grease and Oil analyses. Analyze bacteriological sample from Main Pump.
- *Composite per event*, not to exceed 24 hours, analyzed for BOD and total suspended solids.

6.1.4 Sampling containers and chlorine analyzer. (Both scenarios)

6.1.4.1 Sufficient sample bottles for a 6 hour event will be left at Main Pump and will be labeled "EMERG EVENT – MP"

6.1.4.2 Sufficient sample bottles for a 6 hour event will be left at Sludge Pump and will be labeled "EMERG – SP"

6.1.4.3 A calibrated Hach chlorine colorimeter will be left with sufficient reagents for a 24 hour event, at both Main Pump and at Sludge Pump.

6.1.5 Staffing. (Both scenarios)

6.1.5.1 The laboratory will be staffed as needed during the event depending on the severity and the length of the event.

6.1.5.2 The Laboratory Director will be on call (pager # 774-4506) 24 hours / day.

Buffalo Sewer Authority Laboratory
Standard Operating Procedures
Part 6.0 – BSA Treatment Plant Sampling Program

SOP No.	Revision No.	Effective Date	Page
SA-MPUMP	3	AUG 23 2006	Page 1 of 6

Title: Sampling Procedure for Main Pump Station

Reviewed and Approved By:	Signature	Date
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D. Glab/QA Coordinator	Deborah M Glab	8/23/06
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issued to master By: Deborah M Glab
QA Coordinator

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6.2.1 Scope and Application

This procedure applies only to samples taken at the Main Pump Station. Samples are taken to satisfy requirements of SPDES Permit #NY0028410 issued to the Buffalo Sewer Authority effective July 1, 1999. Samples are also taken to determine the efficiency of the treatment process. Additional special sampling may be required occasionally. In the event of special sampling, instructions will precede the time of sampling.

6.2.2 Samples

6.2.2.1 RAW Auto Composite

The RAW auto composite sample is an automatic flow composited sample of plant influent. The sampling point is located in the wet well at 40 to 60% height of water level. This location is in compliance with EPA

guidelines and is positioned to collect a representative portion of the incoming waste stream. An automatic N-Con sampler which is located in the sample room on the first floor of Main Pump collects a flow determined portion of the stream and deposits the portion into a 2.5 gallon plastic jug. This sample is required by the BSA SPDES permit and is used to determine removal of pollutants.

6.2.2.1.1 Equipment Needed

6.2.2.1.1.1 One 2.5 gallon plastic jug labeled "RAW – Auto M,W,F" for samples collected Monday, Wednesday and Friday.

6.2.2.1.1.2 One 2.5 gallon plastic jug labeled "RAW – Auto T,Th,Sa" for samples collected Tuesday, Thursday, and Saturday.

6.2.2.1.1.3 One 2.5 gallon plastic jug labeled "RAW – Auto Sun" for samples collected Sunday.

6.2.2.1.2 Procedure

Sample bottles will be delivered by the laboratory every afternoon except Sunday. Sunday bottles are delivered on Friday along with the Saturday bottles. If a bottle is missing notify the laboratory immediately (ext. 230 or ext. 238) or the Shift Super.

6.2.2.1.2.1 At midnight, replace the partially full sample jug from inside the N-Con sampler with an empty, appropriately labeled sample jug. Be sure to place the drop hose inside the container so that the sample from the auto sampler is collected inside the jug.

6.2.2.1.2.2 Place the partially full sample container from the previous day inside the refrigerator in the sample room for collection by the laboratory.

6.2.2.2 RAW Manual Composite

The RAW manual composite sample is taken as a confirming sample or as a backup to the RAW auto composite sample. This sample is taken at the grates prior to the screens in the screen room. The sample must be taken in an active and flowing channel.

6.2.2.2.1 Equipment Needed

6.2.2.2.1.1 One 1 gallon plastic jug labeled "RAW – Manual M,W,F" for samples collected Monday, Wednesday and Friday.

6.2.2.2.1.2 One 1 gallon plastic jug labeled "RAW – Manual T,Th,Sa" for samples collected Tuesday, Thursday, and Saturday.

