GARDINER CITY COUNCIL
AGENDA ITEM INFORMATION SHEET

Meeting Date	10/15/2025	**Department**	Wastewater
Agenda Item	4.b)Presentation from Olver Associates regarding the 2025 CSO Master Plan Update		
Est. Cost			

Background Information

Olver associates completed the CSO Master Plan update in July 2025. The draft report was submitted to Maine DEP on July 31, 2025.

Bill Olver of Olver Associates will present the findings in the report, their recommendations for projects to further eliminate future combined sewer overflows and the letter received from Maine DEP after their review of the report.

City staff are looking for City Councils acceptance of the 2025 Updated CSO Master Plan.

Requested Action	"City Council accepts 2025 Updated CSO Master Plan."
City Manager and/or Finance Review	
Council Vote/ Action Taken	
Departmental Follow-Up	

City Clerk Use Only

1st Reading _____ **Advertised** _____

2nd Reading _____ **Advertised** _____ **w/in 15 Days**

EFFECTIVE DATE

_____

Final to Dept _____ **Updated Book** _____ **Online** _____

UPDATED SEWER SYSTEM MASTER PLAN FOR CSO ABATEMENT

CITY OF GARDINER, MAINE
JULY, 2025

OLVER ASSOCIATES INC.
Environmental Engineers
290 South Main Street
P.O. Box 679
Winterport, Maine 04496
(207) 223-2232

OLVER ASSOCIATES INC.

ENVIRONMENTAL ENGINEERS

July 14, 2025

Mr. Stephen Aievoli, Director
Gardiner Wastewater Treatnent Facility
6 Church Street
Gardiner, Maine 04345

Dear Steve:

As requested by the City, we have prepared this draft Updated Combined Sewer Overflow (CSO) Master Plan for submission to the Maine Department of Environmental Protection (DEP). This report reflects our review, conclusions and recommendations with regard to the City's ongoing CSO reduction efforts as mandated by your current DEP wastewater discharge license.

1. GARDINER'S CSO ABATEMENT ISSUES

The City of Gardiner operates a municipal wastewater collection infrastructure that was designed to provide secondary level biological treatment to an average daily flow of about 1.65 MGD (million gallons per day). The system also receives flow from the neighboring communities of Farmingdale, Randolph and Pittston. Gardiner also takes wastewater from the Maine Turnpike Authority's West Gardiner Service Center. Like many older public sewer systems, when the treatment plant was first constructed, it was connected to a series of combined sewer mains that carried both sanitary wastewater and stormwater drainage in the same pipes. In addition, many of the pipes were aged and included leaking joints and old brick manholes that allowed excess flows to enter the sewers during periods of high groundwater. This resulted in excess flow volumes periodically entering the sewer system at levels above the capacity of the downstream wastewater treatment plant. For this reason, combined sewer overflows were built into the system to relieve excess flows when they periodically exceeded its hydraulic capacity. The Gardiner sewer system currently operates a CSO No. 003 at the Maine Avenue Pump Station that has the potential to discharge untreated, or partially treated, sewage into the Kennebec River during extreme wet weather events.

Federal and State environmental regulations, as administered by EPA and DEP, allow the occurrence of occasional wet weather CSO discharges provided that CSO communities prepare a CSO Master Plan that defines a long-term program for the abatement and eventual elimination of these discharges. The purpose of a Master Plan is to identify the origins and volumes of excess sewer system flows that are causing overflows, to identify measures to mitigate and reduce the frequency and volume of CSO discharges, and to

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prioritize a series of remediation measures and projects that can be implemented with the goal of one day eliminating CSO activity below a reasonable threshold storm event. Once a CSO Master Plan is developed and approved, the Plan must be reviewed and updated at five-year intervals. The purpose of each Update is to review CSO abatement efforts that were completed in the previous five years, to evaluate the impact that these efforts had on reducing CSO losses, and to propose additional measures that will be implemented over the next five-year period.

Gardiner first developed its original CSO Master Plan in 1995. Over the nearly three decades that have elapsed since then, the Master Plan has been updated several times. This current Update must be submitted to DEP no later than July 31, 2025.

Since 1995, several different firms have been involved in the preparation of these CSO Master Plans and Updates. Each Updated Plan has proposed various remediation measures and schedules to implement these measures. The original 1995 Master Plan recommended that Best Management Practices be implemented to maximize in-line storage in the interceptor sewers and to maximize the wet weather capacity of the treatment plant. In addition, sewer system separation or remediation at the point of excess flow origin was suggested. The treatment plant's headworks were modified to allow a peak flow of 4.5 MGD to be processed in the secondary treatment portion of the facility and a regulator was installed in the interceptor sewer along the Kennebec River to maximize storage. Several old, leaking areas of the sewer system were rehabilitated. A regulator was installed at Rolling Dam Brook to maximize the interceptor storage capacity.

As the result of later plan updates, the treatment plant's wet weather capacity was upgraded to 9.7 MGD by adding primary treatment and disinfection to 5.2 MGD of wet weather flows above the secondary plant's 4.5 MGD capacity. The pumping capacity of the Maine Avenue pump station was increased from 4.2 MGD to 7.0 MGD and a relief interceptor sewer was added to convey these increased flows to the expanded downstream treatment plant. These measures reportedly resulted in an 85% reduction of annual CSO losses during typical storm events and essentially eliminated CSO No. 002 at Rolling Dam Brook.

A later update also resulted in the construction of a 410,000-gallon storage tank at the Maine Avenue Pump Station to capture and retain peak wet weather flow surges above the system's hydraulic capacity. The tank volume was sized based upon the expected excess flow volume that could be practically pumped and treated. The tank allowed the captured

flows to be added back into the interceptor sewers after the wet weather event had subsided. Together, the combined "transport and treat" approach of the larger treatment plant and the storage tank has greatly reduced CSO activity with remaining discharges now associated primarily with extreme wet weather and snowmelt events.

While the City has expended millions of dollars to implement the above measures, it has not fully reached a level of CSO abatement that is satisfactory to DEP. A review of previous CSO Master Plan Updates suggests that other potential CSO reduction measures are still available to be implemented. These include sewer rehabilitation/separation projects in previously identified areas of the public sewer system, and ongoing cooperative efforts with the Towns of Farmingdale and Randolph to reduce their peak flow contributions into the Gardiner sewer system.

The most recent Master Plan Update was submitted to DEP in January, 2019. The Update recommended that Gardiner complete just under $200,000 in additional sewer separation projects in previously targeted areas. The Update suggested that Farmingdale be encouraged to identify and remove excess flow sources in its sewer system and that efforts be made to upgrade flow measurement equipment in Farmingdale to better assess its flow contributions. The report indicated that a study would be conducted to identify "all" private inflow sources and that they would be removed by the end of 2025. (It is likely that the intent of this statement was to focus on specific private inflow sources in the downtown area, but the word "all" could be misconstrued.) The Update indicated that the City would, by the end of 2020, conduct additional television camera and flow gauging in specific areas of the sewer system in order to prioritize rehabilitation projects. The report stated that preliminary engineering for the separation or storage of downtown building roof drains would be completed by the end of 2020. The report also included additional recommendations to improve flow measurement at CSO No. 003 and to update the City's sewer map. The Report also suggested that a new storm water interceptor pipe be built in the Arcade parking lot to intercept downtown roof drains and cellar drains.

Based upon our recent discussions, it is our understanding that DEP has advised the City that insufficient progress has been made to-date to implement the 2019 CSO Master Plan Update's recommendations. DEP has given the City until July 31, 2025 to review these issues and to report them in an Updated CSO Master Plan. The City retained Olver Associates Inc. in October, 2024 to prepare the required CSO Master Plan Update. Over the past eight months, we have done the following:

- We have reviewed and become familiar with the configuration of both the Gardiner and Farmingdale sewer systems.

- We have reviewed and become familiar with all previous Gardiner CSO Master Plan Updates including the areas of high flow that they identified.

- We have evaluated the available flow monitoring data from prior sewer studies and Plan Updates.

- We have conducted additional flow monitoring of both the Gardiner and Farmingdale sewer systems during several storm events.

- We have conducted internal plumbing inspections of various downtown properties in order to assess the extent of private inflow sources that were identified in past studies.

