


COLLECTION SYSTEM CAPACITY, MANAGEMENT, OPERATIONS, AND MAINTENANCE PLAN

CITY OF AURORA, ILLINOIS

NPDES Permit No. IL0048518

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Acronyms

CBOD – Carbonaceous Biochemical Oxygen Demand

CDL – Commercial Driver's License

CFR – Code of Federal Regulations

CIPP – Cured-in-Place Pipe

Cl – Chlorine

CMOM – Capacity, Management, Operations, and Maintenance

CSO – Combined Sewer Overflow

DMR – Discharge Monitoring Report

FMWRD – Fox Metro Water Reclamation District

FOG – Fats, Oils, and Greases

FSE – Food Service Establishment

GIS – Geographic Information System

GRS – Grease Removal System

I/I – Inflow and Infiltration

IEPA – Illinois Environmental Protection Agency

LTCP – Long Term Control Plan

NPDES - National Pollutant Discharge Elimination System

P – Phosphorus

PVC – Polyvinyl Chloride

SCADA – Supervisory Control and Data Acquisition

SSES – Sanitary Sewer Evaluation Survey

SSO – Sanitary Sewer Overflow

TSS – Total Suspended Solids

USEPA – United States Environmental Protection Agency

Introduction

Background

Sanitary sewer collection systems are designed and built to carry wastewater from private properties to a wastewater treatment plant. Storm sewer collection systems collect and carry rainwater as well as runoff from creeks and streams, typically discharging into retention basins or other bodies of water.

Combined sewer collection systems collect both wastewater and stormwater. The City of Aurora's original collection system was built as a combination system that either discharged into local waterways or was carried to a centralized wastewater treatment plant. The City has conducted numerous separation projects to split the sanitary and storm collection systems and reduce sanitary wastewater flows into the waterways. Currently the combined sewer system only discharges into the waterways in the cases of heavy wet weather when flows overwhelm the sewer system's storage capacity.

To protect public and environmental health, the City strives to limit these discharges, known as overflows, from the collection system into the waterways by effectively and continuously managing, operating, and maintaining its collection system.

Purpose

This Collection System Capacity, Management, Operations, and Maintenance (CMOM) Plan outlines the resources and procedures used by the City of Aurora to effectively manage, operate, and maintain its collection system. The City of Aurora strives to provide its customers with a high level of service while protecting public and environmental health.

This document was prepared in accordance with the regulatory requirements of Special Condition 9 of the City's NPDES Permit No. IL0048518.

Future Updates

The resources and procedures used to manage, operate, and maintain the City's collection system are bound to change over time. Changes may occur due to internal factors such as staffing, budget, or technology advancement or implementation, or via external factors like policy changes, environmental shifts, and changes in City requirements.

The City strives annually to maintain an accurate and up to date CMOM Plan. However, the City will adjust the CMOM Plan whenever there is a significant change to the management, operation, or maintenance of the City's collection system.

Collection System Management

Legal Authority

Federal and state regulations dictate the City's responsibilities pertaining to overflows from the City's sanitary and combined sewer systems. The Illinois Environmental Protection Agency (IEPA) enforces the National Pollutant Discharge Elimination System (NPDES) permit requirements, which state:

- The City must take all reasonable steps to minimize or prevent any discharge in violation of its NPDES permit if the discharge has a reasonable likelihood of adversely affecting human health or the environment (40 CFR 122.41(d));
- The City must at all times properly operate and maintain the facilities and systems necessary to comply with its NPDES permit (40 CFR 122.41(e));
- Overflows from sanitary sewers are prohibited (Ill. Admin Code 306.304); and
- Dry weather overflows from combined sewers are prohibited (Ill. Admin Code 306.305).

Aurora's Municipal Code includes a sewer use ordinance that provides the City with the authority to manage its sewer systems to maintain compliance with these Federal and state regulations. Specifically, this ordinance:

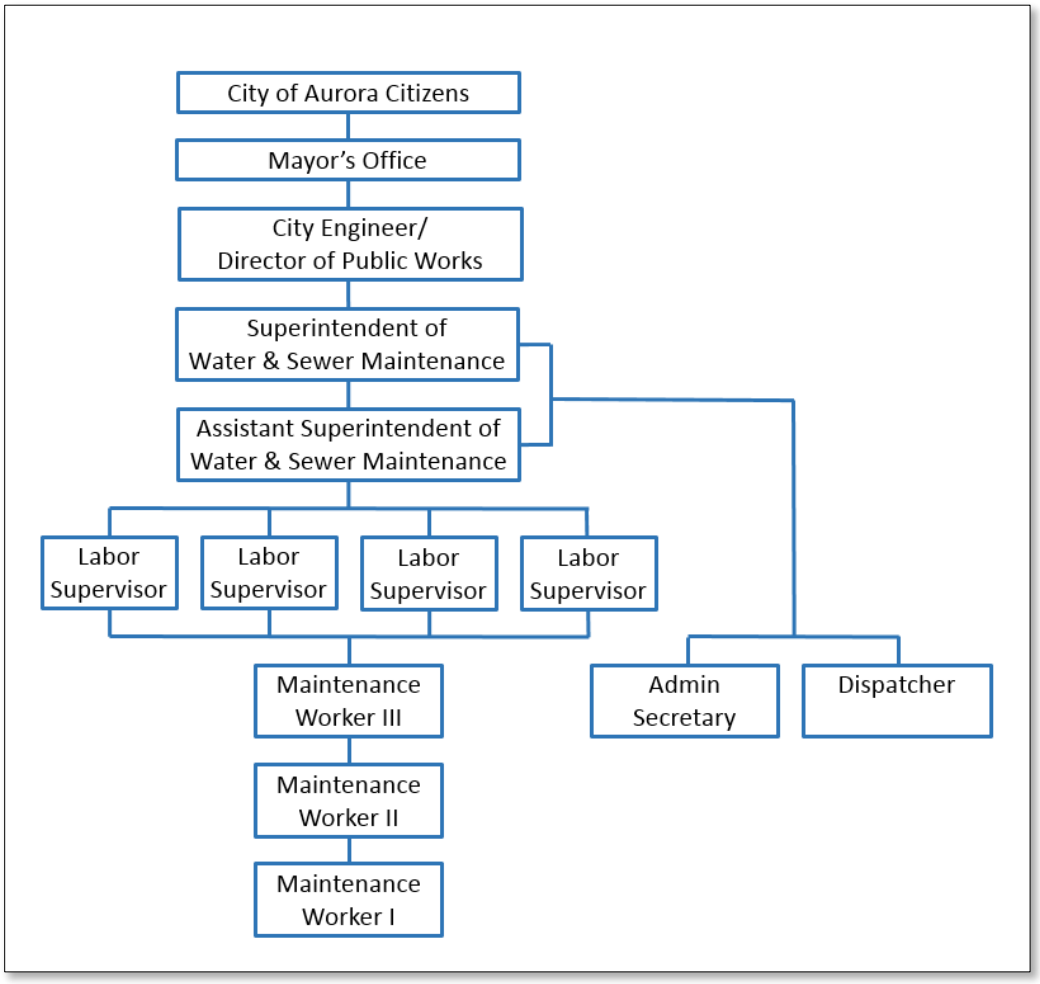
- Prohibits the introduction of liquids or solids to the sewer system that create any nuisance or unsanitary condition, damage any part of the sewer system, or in any way interfere with the sewage treatment process (Sec. 48-132);
- Prohibits the introduction of new inflow sources to the sanitary sewer system (Sec. 48-133);
- Requires that new sanitary sewer construction tributary to the combined sewer system be designed to minimize and/or delay inflow contribution to the combined sewer system (Sec. 48-103);
- Requires that inflow sources on the combined sewer system be connected to a storm sewer within a reasonable period of time, if a storm sewer becomes available (Sec. 48-103);
- Provides that any new building domestic waste connection be distinct from the building inflow connection, to facilitate disconnection if a storm sewer becomes available (Sec. 48-103);
- Assures that combined sewer overflow (CSO) impacts from non-domestic sources are minimized by determining which non-domestic discharges, if any, are tributary to CSOs (Sec. 48-135 through 48-137); and
- Assures that the owners of all publicly owned systems with sewers tributary to the City's collection system have adequate operation and maintenance procedures in place (Sec. 48-140 and 48-141).

Aspects of the sewer use ordinance applicable to new development and re-development are enforced by the City's Buildings & Permits Division as well as the Engineering Division. Fox Metro Water Reclamation District (FMWRD) also administers and enforces its ordinances within the City limits. However, the operation and maintenance of the City's collection system is the responsibility of the City's Water & Sewer Maintenance Division.

Organizational Structure and Staffing

The Water & Sewer Maintenance Division is comprised of: a Superintendent, an Assistant Superintendent, Labor Supervisors, Maintenance Workers at three distinct levels, a Dispatcher, and an Administrative Assistant. Figure 1 is an Organizational Chart illustrating the Division's chain-of-command.

Figure 1: Organizational Chart for the Water & Sewer Maintenance Division



The responsibilities of each position within the Water & Sewer Maintenance Division are described below.

- Administrative Secretary
  - An employee in this position performs varied and responsible clerical and secretarial duties. This position involves typing reports and correspondence, transcribing dictation, assisting the public with inquiries, and providing the public with general information about departmental rules, regulations, and procedures. The minimum qualifications for an employee in this position are: a high school diploma or GED with course work in typing and general office procedures; the ability to type 50 words per minute corrected; and two years of clerical experience.

- Dispatcher
    - An employee in this position operates a variety of communication equipment to respond to calls from the public and dispatches maintenance crews to various public works facilities and work sites. This position also involves: coordinating water and sewer utility locate requests; tracking shift activities with the assignment of personnel, vehicles, and equipment; assisting with the creation of service requests; and assisting with the processing of purchase orders. An employee in this position may perform secretarial duties when the Administrative Secretary is absent. The minimum qualification for an employee in this position is completion of four years of high school (or equivalent knowledge, skill, and mental development).

- Maintenance Worker I
    - Employees in this position perform a variety of manual tasks using hand tools, shovels, rakes, rotary motors, power tools, etc. This position also requires some skill in the operation of trucks, snowplows and salt spreading equipment, and the maintenance and repair of such equipment. Employees at this level will install, maintain, and repair elements of the water distribution system and the sewer system, including work in confined spaces. The minimum qualifications for employees at this level are: 18 years of age, completion of two years of high school, and the ability to obtain an Illinois Class B CDL within 60 days from the date of hire.

- Maintenance Worker II
    - Employees in this position perform semi-skilled manual labor using heavy equipment such as end loaders, manhole rehabilitation equipment, water main line stops, tapping equipment, valve operation equipment, as well as hand tools such as chain saws, picks, and all equipment used by a Maintenance Worker I. Employees at this level act as a crew leader in the absence of a Maintenance Worker III. The minimum qualifications for employees at this level are: completion of two years of high school, two years of experience as a laborer in a maintenance field, and possession of a valid Illinois Class B CDL.

- Maintenance Worker III
    - Employees in this position perform skilled and semi-skilled manual labor using heavy equipment such as backhoes, and combination sewer vacuum jet rodders. This position also requires the use of all equipment used by Maintenance Workers I and II. Employees at this level will be a crew leader for installing, maintaining, and repairing elements of the water distribution system and the sewer system. The minimum qualifications for employees at this level are: completion of two years of high school, three years of experience as a laborer in a maintenance field, and possession of a valid Illinois Class A CDL.

- Labor Supervisor
    - Employees in this position are responsible for the supervision and direction of a group of maintenance workers or equipment mechanics performing a variety of manual, semi-

skilled and skilled tasks in the general maintenance, upkeep and repair of infrastructure, equipment, and vehicles. Labor Supervisors will operate a personal computer and general office equipment. Duties may be performed at an outside location or indoor repair facility. The minimum qualifications for employees at this level are: completion of four years of high school (or equivalent knowledge, skill, and mental development), four years of experience in maintenance of water and sewer distribution systems, including two years of increasingly responsible experience in a Department of Public Works, possession of a valid Illinois Class A CDL, and a Class D Water Operator's Certificate.

- Assistant Superintendent of Water & Sewer Maintenance
    - An employee in this position manages and is responsible for all operations, activities, and employees in the Water & Sewer Maintenance Division, including: planning, assigning, and directing work; interviewing and training employees; appraising performance; rewarding and disciplining employees; addressing complaints; and resolving problems. An employee in this position must be able to analyze and interpret technical documents, write reports and business correspondence, effectively present information, define problems, and draw valid conclusions. The Assistant Superintendent of Water & Sewer Maintenance fulfills the duties of the Superintendent in the Superintendent's absence. The minimum qualifications for an employee in this position are one year of supervisory experience and at least one of the following: an Associate's degree or equivalent from a two-year college or technical school; six months to one year of related experience and/or training; or an equivalent combination of education and experience.

- Superintendent of Water & Sewer Maintenance
    - An employee in this position organizes, directs, and administers a comprehensive water and sewer maintenance operation for the City of Aurora. Essential functions of this position include: establishing and administering divisional operating policies and procedures; budgeting for future divisional needs and costs; monitoring the expenditure of allocated funds for divisional operation; formulating specifications for requisitioning new equipment, tools, and supplies; coordinating divisional activities with various other City departments; and directing the documentation of divisional activities. The minimum qualifications for an employee in this position are: four years of supervisory experience in water distribution and sewer maintenance; and a Bachelor's Degree with major coursework in a field related to Civil Engineering (or equivalent knowledge, skill, and mental development).

The Water and Sewer Maintenance Division is budgeted for 47 full-time positions, though several of those positions are not involved with the day-to-day operations and maintenance of the sewer and collection system. Additionally, the GIS Analyst II position is a budgeted position for the Geographical Information Systems (GIS) Division within the Information Technology (IT) Department. Figure 2 shows the 2024 breakdown of positions within the Division.

Figure 2: Water and Sewer Maintenance Division Staff Counts

Budget	2023	2024	2025
Superintendent	1	1	1
Assistant Superintendent	1	1	1
Administrative Secretary	1	1	1
Custodian	1	1	1
GIS Analyst II	1	1	0
Labor Supervisor	4	4	4
Maintenance Worker I	17	17	17
Maintenance Worker II	8	8	8
Maintenance Worker III	11	11	11
Dispatcher	1	1	1
Utility Service Worker	1	1	1
Total Full-time Positions	47	47	46

None of the staff assigned to the Water & Sewer Maintenance (W&S) Division are assigned just to operation and maintenance of the wastewater collection system. Staff is also responsible for maintenance and repair of the water distribution system and response to the City's utility locate requests. Additionally, W&S divisional staff are called upon to help other City Divisions with tasks such as snow removal, emergency tree removal, and clean-up following fish kills. Other City Divisions will assist W&S with a variety of tasks including vehicle maintenance; pavement repair, and maintenance of electromechanical equipment like pumps, stand-by generators, and control systems.

The Water & Sewer Maintenance Division supplements its work force through contracted services and several inter-governmental agreements with FMWRD. Contracted services include: flow monitoring, preparation of the City's Discharge Monitoring Reports (DMRs), GIS data input, sewer and manhole replacement and rehabilitation, sewer cleaning and televising, landscape restoration, and pavement restoration. The inter-governmental agreements with FMWRD provide staff for maintenance of the CSO Treatment Facility (CSO 027) and on-call services for sewer investigation and rehabilitation.

The Water & Sewer Maintenance Division operates in two shifts throughout most of the year but moves to three shifts during the winter to account for snow and ice operations. The shift hours are as follows:

Regular Shift Hours

- First shift 7:00 am to 3:30 pm Monday through Friday
- Second shift 3:00 pm to 11:30 pm Monday through Friday
- Weekday Standby Duty 11:30 pm to 7:00 am Monday through Friday
- Saturday Standby Duty 12:00 am Saturday to 12:00 am Sunday
- Sunday Standby Duty 12:00 am Sunday to 12:00 am Monday

Winter Shift Hours

- First shift 7:00 am to 3:30 pm Monday through Friday
- Second shift 3:00 pm to 11:30 pm Monday through Friday
- Third shift 11:00 pm to 7:30 am Sunday through Thursday

Winter shift hours generally run between Thanksgiving and early March but the actual start and end dates are determined based on the weather.

Internal Communication

Internal communication is critical between all levels of the Water & Sewer Maintenance Division due to the number of people involved in day-to-day operations. This communication involves top-down, bottom-up, and lateral exchange of information among staff.

Daily responsibilities and priorities are communicated from management to staff using the Daily Work Schedule. The Daily Work Schedule is developed on weekday afternoons by the Assistant Superintendent with input from the Labor Supervisors. It is reviewed by the Superintendent and then distributed to staff at the start of each weekday morning shift. General information from management is posted for all employees to see on a bulletin board in the Water & Sewer Maintenance Facility.

Labor Supervisors meet with the Superintendent and Assistant Superintendent daily. The Safety Committee provides maintenance workers the opportunity to discuss safety concerns with management. Maintenance workers are also encouraged to submit written suggestions to improve operations using a suggestion box.

The nature of the Labor Supervisors' work requires frequent collaboration. They work together closely and regularly fill in for one another. Maintenance workers are cross-trained and rotated into and out of crews periodically, which promotes lateral communication among the staff.

Training

Training is necessary to ensure the effectiveness and safety of the Water & Sewer Maintenance Division's operations. Safety training is typically provided by video or on-site by industry professionals according to the schedule shown in Figure 3. Attendance at each safety training session is documented with a sign-in sheet that is kept in a binder. Safety Data Sheets containing instructions about the proper use and storage of chemicals are available at the Water & Sewer Maintenance Facility near the time clock and the tool cage.

Figure 3: Safety Training Schedule for Water & Sewer Maintenance Division

Topic	Employees	Recurrence
Construction Safety, Workplace Safety, OSHA Compliance, etc.	All	Twice Monthly (1st and 3rd Tuesdays)
Confined Space	All	Every Year
Trench Excavation Safety	All	Every Year
CPR	All	Once Every Two Years

When the Water & Sewer Maintenance Division acquires new equipment all training necessary for operation of the equipment is provided by the manufacturer or the supplier.

Utility locator training is provided to new hires and may be repeated as a refresher course for all staff, as necessary. Maintenance Worker IIs receive backhoe training if they desire to move up to a Maintenance Worker III position.

Figure 4: Training for Water and Sewer Maintenance Division

The Division's experienced employees provide hands-on training for W&S staff on specific divisional duties. Hands-on training includes, but is not limited to: routine pipeline maintenance, repair, and replacement; forklift training; lift station inspection and maintenance; record keeping; emergency response procedures; and traffic control procedures. Hands-on training is built into the organizational structure of the Division because maintenance workers must master new skills in order to move up on the Organizational Chart.

Budget

The Water & Sewer Maintenance Division's services are funded by the City's Water & Sewer Fund, known as Fund 510. The Water & Sewer Fund is an enterprise fund where the City collects fees from users and those fees must only be used to fund operations of the enterprise activity. The balance in the Water & Sewer Fund varies from year to year based on the number of users, the amount of water used, the rates charged, and the City's costs for labor, equipment, materials, and contracted services. Figure 4 shows the annual budget for Fund 510. Note that Fund 510 includes budgets from Water & Sewer Maintenance, Water Production, Engineering, and ancillary City services such as information technology.

Figure 5 shows the budget summary for the Water & Sewer Maintenance Division, excluding other City Divisions. However, as mentioned previously, the W&S budget will contain costs performed for other City Divisions and exclude work conducted by other City Divisions.

Figure 5: Water and Sewer Fund - Fund 510 - Budgeted Amounts

Budget	Annual Budget
2022 - Actual	$ 50,914,741
2023 Estimated Actual	$ 45,671,026
2023 Original	$ 44,163,950
2023 Amended Budget	$ 44,163,950
2024 Budget	$ 50,491,500

Figure 6: Water and Sewer Maintenance Division Budget Summary

Expenditures	2023 Actual	2024 Budget	2025 Budget
Salary & Benefits	$ 5,680,902	$ 5,774,930	$ 5,991,085
Other Non-Capital	$ 5,592,437	$ 7,673,982	$ 8,189,963
Capital	$ 8,240,491	$ 15,930,200	$ 6,300,000
Total	$ 19,513,830	$ 29,379,112	$ 20,481,048

Water and Sewer's budget summary includes routine maintenance as well as small repairs and emergency repairs. Larger projects that are not urgent are incorporated into the Capital Improvement Plan, which is updated annually. Sewers are typically televised one year or more in advance of a road resurfacing project. Television inspection of the sewers reveals locations where repair or replacement is necessary. If the repair or replacement requires excavation within the roadway, the project is scheduled in advance of the road resurfacing. If the sewer can be repaired without excavation, or if the excavation is outside the limits of the roadway, the project is scheduled without regard to the road resurfacing schedule.

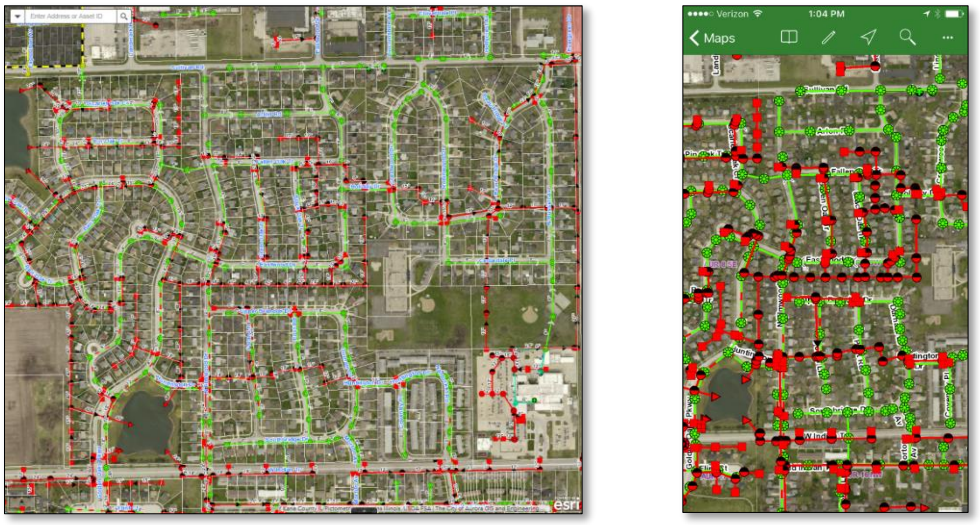
The City of Aurora procures equipment, materials, and contracted services using purchase orders. Once a vendor completes the City's Vendor Application, a purchase order can be requisitioned by identifying the vendor and the budget account to which the expenditure will be charged. Expenditures of more

than $5,000 require multiple quotes. Expenditures of more than $50,000 also require approval by the City Council.