6.2.2.2.1.3 One 1 gallon plastic jug labeled "RAW – Manual Sun" for samples collected Sunday.

6.2.2.2.1.4 Dipper or pail with rope.

6.2.2.2.1.5 Graduated 250 mL cylinder.

6.2.2.2.2 Procedure

6.2.2.2.2.1 Each hour, for 24 hours, starting at midnight, collect a sample of plant influent from an active pre-screen channel by lowering a bucket or dipper into the channel. Take care when raising the sample to avoid scraping the sides, walls or grates of the channel so that no extraneous material falls into the sample container.

6.2.2.2.2.2 From each hourly sample collected, measure a volume in milliliters equivalent to half of the incoming flow. Pour the measured amount into the 1 gallon plastic composite jug labeled for the appropriate day. For example, if the flow equals 120 MGD at the time of the sample, then pour 60 mL of

sample into the plastic jug for that hourly sample. Keep the composite jug in the refrigerator until it is picked up by the laboratory.

6.2.2.2.2.3 Fill out the chain of custody log (Form Q050). Enter the time each hourly portion of sample is collected for the 24 hour composite sample, enter the flow in MGD at the hour of collection and enter the volume of sample in milliliters taken for the composite. Measure the volume in inches of sample in the composite jug at the end of the shift.

6.2.2.2.2.4 Sign the chain of custody log at the end of each shift under "sample relinquished by".

6.2.2.2.2.5 Operators on the 8-4 shift and the 4-12 shift: sign under "samples received by" at the beginning of each shift. The laboratory will pick up the sample and the chain of custody sheet each morning except for Sunday. Saturday and Sunday samples and chains of custody will be picked up on Monday morning.

6.2.2.3 RAW Grab Samples

The RAW grab samples are individual samples of plant influent. The location of this sample is the same as the manual composite sample, which is the Screen room at the grates upstream of the screens. Each shift takes two grab samples. The times for these samples are: 1AM, 5AM, 9AM, 1PM, 5PM and 9PM. These samples are also required by the BSA SPDES Permit.

6.2.2.3.1 Equipment Needed

6.2.2.3.1.1 Six 2 liter plastic wide mouth bottles labeled "RAW" followed by the time (see above) and the day; M,W,F or Tu, Th, Sa or Sun.

6.2.2.3.1.2 Dipper or pail with rope.

6.2.2.3.2 **Procedure**

6.2.2.3.2.1 Every 4 hours, for 24 hours, starting at midnight, and at the times prescribed above, collect a sample of plant influent from an active pre-screen channel by lowering a bucket or dipper into the channel. Take care when raising the sample to avoid scraping the sides, walls or grates of the channel so that no extraneous material falls into the sample container.

6.2.2.3.2.2 Fill the appropriate 2 liter container about ¾ full and refrigerate.

6.2.2.3.2.3 Enter the time each grab sample is taken on the chain of custody sheet. The samples and the chain of custody sheet will be picked up by the laboratory.

6.2.2.4 RAW Bacti Sample

This sample is taken on the first Wednesday of each month. The laboratory will drop off a bacti bottle with the proper label. The bacti sample is used to calculate removal of coliform bacteria.

6.2.2.4.1 **Equipment needed**

6.2.2.4.1.1 One 250 mL sterile bacteriological sample bottle labeled "RAW 9AM".

6.2.2.4.2 **Procedure**

6.2.2.4.2.1 Fill the bacti bottle about ¾ full. Do not rinse or overflow the bottle, do not set the cap down. The sample may be taken from the collection basin at the top of the N-Con sampler. If the N-Con sampler is out of

service then the sample should be taken at the same place as the RAW manual composite and the RAW grab samples.

6.2.2.4.2.2 Refrigerate the sample.

6.2.2.4.2.3 The sample and the chain of custody sheet will be picked up by the laboratory.

SOP No.	Revision No.	Effective Date	Page
SA-OF01A	4	AUG 23 2006	Page 1 of 2

Title: Sampling Procedure for Overflow Outfall 01A

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6.3.1 Purpose

This section describes the method of sampling to be followed when the plant is discharging at the headworks bypass through outfall 01A.