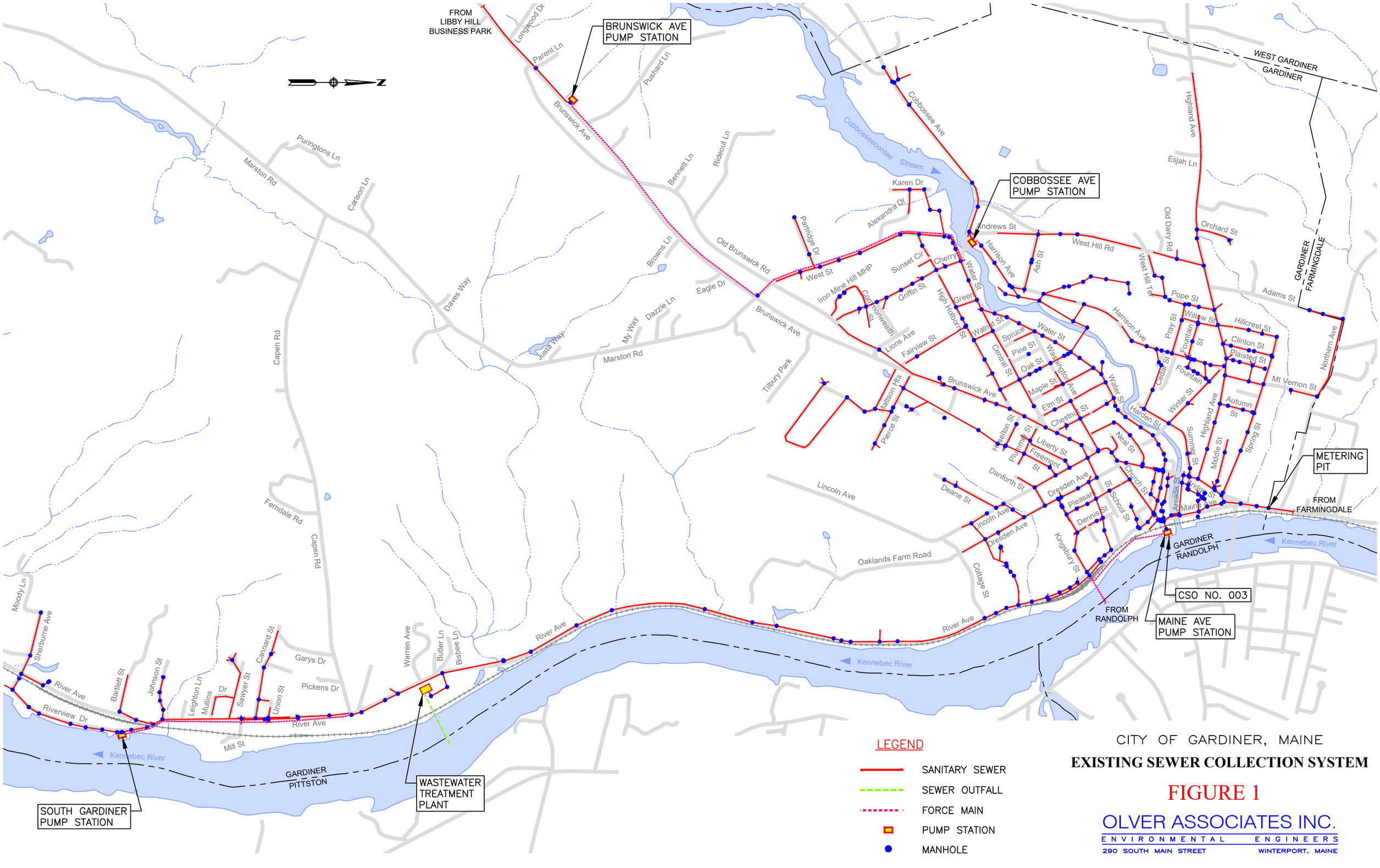
- We conducted manhole inspections throughout the sewer system to assess the condition of the manholes and connected sewer pipes and to determine the role that their condition may play in the entry of excess flows into the sewer system.

- We have prepared this CSO Master Plan Update such that it can be submitted to DEP by July 31, 2025.

This draft report summarizes the work that we conducted and presents our opinion of additional measures that the City should implement to move its CSO reduction program forward.

2. GARDINER'S EXISTING WASTEWATER TREATMENT INFRASTRUCTURE

The City of Gardiner operates a wastewater collection and treatment system that provides public sewer service to about 1,507 connected sewer users representing about 3,800 people. A network of about eighteen miles of pipe collects wastewater from about seventy percent of the City's total area. As shown on Figure 1, the majority of the collection system flows by gravity to two major pump stations that convey sewer flows to the interceptor sewers that feed the wastewater treatment plant. Two smaller pump stations bring flows in from



CITY OF GARDINER, MAINE

EXISTING SEWER COLLECTION SYSTEM

FIGURE 1

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outlying areas. The majority of the sewer system was constructed over 100 years ago. While many sewer separation and upgrade project have been completed over the last few decades, it is believed that about seventy percent of the system is still constructed with outdated vitrified clay pipe and brick manholes.

The Gardiner system also collects and treats sewage from the neighboring communities of Farmingdale, Randolph and a small part of Pittston. The Farmingdale sewer system contains about two miles of sewer pipe that covers about thirty-five percent of the Town's area. These sewers include five upstream pump stations and are connected into the City's gravity interceptor via a flow metering station. Figure 2 shows a schematic representation of the Farmingdale sewer system. The Town of Randolph's sewers consist of about 2.5 miles of pipe that serve about sixty percent of the community. These flows enter the Gardiner system via a pump station and force main that conveys flows under the Kennebec River. The Town of Randolph is independently assessing the sources of peak excess flow in its sewer system and was not part of the current evaluation. While the sewers in all three communities are essentially separated with no known catchbasins, all three systems show increased excess flows during periods of precipitation and snowmelt. This has caused excess flows to occasionally overload the hydraulic capacity of the system which has resulted in untreated sewage discharges.

Two combined sewer overflows were originally included to relieve excess flows from the system to avoid overloading the pump stations and treatment processes. The majority of the flows sent to the wastewater treatment plant are conveyed through the central pump station at Maine Avenue. CSO No. 003 at this location becomes active if the pump station and wastewater plant cannot accommodate the station's flows and after the storage tank at the pump station is filled. CSO No. 002 was previously located at Rolling Dam Brook just upstream of the treatment plant. Its role was to protect the plant from being hydraulically overloaded and flooded. As will be discussed, remediation measures related to ongoing excess flow abatement, and increased pumping and treatment capacity, have resulted in the abandonment of CSO No. 002.

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FARMINGDALE SEWER SYSTEM
SCHEMATIC

FIGURE 2

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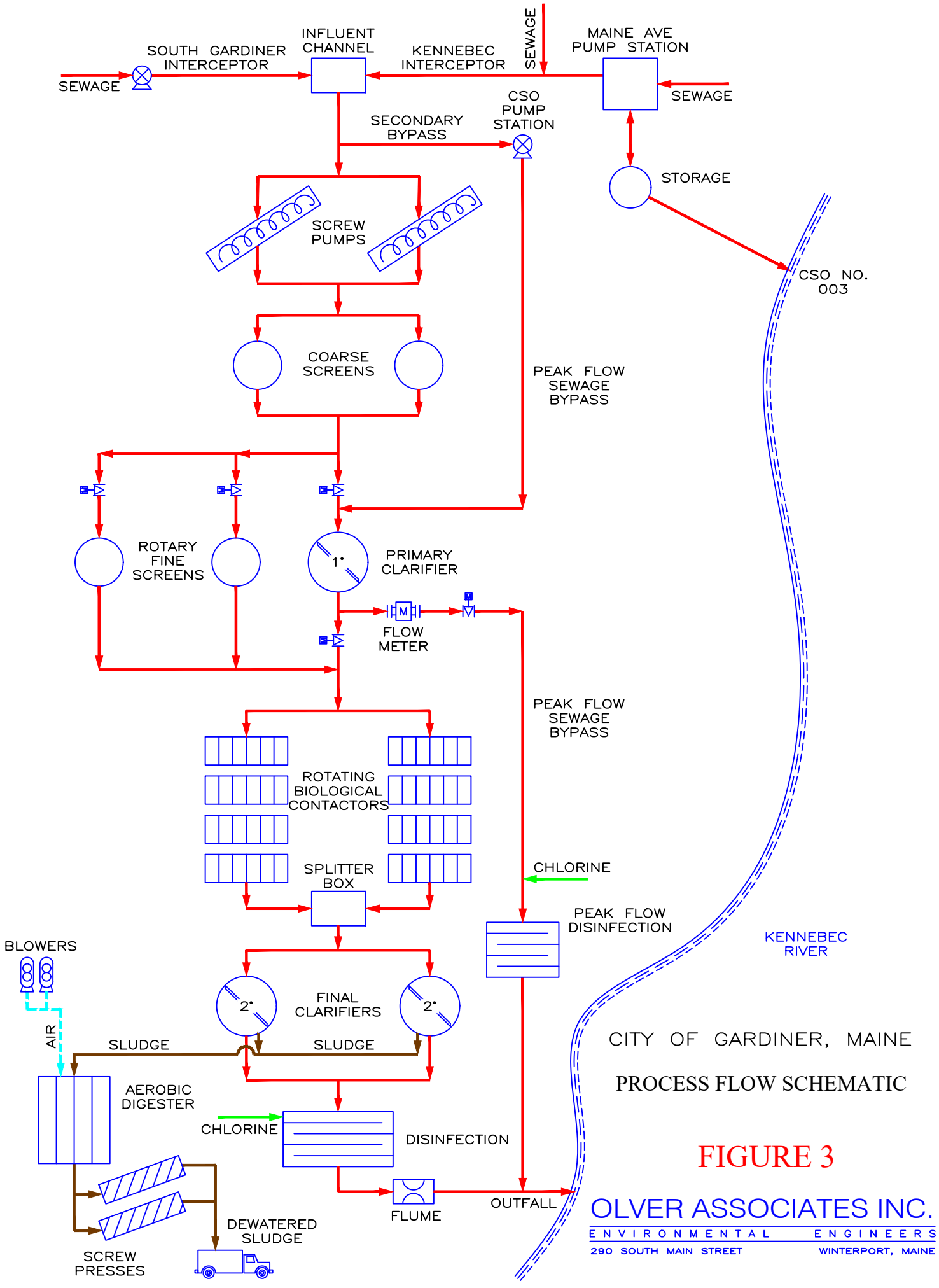
The Maine Avenue pump station discharges into the Kennebec Interceptor which sends flows by gravity to the wastewater treatment plant. A second pump station at South Gardiner also sends flows to the plant. The facility was constructed in 1981 and has received several process and capacity upgrades over the last four decades. Figure 3 shows a schematic representation of the treatment plant.