Information Systems

The City's sanitary sewer system and combined sewer system have been mapped in GIS, along with the FMWRD's interceptor sewers. Over time, basic mapping data such as manhole location and pipe size are being enhanced with invert elevations, links to sewer inspection videos, and links to record drawings. GIS mapping is accessible in the office for all staff and in the field for Water & Sewer Maintenance Division employees that have been assigned mobile devices. These mobile devices are increasingly being used to track the Division's maintenance activities in GIS. Additionally, the City aims to better track asset maintenance activities through an asset management software platform within the coming years.

Figure 7: GIS Mapping



The City's GIS mapping is updated continuously using as-built plans from new development projects and capital improvement projects, or with mark-ups provided by Water & Sewer Maintenance Division or Engineer Division staff. Paper atlas books are printed periodically from the GIS data. These hard copies can be used when the digital maps are not accessible during GIS server maintenance or during emergencies.

Customer Service

To provide customers with a high level of service, the Water & Sewer Maintenance Division responds to service requests quickly and professionally. City representatives are also expected to interact with customers politely.

Service requests come to the Water & Sewer Maintenance Division in several ways: phone calls directly to the Water & Sewer Maintenance Division, phone calls referred by another City department, e-mail messages, or from tasks assigned by the City's 311 (i.e., customer service) staff. Regardless of their format, service requests are typically received by the Dispatcher who determines the area of the City to which the request should be assigned. The W&S Division splits the City into three work zones: West Aurora, East Aurora, and Fox Valley. The Dispatcher then forwards the request to a maintenance worker

assigned to that area. The maintenance worker typically responds by visiting the site that day or the following day. If the maintenance worker is unable to resolve the service request at that time, the Labor Supervisor is notified and a maintenance crew is scheduled to resolve the service request. Maintenance workers arrive at a site in a vehicle marked with the City logo while wearing a City identification badge.

While the maintenance worker can only offer to address issues for which the City is responsible, the W&S Division expects maintenance workers to:

- Listen carefully to customers,
- Be knowledgeable about what the City can and cannot do for its customers, and
- Demonstrate an understanding of the customer's situation.

In some cases, the service request was made by a customer trying to deal with a significant, unplanned expense. Furthermore, and particularly in the case of sewer back-ups, the customer may have significant damage to personal property. Therefore, the maintenance worker should be prepared for the customer to be under stress.

Collection System Operation

Service Area

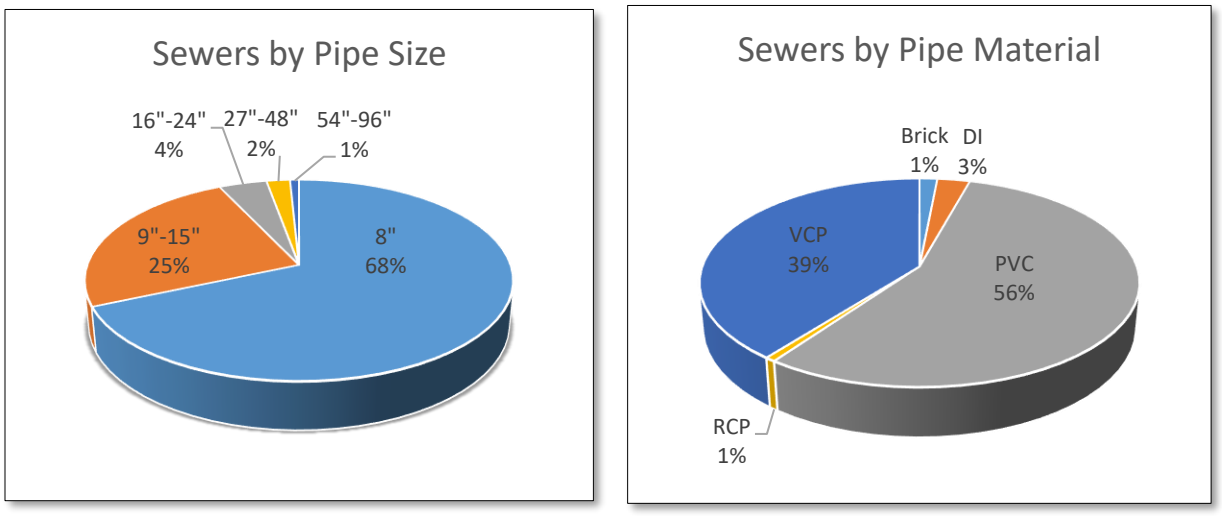
There are approximately 49,000 active services connected to the City's collection system. 94% those are residential services and 99% are within the City limits.

The City's collection system is roughly 500 miles in length, including 12,500 manholes, 4 sanitary lift stations, and 1.5 miles of force main. The collection system spreads out over 46 square miles and is divided into more than 50 sewer basins. Sewer basins are distinguished by an individual connection to one of the interceptor sewers. These basins are shown on the Sewer Basin Map in Appendix 1.

Figure 7 illustrates how the pipe sizes vary for the gravity sewers within the collection system. Pipe sizes smaller than 8 inches, elliptical pipes, and pipes of unknown size are not represented in the figure, but each of these categories comprises 1% or less of the gravity sewers. Force mains range in size between 4 inches and 10 inches, with nearly half the force main being 6 inches in diameter.

Figure *8* illustrates how the pipe material varies for the gravity sewers within the collection system, where the pipe material has been documented. It should be noted, however, that the pipe material has only been documented for 34% of the collection system.

Figure 8: Gravity Sewers by Pipe Size and Pipe Material



The combined sewer system is a subset of the collection system covering nearly 11 square miles. It includes 157 miles of sewer and one of the City's lift stations. There are 16 Combined Sewer Outfalls (CSOs) within the City limits. The locations of these overflows and the limits of the combined sewer area are shown on the CSO Basin Map in Appendix 2.

Responsibility for the collection system is shared between the FMWRD, the City, and private property owners. The Original Combined Sewer Interceptor and sanitary sewers 15 inches and larger are owned by FMWRD. The City owns sanitary sewers smaller than 15 inches and all other combined sewers, regardless of their size. Private property owners are responsible for the sewer service connecting an individual building to a sewer main.

Wastewater from the collection system is treated at the Fox Metro Wastewater Treatment Plant located 2 miles south of the City limits at 682 State Route 31 in Oswego. The plant is owned and operated by FMWRD.

New Development and Redevelopment

The construction of every new public sanitary sewer and every new private sewer service involves oversight by the City and FMWRD through a multi-phase process. When a new sewer service expects to service more than 1,500 gallons of wastewater per day, then the City also includes the IEPA.

Proposed construction plans must meet the Standard Specifications for Water & Sewer Main Construction in Illinois, the FMWRD Sewer Use Ordinance No. 859, and the City's Engineering Standards as defined by City Ordinance. Permits are issued after the proposed construction plans have been reviewed and approved by each government agency. FMWRD's Manhole/Sewer Pipe Materials and Installation Specifications, which applies throughout the City, is included as Appendix 3, but some of the more pertinent specifications are summarized below.

- New pipe and fittings must be PVC. The minimum pipe thickness varies with the depth of cover.
- Minimum pipe diameter is 8 inches for new sewer mains and 6 inches for new sewer services.
- Maximum distance between new manholes is 400 feet.

- Service connections to new mains must be made with a tee or wye at a 45-degree angle.
- Service connections to an existing main (10 inches or larger) must be made using an Inserta Tee.

During construction, the City inspects the installation of new sewer mains and FMWRD inspects the installation of new services. Prior to accepting a new sewer main the sewer must pass pressure and deflection tests. The manholes must pass a vacuum test. Reports from these tests are filed with both the City and FMWRD. After passing these tests, the new sewer is televised, record drawings are prepared, and GIS mapping is updated. Then the new sewer is finally accepted via a City Council resolution.

Level of Service

The City's Water & Sewer Maintenance Division has established operational procedures to provide customers with a high level of service. These operational procedures are intended to:

- Prevent overflows from sanitary sewers;
- Prevent dry weather overflows from combined sewers; and
- Respond to customer service requests the same day or the following day.

The City is also working toward the goal of reducing wet weather overflows from combined sewers as part of its CSO LTCP. The City, by IEPA permit, must capture and treat at least 85% of wet weather flow by volume of combined sewage on an annual basis. Currently the City captures and treats between 95-98% of wet weather flow by volume yet continues to make improvements to the sewer infrastructure to reduce total flow into the river and improve quality of service for service customers.

Monitoring the Collection System

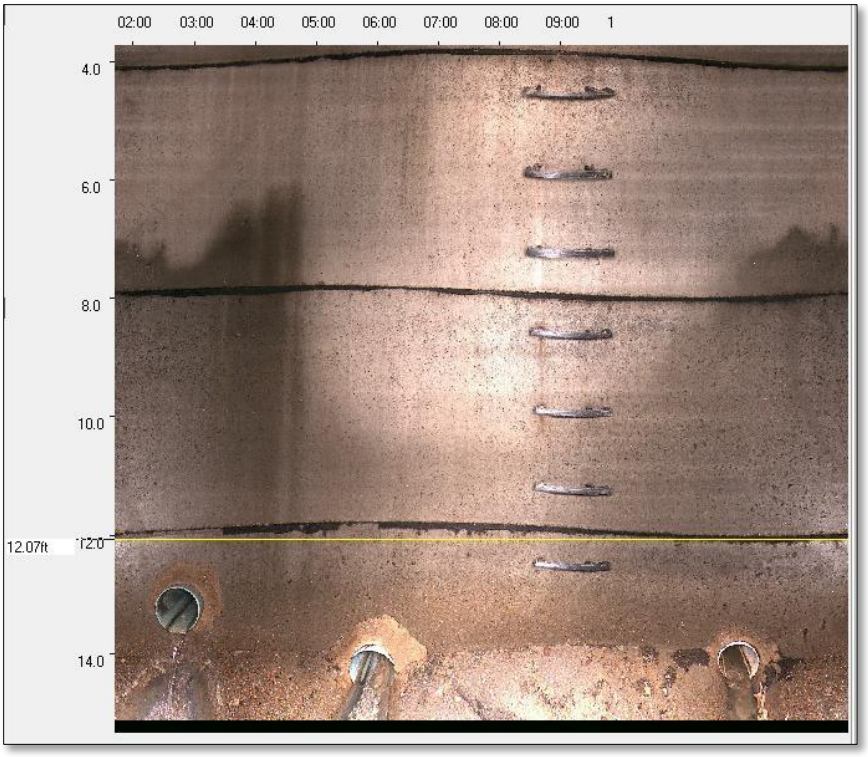
Each year the City cleans and televises the portion of its collection system along roads likely to be resurfaced in the next few years. Manholes in these locations are also inspected. This information allows the City to perform necessary dig repairs before the roads are resurfaced and assures the City is taking steps to proactively monitor the condition of its collection system. In any given year, additional sewers and manholes are likely to be inspected, particularly in areas where an underground infrastructure project is planned or where there is reason to believe sewer maintenance may be needed.

The City typically televises between 5-10% of the total sewer system length and inspects between 500-1000 manholes annually.

Individual television inspection videos are recorded from manhole to manhole. Each video is stamped with the time and date the video was recorded and with the unique identifier assigned to the upstream and downstream manholes. Inspection reports summarize the inspection findings, noting the type and location of service connections, as well as pipe conditions that may warrant maintenance. These conditions may include pipe fractures, offset joints, infiltration, root intrusion, sedimentation, or the build-up of other solids within the pipe. The videos and inspection reports are cataloged for future reference. Over time, the videos and inspection reports are being linked to the City's GIS mapping.

Manholes are inspected visually and using a camera, by both City staff and consultants. The City owns a pole camera that is particularly helpful for inspecting deep manholes, large diameter manholes, and shallow flat-top manholes. 360-degree panoramic manhole images can be obtained through contracted services.

Figure 9: Panoramic Image of a 360-Degree Manhole Inspection



The FMWRD regulates the character of wastewater discharged to the collection system through the administration and enforcement of two ordinances.

- The Industrial Wastewater Pretreatment Ordinance requires a permit to discharge to the collection system. Individual permits are required for Significant Industrial Users and Categorical Industrial Users, whereas General Permits are required for other types of industries. The Ordinance sets prohibitive discharge standards, requires pretreatment to meet those standards, and requires permittees to demonstrate compliance through sampling and reporting according to a prescribed schedule. This Ordinance incorporates the National Categorical Pretreatment Standards and the Illinois Pretreatment Program requirements.

- The Fats, Oils, and Greases (FOG) Ordinance requires Food Service Establishments (FSEs) and Non-FSE FOG Discharges to install appropriate grease removal systems (GRS). The Ordinance includes specifications for GRS sizing and installation. It also prescribes a maintenance schedule, based on the type of GRS. Permittees are required to document cleaning and maintenance of the GRS and keep these records for a minimum of three years. Maintenance records must be submitted to the FMWRD upon request.

Lift stations are inspected every weekday to make sure they are operating normally. The locations of the four sanitary lift stations are listed below.

1. White Eagle, 4100 Palmer Drive
2. Clark Street, 155 Baje Industrial Drive
3. Butterfield East 2550 Frieder Lane
4. Linden Estates, 3112 Moraine Drive

A more detailed or site-specific checklist may be posted inside the lift station, but in general the following tasks are performed as part of a routine lift station inspection.

1. Let Water Production know the inspection is beginning.
2. Turn off the security alarm.
3. Visually inspect the area.
4. Listen and smell for anything unusual.
5. Check the building heater and fan.
6. Inspect the generator.
    a. Visually inspect for leaks.
    b. Check the oil and radiator fluid levels.
    c. Check the battery and water level.
    d. Check the engine block heater.
7. Test the generator.
    a. Start the generator.
    b. Transfer the electric service to the generator by activating the transfer switch.
    c. Perform these checks separately.
8. Check the wet well for excessive rags or grease and clean the screens, if necessary.
9. Log the generator and pump hours. Date and initial the maintenance log.
10. Empty the trash can, sweep the floor, and knock down spider webs.
11. Reset the security alarm.
12. Lock the door and notify Water Production the inspection has concluded.

The log of generator hours is used to determine whether the generator has operated between tests. The log of pump hours indicates whether the dual pumps are running in a normal lead-lag sequence. One pump running notably longer than the other is indicative of a problem with that pump. When an inspection reveals the need for some type of maintenance – e.g., resetting pump controls, removing rags or grease from the wet well, changing the oil, or replacing parts – the Labor Supervisor is notified and a contractor is scheduled to perform the maintenance.

All four of the City's sanitary lift stations are equipped with SCADA, which allows the Water Production Division to monitor the wet well levels remotely 24 hours a day, 7 days a week. When there is a SCADA communications failure at one of the lift stations, a maintenance worker is stationed at the lift station site until communications are restored. During that time, the maintenance worker monitors the wet well level and makes sure the pumps turn on.

14 of the City's 16 CSOs have been fitted with a portable ISCO 2150 Area Velocity meter that continually measures the flow depth at the CSO. Flow is also metered within the CSO Treatment Facility (CSO 027). CSO 016 is the only CSO in the City without a flow meter, though CSO 016 is tributary to a lift station

outfitted with wet well level alarms that indicate when flow is high enough to force an overflow. Data collected by the CSO flow meters is downloaded monthly allowing staff to analyze the frequency and duration of overflows. CSO 001 has the largest tributary area and is the most prone to overflow so it is also visually inspected regularly – from above ground weekly and from within the CSO chamber monthly. The locations of the 16 CSOs are shown on the CSO Basin Map in Appendix 2. Appendix 4 includes detail drawings of each CSO showing the configuration of the overflow and the location of the flow sensor.

The City began a telemetry improvement project in 2024 to replace the measuring devices with newer technology equipped with cellular communication. This allows staff to continuously monitor the overflows and be alerted immediately when an overflow is occurring. The anticipated completion of the project is September 2025.

Additionally, the Fox River Study Group and FMWRD work together to collect monthly samples from the Fox River and Indian Creek – which are the receiving waters for the City's 16 CSOs – to ensure water quality standards set by the IEPA are being met. Collected samples are laboratory tested for various water quality parameters, including CBOD, pH, TSS, NH_3, P, Cl, and fecal coliforms. Samples are collected at the following City of Aurora locations:

- Sullivan Road crossing of the Fox River;
- North Avenue crossing of the Fox River;
- Ashland Avenue crossing of the Fox River;
- IL Route 25 (Broadway) crossing of Indian Creek;
- Ohio Street crossing of Indian Creek;
- Austin Avenue crossing of Indian Creek; and
- Reckinger Road crossing of Indian Creek.

Notification

On or before the 25th day of each month, the City is required to submit a DMR for its 16 CSOs. The DMRs must be submitted by e-mail and digitally.

- Scanned Paper DMRs are prepared on IEPA forms and e-mailed to the IEPA at the address specified in the City's NPDES Permit No. IL0048518. The DMR form for the CSO Treatment Facility (CSO 027) requires water quality data collected by FMWRD during discharges. The required water quality data includes: BOD, pH, TSS, NH_3, P, Cl, fecal coliforms, and total flow. The DMR form for all other CSOs requires the date, duration, estimated discharge hours, and estimated discharge volume for each overflow. The paper DMRs are reviewed and signed by John Hoffmann, P.E., Engineering Coordinator, City of Aurora, 630-256-3244, hoffmannj@aurora.il.us.

- Digital DMRs are submitted using the USEPA's Central Data Exchange (https://cdx.epa.gov/). The digital DMR for the CSO Treatment Facility (CSO 027) requires water quality data collected by FMWRD during discharges. The required water quality data includes: BOD, pH, TSS, NH_3, P, Cl, fecal coliforms, and total flow. Digital DMRs for all other CSOs simply require notification of

the number of overflows during the month. The digital DMRs are submitted by: Brian Katamay, Long Term Control Planning Project Assistant, City of Aurora, 630-256-3205, katamayb@aurora.il.us.

Whenever a SSO or dry weather CSO occurs, the City is required to notify the IEPA regional wastewater staff within 24 hours of the occurrence by telephone, fax, e-mail, or voice mail. Within 5 days of the occurrence, the City is required to submit a written report to the IEPA at:

BOW/CAS – MC #19
1021 N. Grand Ave. E.
P.O. Box 19276
Springfield, IL 62794.

The written report must be prepared on the IEPA's Sanitary Sewer Overflow or Bypass Notification Summary Report form. This form requires the date and time the IEPA was notified, the date and time of the overflow, a description of the circumstances causing the overflow, rainfall data (if applicable), a description of the overflow location, and supporting documents (i.e. cover letter and maps of the overflow locations). The form is signed by Michael Houston, Water and Sewer Maintenance Superintendent, 630-256-3710, houstonm@aurora.il.us. Copies of the report are also e-mailed to:

- Manager, IEPA Des Plaines Office
- Executive Director, FMWRD
- Director of Field Operations, FMWRD
- Director of Public Works, City of Aurora

Emergency Preparedness and Response

Among the City's collection system assets, its four sanitary lift stations are its most critical. Whenever a lift station is not working properly, there is a significant risk of widespread sewer back-ups. Because of this risk, the lift station wet well levels are monitored with SCADA 24 hours a day, 7 days a week by the Water Production division. They are also visually inspected every weekday. Furthermore, each lift station has built-in redundancy in its pumps and power supply.

All four sanitary lift stations consist of two submersible pumps that normally run in a lead and lag sequence. During high flows, transducer level sensors prompt the pumps to run as a pair. Each lift station has a back-up submersible pump on site that can be used to replace a faulty pump. In case of a power outage, each lift station is equipped with a gas-powered back-up generator system that automatically starts when power loss is detected. The City also has a contractor on-call to assist with specialized emergency lift station maintenance.

In certain emergency situations, the circumstances make it necessary to set up a temporary pumping system to bypass a malfunctioning lift station. In such situations, the following equipment is necessary:

- A 6" diesel-driven, trailer-mounted pump;
- A 6" suction hose;
- 6" discharge hoses;
- A 6" adapter to reverse a hose end from male to female;

- A valve key to lift/turn the backflow check valve;
- Rubber gloves; and
- Hammers, screwdrivers, crescent wrenches, chisels, and other miscellaneous tools.

General procedures for bypass pumping are described below. Water & Sewer Maintenance Division staff periodically practice these procedures, so they are ready in an emergency.

1. Make sure the site is safe and bypass pumping is the only feasible option.
2. Silence any alarms and check the available power supply.
3. Back the trailer-mounted pump up to the wet well doors, leaving enough room to connect the suction hose and discharge hose to the pump.
4. Open the wet well doors and safety grates and slide the suction hose into the wet well.
5. Open the check valve vault doors. Remove the flange cap and connect the discharge hose to the flange and pump. Lift the handle on the backflow check valve.
6. Make sure the end of the suction hose is deep enough in the wet well (just below the pipe flowing into the wet well).
7. Disconnect the pump from the truck and secure the jacks.
8. Start the pump at low speed and wait for it to prime. Then adjust the speed for optimal output.
9. Monitor the pump and hoses. Replace any hoses leaking on land. Set up barricades or ramps over the hoses, as needed.

In case of a widespread City emergency where bypass pumping is needed at multiple lift stations simultaneously, the Water & Sewer Maintenance Division will prioritize the lift stations as noted below, based on the largest service area and the highest potential for damage.

1. White Eagle, 4100 Palmer Drive
2. Clark Street, 155 Baje Industrial Drive
3. Butterfield East 2550 Frieder Lane
4. Linden Estates, 3112 Moraine Drive

Collection System Maintenance and Equipment

Planned Maintenance

Planned maintenance of the collection system can prevent damage associated with sewer back-ups. By limiting the number of emergencies, planned maintenance can also reduce the overall cost of maintenance. The basic elements of the City's planned maintenance program for the sewer system are television inspection, sewer jetting, and root control.

Sewers are televised and jetted by crews on three sewer cleaning trucks that rotate through the collection system. Sewer cleaning trucks are typically assigned each day to a quarter section in each of the City's three distinct areas: West Aurora, East Aurora, and the Fox Valley. Sewers in the assigned quarter section are cleaned from manhole to manhole, then televised with a standard sewer camera.

Crews review the video image in the field to verify the cleaning was successful. This process is repeated if additional cleaning is necessary. When a collapsed pipe or other urgent need is identified during this process, the crew notifies a Labor Supervisor immediately. Less urgent maintenance needs, such as minor root intrusion, are scheduled after a Labor Supervisor reviews the video. A crew moves on to a new section once all the sewers in the previous section have been jetted. Sewer jetting dates and data are tracked through GIS.

Each month the Water & Sewer Maintenance Division also televises and jets the sewers listed on their "Problem List of Sewers." Over time, prioritization of capital improvement projects has reduced the number of problem sewers.

Additionally, the W&S Maintenance Division visually checks each CSO diversion structure weekly and performs cleaning duties as needed. Once a month the maintenance team will enter the structures for a more comprehensive visual examination. The Water Production Division's team will check the sanitary lift stations weekly during their own inspection rounds. If a maintenance worker from either division identifies a maintenance need during these routine inspections, the W&S Labor Supervisor is notified, and a maintenance crew is scheduled to perform the necessary maintenance.