6.3.2 Scope and Application

This procedure applies only to outfall #01A and is in compliance with SPDES Permit #NY0028410 (Permit) issued to the Buffalo Sewer Authority and effective July 1, 1999. The Permit requires grab samples to be taken once per event, regardless of the number of events per day. See attachment for Page 9 of Permit – Part 1. ***This sampling procedure is meant to satisfy permit requirements and is not intended to replace routine process testing which the operator feels is necessary to establish the status of the process.***

6.3.3 Procedure

Take overflow samples once during the bypass event.

Main Pump

1. Overflow sample bottles are kept at the Shift Superintendent's office. If a set of bottles are not at Main Pump, call SS for bottles.
2. The sample bottle used for this event is a 1 gallon jug with handle. Each bottle will be accompanied by a chain of custody sheet (See Form Q007 in Appendix B - a copy of Form Q007 may be attached to an uncontrolled copy of this SOP).
3. Take sample at sample sink in the inlet room. Take care not to scrape sides of sink or to collect unrepresentative solids. Fill gallon jug to a level between the two red lines drawn on the jug.
4. Label 1 gallon jug with time, date and initials in spaces given for that purpose.
5. Fill out chain of custody sheet completely.
6. Inform SS that sample has been taken.
7. If SS is to deliver sample to Laboratory, he must sign chain of custody sheet next to "Received by: ". Fill in date and time that operator or sampler has relinquished the sample (See attached example).

6.3.4 Safety

Take all necessary precautions to avoid contact with wastewater. Wear protective clothing and gloves when taking samples.

6.3.5 Attachments

1. Chain of custody Form Q007 (example)
2. Page 9 of SPDES Permit Part 1

SOP No.	Revision No.	Effective Date	Page
SA-PT001	4	AUG 23 2006	Page 1 of 2

Title: Sampling Procedure for Partial Treatment Outfall 001

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6.4.1 Purpose

This section describes the method of sampling to be followed when the plant is in partial treatment and is discharging primary effluent through outfall 001.

6.4.2 Scope and Application

This procedure applies only to outfall #001 and is in compliance with SPDES Permit #NY0028410 (Permit) issued to the Buffalo Sewer Authority and effective July 1, 1999. The Permit requires grab samples to be taken every 4 hours per event, regardless of the number of events per day. See attachment for Page 9 of Permit – Part 1. ***This sampling procedure is meant to satisfy permit requirements and is not intended to replace routine process testing which the operator feels is necessary to establish the status of the process.***

6.4.3 Procedure

Take partial treatment samples 3 hours after the bypass valves are opened. If the bypass event lasts less than 3 hours, take the samples before going out of partial treatment.

Sludge Pump

1. Partial treatment sample bottles are kept at the Shift Superintendent's office. If a set of bottles are not at Sludge Pump, call SS for bottles.
2. Each set of sample bottles for Sludge Pump contains a 1 gallon jug with handle, a bacteriological sample bottle with a sodium sulfite tablet and a chain of custody sheet (See Form Q007 in Appendix B - a copy of Form Q007 may be attached to an uncontrolled copy of this SOP).
3. Use plastic dipper to take sample at outfall conduit. Fill gallon jug to a level between the two red lines drawn on the jug.
4. Fill a bacti sample bottle to approximately ¾ full.
5. Analyze a portion of sample for total residual chlorine using a Hach colorimeter and record results.
6. Label 1 gallon jug and bacti sample bottle with time, date and initials in spaces given for that purpose.
7. Fill out chain of custody sheet completely.
8. Inform SS that sample has been taken.
9. If SS is to deliver sample to Laboratory, he must sign chain of custody sheet next to "Received by: ". Fill in date and time that operator or sampler has relinquished the sample (See attached example). Normal business hours for the laboratory are 8:00 AM to 4:00 PM, Mon. – Fri. After business hours or whenever there are no Laboratory personnel available, leave the samples in the Administration building foyer fridge and the completed Chain of Custody Sheet (Form Q007) in the mail slot labeled "Partial Treatment Chain of Custody forms". The mail slot is located on the wall next to the Laboratory office door.
10. Take a sample every 4 hours after the first sample has been taken. Example: Bypass valves are opened at 7PM. Take sample at 10PM. Take another sample at 2AM. Take another sample at 6AM. Bypass valves are closed at 7AM.