Influent into the wastewater treatment plant flows into the wet well of two parallel Archimedes screw pumps. Flows are lifted up to the plant and passed through two coarse screens followed by two grit chambers and a primary clarifier. The flows are then treated in two rotary fine screens before entering two parallel trains of rotating biological contactors (RBC), each with four RBC units, upon which microorganisms are grown to biodegrade the incoming organic wastes. Excess cell growth is sloughed off and settled into secondary clarifiers. Treated effluent is discharged into the Kennebec River after disinfection with sodium hypochlorite. An effluent Parshall flume records the volumes of discharged effluent.

During wet weather events, the 4.5 MGD capacity of the secondary treatment system can be exceeded. Excess flows above the 4.5 MGD design flow are automatically diverted by a weir into a CSO pump station which lifts the excess flow into a primary clarifier for treatment. The peak flow bypass of secondary treatment can process an additional 5.2 MGD of flow. After flow metering and disinfection, the secondary bypass flows are blended with secondary effluent and discharged to the Kennebec River. Sludge removed from the clarification reactors are processed through an aerobic digester and then pumped into two Huber screw presses for dewatering and disposal.

Figure 4 shows the intended design flow balance of the various influent sources that reach the treatment plant. The secondary treatment bypass is activated at 4.5 MGD with the excess flows above 4.5 MGD diverted to primary treatment. As noted on Figure 4, the total peak flow projected to be present in the Gardiner sewer system was estimated projected to be about to 12.0 MGD in previous sewer studies. Of this amount up to 2.3 MGD was estimated to be lost out CSO 003 at the Maine Avenue pump station with the remaining 9.7 MGD reaching the treatment plant.



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PROCESS FLOW SCHEMATIC

FIGURE 3

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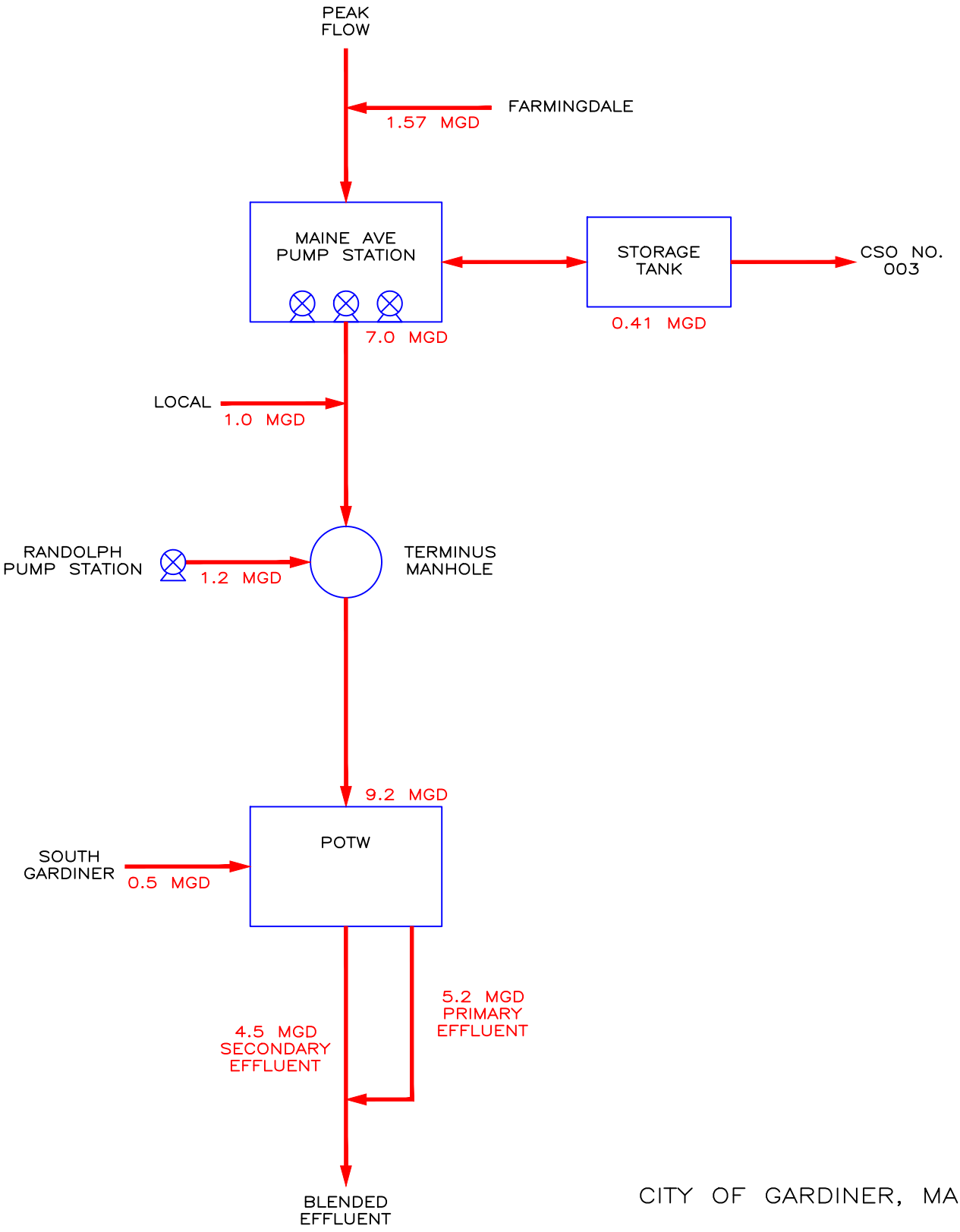