Unplanned Maintenance

Unplanned maintenance is typically brought about by a sewer back-up, observation of a surcharged manhole, sinkhole, or due to a structural failure discovered while performing sewer televising. When a sewer back-up has been reported the City's first objective is to determine the cause. The City can determine whether the maintenance responsibility belongs to the City or the private property owner.

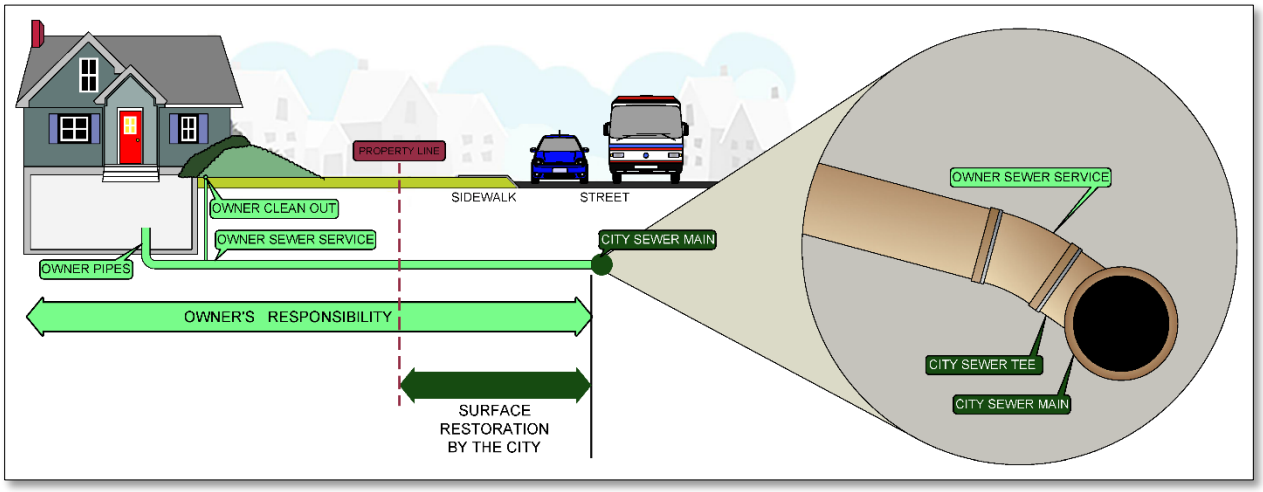
Sewer back-ups are typically caused either by a blockage in the sewer or by too much flow through the sewer. In some cases, both may be the case. Blockages in the sewer might be the result of oil and grease deposits, root intrusion, a collapsed pipe, or a lift station failure. Excess flow might come from pipes connected to the sewer, such as storm drains, downspouts, or foundation drains. It also might come from seepage through leaky joints in the sewer or manholes, known as infiltration into the system.

A maintenance worker typically responds first to a sewer back-up. The maintenance worker checks the nearest manholes downstream and upstream from the sewer back-up to note if the water level in these manholes is elevated. If a high-water mark or a debris line is evident then the problem is likely in the City sewer system. If the water level in these manholes is normal and the sewer back-up remains, the problem is likely in the private sewer service. If the water level in these manholes is normal and the sewer back-up has receded, then additional investigation is needed.

Next, the maintenance worker checks for evidence of a sink hole or recent construction in the area. A sink hole in the vicinity of a sewer back-up is a strong indication of a pipe collapse. Disturbed soil and pavement patching are evidence of recent construction that may have compromised the capacity of the sewer service or the sewer main.

If this investigation is not conclusive then the maintenance worker notifies the Labor Supervisor to schedule a maintenance crew to televise the sewer. The crew will start by televising the City's sewer main. The video may reveal a blockage or the source of excess flow. If the problem is found within the sewer main or at a mainline tee, the City is responsible to correct the problem. If the televising indicates there are no problems with the sewer main, the private property owner is advised to hire a contractor to have their sewer service televised. If the problem is located within the private sewer service, the private property owner is responsible to correct the problem. Figure 10 illustrates the limits of the City's responsibility and private property owner's responsibility.

Figure 10: Sewer Maintenance Responsibility



In the past sewer back-up reports were stored in a database. The City is currently developing a GIS based process for storing sewer back-up data.

Inventory of Parts and Materials

The Water & Sewer Maintenance Division keeps the parts and materials most commonly used for sewer maintenance in stock at the Maintenance Facility (649 South River Street). These items are:

- 4", 6", 8", 10", 12", and 15" non-shear mission couplings (clay-to-plastic and plastic-to-plastic)
- 4", 6", 8", 10", 12", 15", and 18" SDR-26 PVC pipe
- 2", 3", 4", and 6" concrete adjustment rings
- 4", 7", and 9" manhole frames with solid lids
- 4' x 32" manhole sections with bases
- Mastic
- Chimney seals
- Test plugs
- Bricks and mortar
- Hydraulic Cement
- Select granular backfill (CA-6 and CA-7)
- Liquid dye

Figure 11: Inventory of Parts and Materials

When stock items need to be replenished, or when more specialized items are needed, the Water & Sewer Maintenance Division can obtain parts and materials from one of the following local suppliers 24 hours a day, 7 days a week.

- Mid American Water, Inc. – 1500 E. Mountain Street, Aurora, 630-851-4500
- Water Products Company – 3255 E. New York Street, Aurora, 630-898-6100

Labor Supervisors place an order by completing a Material Request Form with Superintendent or Assistant Superintendent approval.

Inventory of Vehicles, Equipment and Tools

The fleet of vehicles and equipment used to maintain the City's collection system includes: backhoes, end loaders, skid steers, dump trucks, crew cabs, sewer cleaning trucks, utility trucks, pumps, air compressors, generators, saws, arrow boards and more. Each vehicle and piece of equipment in the fleet is numbered as shown on the Water & Sewer Maintenance Vehicles and Equipment Inventory in Appendix 5.

Figure 12: Inventory of Vehicles and Equipment

The City's Central Garage tracks vehicle mileage and notifies Water & Sewer Maintenance whenever a vehicle is due for routine maintenance. Any employee that notices a potential maintenance issue with a vehicle or piece of equipment fills out and submits an equipment maintenance request form.

Most maintenance and repairs are performed by the City's Fleet Maintenance Division at Central Garage. One exception is small engine repair, which is performed by contracted services.

Each truck in the Water & Sewer Maintenance Division is assigned a specific set of tools that is stored on the truck in lock boxes. For example, the trucks used to respond to service calls are equipped with manhole hooks, dye tablets, and utility marking paint for general sewer inspection. The sewer manhole rehab truck is equipped with the tools and materials listed below.

- Air compressor
- Generator
- Tripod
- Safety winches
- Harnesses
- Bricks and mortar
- Hydraulic cement
- Barricades
- Work fence
- Personal protective equipment
- Hammers, screwdrivers, wrenches, and other miscellaneous hand tools

Employees can request replacement tools and additional tools can be requested at any time.

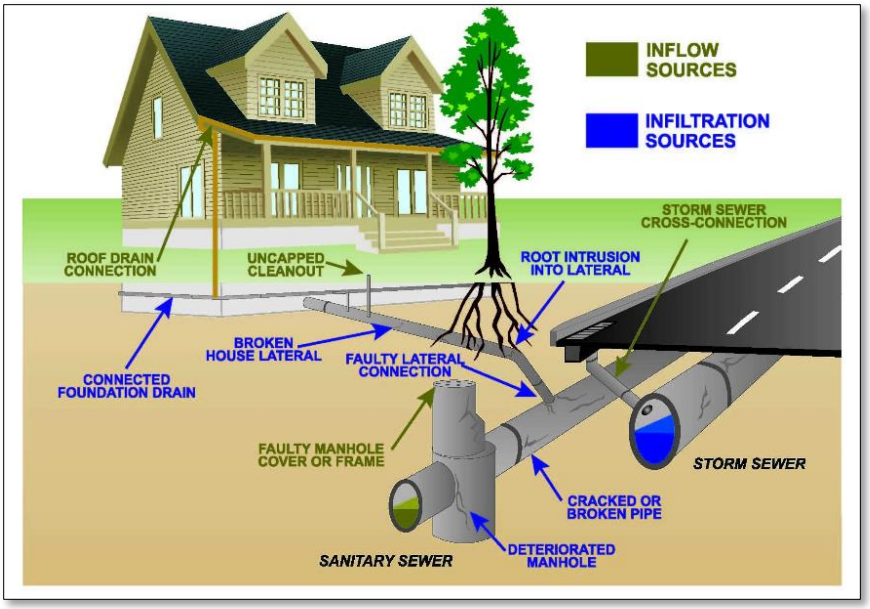
Collection System Capacity Evaluation

Inflow and Infiltration

The base flow in sanitary and combined sewers is wastewater from residential and non-residential buildings. In combined sewers, it is normal for the flow rate to spike in response to a storm, but it signals a problem in sanitary sewers. Stormwater and groundwater can enter a sanitary sewer system from a variety of sources, as illustrated in

Figure 13. Water that flows rapidly into the system and subsides quickly after the storm is considered inflow. Infiltration enters the system slowly through cracks, leaky joints, and other defects. Infiltration may continue long after the storm. Inflow and infiltration (I/I) in a sanitary sewer system are problematic because they can cause sewer overflows and violations of the City's NPDES permits, as well as increase the amount of water needing treatment at FMWRD.

Figure 13: Common Sources of I/I



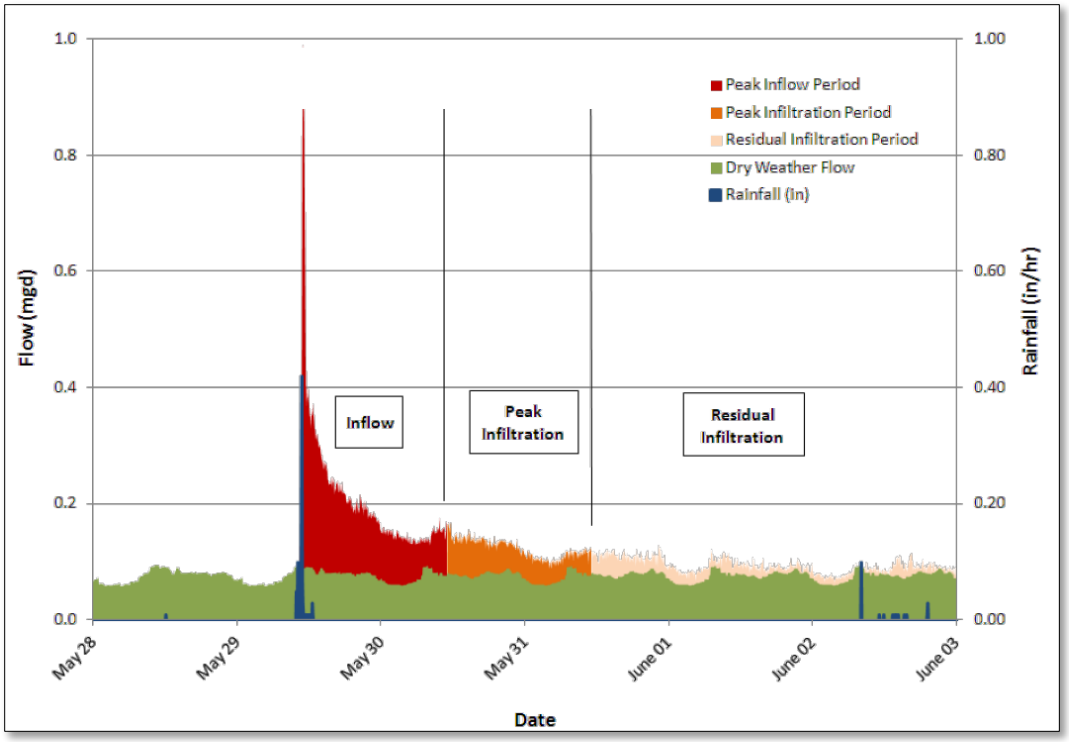
Source: http://www.oregonohio.org/engineering/engineering/inflow-infiltration.html

Flow Monitoring

The City currently uses ISCO 2150 Area Velocity meters with ISCO DuraTracker devices to monitor the flow in its collection system. During development of the City's Long Term Control Plan, and subsequent updates, the City places flow meters throughout the system to monitor regular flow patterns and measure I&I.

Area Velocity flow meters measure the depth and velocity of flow in a pipe over time. The flow rate can then be calculated using the measured depth and velocity, along with the pipe diameter. Figure 14 illustrates how I/I in the collection system becomes evident when comparing flow monitoring data with rainfall data.

Figure 14: Determination of I/I With Flow Monitoring Data



Source: RJN Group - CMOM: Flow Monitoring, SSES and I/I Analysis
APWA Fox Valley CMOM Seminar – May 25, 2016

When the City initiates a SSES to identify sewers with excessive I/I, one of the primary decisions is meter placement. Site selection should be based on the following considerations:

- Major Branches - Meters should be placed near junctions of sizable branches of the collection system. The meters should be installed on all but one branch at a junction. (Flow in the unmetered branch can be calculated by addition or subtraction).

- Data Quality - Meters should be placed in locations with smooth, laminar flow beyond the influence of bends, drops, and lift stations. Turbulent flow creates inaccurate readings due to air entrainment, solids suspension, eddies, among other issues.

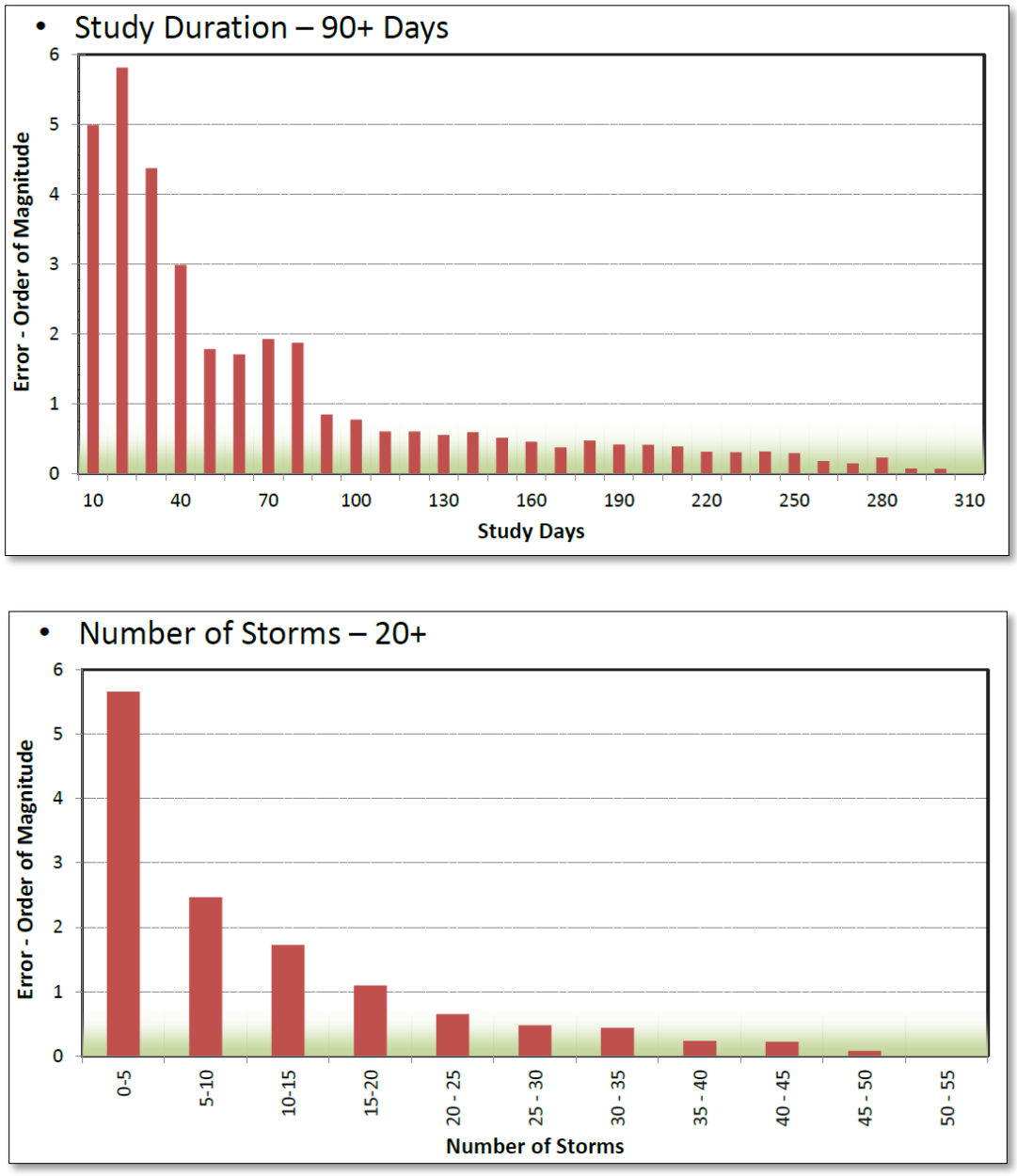
- Meter Accessibility – Ideally, meters will be placed in locations that are easily accessible with a vehicle and that require minimal traffic control.

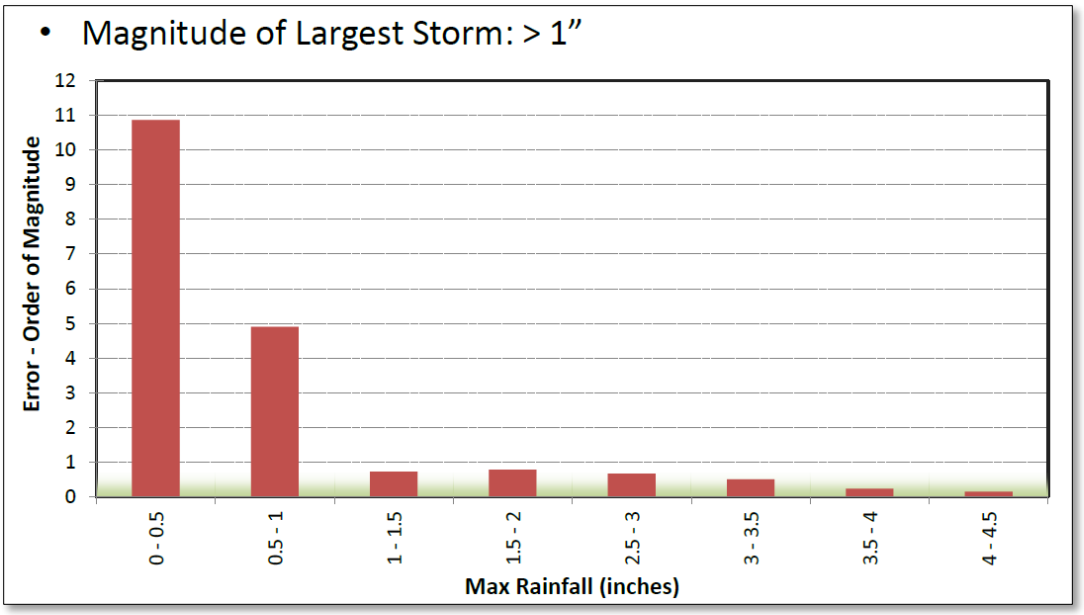
Appendix 6 contains maps showing the placement of meters during two stages of the City's SSES in Basin 48. The initial meter placement helped the City identify a specific neighborhood that was responsible for a significant portion of the I/I in the Basin. After several months and several storm events, the City honed in on specific branches of the sewer system in that neighborhood by moving more meters into the neighborhood from remote locations in the Basin.

Another important decision in a SSES is the length of the monitoring period. Storms vary in their intensity and duration. The I/I observed in a collection system during a short duration, high intensity

storm event may be drastically different from the I/I observed in a longer, less intense storm. Collecting more data from a wider variety of storms will lead to more informed decisions. However, the timing and character of storms is unpredictable. There is no standard length for a SSES monitoring period; determining the appropriate length involves some judgement based on the frequency and intensity of storms throughout the course of a monitoring period. The three charts in Figure 15 provide guidance from the RJN Group on determining the appropriate length of a SSES monitoring period.

Figure 15: SSES Monitoring Period





Source: RJN Group - CMOM: Flow Monitoring, SSES and I/I Analysis
APWA Fox Valley CMOM Seminar – May 25, 2016

Flow meters must be maintained during the monitoring period. The meters should be calibrated in a laboratory before they are installed in the collection system and then re-calibrated within the system at least once every three months. Batteries must be replaced periodically. Any accumulation of debris on the meter can inhibit data collection so cleaning is paramount. When the City undertakes a SSES, a contractor typically installs and maintains the meters. The contractor's scope of services includes: initial meter calibration; downloading the collected data twice per month; and performing the necessary maintenance, such as replacing batteries and cleaning the probes and transducers.

Manhole Monitoring

In some cases, visual manhole inspections can provide useful information about I/I and the capacity of the collection system. During and shortly after storm events, sources of I/I might be plainly visible in manholes. The joints just below the frame and at the base of the manhole are likely sources, plus any visible cracks.

I/I sources may be inundated when flows are high, but valuable information can still be collected in these conditions. If the water surface is higher than the crown of the pipe, the pipe is considered surcharged. Surcharged pipes within a localized area indicate a blockage or bottleneck in the system if the pipes in the wider basin area are not also surcharged. When surcharged pipes are found it is useful to document the time and the measured distance from the manhole rim to the water surface. Tracking that measurement over time indicates whether flow through the manhole is stable, increasing, or decreasing. If a surcharged pipe results in basement back-ups, the measured distances over time can be used to estimate the critical elevation at which basement back-ups begin and end.

The City owns an ADS ECHO Level Monitor that records the depth of water in a manhole over time and provides text and e-mail notifications when the depth reaches critical elevations. This level monitor can

be installed in a manhole and later moved to another manhole. The critical elevations should be re-programmed at each location based on site specific considerations.

Smoke and Dyed Water Testing

Smoke testing and dyed water testing are two additional tools that can be used to find sources of I/I in a collection system. Smoke testing is best suited for detecting: downspout connections; cross-connections between storm drains and sanitary sewers; and other point sources of inflow. Dyed water testing is used to confirm a suspected source of I/I.

Smoke testing involves plugging both ends of the sewer test section with sandbags inside a manhole. Test sections should generally be 400 feet or less. Smoke can be introduced into the test section using smoke candles or liquid smoke. The City's operational procedures dictate that smoke should be pushed into the sewer using two high-capacity blowers. If properly connected to the sanitary sewer system, smoke should exit the vent stacks of surrounding properties. If smoke exits at any other location then that location is a source of I/I. Photographs should be used to document evidence of I/I, as shown in Figure 16. Smoke testing should only be performed during daylight hours and works best in dry weather with little wind.

It can be alarming to the public to see smoke pouring out of the collection system, so public notification is important prior to the start of a test. The W&S Maintenance Division typically leaves door hangers at every address adjacent to a test area 24 hours before testing and provides daily updates when the testing lasts more than one day. Daily notifications are also provided to the Police Department, Fire Department, and the Customer Service Call Center.