6.4.4 Safety

Take all necessary precautions to avoid contact with wastewater. Wear protective clothing and gloves when taking samples.

6.4.5 Attachments

1. Chain of custody Form Q007(example)
2. Page 9 of SPDES Permit Part 1

Buffalo Sewer Authority Laboratory
Standard Operating Procedures
Part 6.0 – BSA Treatment Plant Sampling Program

Part 6.0 Reference Annual Sampling and Analysis Schedule	Revision No. 3	Effective Date 3/15/2005	Page 1 of 4

Sample Source	Code	Analyses	Type	Frequency	Reporting Deadlines	Notes
Plant Influent	RAW	BOD	24 hr. comp.	1/day	Analysis Complete	1, 3
		Total Susp. Solids	24 hr. comp.	1/day	Analysis Complete	1, 3
		TKN	24 hr. comp.	1/month	Analysis Complete	1
		Ammonia	24 hr. comp.	1/month	Analysis Complete	1
		pH	Grab	1am, 5am, 9am 1pm, 5pm, 9pm	Analysis Complete	1, 3
		Sett. Solids	Grab	1am, 5am, 9am 1pm, 5pm, 9pm	Analysis Complete	1, 3
		Total Coliform	Grab	1/month	Analysis Complete	9
		Phenols (Total), CN, Anliline, Bis-2-EHP, Cd, Cr, Cu, Pb, Ni, Zn	24 hr. comp.	2/month	15th of following month	1
		Priority Pollutant Scan plus all aniline compounds		1/3 months	Feb, May, Aug, Nov	1
Primary Effluent	PFO	Total Susp. Solids	24 hr. comp.	1/day	Analysis Complete	3
Raw Sludge	PSF	pH	24 hr. comp.	1/day	Analysis Complete	3
		Total Solids	24 hr. comp.	1/day	Analysis Complete	3
		Volatile Matter	24 hr. comp.	1/day	Analysis Complete	3
Grit	Grit	Total Solids	Grab	1/day	Analysis Complete	3
		Volatile Matter	Grab	1/day	Analysis Complete	3
		TCLP	Grab	1/year	ASAP after Jan 1	7
Aeration Tank Influent	ATI	BOD	24 hr. comp.	1/day	Analysis Complete	3
		Total Suspended Solids	24 hr. comp.	1/day	Analysis Complete	3
		Ammonia-N	24 hr. comp.	2/week	Analysis Complete	9
		Nitrite-N	24 hr. comp.	As needed	Analysis Complete	9
		Nitrate-N	24 hr. comp.	As needed	Analysis Complete	9
Mixed Liquors	ML	MLSS	Grab	1/day/trough	Analysis Complete	3

Mixed Liquors (Cont.)	ML	Settled Volume, 30 min	Grab	1/day/trough	Analysis Complete	3
		SVI	Grab	1/day/trough	Analysis Complete	3
		Microscopic Exam	Grab	3/week/battery	Analysis Complete	8
		OUR	Grab	2/week/battery	Analysis Complete	8
		OCR	Grab	2/week/battery	Analysis Complete	8
		RR	Grab	2/week/battery	Analysis Complete	8
Clarifier Effluent	CFO	Ammonia-N	Grab	As needed	Analysis Complete	9
		Nitrite-N	Grab		Analysis Complete	9
		Nitrate-N	Grab		Analysis Complete	9
Final Effluent	FE	BOD	24 hr. comp.	1/day	Analysis Complete	1,3
		Total Susp. Solids	24 hr. comp.	1/day	Analysis Complete	1,3
		Phosphorus	24 hr. comp.	1/day	Analysis Complete	1,3
		TKN	24 hr. comp.	1/month	Analysis Complete	1
		Ammonia	24 hr. comp.	1/month	Analysis Complete	1
		Fecal Coliforms	Grab	6am	Analysis Complete	1,3
		pH	Grab	2am, 6am, 10am 2pm, 6pm, 10pm	Analysis Complete	1,3
		Sett. Solids	Grab	2am, 6am, 10am 12am, 4am, 8am 2pm, 6pm, 10pm 12pm, 4pm, 8pm	Analysis Complete	1,3
		Cyanide, Total	Grab	2/month	15th of following month	1,2
		Metals: Cd, Cr, Cu, Pb, Ni, Zn	24 hr. comp.	2/month	15th of following month	1,2
		Phenols (Total)	24 hr. comp.	1/month	15th of following month	1,2
		Bis(2-ethylhexyl) phthalate	24 hr. comp.	2/month	15th of following month	1
		Aniline	24 hr. comp.	2/month	15th of following month	1
		Priority Pollutant Scan	24 hr. comp.	4/year	Feb, May, Aug, Nov	1
		Biomonitoring	24 hr. comp.	As required by DEC	Quarterly	1,2