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PEAK FLOW PATHS

FIGURE 4

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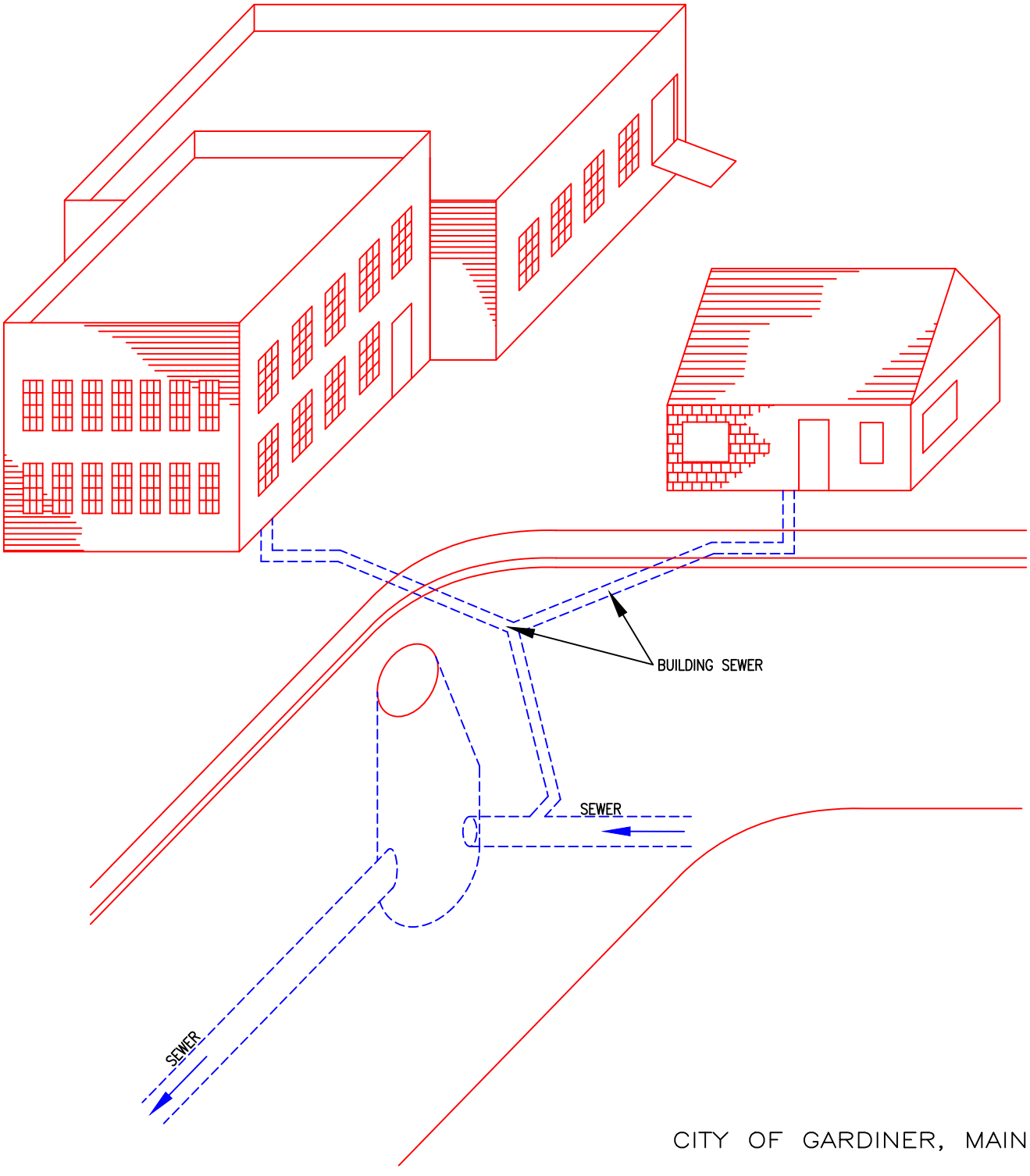
3. OBSERVED SEWER SYSTEM FLOW COMPONENTS

CSO discharges occur when the peak flow capacity of the treatment system is exceeded. The origins of these peak flows must be considered in order to determine how to mitigate CSO activity.

The appropriate CSO analysis of a wastewater infrastructure system begins with an understanding of the various origins of flows that are present in the sewer system including an analysis of the extent to which each of these flows can collectively impact the peak hourly flows that must be collected and treated. The following flow components combine together to create the basis of flow design for the treatment facility:

- Base sanitary flow is a measure of the raw sewage generated by homes, businesses, industrial applications, educational institutions and commercial users throughout the community. Sanitary flows are the flow component for which the construction of wastewater treatment facilities was generally intended. The amount of sanitary wastewater present in the sewer system can be estimated by a correlation with the City's potable water records, by considering typical design values (such as Plumbing Code data) for various categories of sewer users, or by analyzing actual flow records for the existing treatment facilities. Figure 5 shows the typical routes of sanitary flow entering into the sewer system through a series of building sewers, manholes, and sewer pipes.

- Peak hourly sanitary flow is generally estimated by applying a statistical peaking factor to the base sanitary flow. For a community of Gardiner's size, it is typical to observe a peak sanitary flow rate that is about four times the base sanitary flow rate. These peak flow periods occur throughout the day in response to fluctuating water use patterns by the sewer users. It is not uncommon to experience a maximum peak flow in the system early in the morning as sewer users rise and shower and then throughout the day in relation to noon and evening meal preparation.



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TYPICAL SANITARY
FLOW ORIGINS

FIGURE 5

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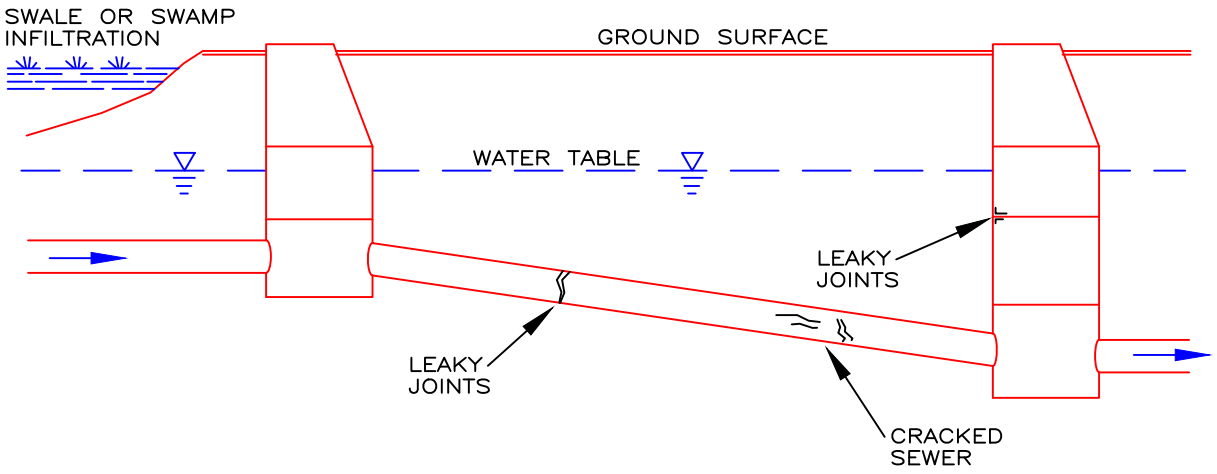
- Infiltration is the introduction of extraneous groundwater into sewer systems through defective pipes, pipe joints, service connections, and manhole walls. The rate of infiltration into the system is generally at its annual peak each spring corresponding to the highest elevation of the groundwater table. The net infiltration flow rates at various locations in the sewer system can be used to calculate the unitized infiltration rates per unit quantity of pipe in each CSO drainage area or subsystem. Where appropriate, upstream flow areas are subtracted from downstream measurements to determine the infiltration rate entering a specific reach of pipe.

  Older PVC sewers in good condition may experience infiltration rates in the 500 GPD/in-mi range. Clay sewers leak at much larger rates. EPA criteria for sewer system evaluations generally considers infiltration rates above 3,000 to 10,000 GPD/in-mi as excessive depending on the length of the sewer system. Figure 6 shows the typical origins of sewer system groundwater infiltration.

- Inflow is the largest single source of extraneous water entering the Gardiner sewerage system. It consists of stormwater which enters through catchbasins in combined sewers, and roof, cellar, and underdrains from buildings which are connected to the collection system. Inflow can also come from above ground drainage ditches or streams which intersect catchbasins or field inlets and flow into the sewer system. The magnitude of stormwater inflow into a sewer system depends on the frequency, duration, and rainfall amounts during various storm events. It also depends on ground cover conditions, soil conditions, groundwater saturation levels, and frozen ground conditions at the time of the storm. For example, a similar rain event falling on dry soil during summer conditions may have less of an impact on the sewer system than the same event falling onto frozen winter ground conditions or saturated spring groundwater conditions. A two-inch rainfall that occurs gradually over twenty-four hours will have less of an impact on the sewer system than a summer thunderstorm that causes two inches of rain to fall in a few hours. While the extent of peak inflow into the sewer system can be highly variable, the adverse impact of inflow on the sewer or treatment system is often severe. Inflow represents sudden, peak flow variations that can rapidly enter the sewer system and cause CSO overflows or process washouts. This type of sudden flow impact is in contrast to that of groundwater infiltration which tends to occur more gradually and