Figure 16: Evidence of I/I Sources

Source: RJN Group - CMOM: Flow Monitoring, SSES and I/I Analysis
APWA Fox Valley CMOM Seminar – May 25, 2016

The City uses a concentrated liquid dye for its dyed water testing. After identifying a suspect sewer or manhole, the nearby ground surface should be flooded, and the dye should be applied to the flooded area. I/I is confirmed in the suspect sewer or manhole when the dyed water is observed in the collection system, as shown in the right image in Figure 16.

Building Inspections

Finding sump pumps and foundation drains that are illegally connected to the sanitary sewer system typically requires plumbing inspections inside buildings. This is a labor-intensive endeavor and usually includes scheduling appointments on evenings and weekends if contact with 100% of the residents in the area is necessary. When an inspector finds a suspicious connection to the sanitary service, a dyed water test can be used to confirm the illegal connection, as shown in Figure 17.

Figure 17: Illegal Sump Pump Connection to a Sewer Service

Source: RJN Group - CMOM: Flow Monitoring, SSES and I/I Analysis
APWA Fox Valley CMOM Seminar – May 25, 2016

Modeling

A hydraulic model of the collection system can be used to evaluate the collection system's capacity, as well as the effectiveness of potential sewer rehabilitation alternatives. As part of its CSO LTCP, the City hired a consultant to build a hydraulic model of its combined sewer system using XP-SWMM software. Model input data included dry weather wastewater flows, manhole rim and invert elevations, pipe sizes and materials, land use data, soil data, and rain data. The model was calibrated with flow monitoring data for dry weather and wet weather conditions. Finally, potential improvements were modeled to determine a series of projects that would reduce CSOs. These improvements included sewer separation projects, construction of storage facilities, and green infrastructure projects.

Assessment of the Collection System Capacity

With very few exceptions, the City's sanitary sewer system was planned, designed, and constructed with enough capacity to avoid overflows and sewer back-ups. Master planning for the sanitary sewer system began in the 1950's and led to sewers installed low enough to minimize the number of lift stations. The sewers were sized based on a conservative estimate of future land use densities. To maximize capacity in the combined sewer system, sanitary bypass sewers were constructed to route wastewater flow from separate sewer areas around the combined sewer system. Nearly all the overflows and sewer back-ups in the separate sanitary sewer system occur because of pipe failure or an obstruction in the sewer. Whenever excessive I/I results in SSOs or back-ups, the City initiates a SSES and makes any necessary improvements.

The City's original CSO LTCP was submitted in 2010 and was approved by the IEPA in 2015. The City revised its original LTCP plan per permit requirements in 2024. However, the City expects that on a system-wide annual average basis, the combined sewer system captures and treats at least 85% (by volume) of the combined sewage.

Collection System Rehabilitation

Alternative Approaches

As the elements of a collection system age, infrastructure may need more than routine maintenance. Rehabilitation may be necessary to restore structural integrity, control excessive I/I, or increase system capacity. Rehabilitation alternatives can generally be divided into two categories: trenchless and open cut. Trenchless alternatives repair existing sewers and manholes without excavation. Open cut alternatives require excavation so the existing infrastructure can be replaced or repaired. Typical rehabilitation alternatives are described below.

Trenchless Alternatives

- Full Length CIPP Lining – A flexible tube saturated with resin is inverted into the original pipe from manhole to manhole and then expanded to fit tightly against the original pipe. The resin is cured by steam pressure to form a continuous pipe liner inside the original pipe. Service connections are restored from inside the lined pipe using a self-propelled robotic cutting device with a television camera.

Figure 18: Cured-in-Place Pipe Liner Installation

Source: http://visu-sewer.com

- Sectional CIPP Lining – A resin-saturated tube is placed inside a protective launching device, winched through the sewer pipe, and robotically positioned at the defective section. The end of the launching device is then opened, and the resin-saturated tube is inverted and expanded to fit tightly against the original pipe using controlled air pressure. Once the resin has cured, the inversion bladder and launching device are removed from the pipe.

- CIPP T-Liner – A resin-saturated liner is loaded onto a protective launching device, winched through the sewer pipe, and robotically positioned at the service lateral connection. The liner is designed to fit tightly against a section of the service lateral and the circumference of the sewer

main in a continuous, single piece. A mainline bladder is inflated to press the liner against the mainline pipe using controlled air pressure. Then the lateral tube is inverted into the lateral pipe using an inversion bladder. Once the resin has cured, the bladders and launching device are removed from the pipe.

- Pressure Test and Grout – A joint sealing packer is robotically positioned at the pipe joint. Then the end elements of the packer are expanded using controlled air pressure to form a tight seal against the inside wall of the pipe, completely isolating the joint from the remainder of the pipe. Chemical sealant is pumped through a hose into this isolated area at a pressure exceeding the groundwater pressure. A pressure test is used to confirm the sealed joint can maintain a minimum pressure for a set period.

- Manhole Joint Sealing – Holes are drilled through the manhole wall at each point of leakage. Grout ports are then placed in these drilled holes, creating a watertight seal between the manhole and each port. A chemical sealant is pumped into each port through a hose until material refusal or until a predetermined quantity has been injected. Once the injection is complete, the ports are removed, and the remaining holes are filled with mortar. This procedure is used for pre-cast manholes and masonry manholes alike, except when there are numerous leaks in a masonry manhole. In that case, two coats of cementitious waterproof lining are applied before pumping the chemical sealant.

- Manhole Lining - A monolithic cementitious liner is sprayed onto the walls, chimney, and bench of the manhole.

Figure 19: Monolithic Cementitious Manhole Liner

Source: http://trenchlesstechnology.com

Open Cut Alternatives

- Manhole-to-Manhole Replacement - The existing sewer is completely removed and replaced between two manholes.

- Dig Repairs – A section of the existing sewer is completely removed and replaced.

- Chimney Rehabilitation – The existing masonry between the top of the corbel and the bottom of the frame is removed. New concrete adjusting rings are set in a butyl rope and external seals are applied to all exposed chimney components.

Depending on the site-specific circumstances surrounding a rehabilitation project, some of the alternatives listed above may not be appropriate. For example, a CIPP liner should not be used to rehabilitate a collapsed pipe. Within the range of appropriate options for a given application, the selection of one alternative over another may be based on a number of factors, such as cost, durability, and disruption to the work area.

Back-up Prevention Assistance Program

The City encourages residents that have experienced one or more sewer back-ups to install sewer back-up protection by offering residents a 50% rebate on the cost of the project up to a maximum City cost of $5,000. A document describing the application process and the types of projects eligible for the rebate is included in Appendix 7.

Asset Management

The City's sanitary sewer system and combined sewer system have been mapped in GIS. This mapping forms a digital inventory of the City's collection system assets. The size of the collection system has grown from approximately 50 miles in 1905 to its current size of nearly 500 miles. Figure 20 shows how Aurora's population has grown through the years and provides an estimate of the size of the City's collection system, assuming the collection system grew at nearly the same rate as the population.

Figure 20: Aurora's Population and Estimated Collection System Size

Year	Aurora Population	Aurora Sewer (mi)
1905	26,974	50
1910	29,800	57
1920	36,300	74
1930	46,589	101
1940	47,200	102
1950	50,600	111
1960	63,715	145
1970	74,200	172
1980	81,293	190
1990	99,581	237
2000	142,990	349
2010	197,899	491
2020	180,542	499

Due in part to the fact that portions of its collection system were built over 100 years ago, the City regularly monitors the condition of its collection system assets. Each year the City cleans and televises the portion of its collection system along roads likely to be resurfaced in the next few years. Manholes in these locations are also inspected. Many of the City's oldest sewers have held up well over the years. Some have been replaced, but those that are still in service are in good working condition.

Among the City's collection system assets, lift stations are its most critical. Whenever a lift station is not working properly, there is a significant risk of widespread sewer back-ups. Because of this risk, the lift station wet well levels are monitored with SCADA 24 hours a day, 7 days a week. They are also visually inspected every weekday.

Collection system rehabilitation is funded by the City's Water & Sewer Fund. Since the Water & Sewer Fund is an enterprise fund, the City collects fees from users and those fees must only be used to fund operations of the enterprise activity. Fees are adjusted periodically to account for inflation and projected needs.

System Evaluation

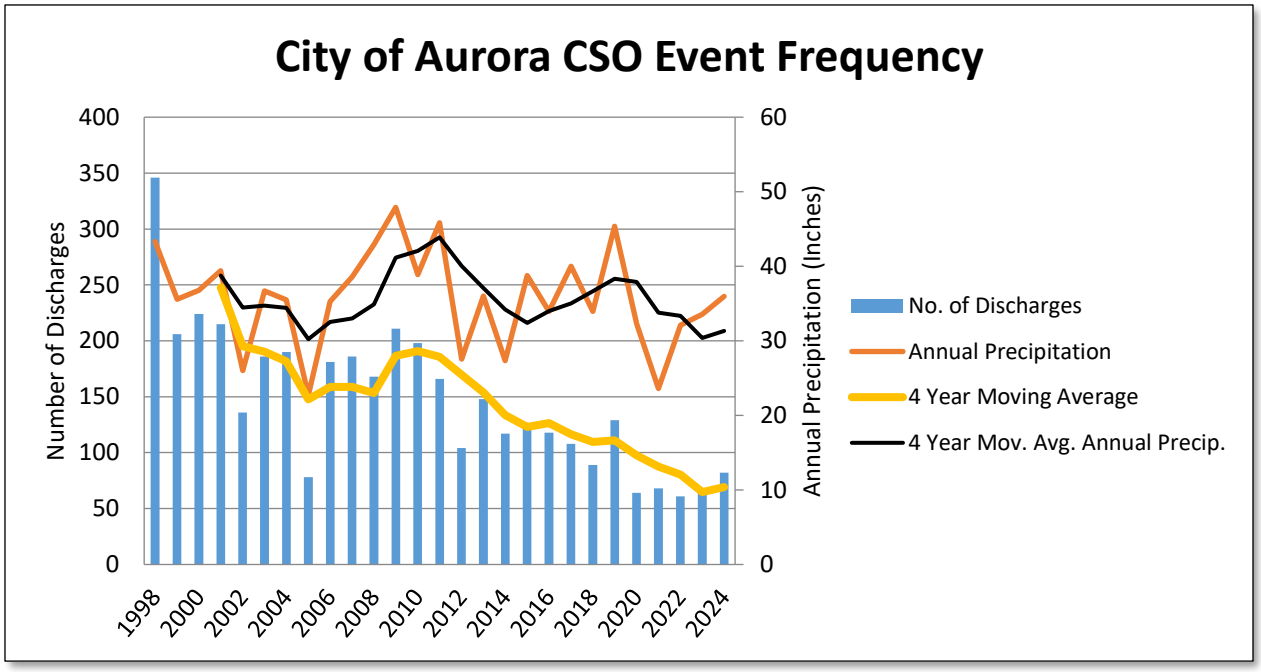
The number and nature of collection system overflows is an important measure of the effectiveness of the City's efforts to manage, operate, and maintain the collection system. The Water & Sewer Maintenance Division proactively maintains the collection system to limit the number of overflows, but the system is nearly 500 miles in length so some unplanned maintenance can be expected. Figure 21 shows the number of SSOs identified since 2017 along with their cause and solution/fix. Several of those SSOs were addressed immediately by cleaning the sewer and distributing FOG Info-pamphlets to residents. Other SSOs witnessed during the time period were caused by excessive I/I. To address the excessive I/I an SSES was performed which resulted in 6,400 feet of sewer lining and the construction of a 650-foot relief sewer to resolve a bottleneck in the collection system.

Figure 21: SSO History

Year	Total	Causes	Solution
2018	1	Wet weather	Installed 650 LF of relief sewer
2019	1	Grease build up	Removed blockage, distributed FOG information
2020	1	Grease build up	Remove blockage, distributed FOG information
2021	2	Grease build up (1 instance) Blockage (1 instance)	Remove blockage, distributed FOG information
2022	3	Grease build up (1 instance) Roots (1 instance) Blockage (1 instance)	Remove blockage, cleaned sewer
2023	3	Roots (1 instance) Grease (1 instance) Rags/Blockage (1 instance)	Remove blockage, distributed FOG information
2024	6	Grease buildup (2 instances) Roots (1 instance) Blockage (2 instance) Broken Sewer (1 instance)	Removed blockage, distributed FOG information, performed spot repair

The City is working toward the goal of reducing wet weather overflows from combined sewers as part of its CSO LTCP. The City began implementing its LTCP prior to its official approval and construction has continued steadily since then. The projects are scheduled to be completed by December 31, 2030, but Figure 22 demonstrates the progress that has already been made. 1983 was a wet weather year prior to the City starting implementation of its LTCP.

Figure 22: Number of Overflow Events by Year



APPENDIX 1

Sewer Basin Map


Centerlines
Paths
Railroads
Fox River
City of Aurora
05OR Sewer Basin ID
Sewer Basin Map
DRAFT
INFORMATION TECHNOLOGY DIVISION - AURORA, ILLINOIS
The information and/or data on this map depicts/illustrates generalized roadways and circulation and their relationships and is not intended to reflect precise dimensions, and or distances of individual roads, and/or exact road alignments and right of ways.
The map and data on this map is intended for informational purposes only.
Printed Jan. 10, 2018

APPENDIX 2

CSO Basin Map

CSO Basin Map

DRAFT

INFORMATION TECHNOLOGY DIVISION - AURORA, ILLINOIS

The information and/or data on this map depicts/illustrates generalized roadways and circulation and their relationships and is not intended to reflect precise dimensions, and or distances of individual roads, and/or exact road alignments and right of ways.
The map and data on this map is intended for informational purposes only.

Printed Feb. 14, 2018

APPENDIX 3

FMWRD Manhole/Sewer Pipe Materials and Installation Specifications

Fox Metro
Water Reclamation District
1135 South Lake Street • Montgomery, Illinois 60538
Engineering Inquiries (630) 301-6882
Inspections (630) 301-6811 • FAX (630) 897-6094

Rev: 10/10/17

FOX METRO WATER RECLAMATION DISTRICT
MANHOLE / SEWER PIPE MATERIALS AND INSTALLATION SPECIFICATIONS MATERIALS

1. PIPE & FITTINGS

Pipe and fittings used in sanitary sewer construction shall be polyvinyl chloride (PVC) pipe. PVC pipe and fittings dated over one-year-old shall not be permitted for use. **No solvent-welded joints shall be allowed outside of the foundation wall of any building**.

The types of PVC pipe and fittings that shall be used in the District include:

- Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings (ASTM – SDR series), conforming to ASTM Numbers D-1784 (cell classification), D-3034, D-3212 (joint spec), and F-477 (gaskets).

- Poly Vinyl Chloride (PVC) Pressure Rated Pipe and Fittings (ASTM - SDR series), conforming to ASTM Numbers D-1784 (cell classification), D-2241, D-3139 (joint spec), and F-477 (gaskets).

- Poly Vinyl Chloride (PVC) Pressure Rated Pipe and Fittings (AWWA DR-series) conforming to AWWA C-900, AWWA C-905, and ASTM Numbers D-1784 (cell classification), D-3139 (joint spec), F-477 & F-913 (gaskets).

All PVC plastic pipe and fittings shall have a cell classification of 12454 as defined in ASTM D-1784 and shall have minimum pipe stiffness as shown below in Table 1. The required Standard Dimension Ratio (SDR) or Dimension Ratio (DR) for PVC pipe and fittings shall be selected based upon the depth of cover, as also shown in the table below:

Depth of Cover	Pipe Diameter	Minimum Thickness	National Standard	Minimum Pipe Stiffness
3.5' - <15'	6" - 12"	SDR 26	ASTM D-3034	115
3.5' - <20'	6" - 12"	SDR 21	ASTM D-2241	224
3.5' - <30'	6" - 12"	DR-18	AWWA C-900	364
3.5' - <30'	14"	DR-18	AWWA C-905	364

Fittings in sizes through twelve (12) inches shall have elastomeric joints and minimum socket depths as specified in each respective section. Fittings above twelve (12) inches shall be molded or fabricated with elastomeric joints in accordance with ASTM standards D-1784 and D-3139 incorporating the manufacturer's standard pipe bells and gaskets. Gaskets shall conform to ASTM F-477 and ASTM F-913.

The District reserves the right to approve/reject all pipe and fittings on a case-by-case basis.

2. BEDDING, HAUNCHING, AND INITIAL BACKFILL

Bedding material shall be CA-7 Class 1A, as outlined in ASTM D-2321 and shall be certified by the manufacturer and approved by the District prior to installation, to have the following characteristics:

- Description: Shall be crushed stone or crushed gravel, as produced ~~from crushing~~ by mechanical means.
- Gradation: Shall meet the IDOT gradation of CA-7, Class 1A.
- Plasticity Index: Shall meet a plasticity index of 0 to 4 percent as determined by the method given in AASHTO T 90.
- Specific Gravity: Shall have a specific gravity (dry) of greater than 2.45.

LABORATORY TEST

The District reserves the right to require a contractor to submit certified copies of all reports of tests conducted by an independent laboratory before installation of PVC plastic pipe. Tests shall be conducted in accordance with Standard Method of Test for "External Loading Properties of Plastic Pipe by Parallel-Plate Loading" per ASTM D2412.

PIPE INSTALLATION AND FIELD TESTING

1. INSTALLATION

If the invert of any overhead sewer exceeds two (2) feet above the footing, plate compaction of the CA-7 Class 1A aggregate shall be required in twelve (12) inch lifts.

Trench widths should be stable or supported, provide a width sufficient, but no greater than necessary to ensure working room to properly and safely place haunching and other embedment materials. The minimum trench width shall be 32" plus the outside diameter of the pipe and the maximum trench width shall be 48" plus the outside diameter of the pipe.

Pipe size shall be a minimum of eight (8) inches for public sewers and six (6) inches for building sewers.

Pipes shall be laid in a manner which provides uniform support over the entire length. No blocking of any kind shall be used to adjust the pipe to grade except when embedment concrete is used. Bedding shall be a minimum of six (6) inches in depth. The bedding material shall be placed and worked in around pipe by hand to provide uniform support, then around and over the crown of the pipe by a minimum of twelve (12) inches. The granular embedment material shall be placed and consolidated along the full width of the trench. The contractor shall be required to install the pipe in such a manner that the diametric deflection of the pipe shall not exceed five (5) percent.

PVC transition fittings shall be used in all new construction when joining PVC pipes of different outside dimensions.

Service connections to new mains shall be with a tee/wye fitting with a six (6) inch branch and shall connect to the main at a (max.) forty-five (45) degree angle. Where no tee/wye exists, an Inserta Tee brand fitting shall be required.

Cast iron clean out covers conforming to ASTM A-48 Class 30 or equivalent shall be required for all sanitary sewer services located in any paved surface. Locations of said covers shall be limited to a spacing of no greater than one hundred (100) feet or that constructed per the approved engineering plan.

The use of ductile iron & cast iron pipe is not allowed for the use of gravity sewers in the District.

Either 4" X 6" rubber or non-shear couplings shall be used to connect the building drain to the building sewer. If using a rubber fitting, the four-inch pipe shall be inserted six to twelve inches inside of the six inch building sewer.

Whether any grease removal system (GRS) is newly constructed or retrofitted to an existing building, all District guidelines pertaining to minimum slope and cover depth for sanitary construction shall be strictly adhered to.

All building drains/sewers shall be overhead or "hung" through the wall of any basement.

Full-sized cleanouts shall be installed five (5) feet from the foundation wall.

2. TESTING

Before final acceptance, all public sewers shall be tested in accordance with Section 31-1.11 of the "Standard Specifications for Water and Sewer Main Construction in Illinois" (*see item #2 under "Manhole Installation and Field Testing" below for vacuum testing).

All pipelines constructed of polyvinyl chloride (PVC) shall be subject to air exfiltration, deflection, vacuum and televising tests.

The deflection test shall be performed no sooner than thirty (30) days of the backfilling operation and shall consist of measuring the pipe for vertical ring deflection. Maximum ring deflection of the pipeline under load shall be limited to five (5) percent of the internal pipe diameter. All pipes

exceeding this deflection shall be considered to have reached the limit of its serviceability and shall be re-laid or replaced by the contractor at their sole expense.

The cost of all deflection testing shall be borne by the contractor and shall be accomplished by pulling a mandrel, sphere, or pin-type "go / no go" device, with a diameter equal to ninety-five (95) percent of the un-deflected inside diameter of the flexible pipe through the pipeline. Pipe shall be constructed so that the internal diameter does not decrease by more than five (5) percent.

All sanitary sewer (public or private) having a diameter of eight (8) inches or greater shall be televised by the District. Said televising work is scheduled once all sanitary testing (air & vacuum) has been received by the District. Any defects in said sewer shall be required to be excavated and repaired at the contractor's or developer's sole expense. Caution should be taken before constructing roads, curbs, sidewalks or any other infrastructure, whether it is above or below the ground surface. It is the responsibility of the utility contractor and the developer to contact the District prior to installing any of these utilities or infrastructure. Repairs to defective sanitary sewers shall be performed regardless of the status of other construction or extraneous expenses.

MANHOLE INSTALLATION AND FIELD TESTING

1. INSTALLATION

All manhole castings, adjusting rings and manhole sections shall be set in butyl rope or approved equal. The inside joints of manhole sections, adjusting rings, and frame shall not be mortared. However, the area between the pipe and flow channel shall be filled with cement mortar to provide a flush smooth surface.

Each manhole cone and barrel section joint shall also be externally sealed with a *6" or **9" wide (min.) sealing band of rubber and mastic (see "REPAIRS" below). The band shall have an outer layer of rubber or polyethylene with an under layer of rubberized mastic (with a protective film), meeting the requirements of ASTM C-877, **type II or *type III**.**

Pipe connections to all manholes through openings (cast or core-drilled) shall be provided with a flexible rubber watertight connector conforming to ASTM C-923, "Standard Specifications for Resilient Connectors between Reinforced Concrete Manhole Structures and Pipes".

A maximum of eight (8) inches of adjusting rings (2 total rings) is allowed. The frame, chimney, and top "lip" of the cone section shall be required to be sealed with a chimney seal.

Only "Adaptor-Seal", "Infi-Shield", Canusa (Wrapid Seal), or an approved equal will be allowed. Do not use unapproved seals.

When a new manhole is approved to be constructed on an existing public sewer, only Cascade brand (CR style), or approved equal, stainless steel repair clamps shall be installed. Only repair clamps conforming to ANSI/NSF-61 shall be allowed. This work shall be inspected by the District.