Return Activated Sludge	RAS	Total Susp. Solids Volatile Matter	24 hr. comp. 24 hr. comp.	1/day 1/day	Analysis Complete Analysis Complete	3 3
Thickener Influent	TFI	Total Susp. Solids	24 hr. comp.	1/day	Analysis Complete	3
Thickener Subnatant	TFO	Total Susp. Solids	24 hr. comp.	1/day	Analysis Complete	3
Thickened Sludge	TSF	Total Solids Volatile Matter	24 hr. comp. 24 hr. comp.	1/day 1/day	Analysis Complete Analysis Complete	3 3
Digester Sludge Digester Sludge	DIG#	pH Alkalinity Total solids Volatile Matter Volatile Acids ORP	Grab Grab Grab Grab Grab Grab	Each Dig./week or as required by Process	Analysis Complete Analysis Complete Analysis Complete Analysis Complete Analysis Complete Analysis Complete	3 3 3 3 3 3
Filter Feed	FFI	pH Total Solids Volatile Matter	24 hr. comp. 24 hr. comp. 24 hr. comp.	1/day 1/day 1/day	Analysis Complete Analysis Complete Analysis Complete	3 3 3
Filtrate Liquor	FFO	Total Solids	24 hr. comp.	1/day	Analysis Complete	3
Filter Cake	Cake East and Cake West	Total Solids Volatile Matter Metals (503) As, Be, Cd, Cr, Pb, Hg, Ni TCLP and Aniline series	24 hr. comp. 24 hr. comp. Grab 24 hr comp	1/day 1/day 1/belt /month 1/belt/cal. year	Analysis Complete Analysis Complete Semi-annually ASAP after Jan 1	3 3 4 7
Ash	ASH	Volatile Matter TCLP	Grab 1 year comp.	1/day 1year	Analysis Complete Jan 1st	3 7
Overflow	001A	BOD Total Susp. Solids Settleable Solids pH HEM	Grab Grab Grab Grab Grab	1/event 1/event 1/event 1/event 1/event	Analysis Complete Analysis Complete Analysis Complete Analysis Complete Analysis Complete	1 1 1 9 1
Partial Treatment	001	BOD	Comp	1/event	Analysis Complete	1

Partial Treatment (Cont.)	001	Total Susp. Solids	Comp	1/event	Analysis Complete	1
		Settleable Solids	Grab	1/ 4 hrs/event	Analysis Complete	1
		Fecal coliform	Grab	1/ 4 hrs/event	Analysis Complete	1
		HEM	Grab	1/ 4 hrs/event	Analysis Complete	1
		pH	Grab	1/ 4 hrs/event	Analysis Complete	9
Materials	Hypochlorite	Specific Gravity	Grab	1/truckload	Analysis Complete	10
	Polymer	Total Solids	Grab	As needed	Analysis Complete	10
Industrial Waste	IW #	BOD	24 hr. comp or	Up to 6/week	Analysis Complete	11
		pH	Grab			
		Total Susp. Solids				
		Phosphates				
		Metals, Organics, HEM		As schedule allows	Analysis Complete	11

Notes:

1. Discharge Monitoring Report (DMR), or required for SPDES compliance.
2. Priority Pollutant Summary Report
3. Facility Operations Report (formerly the BMW-88) excluding attachments
4. 503 Regs. Annual Summary
5. Compounds detected at or above detection limit must be reported in the Facility Operations Report (92-15-7).
6. Substance of Concern Summary Report.
7. TCLP Analyses summary (IW sends out samples and receives report from contracted lab).
8. Process Report, Weekly
9. Process data.
10. Materials Quality Control
11. Industrial Waste Report