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TYPICAL GROUNDWATER
INFILTRATION SOURCES

FIGURE 6

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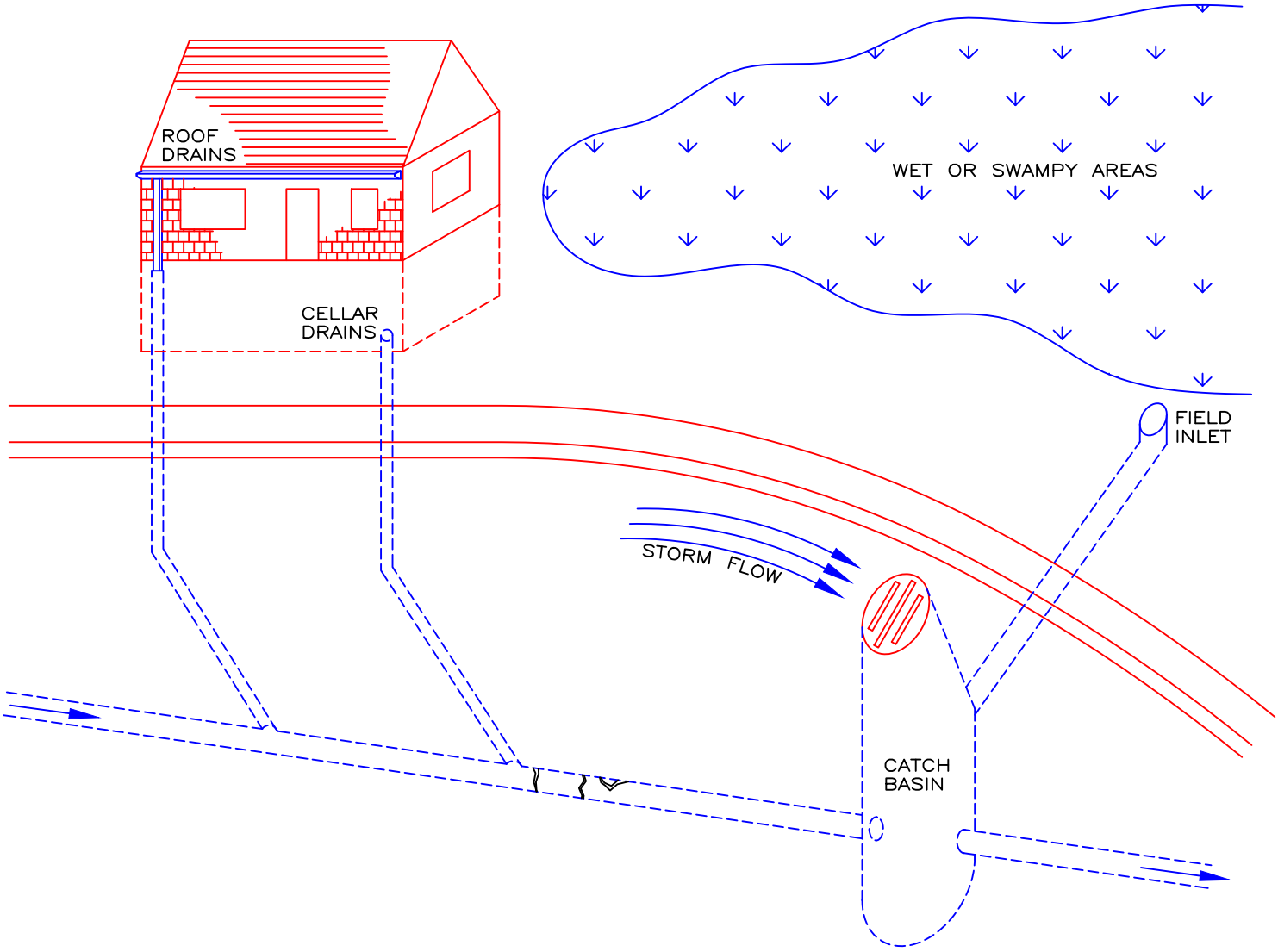
that represents a background level of flow that varies seasonally. Inflow events show up as peak, spiked flows in the sewer system and treatment plant. Figure 7 shows typical sources of sewer system inflow. There are no known remaining catchbasins connected to the system.

- Inflow induced infiltration represents the combined effects of inflow and infiltration in the sewer system. Rainfall from inflow events can cause temporary changes in the local groundwater table as precipitation soaks into the soil. This elevation of the groundwater table causes an increase in the static pressure of water over old and leaking sewer pipes and manholes with a subsequent increase in groundwater infiltration into the pipes. Inflow induced infiltration is manifested by a gradual rise in background infiltration levels that occurs after a rainfall event and that may take several days to subside after the storm event ends.

- Snowmelt represents additional wet weather inflow that occurs each spring as elevated ambient temperatures cause a gradual loss of the snowpack. Overland runoff of melting snow may find its way into catchbasins, field inlets, and streams that are the source of inflow into the sewer system. Snowmelt also results in the eventual elevation of the groundwater table under spring saturation conditions which is often coincident with the onset of peak annual sewer system groundwater infiltration.

Previous sewer system evaluation studies have consistently concluded that seasonal groundwater infiltration is not a major issue in Gardiner with regard to CSO activity. This has tended to sway past recommended remediation measures away from repairing old leaking sewer lines while focusing on direct inflow sources. In our experience, sewer systems and no identified direct inflow sources are often overwhelmed during wet weather events by the effects of inflow induced infiltration. Many communities have made major reductions in CSO activity by addressing the inflow induced wastewater sources that become active in wet weather. The significance of this flow component will be examined in greater detail during the current evaluation.



CITY OF GARDINER, MAINE

TYPICAL STORMWATER
INFLOW SOURCES

FIGURE 7

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Table 1 summarizes the original and current Basis of Design for the Gardiner wastewater collection and treatment facilities. The Maine Avenue pump station was originally designed to convey up to 4.5 MGD with all three pumps running. It discharged into a force main with a hydraulic capacity of 7.0 MGD and an interceptor sewer with a hydraulic capacity of 6.5 MGD. The downstream wastewater treatment plant was designed to process an average daily flow of 1.65 MGD and a peak hourly flow of 4.3 MGD. Due to hydraulic limitations in the treatment plant's headworks, the actual peak flow that could be processed was only 2.5 MGD. Excess flows above those amounts were lost out of the two CSO discharge points.

In order to process more flows at the treatment plant, while at the same time reducing CSO discharge losses, the Maine Avenue pump station was upgraded to increase its output to 7.0 MGD. A parallel relief sewer was added to accommodate the increased flows. The treatment plant's headworks were modified to allow up to 4.5 MGD to receive secondary treatment. A primary clarifier and peak flow disinfection system was also added to allow an additional 5.2 MGD to receive treatment. This increased the facility's peak wet weather flow capacity to about 9.7 MGD. This created a significant reduction in CSO discharge volumes by about 85%.

TABLE 1: ORIGINAL AND CURRENT SYSTEM DESIGN FLOWS (MGD)

PARAMETER	ORIGINAL	CURRENT
Maine Avenue PS		
Peak hourly flow	4.50	7.00
Wastewater Treatment Plant		
Average daily flow	1.65	1.65
Peak hourly secondary flow	4.32 (limited to 2.50)	4.50
Secondary bypass flow	-	5.20
Total plant peak flow capacity	4.32	9.70

The plant's flow data record shows that peak excess flow levels still exist in the sewer system beyond the reported design capacity of the treatment plant. This leaves the City subject to continued CSO activity until additional excess flows are removed, additional

storage capacity is provided in the sewer system, or until additional treatment plant capacity is constructed.

The plant's examined data record is only valid for the two-year period that it represents. Since peak flows are heavily influenced by the magnitude, intensity and duration of wet weather events, higher or lower plant flows may occur during storm events that vary from those observed during the examined data record. Because the treatment plant must provide sufficient capacity during all storm events, it is necessary to extrapolate the observed data to other wet weather conditions that were not observed during the two-year study period, but which could occur in the future.

A statistical review and analysis of the plant's flow data provides a valuable approach to determine and model potential peak flows in the sewer system beyond that shown by the data record. This procedure consists of a detailed examination of plant flow records and an allocation of the total flow observed to the categories of their origin, namely sanitary flow, groundwater infiltration, stormwater inflow, and snowmelt. Once design values are developed for each of these flow categories, the individual categories can be added back together to yield the theoretical total flows that might be expected to be present if the study period was extended and if the flow meter was large enough to record them. This approach is first calibrated to see how it compares to actual plant data and, if the calibration shows good reliability, it is extrapolated to look at flows that might occur during a potential design storm of a twenty-five year frequency.

The treatment plant's flow records can be analyzed to yield useful information about the origins of the plant's flow as follows:

- The total influent flow for each day of the year can be obtained from the plant's flow records. The total plant flow reflects both wet weather and dry weather days.