2. TESTING

Each new manhole shall be vacuum tested after manhole is at finished grade. All lift holes shall be plugged with a non-shrinking grout. The manhole frame, adjusting rings and chimney seals shall be in place when testing. No grout shall be placed in the horizontal joints before, after or during testing in order to achieve a passing test result. All pipes entering the manhole shall be plugged, taking care to securely brace the plugs from being drawn into the manhole. A vacuum of ten (10) inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to nine (9) inches of mercury (Hg) for the following time periods for each size manhole:

*Forty-eight (48) inches Diameter - sixty (60) seconds

*Sixty (60) inches Diameter – seventy-five (75) seconds

*Seventy-two (72) inches Diameter - ninety (90) seconds

*Manhole testing will be in accordance with ASTM-1244-93 or in accordance with District requirements. In case of conflict, the more stringent requirement will apply (e.g. where deeper manholes are constructed).

The contractor shall provide all material and equipment necessary for testing. Should the manhole fail the vacuum test, the structure shall be disassembled to a point that said leak can be repaired with butyl rope. After the repair is complete, the manhole shall be re-tested until a satisfactory result is obtained.

REPAIRS & REHABILITATION OF EXISTING PIPES AND MANHOLES

1. PIPES

Pipe connections of dissimilar materials where no hub exists shall be made with a non-shear connector.

Where a new home is constructed on any lot where the sanitary service is made of rigid materials such as vitrified clay, cast iron, or ductile iron, said service will be required to be removed or lined to the public main. Any existing sanitary sewer main or service, which is required to be lined, shall be repaired with a cured-in-place pipe (CIPP) meeting the requirements of ASTM F1216, D5813, D790 and D2990. Said CIPP shall be installed using the inversion method only. Hot water or steam shall be used to cure all liners.

Building sewers shall be permanently abandoned using one of following two methods.

1.) Removed to within one (1) foot of the public sewer and plugged using a mechanical plug and mortar. This is the required method. If this is not feasible, see item two below.

2.) The incoming building sewer shall be sealed within the public sewer with a four (4) foot minimum length cured in place pipe (C.I.P.P.) liner with hydrophilic gaskets.

Where a newly constructed public sewer needs to be repaired due to damage having occurred during construction, Cascade brand (CR style), or approved equal, stainless steel repair clamps shall be required. Only repair clamps conforming to ANSI/NSF-61 shall be allowed. When the damage occurs within thirty (30) feet of a manhole, the contractor shall remove and replace the damaged main from the nearest joint to the manhole.

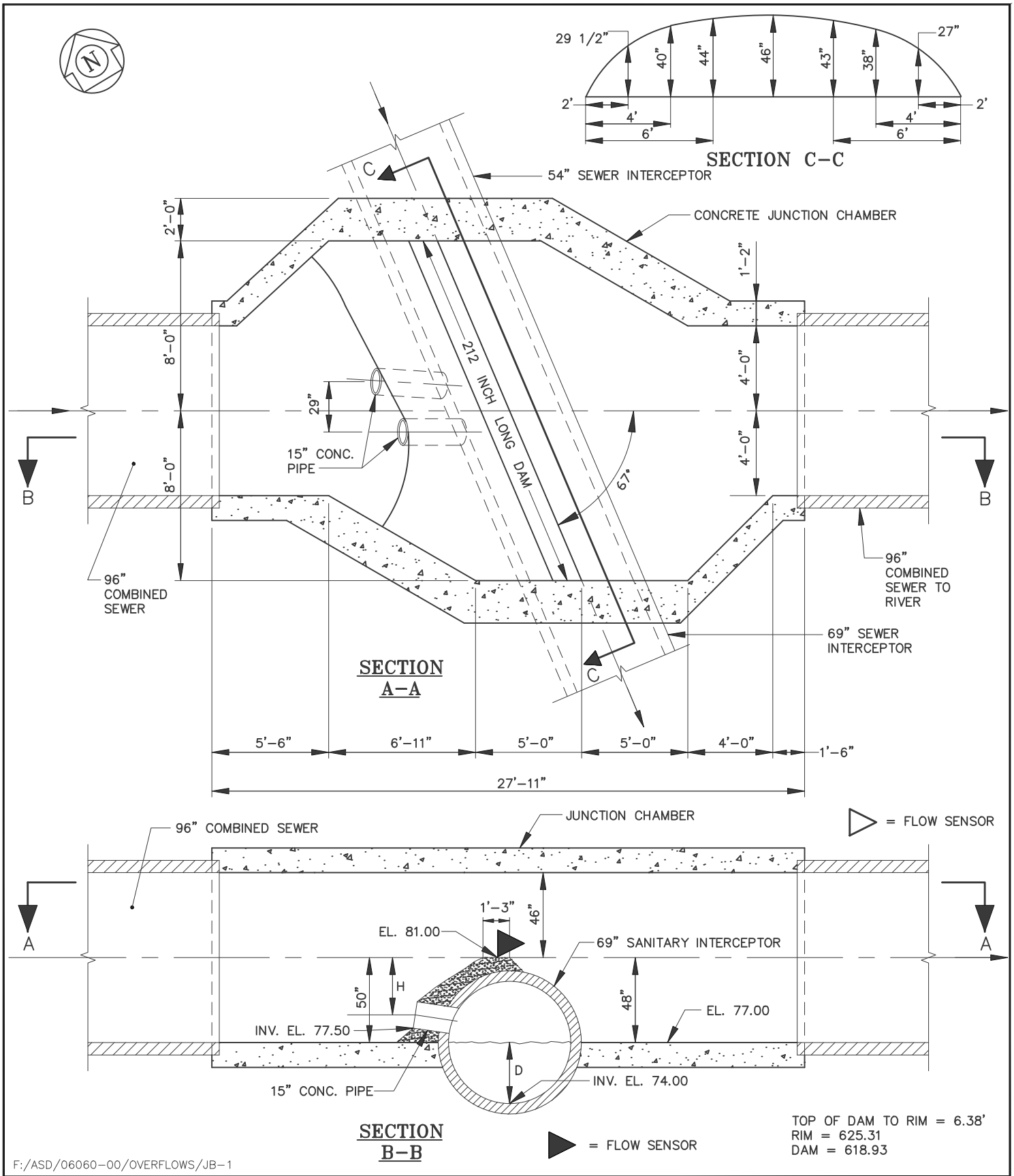
2. MANHOLES

Each manhole, which has been disturbed in any way, including being raised or lowered, should be cleaned and dried before re-sealing. Each cone and barrel section joint shall require a double-layer of butyl rope and also be externally sealed with a *6" or **9" wide (min.) sealing band of rubber and mastic. The band shall have an outer layer of rubber or polyethylene with an under layer of rubberized mastic (with a protective film), meeting the requirements of ASTM C-877, **type II or *type III.

A maximum of eight (8) inches of adjusting rings (2 total rings) is allowed in any repair. The frame and chimney of the cone section shall be required to be sealed with a chimney seal. Only "Adaptor-Seal", "Infi-Shield", Canusa (Wrapid Seal), or approved equal will be allowed.

APPENDIX 4

CSO Detail Drawings



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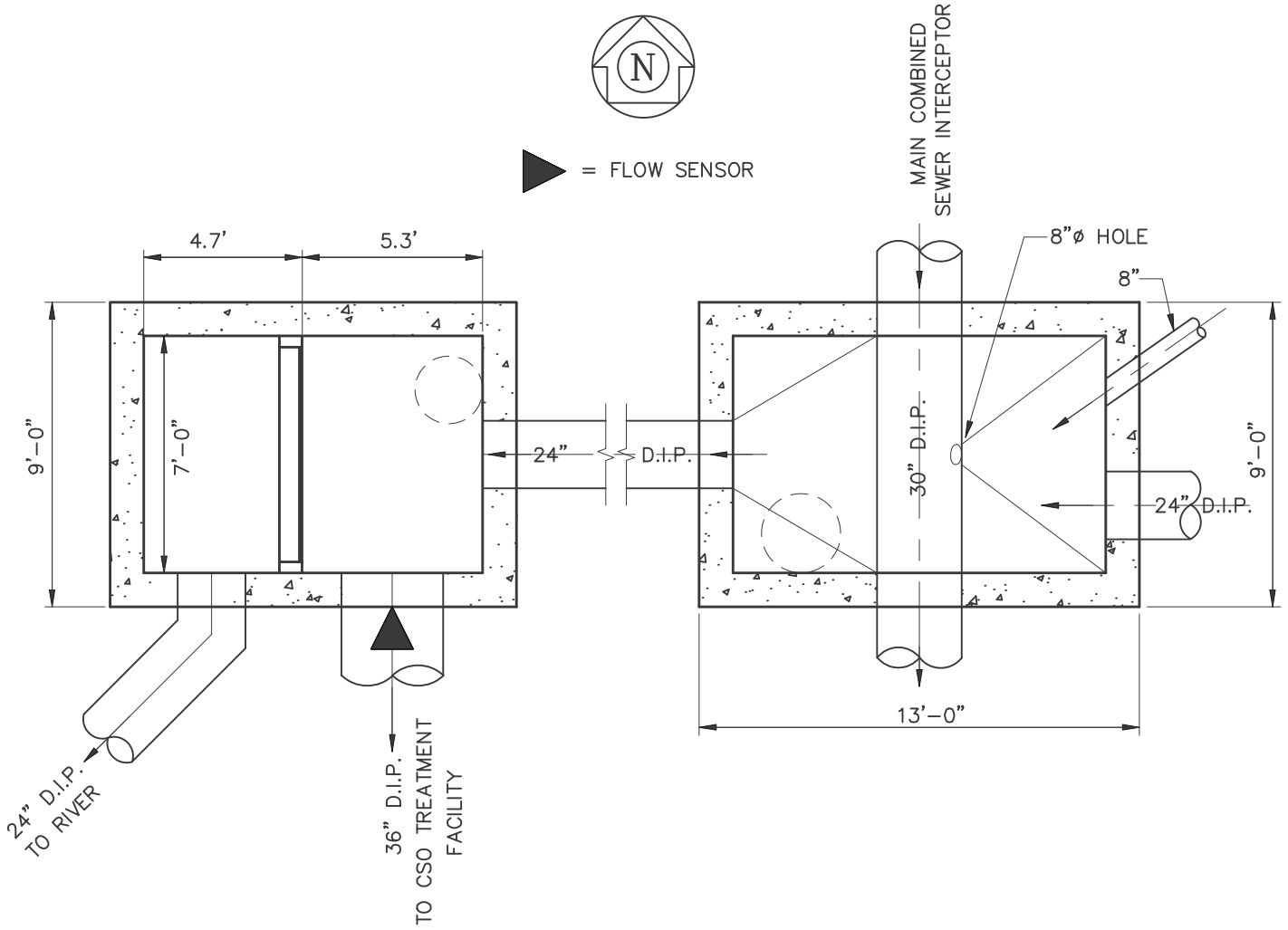
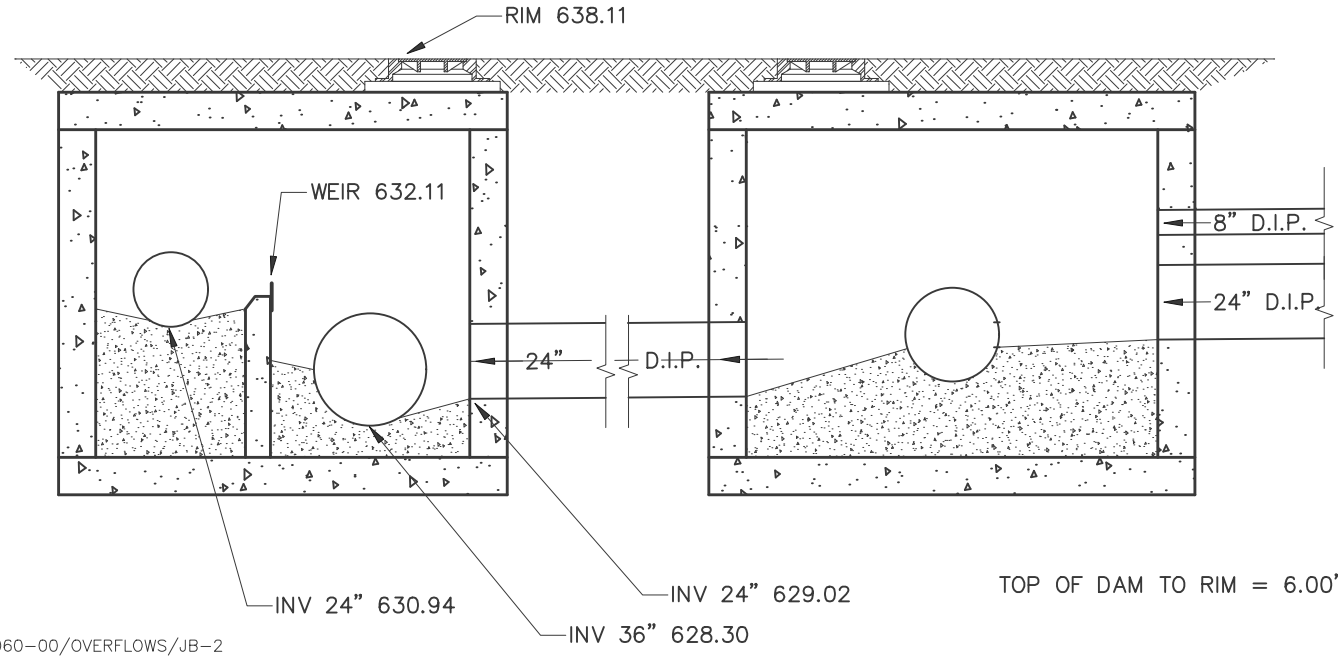
SHEET 1 OF 1

REVISIONS

DESIGNED	JWF	APPROVED	JWF	BOOK	203	JOB NUMBER	111/06060-00
DRAWN	JES	DATE	5/13/13	SCALE			

CITY OF AURORA CSO 001
RATHBONE AVE.





TOP OF DAM TO RIM = 6.00'

F:/ASD/06060-00/OVERFLOWS/JB-2

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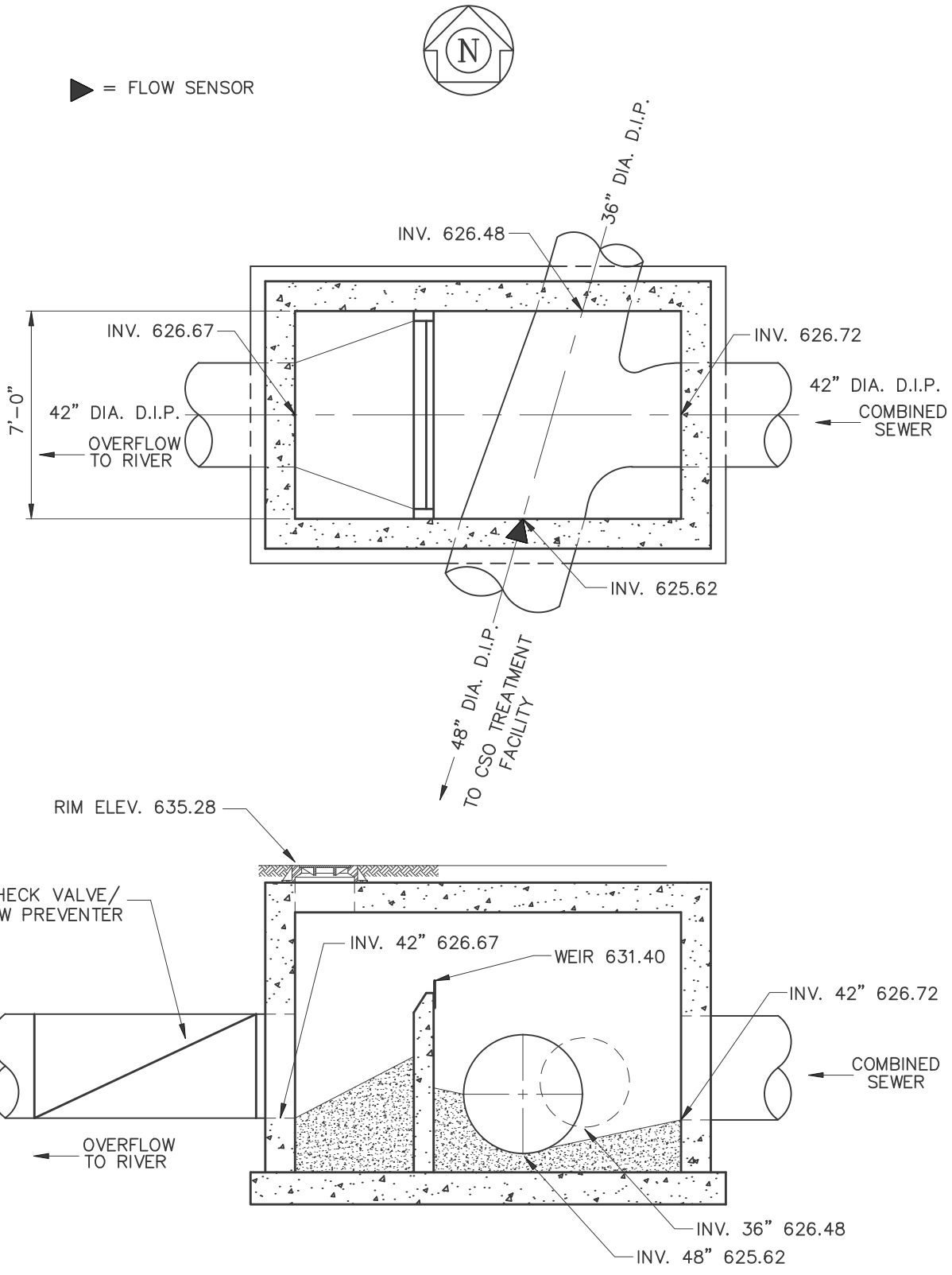
SHEET 1 OF 1

REVISIONS

DESIGNED	DRAWN	APPROVED	DATE	BOOK	SCALE	JOB NUMBER
JWF	JES	JWF	5/13/13	203	1"=5'	111/06060-00

CITY OF AURORA CSO 002
EAST ILLINOIS AVE.



TOP OF DAM TO RIM = 3.88'

F:\ASD\06060-00\OVERFLOWS\OVF-3

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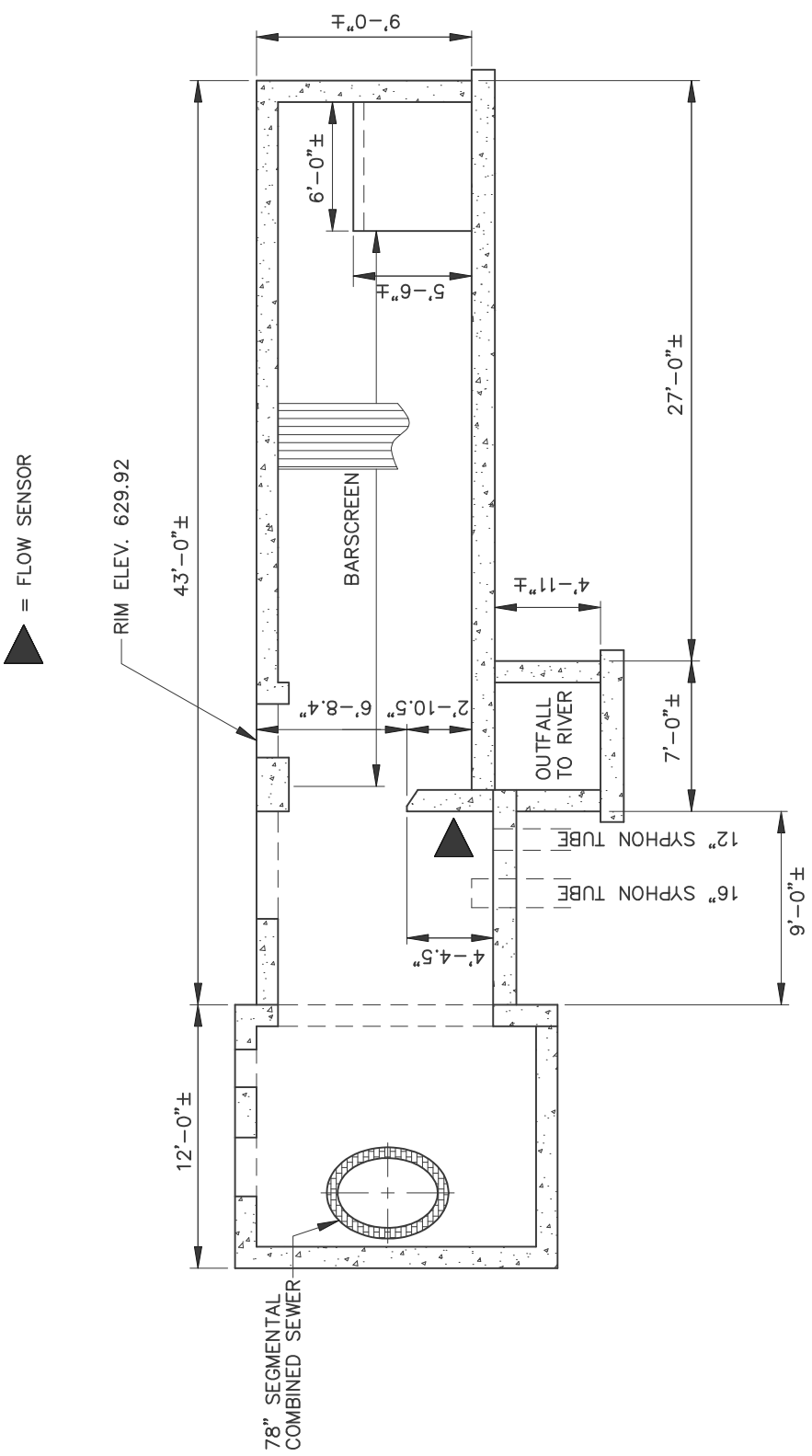
SHEET 1 OF 1

REVISIONS
SHOW LOCATION OF BACKFLOW PREVENTION – 11/9/15

DESIGNED	APPROVED	BOOK	JOB NUMBER
JWF	JWF	203	111/06060-00
DRAWN	DATE	SCALE	
JES	5/13/13	1"=5'	

CITY OF AURORA CSO 003A PIERCE ST.



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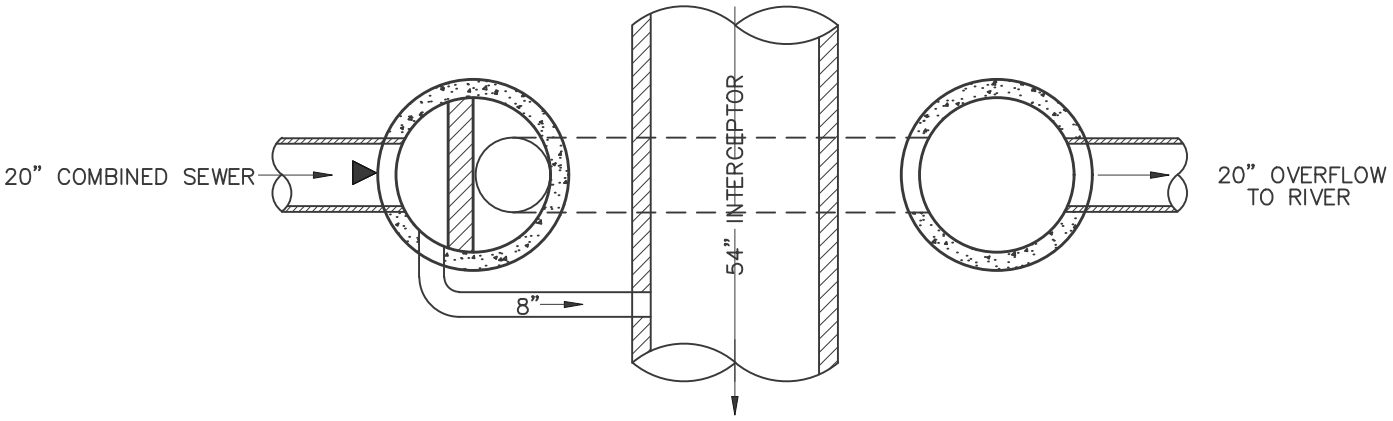
SHEET 1
OF 1

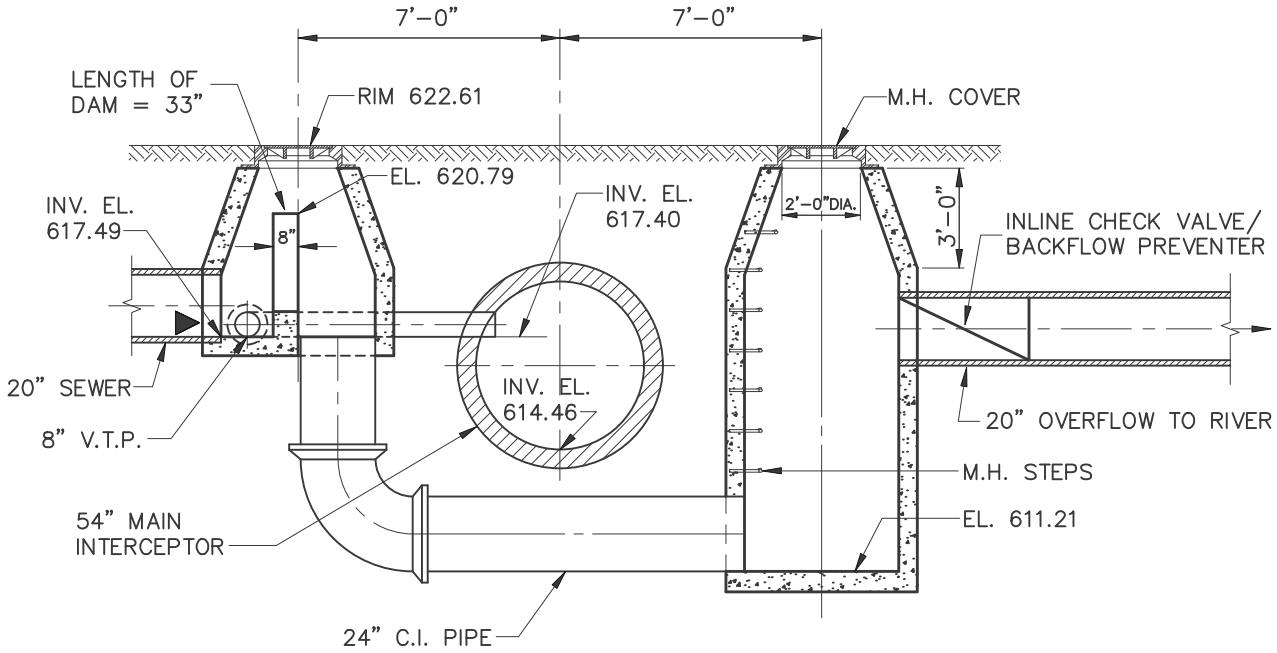
REVISIONS

CITY OF AURORA CSO 004
HAZEL AVE.

DESIGNED	JWF	APPROVED	JWF	BOOK	203	JOB NUMBER	111/06060-00
DRAWN	JES	DATE	5/13/13	SCALE	1"=3'		



▶ = FLOW SENSOR



TOP OF DAM TO RIM = 1.82'

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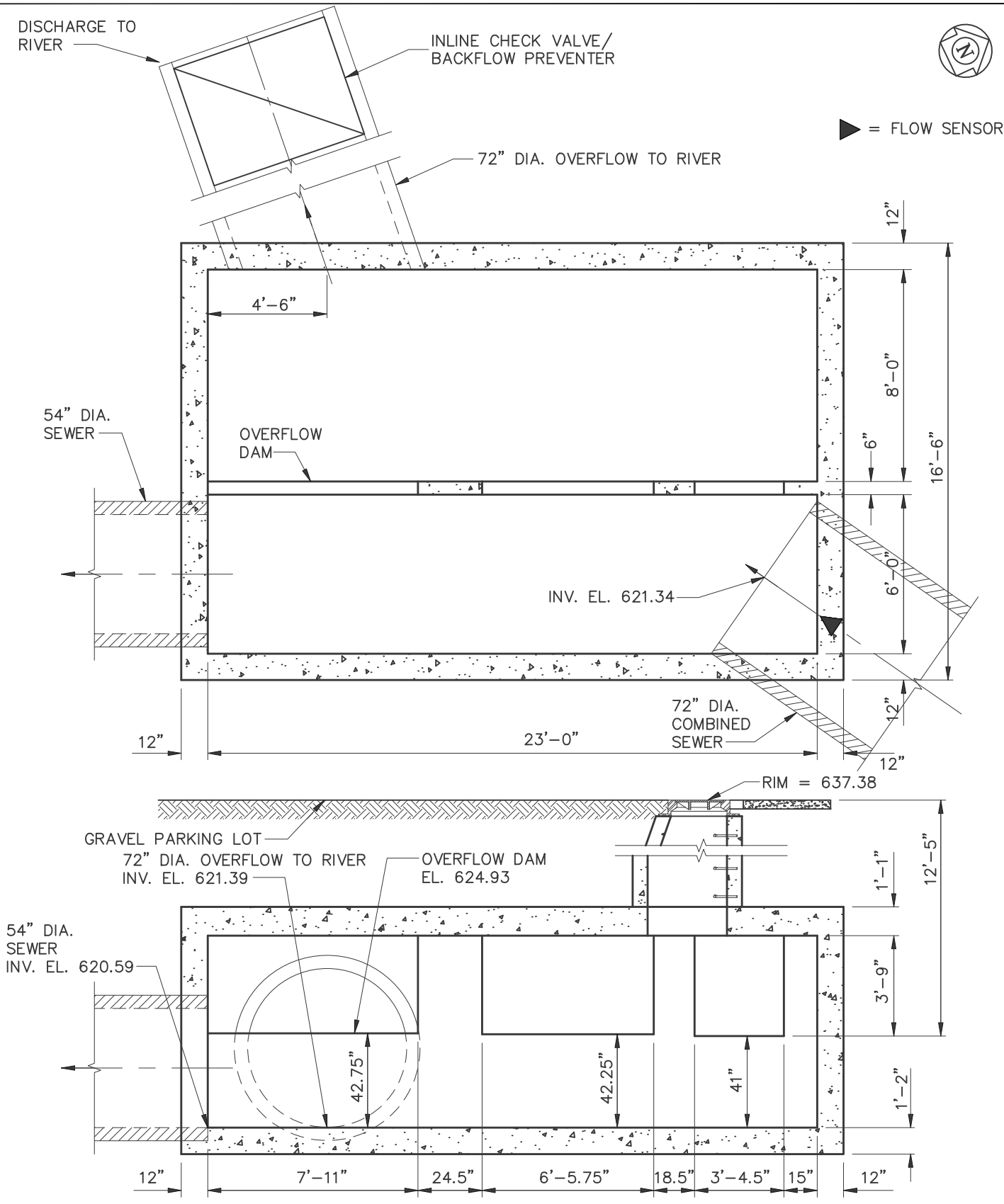
SHEET 1
OF 1

REVISIONS
SHOW LOCATION OF BACKFLOW PREVENTION – 11/9/15

DESIGNED JWF	APPROVED JWF	BOOK 203	JOB NUMBER
DRAWN JES	DATE 5/13/13	SCALE 1"=5'	111/06060-00

CITY OF AURORA CSO 005
THIRD ST.



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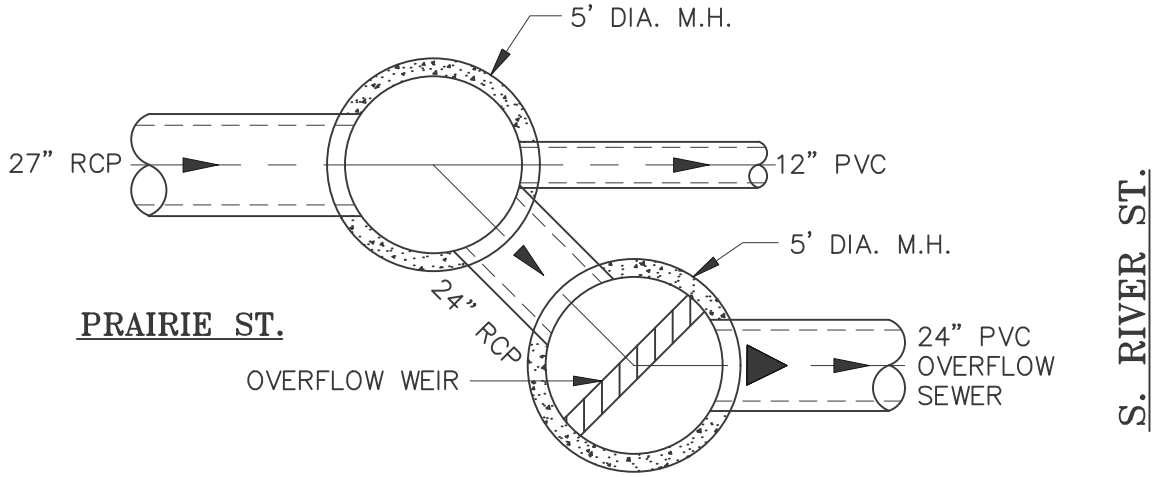
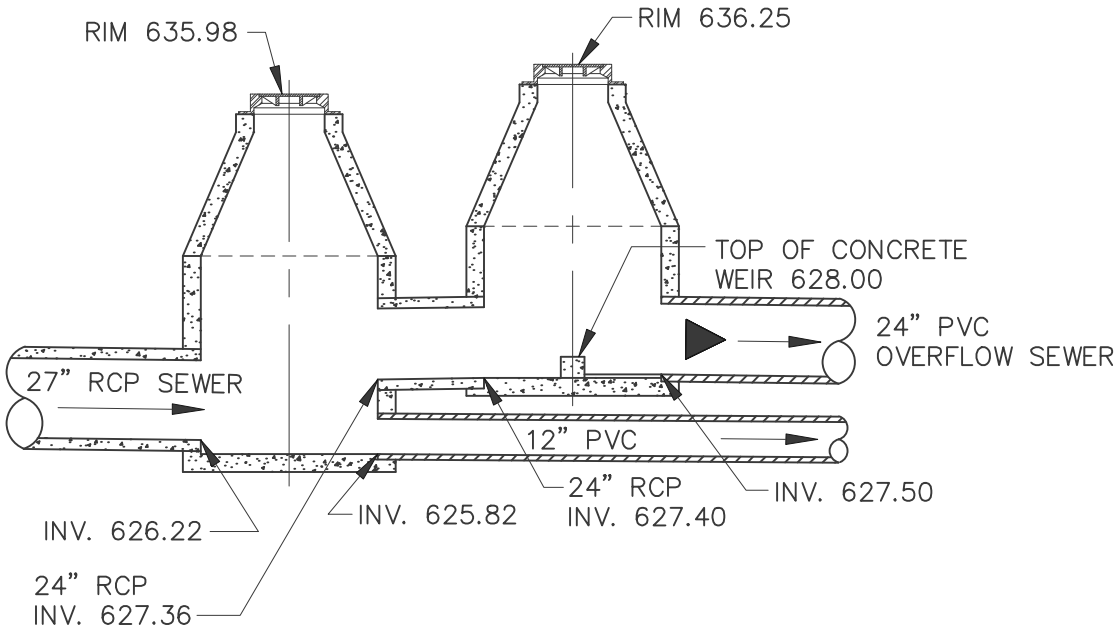
SHEET 1
OF 1

REVISIONS
SHOW LOCATION OF BACKFLOW PREVENTION – 11/9/15

DESIGNED JWF	APPROVED JWF	BOOK XXX	JOB NUMBER 111/06060-00
DRAWN JES	DATE 01/28/08	SCALE 1"=5'	

CITY OF AURORA CSO 008
EAST BENTON ST.





▶ = FLOW SENSOR

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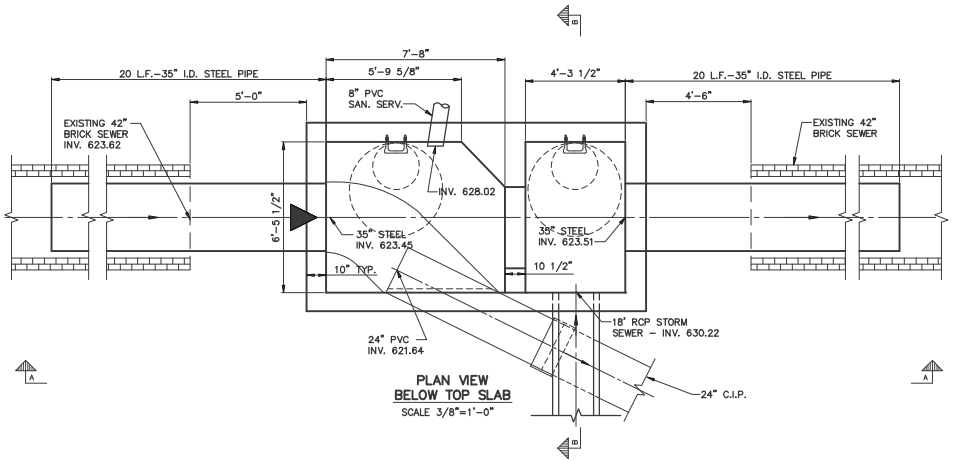
SHEET 1
OF 1

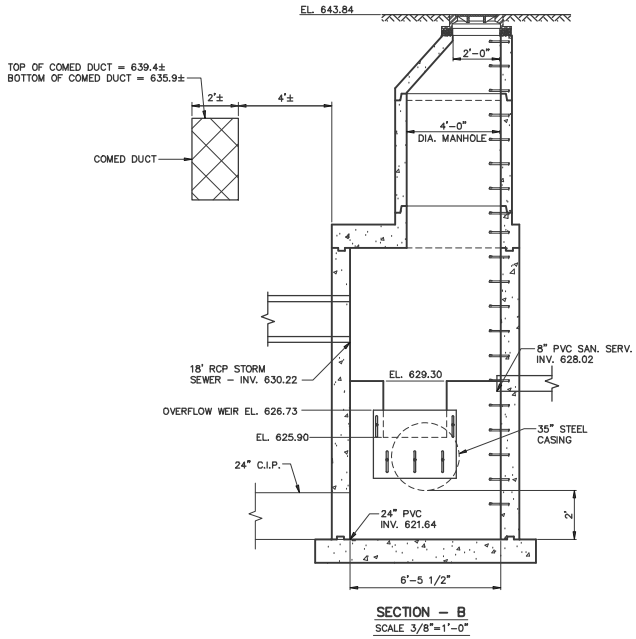
REVISIONS
STRUCTURE RECONFIGURED – 6/11/14

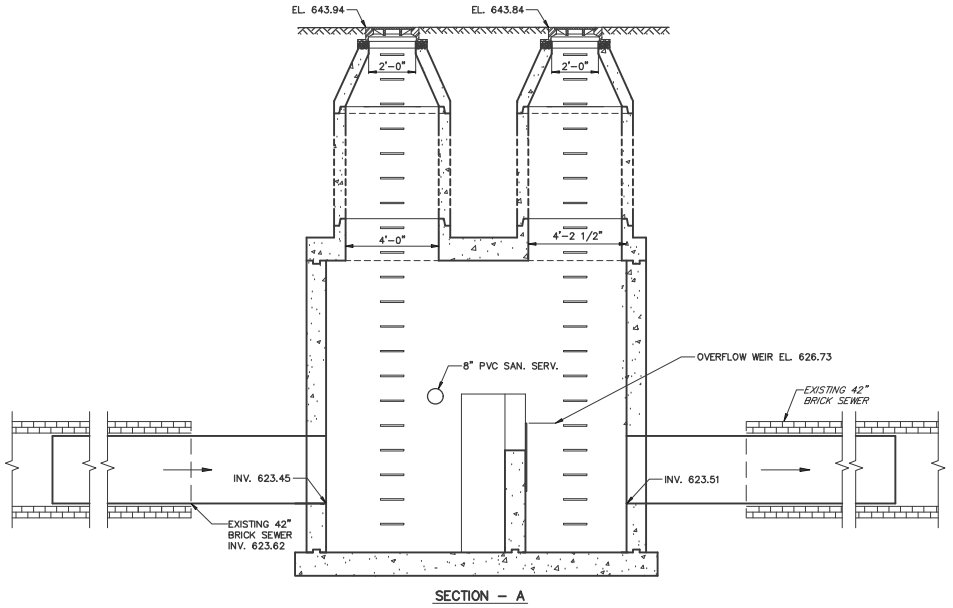
DESIGNED	APPROVED	BOOK	JOB NUMBER
RDC	JWF	FILE	111/06060-00
DRAWN JES	DATE 11/11/15	SCALE 1"=5'	

CITY OF AURORA CSO 010
FIRST ST.

W. BENTON ST.







▶ = FLOW SENSOR

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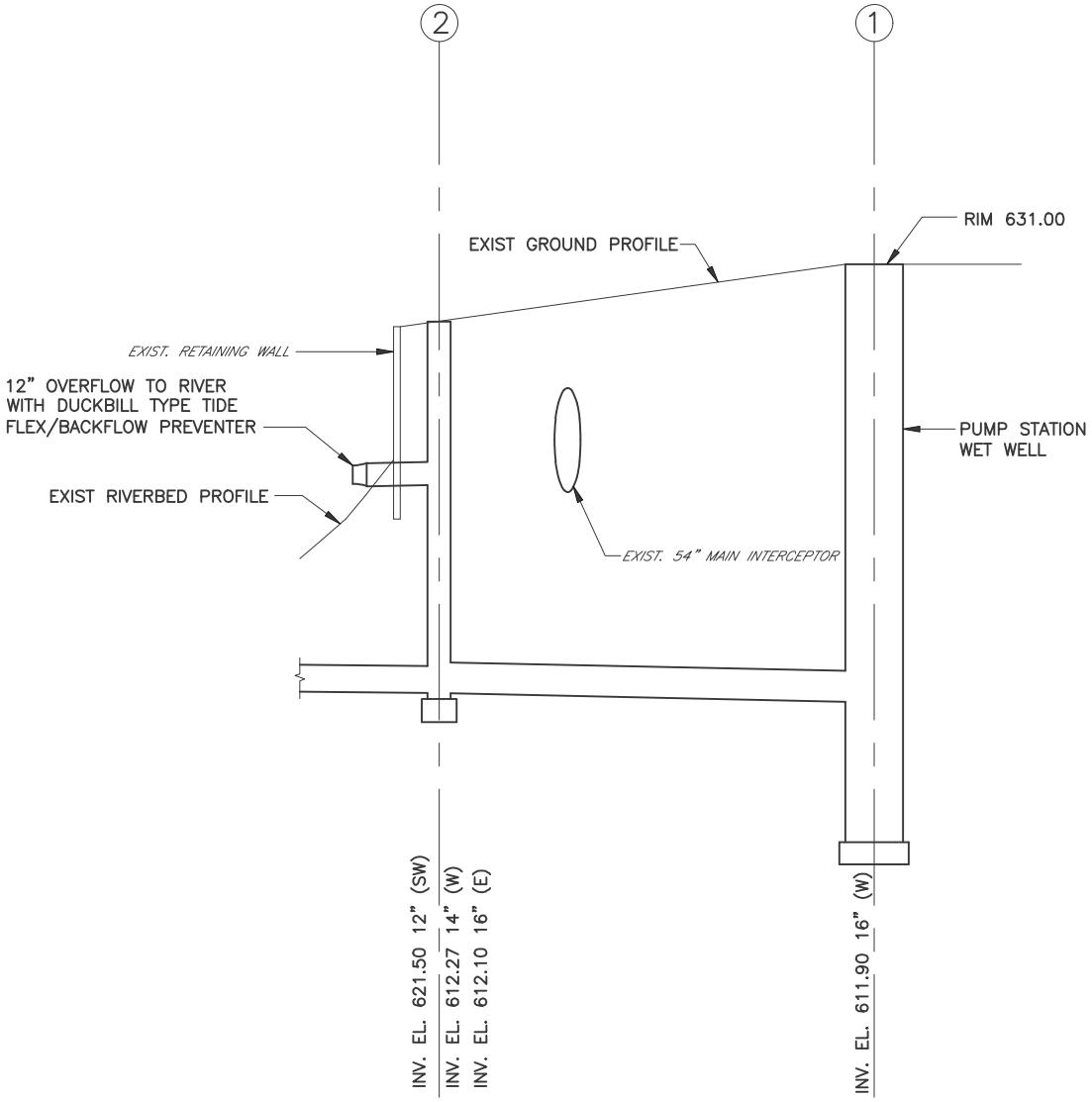
REVISIONS

DESIGNED RDC	DRAWN RDC	APPROVED JWF	DATE	BOOK	SCALE NONE	CAD DWG. F:\ASD\06060\OVF\OVF-15	JOB NO. 111/06060/00

CITY OF AURORA CSO 015
WEST BENTON ST.