- The daily dry weather flow reflects sanitary influent and groundwater infiltration, but it deletes wet weather flow impacts. The daily dry weather flow can be estimated by deleting from the average any day that had precipitation. It is often necessary to also ignore the flows that occur several days after a rain event due to the lasting effects of inflow induced infiltration which tends to bias flows.

- Groundwater infiltration flows into the treatment plant can be estimated by reviewing the minimum instantaneous volumes that the plant receives over a twenty-four hour period during dry weather. Often, these minimum flows occur between 2 AM and 6 AM in the morning when very few users are sending wastewater to the system. On dry weather days, the minimum nighttime flows to the plant will essentially be only the groundwater leakage that is occurring. This represents a base background flow that occurs at a constant rate over twenty-four hours, but which may vary seasonally as the groundwater table fluctuates. Maximum levels are generally observed in the Spring at the highest groundwater elevations.

- Base sanitary flows into the sewer system can be estimated as the difference between the daily dry weather flow and the nighttime groundwater infiltration rate. During dry weather periods, these are essentially the only two flows that are present in the sewer system.

- The total base wet weather impact on the treatment plant can be estimated by analyzing the amount of additional daily flow volume above average levels that occurs at the plant during various precipitation events. This data can be unitized to MGD per inch of rainfall to gain a perspective on how various storm events impact the system. As the number of storm events increase, the unitized data generally will be shown to converge to a very reliable and replicable range of values.

- The peak hourly flow rates received at the plant will vary during periods of both dry weather and wet weather. They can be found by a review of the peak instantaneous flow values recorded by the plant's flow meter with CSO flows added as applicable.

- Snowmelt into the plant can be evaluated by an analysis of how flows into the plant change in February to April soon after ambient temperatures begin to exceed the freezing point of 32°F. There is generally a rapid rise in influent flow that lasts for one or two weeks as the snowpack recedes. If the background effects of infiltration and stormwater inflow are first assessed and then removed, the remaining impact is caused by rapid snowmelt.

The Gardiner flow data, as reviewed over a two-year period, allows some general observations to be made regarding the origins of various sources of flow into the City's sewer system as follows:

- The average daily flow to the plant on all days, including wet weather events, was 1.40 MGD.

- If wet weather days are omitted, the average daily dry weather flow was 0.90 MGD.

- Base daily sanitary flows into the system average 0.45 MGD over the year.

- Peak hourly sanitary flows can be estimated by applying a typical peaking factor of 4.0 to the base sanitary flow. On an annual average basis, this would yield an estimated peak hourly sanitary flow of about 1.80 MGD.

- Peak groundwater infiltration reaches a maximum level of about 1.40 MGD during spring high water table conditions. During the remainder of the year, base infiltration is typically about 0.50 MGD.

- The base inflow impact on the treatment plant is significant and varies over the year. The average base inflow impact causes an average daily flow rise of 1.25 MGD per inch of rainfall over the entire year.

- Peak hourly inflow impacts are the origin of most of the sewer system's CSO discharge problems. The impact of peak inflow on the plant's peak hourly flow averages 1.80 MGD of peak flow per inch of rainfall.

- Snowmelt by itself causes an added base flow of about 0.30 MGD to reach the plant after adjustments are made for any rainfall, inflow, and infiltration that occurred at the same time.

In order to extrapolate the observed data to other storms beyond the observed two-year period of record, it is useful to consider the magnitude of other rainfall events that are typical for the Gardiner area. Table 2 defines the amount of rainfall that would be expected for various magnitude storm events. The storm return period listed in the table indicates the statistical probability of a storm of that size occurring at the specified interval. For

example, a one-year storm event of 2.50 inches/day has a statistical probability of occurring once each year.

TABLE 2: STORM MAGNITUDE FREQUENCY FOR GARDINER

STORM RETURN FREQUENCY	STORM MAGNITUDE (INCHES/DAY)	STORM INTENSITY (INCHES/HOUR)
3 Month	1.50	0.06
6 Month	1.90	0.08
9 Month	2.30	0.10
1 Year	2.50	0.11
2 Year	3.00	0.13
5 Year	3.90	0.16
10 Year	4.60	0.19
25 Year	5.40	0.23
100 Year	6.50	0.27
500 Year	7.80	0.33

Since Gardiner will eventually be required to eliminate its CSO discharges below a threshold storm, it is typical to estimate peak flows in the sewer system based on a significant inflow event such as a 25 year frequency storm of 5.4 inches/day of rainfall. Table 3 extrapolates the expected sewer system peak flows that might occur using a design rain storm of 5.4 inches/day:

TABLE 3: FLOW BASIS AT 25 YEAR STORM (MGD)

FLOW PARAMETER	AVG. DAILY DRY	MAX. DAILY DRY	PEAK HOURLY DRY	MAX. DAILY WET	PEAK HOURLY WET
Sanitary flow	0.45	0.45	1.80	0.45	1.80
Infiltration	0.50	1.40	1.40	1.40	1.40
Snowmelt	0.00	0.00	0.00	0.30	0.30
Inflow	0.00	0.00	0.00	6.75	9.72
TOTALS	0.95	1.85	3.20	8.90	13.22

From the data presented in Table 3, the following conclusions can be reached regarding the typical 25-year frequency storm basis of design for the Gardiner wastewater treatment system at current loading levels:

- The treatment plant will typically need to treat a minimum dry weather flow of about 0.95 MGD at current loading levels.

- Maximum daily dry weather flows in the Spring will typically be 1.85 MGD prior to the onset of peak groundwater conditions.

- Peak hourly flows to the plant will normally be up to 3.20 MGD on dry weather days.

- The maximum daily sustained flow that might enter the sewer system on wet weather days is about 8.90 MGD at current loading conditions. This is within the 9.70 MGD hydraulic capacity provided in the upgraded plant design.

- The maximum instantaneous peak hourly flow rate that might be present in the sewer system during a design storm of twenty-five years is about 13.22 MGD. This instantaneous peak exceeds the hydraulic capacity of the pump stations and the plant. The excess flows above that which the pumps and plant can pass and treat will be bypassed upstream in the CSO. This suggests that CSO discharges of just over 3.52 MGD might still occur during extreme wet weather events. Since the sewer system flow is currently mitigated by the 0.41 MG storage tank that was added in 2016, this suggests that an additional 3.11 MG of flow must be removed from the system, stored, or treated to contain a 25-year storm. As will be discussed, there are presently deteriorated area of the sewer system where excess flows of this magnitude were measured.

The above flow analysis shows the benefit of removing peak flows from the sewer system to reduce both excess flow volumes and excess flow rates. As these flows are reduced, CSO activity will decrease. In order to develop a CSO abatement program that is both cost-effective and successful in attaining its goal of complete CSO elimination, it is important to define the highest priority excess flow removal projects for implementation. In evaluating these priorities, it is important to do so with a sense of how much excess flow that each project will remove from the sewer system.

3. OBSERVED CSO ACTIVATION EVENTS

Based on the above discussion on sewer system flow volumes as compared to the treatment plant and pump station's peak flow capacity of 7.0 and 9.70 MGD, respectively, it is evident that CSO activity can still occur in Gardiner during peak wet weather events. Table 4 summarizes the recorded CSO activity that has occurred in Gardiner over the last twenty-five years:

TABLE 4: OBSERVED CSO ACTIVATION EVENTS

YEAR	NO. CSO EVENTS		CSO VOLUME (MG/YR)	UNITIZED CSO LOSS (MG/EVENT)
2000	13		8.28	0.637
2001	9		6.49	0.721
2002	13		11.53	0.887
2003	24		13.15	0.548
2004	11		5.11	0.465
2005	41		46.62	1.137
2006	14	*Secondary bypass on line*	10.27	0.734
2007	2		2.50	1.250
2008	16		5.00	0.313
2009	2		1.38	0.690
2010	12		10.45	0.871
2011	7		4.66	0.665
2012	9		4.46	0.496
2013	4		1.29	0.323
2014	3		1.95	0.650
2015	2		2.30	1.150
2016	1	*Storage tank on-line*	0.67	0.670
2017	5		2.88	0.576
2018	5		4.89	0.978
2019	5		2.88	0.576
2020	5		9.74	1.950

2021	3	1.99	0.663
2022	1	0.06	0.060
2023	2	18.24	9.120
2024	0	0.00	0.000
2025	0 (to-date)	0.00	0.000
AVERAGE	8	6.80	1.040

The data presented above in Table 4 shows that the City of Gardiner has averaged about 8 CSO discharge events per year over the past twenty-five years. Prior to conducting a secondary bypass at the treatment plant for peak wet weather flows, the City was averaging 18 CSO events per year. The number of discharge events dropped by 67% to about 4 per year when the secondary bypass was put on-line. Ten years later, the City put its 410,000 gallon storage tank on-line at the Maine Avenue pump station. This further reduced average CSO events down to about three per year over the last few years.