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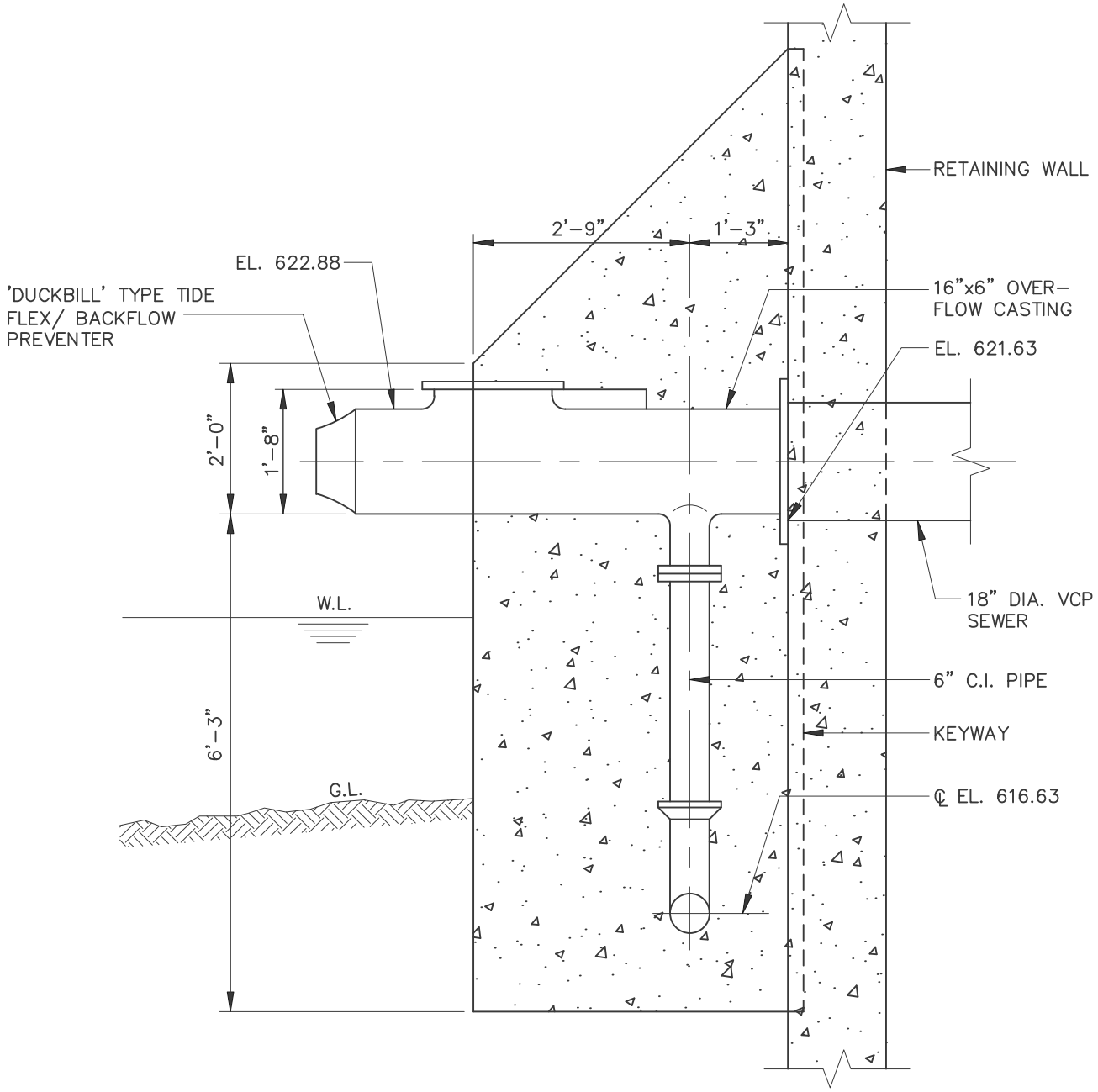
SHEET 1
OF 1

REVISIONS

CITY OF AURORA CSO 016A CLARK ST.

DESIGNED	RDC	APPROVED	JWF	BOOK	203	JOB NUMBER	111/06060-00
DRAWN	JES	DATE	5/17/16	SCALE	1"=2'		



F:/ASD/06060-00/OVERFLOWS/OVF-17

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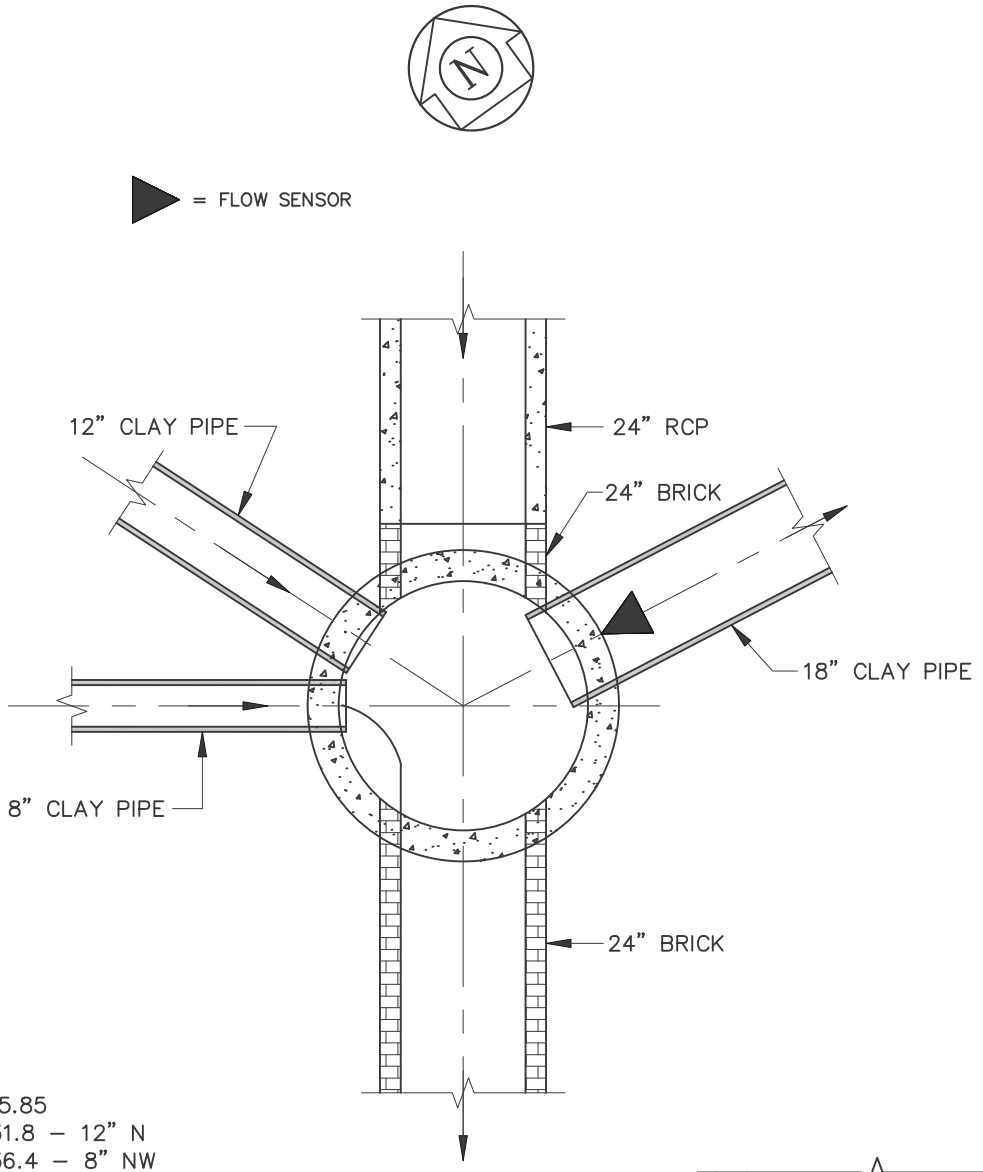
SHEET 1
OF 1

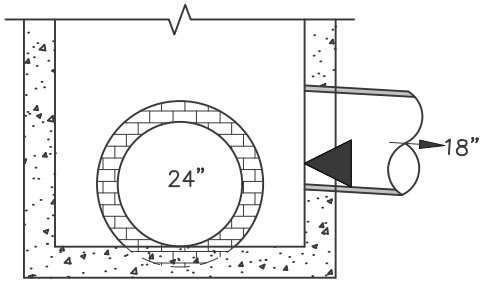
REVISIONS
CLARIFY LOCATION OF BACKFLOW PREVENTION – 11/9/15

DESIGNED	APPROVED	BOOK	JOB NUMBER
JWF	JWF	203	111/06060-00
DRAWN	DATE	SCALE	
JES	5/13/13	1"=2'	

CITY OF AURORA CSO 017
STOLP AVE.



RIM 645.85
INV. 631.8 – 12" N
INV. 636.4 – 8" NW
INV. 631.7 – 18" E
INV. 630.8 – CL.



F:/ASD/06060-00/OVERFLOWS/COA – OVF-018

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Consulting Engineers — Aurora, Illinois

©

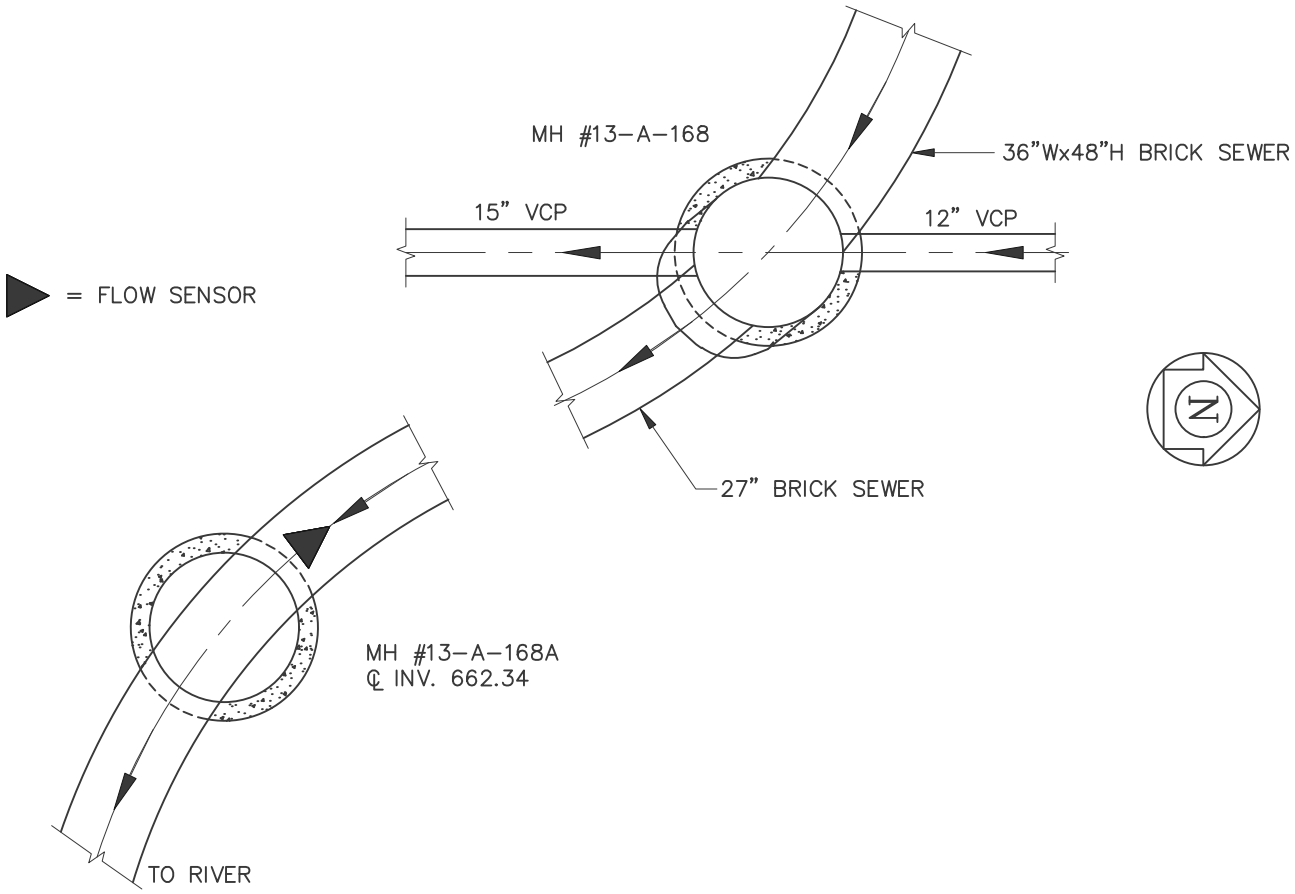
SHEET 1
OF 1

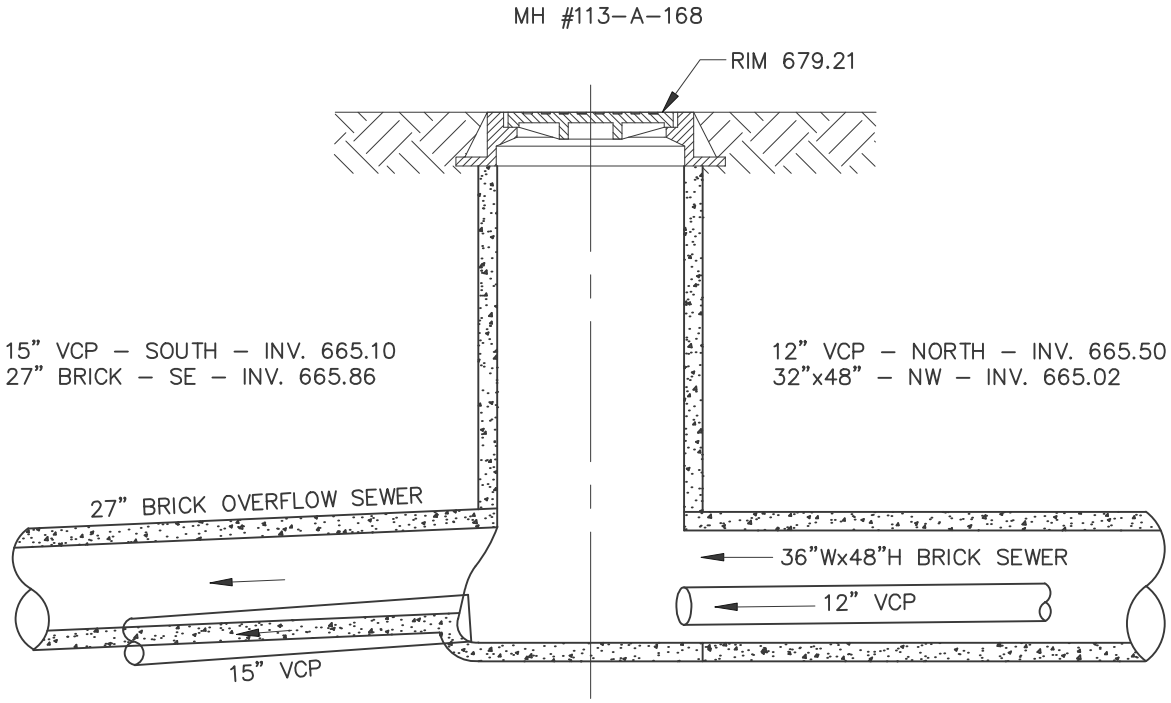
REVISIONS

DESIGNED	APPROVED	BOOK	JOB NUMBER
JWF	JWF	203	111/06060-00
DRAWN	DATE	SCALE	
JES	5/13/13	1"=3'	

CITY OF AURORA CSO 018
WEST GALENA BLVD.

LOCATION – CL. LAKE ST. AT WEST PARK AVE./ELM ST.





F:/AU/08023–00/OVF–21

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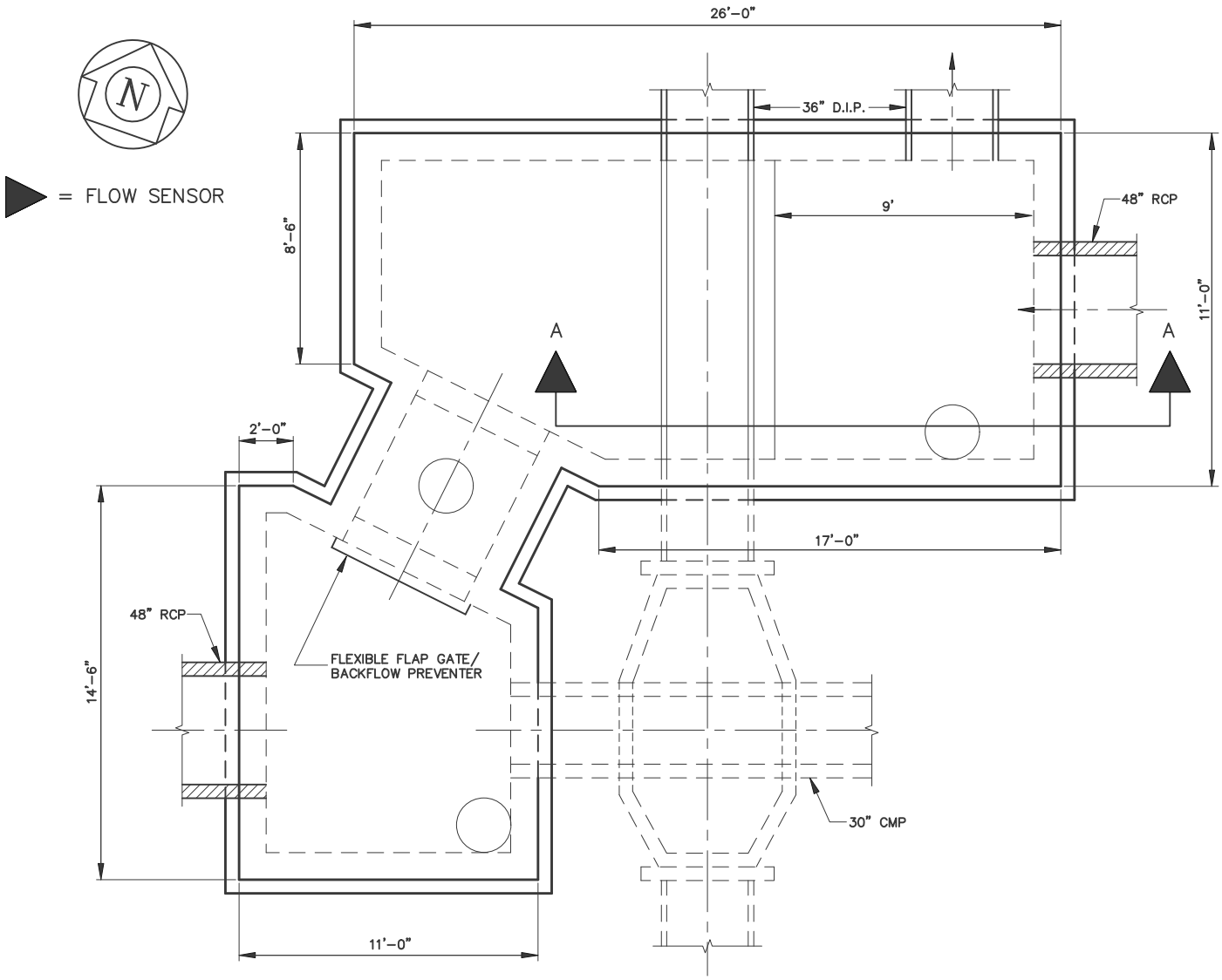
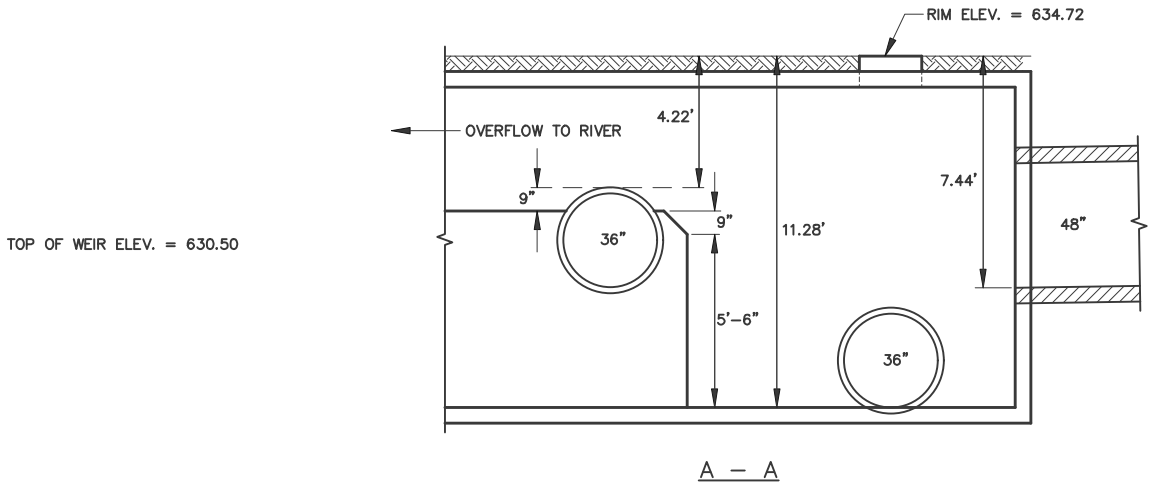
SHEET 1
OF 1

REVISIONS

DESIGNED RC	APPROVED RC	BOOK 203	JOB NUMBER 155/08023–00
DRAWN JES	DATE 5/13/13	SCALE 1"=2'	

CITY OF AURORA CSO 021
ELM (WEST PARK AVE.)





TOP OF WEIR ELEV. = 630.50

A – A

F:/ASD/06060-00/OVERFLOWS/OVF-22

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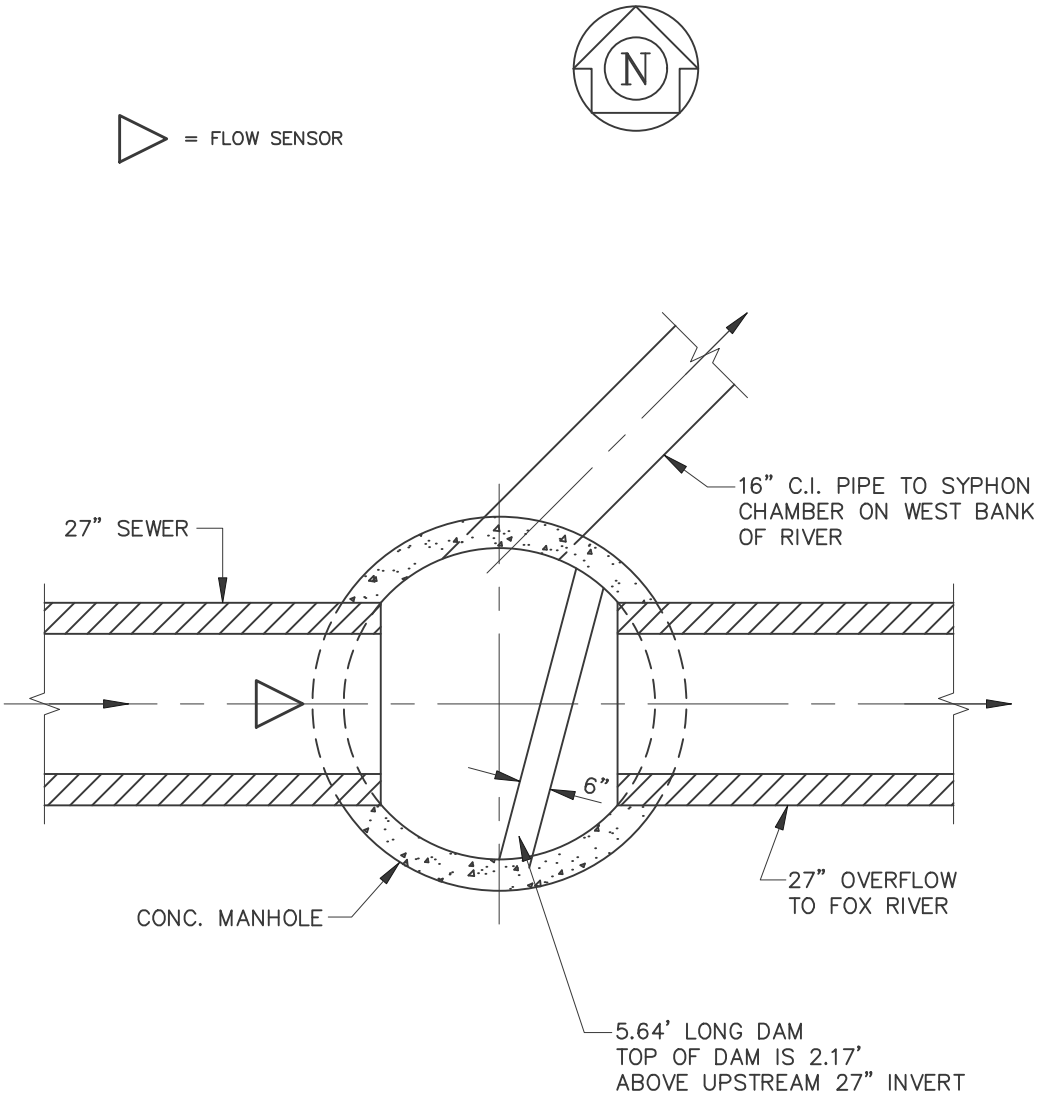
SHEET 1
OF 1

REVISIONS
CLARIFY LOCATION OF BACKFLOW PREVENTION – 11/9/15

DESIGNED	APPROVED	BOOK	JOB NUMBER
JWF	JWF	203	111/06060-00
DRAWN	DATE	SCALE	
JES	5/13/13	1"=4'	

CITY OF AURORA CSO 022
SUPERIOR ST.



TOP OF DAM TO RIM = 3.75'
RIM ELEV. = 642.09
TOP OF DAM ELEV. = 638.34

F:/ASD/06060-00/OVERFLOWS/OVF-23

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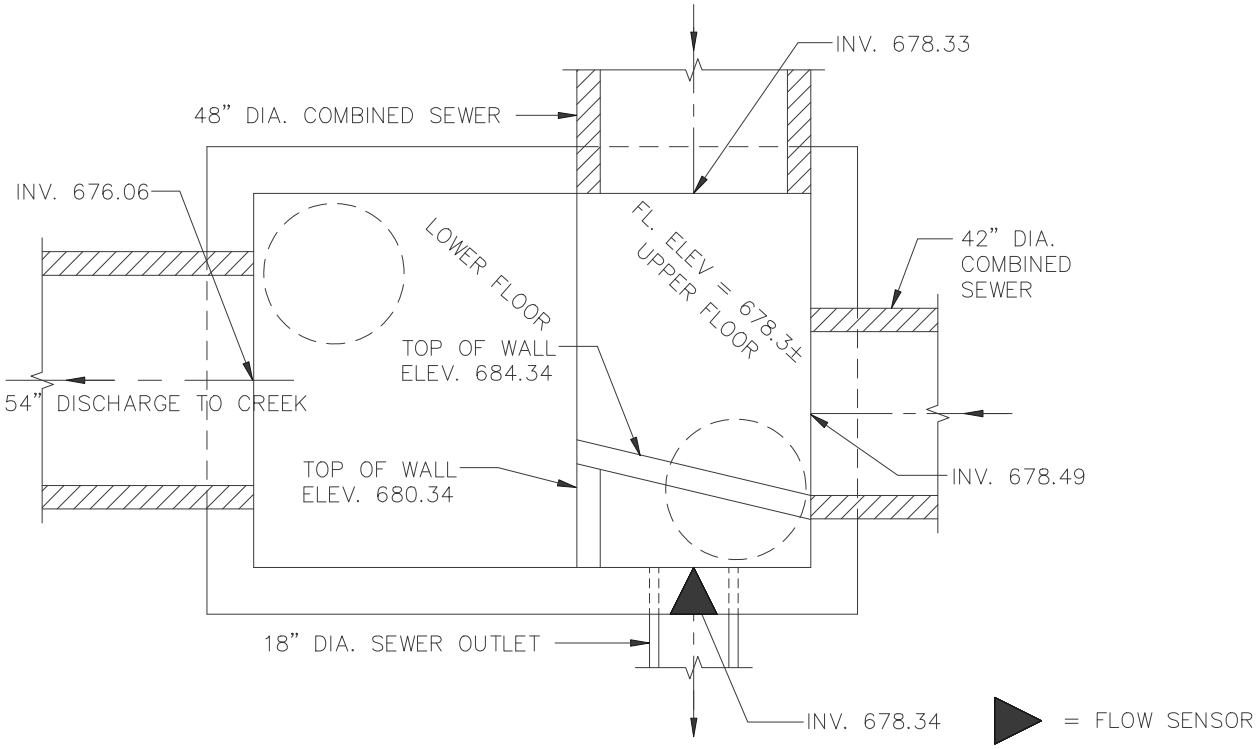
SHEET 1
OF 1

REVISIONS

DESIGNED	APPROVED	BOOK	JOB NUMBER
JWF	JWF	203	111/06060-00
DRAWN	DATE	SCALE	
JES	5/13/13	1"=3'	

CITY OF AURORA CSO 023
WEST ILLINOIS AVE.



RIM ELEV. = 691.46
TOP OF DAM ELEV. = 680.34

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Consulting Engineers — Aurora, Illinois

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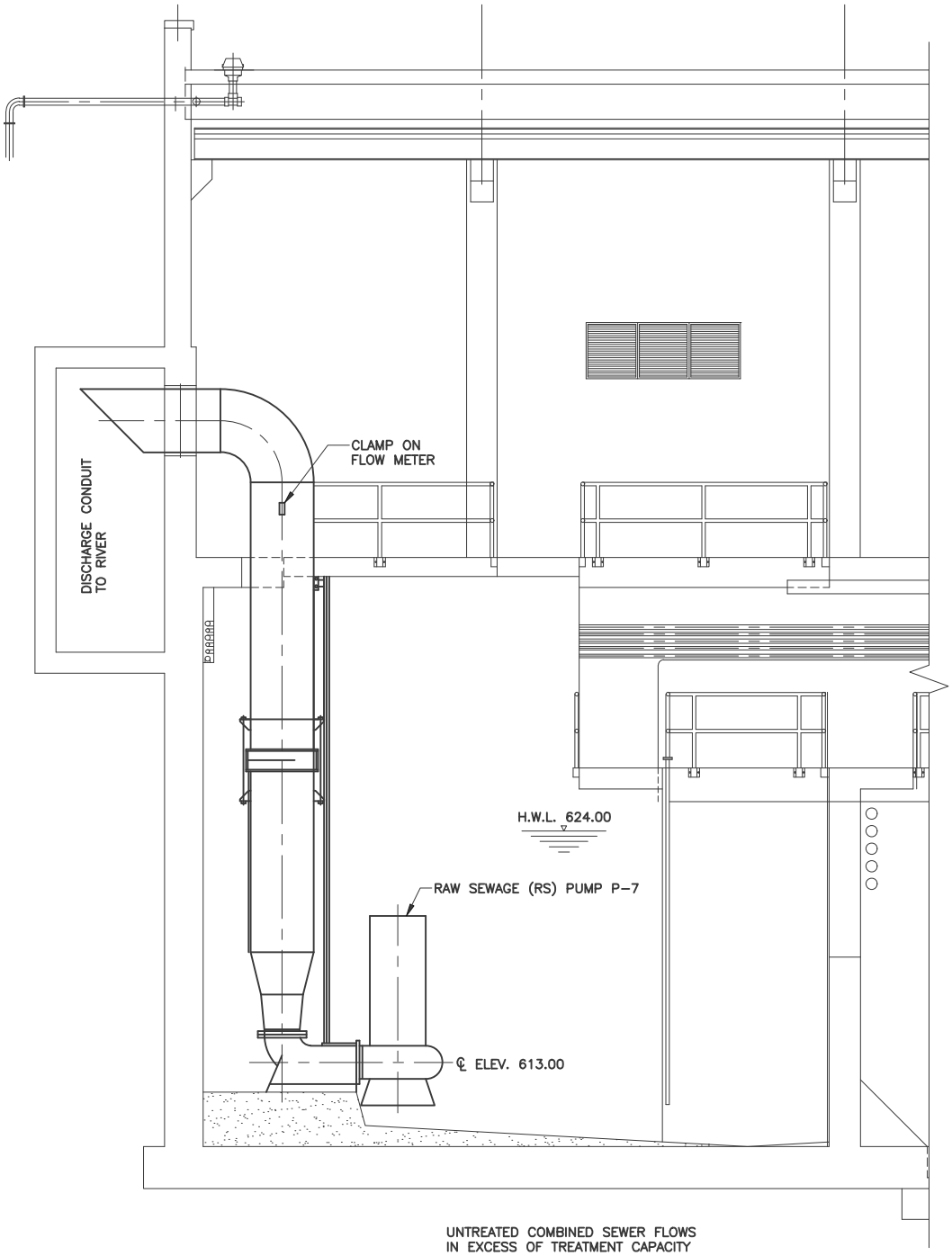
SHEET 1
OF 1

REVISIONS 12/17/15 – RECONSTRUCTED OVF WEIR

DESIGNED RDC	APPROVED RDC	BOOK XXX	JOB NUMBER 111/94061-03
DRAWN JES	DATE 11/4/15	SCALE 1"=4'	

CITY OF AURORA CSO 025
DEARBORN AVE. & TRASK ST.



F:/ASD/06060-00/OVERFLOWS/OVF-27

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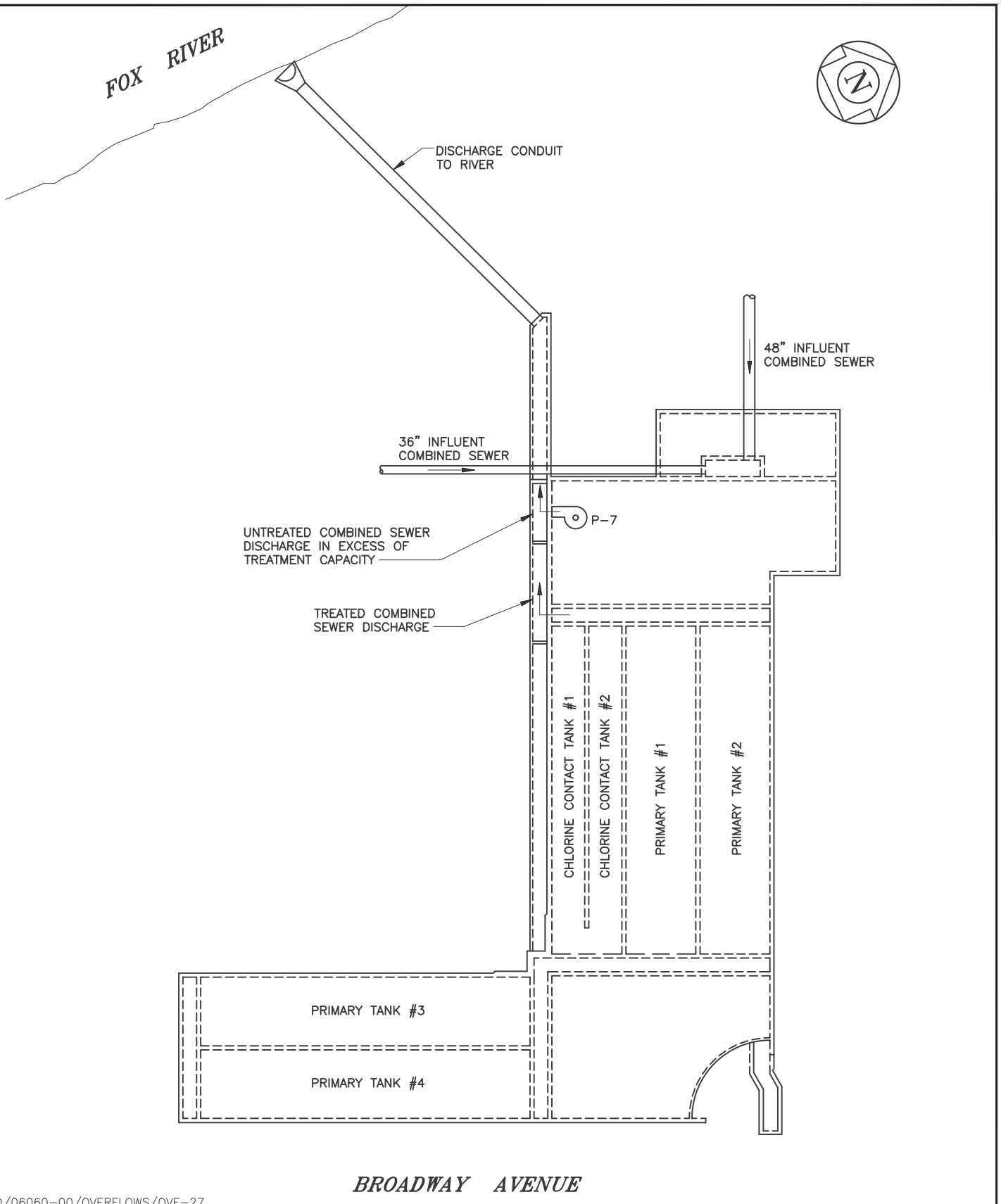
SHEET 1
OF 2

REVISIONS

DESIGNED	RDC	APPROVED	JWF	BOOK	XXX	JOB NUMBER	111/06060-00
DRAWN	JES	DATE	5/17/16	SCALE	1"=4'		

CITY OF AURORA CSO 027
CSO TREATMENT FACILITY



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Consulting Engineers — Aurora, Illinois

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SHEET 2 OF 2

REVISIONS

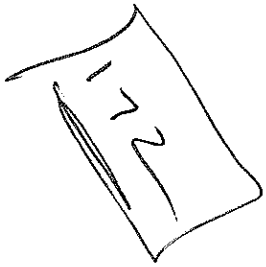
DESIGNED	RDC	APPROVED	JWF	BOOK	XXX	JOB NUMBER	111/06060-00
DRAWN	JES	DATE	5/17/16	SCALE	1"=4'		

CITY OF AURORA CSO 027
CSO TREATMENT FACILITY

APPENDIX 5

Water & Sewer Maintenance Vehicles and Equipment Inventory

WATER SEWER MAINTENANCE
VEHICLES EQUIPMENT



Operator(s)	Backhoe	Crew Cab
Nobles/Soderdahl	133	155/567
Soderdahl	138/139	155/567
Chapa/Leifheit	136	156/564
Leifheit	138/139	156/564
Vogt/Davis	137	157/566
Davis	138/139	157/566

Spare Backhoes & additional equipment	
138	163 - Kabota
139	143 - Skidsteer
149 - End Loader	101 - Fork Lift

Utility Trucks	Water & Sewer		Meter Shop
100 (Superintendent)	106*	118*	171 (Van)
110 (Meter Shop Sup.)	108	121	174 (Van)
120 (W&S Supervisor)	109	122	175 (Van)
123 (W&S Supervisor)	114	150	
124 (W&S Supervisor)	115	151*	
158 (Asst. Supt.)	116	170	
	117*	172 TV truck	

Legend
Call Trucks
Taps Truck
Valve Truck
Joint Meets
* Spreader

5 yd Dump Trucks	15 yd (10 yd) Dump Trucks		
127*	126	159*	165*
152*	128*	161*	166*
154*	129*	164	Semi - 169

Legend
* Spreader

Crew Cabs	
135 (MH Rehab)	156/564
155/567	157/566

Sewer Cleaning Trucks
132 Vac-Con
134 Vac-Con
160 Vactor

Trailers		
125 (Lowboy)	564	567 (utility)
168 (Semi-Trailer)	566 (utility)	568 (utility)
570 (Flatbed)		

WATER SEWER MAINTENANCE
VEHICLES EQUIPMENT

Hydraulic Pumps	6" Hydraulic Potable Pumps
104	099
105	130
140 (power unit)	131
141	586
569	599
595	

Water Pumps		
093	095	097
094	096	098

Air Compressors
066
145
146

Arrow Boards
584 Solar
594 Solar
596 Solar
598

Generators		
090	558	559
581 (Portable)	560	575

Saws		
091 (Chain Saw)	556	561 (Cut Off)
092 (Chain Saw)	557	571 (24" Saw)
552 (Demo Saw)	565	587 (Concrete)
553 (Demo Saw)	573	589 (Concrete)

Plows				
106 **(8.5 plow)**	800	829	845	873
151 **(8.5 plow)**	801	830	846	807
257 **(8.5 plow)**	803	842	847	
258 **(8.5 plow)**	827	843	848	
	828	844	872	

Misc.	
144 (12K Tilt Deck)	582 (Smoke Blower)
168 (22-1/4" Hi-Dump)	585 (Roto Tiller)
550 Light Tower	588 (Pipe Cutter)
551 (48" Cut John Deere)	590 (Valve Turning Machine)
562 (Snow Blower)	591 (Trac-L-Vac)
563 (Lawn Mower)	592 (Valve Turning Machine)
574 (Valve Operator)	

APPENDIX 6

Example SSES Meter Placement (Stage 1 and Stage 2)


Basin 48
48WA-041 (10")
48WA-018
48WA-001 (24")
BURLINGTON - NORTHERN R.R.
KANE COUNTY
DUPAGE COUNTY
AURORA TOWNSHIP
NAPERVILLE TOWNSHIP
COUNTY LINE RD.
LIBERTY ST.
E. NEW YORK ST.
EOLA RD.
McCOY DR.
BRECKENRIDGE DR.
ASBURY DR.
GLENFORD
TREMONT
WOODVIEW
ELEMENTARY SCHOOL
AMLI APARTMENTS
FAITH LUTHERAN
PLAY USA
BALLCO
WEBER DR.
O'BRIEN DR.
FIRST AMERICAN BANK
DOMINICK'S
WATER PRODUCTS
JAMESTOWN LN.
STOUGHTON CR.
MAPLESIDE LN.
ADAMSWAY
CHESHIRE DR.
BEAUMONT
FOREST
WETLANDS
WABONSIE CREEK
OAKHURST COMMUNITY PARK
COMPTON
BREMERTON CT.
McCARTY ELEMENTARY SCHOOL
EOLA COMMUNITY CENTER & LIBRARY
VILLAGE BAPTIST CHURCH
U.S. 34
E. J. & E. R.R.

2/23/2018, 8:22:13 AM

1 inch = 458 feet

Fox Metro
Water Reclamation District

FMWRD Field Ops GIS

APPENDIX 7

Sewer Back-up Prevention Assistance Program

CITY OF AURORA

Program Summary for Sanitary Sewer Backup Prevention Assistance

(Revised effective April, 2014)

General: The City encourages residents that have had sanitary sewer backups in the past to install a protective backup device or revise their plumbing to prevent sanitary sewer backups in the future.

Funding Arrangement: Residents may apply for a rebate of 50% of the cost of their project up to a maximum $5,000.00.

The payment you receive is considered a grant and will require the City of Aurora to issue IRS Form 1099-G, reporting this payment as taxable income. You should consult with your tax advisor regarding the proper reporting of this payment.

Types of Projects Funded: Sewer backup protection projects, such as installation of overhead sewers and backflow prevention devices. This would also include improvements to upgrade existing sewer backup prevention components (this would not include routine maintenance of existing systems or the installation of a sump pump).

Projects are limited to existing residential single family and multifamily homes (new construction and non-residential structures are excluded). Homes constructed after April 14, 1998 will be eligible if it can be shown that the home has experienced flooding by sewer backup.

Pre-approval is required to be eligible. Once eligibility has been established and a method of prevention has been chosen, the City's Engineering Division will notify the homeowner that they may proceed and make application for a building permit.

All projects will require a City building permit and inspection to verify proper installation.

Once installed and inspected, protective back up devices must be regularly and properly maintained by a licensed plumber according to manufacturer's specifications. The City will not be responsible for the maintenance or operation of prevention devices nor will the City be liable for any resulting damages caused by the failure of prevention devices.

The Applicant Must Submit:

1. A description of the work to be done.

2. A detailed cost estimate from two licensed and bonded contractors.

3. Upon completion, a detailed invoice from, the contractor or other evidence of the costs, including proof of payment.

4. A final inspection and approval by the City's Division of Inspections and Permits.

5. Proof of ownership of the property.

6. Completed IRS Form W-9

The above information must be provided along with a completed application to the City of Aurora's Department of Engineering, 44 East Downer Place, Aurora, Illinois 60507. For additional information call 630-256-3200.

CITY OF AURORA

Application for Sanitary Sewer Backup Prevention Rebate Program

(Revised effective April, 2014)

I/We hereby make application for a rebate for the sanitary sewer backup prevention work at the following address in the City of Aurora:

Name: _____

Address: _____

Email: _____

Telephone: _____

The following information must be supplied with this application **Before Work Has Commenced:**

_____ 1. A description of the work to be performed.

_____ 2. A detailed cost estimate from two plumbing contractors licensed and bonded with the State of Illinois.

The following information must be supplied prior to reimbursement:

_____ 1. City permit number and date of final inspection.

_____ 2. Upon completion, a detailed invoice from the contractor or other evidence of the project costs incurred.

_____ 3. Canceled check or other proof of payment of the project costs.

_____ 4. Copy of most recent real estate tax bill or other proof of ownership of the property.

_____ 5. Completed IRS Form W-9.

Upon approval by the City, a rebate of 50% of the total applicable project costs and permit fees up to a maximum of $5,000.00 will be paid to the property owner. Please allow four weeks for processing of payment.

The City assumes no responsibility for the maintenance or operation of the sanitary backflow prevention device.

I/We hereby attest that the attached documents are true and correct copies of original documents of the actual project costs incurred, and that I/We are the owner-occupants of the above property.

_____ _____

Date Property Owner

Account Number
280-1852-512-45-39

FOR CITY USE ONLY

Approved: Date:

Inspection Services _____ _____

Engineering Department _____ _____

Form **W-9**
(Rev. August 2013)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name/disregarded entity name, if different from above

Check appropriate box for federal tax classification:
☐ Individual/sole proprietor ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____

☐ Other (see instructions) ▶

Exemptions (see instructions):
Exempt payee code (if any) _____
Exemption from FATCA reporting code (if any) _____

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number
☐☐☐ - ☐☐ - ☐☐☐☐

Employer identification number
☐☐ - ☐☐☐☐☐☐☐

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below), and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here | **Signature of U.S. person** ▶ | **Date** ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. The IRS has created a page on IRS.gov for information about Form W-9, at *www.irs.gov/w9*. Information about any future developments affecting Form W-9 (such as legislation enacted after we release it) will be posted on that page.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, payments made to you in settlement of payment card and third party network transactions, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.