Over the last twenty-five years, annual CSO discharge volumes have ranged from zero to-date in the current year up to a high of 47 MG/year back in 2005. Over the entire time period, the annual average has been about 6.80 MG/year. In the early years of the program, the City averaged annual CSO discharges of about 14.50 MG/year. This dropped to 3.50 MG/year after the secondary bypass became active. In the nine years since the 410,000 gallon storage tanks was put on-line, annual average CSO discharges have been about 4.52 MG/year. This could be the result of greater intensity storms, increased deterioration of the upstream sewer systems, or the fact that the 2023 data skews the averages. If the 18.24 MG/year discharge that was recorded in 2023 is omitted from the data record, the annual CSO discharge volume would be decreased from 4.52 MG/year down to 2.80 MG/year.

The Table 4 data also summarizes the amount of CSO loss per each event. Over the last twenty-five years, annual CSO losses have averaged 1.04 MG per event. During the first seven years of the program, the City was averaging typical CSO losses of about 0.75 MG/event. When the secondary bypass was put on-line, CSO losses decreased by about seven percent to about 0.70 MG/event. Since the 410,000 gallon storage tank has been active, CSO discharges have averaged 1.55 MG/event. This data is skewed by the large losses received during a sizable storm in 2023. If that outlier data point is ignored, the average annual CSO losses per event would be about 0.60 MG/event. This suggests that the storage tank is having the benefit of reducing the number of active CSO events per year; however, once the tank fills up during larger storms, the amount of excess flow

volume upstream in the sewer system has not been greatly reduced. The tank has the benefit of allowing less active CSO days, but on days when the tank becomes filled, about the same volume of excess flows are diverted from the tank. This tends to reinforce the focus on reducing excess flows upstream to the extent possible.

The data shown below in Table 5 depicts the impact that rainfall has on CSO discharge volumes. As previously discussed, average annual CSO discharges over the past twenty-six years have been about 6.80 MG/year. Over this same time period, annual rainfall has averaged 46.65 inches/year. This represents a typical CSO volume loss of about 0.143 MG/inch of rainfall.

TABLE 5: IMPACT OF RAINFALL ON CSO LOSSES

YEAR	CSO VOLUME (MG/YR)		RAINFALL (IN/YR)	CSO LOSSES (MG/IN)
2000	8.28		50.27	0.165
2001	6.49		35.68	0.182
2002	11.53		42.60	0.271
2003	13.15		50.40	0.261
2004	5.11		37.82	0.135
2005	46.62		68.38	0.682
2006	10.27	*Secondary bypass on-line*	25.80	0.398
2007	2.50		43.00	0.058
2008	5.00		60.47	0.083
2009	1.38		55.31	0.025
2010	10.45		55.91	0.187
2011	4.66		50.96	0.091
2012	4.46		49.36	0.090
2013	1.29		49.49	0.026
2014	1.95		54.07	0.036
2015	2.30		47.56	0.048
2016	0.67	*Storage tank on-line*	42.12	0.016
2017	2.88		40.53	0.071
2018	4.89		51.95	0.094
2019	2.88		38.43	0.075

2020	9.74	48.52	0.201
2021	1.99	27.77	0.072
2022	0.06	41.30	0.002
2023	18.24	46.60	0.391
2024	0.00	45.70	0.000
2025	0 (to-date)	26.71 (to-date)	0.000
AVERAGE	6.80	46.65	0.141

The data shown above in Table 5 depicts the impact that rainfall has on CSO discharge volumes. As previously discussed, average and CSO discharges over the past twenty-six years have been about 6.80 MG/year. Over this same time period annual rainfall has averaged 46.65 inches/year. This represents a typical CSO volume loss of about 0.141 MG/inch of rainfall.

During the first seven years of the City's CSO abatement program, typical annual CSO discharges averaged about 0.30 MG/inch of rainfall. The construction of the secondary bypass made a significant reduction in CSO losses to only 0.07 MG/inch of rainfall, a decrease of about seventy-seven percent. With the new 410,000 gallon storage tank on-line, this value is now 0.10 MG/inch of rainfall. If the 2023 data is removed, that average becomes about 0.065 MGD/inch of rainfall. This suggests that once the storage tank is filled during high intensity storms, the amount of excess flow that is discharged has remained constant. The storage tank appears to have had the benefit of reducing CSO events; however, once the tank is full during large wet weather events, the amount of excess flows leaving the system remains slightly lower. This indicates that the reduction of excess flows upstream in the sewer system should likely be the next step in further reducing CSO discharge volumes in Gardiner.

Table 6 below shows the average rainfall intensity that has been associated with active CSO events over the last twenty-six years. The data suggests that an average intensity of 1.05 inch/day was associated with CSO events in the early days of the program. This was equivalent to under a three-month frequency storm event. After the secondary bypass was constructed, the average rainfall amount associated with a CSO event increased to 2.61 inches/day. This is equivalent to just over a one-year storm event. After the 410,000 gallon storage tank was placed on-line, the threshold rainfall intensity during CSO activity has averaged 3.42 inches/day which is between a three and a five-year frequency storm. The data shows that, as the City completes additional CSO abatement projects, it is taking larger

storm events to cause CSO discharges. This suggests that the trend is moving in the right direction. The goal of the City's CSO program should be to increase the level of storm that leads to a discharge such that it eventually occurs only at an extreme threshold storm. Typically, a twenty-five year storm has been a reasonable threshold below which no CSO activity will occur.

TABLE 6: TYPICAL THRESHOLD STORMS DURING CSO EVENTS

YEAR		TYPICAL STORM (INCHES/DAY)
2000		1.10
2001		0.95
2002		1.06
2003		0.81
2004		1.10
2005		1.18
2006	*Secondary bypass on line*	1.11
2008		1.89
2009		2.55
2010		1.51
2011		1.14
2012		1.81
2013		1.85
2014		2.39
2015		4.20
2016	*Storage tank on-line*	6.15
2017		3.93
2018		6.74
2019		3.93
2020		2.15
2021		2.06
2022		1.70
2023		3.45

It is clear that the City's efforts to-date have been moving the CSO abatement program forward. It is also evident that the potential for continued CSO activity still exists. The further reduction of CSO discharges will require measures to either add treatment capacity, store more water, or remove excess flows at their source upstream of the sewer system. To-date, Gardiner has already expanded its treatment plant's capacity by adding a bypass of secondary treatment. It has also constructed a 410,000 gallon storage tank at the Maine Avenue pump station. The City still has miles of 100 year old sewers, many of which are constructed with clay pipe and brick manholes. It would appear that upstream sewer remediation should be the next focus to remove the excess flows that lead to CSO discharges. The benefit of focusing on the sewer system is that it is likely that these old sewers will need remediation in the near future to address their structural condition. Prioritizing the repair of the leakiest old sewers will provide the dual benefit of extending their useful life into the next century while concurrently reducing CSO losses.

4. PREVIOUS SEWER SYSTEM EVALUATIONS AND CSO MASTER PLANS

Over the past fifty years, the City of Gardiner has commissioned numerous sewer system evaluations, a CSO Master Plan, and several Updates to the Master Plan. These reports can be summarized as follows:

- 1975 SEA CONSULTANTS INFILTRATION/INFLOW ANALYSIS

  As part of the wastewater treatment plant's planning and design process, SEA Consultants conducted an excess flow evaluation of the City's sewer system in 1975. The purpose of this evaluation was to develop a basis of design for the treatment plant's flow capacity by determining the extent of excess flows in the upstream sewer system. The study concluded that background groundwater infiltration did not appear to be an issue, but suggested that wet weather direct inflow should be addressed. The study proposed that all known connected catch basins be removed and that some areas of the high flow be remediated.

  The 1975 report concluded that most of the City's sewer manholes were old and constructed of brick and mortar. Much of the sewer system was found to contain clay pipe. These types of sewers and manholes have many potential points of entry for groundwater infiltration into the sewer system; however, base infiltration was not believed to be an issue. The report did not fully address the potential of inflow

induced infiltration that can enter these types of sewers during wet weather. In our experience, we have found that excessive amounts of excess flow can enter sewer systems as inflow induced infiltration during wet weather, even though there are few known points of direct inflow such as catchbasins. We suspect that this may prove to be the cause in Gardiner, given the fact that CSO discharges remain.

The 1975 study found that excess inflow was present in twelve areas of the sewer system. Eight catchbasins were recommended for removal on Spring, Bridge, Middle, Clinton and Autumn Streets. Catchbasins were suggested for removal on Pine, Washington and Oak Streets. Three catchbasins were suggested for removal on Central Street. Forty catch basins were recommended to be separated in the downtown area between Church, Mechanic and Water Streets and Brunswick Avenue. Catch basins on Dresden and Pleasant Streets were also slated for removal via the construction of a new cross country storm drain to the Kennebec River.

All excess flows in the remaining areas of the sewer system were considered to be from private inflow sources such as cellar, roof and foundation drains. It was concluded that it would be more cost-effective to leave those sources in the sewer system for treatment at the downstream plant or to be discharged through the CSO points as was the custom at that time. It is important to note that fifty years ago, the focus was to develop a reasonable design capacity basis for the treatment plant's construction. The elimination of CSO discharges during peak flow events was not a major concern. It appears that the identified sources of direct inflow were removed as part of the 1981 design and construction of the wastewater treatment plant. The facility was designed to process a peak hourly flow capacity of 4.3 MGD. Two CSO structures were installed over time to bypass excess peak flows above this capacity out to the Kennebec River and the Cobbosseecontee Stream.

- 1995 WHITMAN & HOWARD ORIGINAL CSO MASTER PLAN

Twenty years after the 1975 SEA excess flow study, the wastewater treatment plant was already in operation and environmental regulations had began to focus on the reduction or elimination of CSO discharges. The City retained Whitman & Howard to prepare its first CSO Master Plan. The 1995 report noted that Gardiner had completed five additional excess flow monitoring reports in the ten-year period between 1984 and 1994. The focus of those reports was to identify and address the

presence of excess flows in the Gardiner sewer system. The report noted that the treatment plant's headworks had several inherent hydraulic limitations that restricted its peak flow capacity to only 2.5 MGD instead of the 4.3 MGD for which it was designed. This resulted in the additional loss of excess flows through the two CSO points upstream in the sewer system.

The 1995 CSO Master Plan suggested that the City modify the treatment plant's headworks to remove the hydraulic limitations that would allow peak flows to reach 4.5 MGD. The report also recommended relocating the Cobbosseecontee CSO to the Kennebec River to allow greater dispersion of the CSO discharges. It suggested adding improved screening and pump controls at the Maine Avenue pump station to improve its efficiency and to modify its CSO such that all discharges would occur after screening. The use of existing interceptor sewer storage capacity was suggested by the addition of a regulator at CSO 002. The report noted that short term CSO mitigation should consist of enhanced Best Management Practices (BMP) in the sewer system as well as maximizing flows through the treatment plant through a High Flow Management Plan. The report looked ahead to future capital improvement projects that might include storage of peak flows and the removal of excess flows in previously identified areas of the sewer system including: Highland Avenue, Brunswick Avenue, Oak Street, Sherburne Street and Dresden Avenue. The report also suggested a continued focus on private inflow removal.

- 2000 EARTH TECH CSO MASTER PLAN UPDATE

The City retained Earth Tech in 2000 to prepare a CSO Master Plan Update which was later revised in 2002. The report noted that most of the short term measures suggested in the 1995 Master Plan had been completed, but that CSO discharges were still occurring. The report noted that CSO No. 002 at Rolling Dam Brook was designed to protect the downstream treatment plant from flooding and that it was nearly twice as active as upstream CSO No. 003 at the Maine Avenue Pump Station. It was suggested that a secondary bypass be constructed at the treatment plant consisting of primary clarification and high rate disinfection. This would increase the total peak flow capacity of the plant to 9.7 MGD with 4.5 MGD going through secondary treatment and an additional 5.2 MGD receiving primary treatment and disinfection. This would allow for the elimination of CSO No. 002 and would leave the City with only a single CSO at the Maine Avenue pump station. In addition, it

was suggested that the Maine Avenue pump station capacity be increased from 4.2 MGD to 7.0 MGD to reduce CSO losses at the station.

The Master Plan Update also included additional excess flow monitoring upstream in the sewer system with a focus on about 11,000 LF of sewer that had been identified as being inflow sources during previous studies. The program consisted of placing flow meters at seven locations in the sewer system. Further investigation was conducted in areas where high flows were measured. The repair of identified sewer deficiencies was recommended. Addressing sewer system private inflow removal was suggested for the future if needed. The focus of the 2000/2002 CSO Master Plan Update was to maximize the amount of flow that could reach the plant for treatment instead of being lost out the one remaining CSO.

- 2003 WRIGHT-PIERCE CSO PROJECT DESIGN REPORT

In 2003, Wright-Pierce prepared a Preliminary Design Report for the implementation of the CSO abatement measures defined in the 2000/2002 Master Plan Update. The report contained design criteria for a major capital project to maximize the flow volumes conveyed to, and treated by, the wastewater treatment plant. The proposed project included the design and implementation of increased capacity at the Maine Avenue pump station to 7.0 MGD, the construction of a relief interceptor sewer to increase the capacity of the Kennebec Interceptor to 9.0 MGD, and the construction of a secondary bypass at the treatment plant to increase its current capacity to 9.7 MGD. It was suggested that further upstream excess flow reduction projects might eventually be needed to achieve full CSO reduction, but it recommended that the implementation of these measures be delayed so that the benefit of the current project could be evaluated. The proposed pump station and treatment plant capacity improvements were completed in 2006.

- 2008 WRIGHT-PIERCE CSO MASTER PLAN UPDATE

The City commissioned a CSO Master Plan Update in 2008 to evaluate how the previous primary and treatment capacity projects had reduced CSO activity. The results were very promising. Prior to the capacity improvement projects, CSO losses had averaged about 15.5 MG/year in the prior six years. Since completion of the projects in 2006, CSO losses had been reduced to 2.2 MG/year, a reduction of about

85%. Before the 2006 project completion, the CSO loss rate had averaged 0.33 MG/inch of rainfall. The completed pump station and treatment plant capacity improvements had reduced the CSO loss rate to an average of 0.048 MG/inch of rainfall, an average reduction of 85%. Despite these positive results, CSO losses had not yet been reduced to zero.

The Master Plan Update recommended that the next major project be the construction of a storage tank at the Maine Avenue pump station. It suggested that to achieve complete CSO reduction beyond that, it would be necessary to conduct upstream excess flow reduction in the sewer system. It was suggested that sewer remediation work be delayed until after the completion of the storage tank project so that its CSO reduction benefits could be assessed. The 410,000 gallon storage tank project was completed in 2016. Over this period of time, the City continued to conduct additional excess flow evaluations upstream in the sewer system.

- 2012 DIRIGO ENGINEERING LIMITED EXCESS FLOW ASSESSMENT

In 2012, Dirigo Engineering was retained to conduct a limited assessment of excess flow sources in the northern area of the Gardiner sewer system. Flow meters were placed in the sewers over a six-week period to measures flow from Farmingdale, Spring Street, Middle Street, and Bridge Street. Flow data showed evidence of direct inflow in many areas. Spring Street was found to show evidence of inflow induced infiltration with peak flows taking up to three days to subside after major rain events. Flow data from Farmingdale showed evidence of inflow, but data during rainfall events appeared skewed due to surcharging of the Farmingdale flow meter which flooded during some peak flows. The report suggested that further smoke testing, dye testing and camera inspection would be beneficial in the Spring Street and Middle Street areas and that an infiltration/inflow assessment would be beneficial in Farmingdale.

- 2014 HOYLE TANNER SEWER SYSTEM EVALUATION SURVEY (SSES)

In 2014, Hoyle Tanner conducted a sewer system evaluation survey of sewers in the areas of Spring Street, Middle Street, Highland Avenue, Washington Street, and Summer Street. These sewers had been identified as having excess flows in previous evaluations. They were also located upstream of CSO No. 003 at the Maine Avenue

pump station. The 2014 study included TV camera work, manhole inspections, and flow monitoring. The report noted that many sewers in these areas were constructed of clay pipe. Some of these pipes were in poor condition and prevented camera access due to offset joints and deformed pipe cross-sections. The report also reviewed the possibility of combined sewers still being present in the Arcade area behind several downtown buildings on Water Street. Cellar flooding and sewer backup into the buildings had been reported in the past.

The 2014 report included several recommendations for sewer system improvements. This included the relining of sewers on Highland Avenue and Spring Street. Three improper sewer service taps on Maine Avenue were recommended for repair to reduce the possibility of inflow entering the sewer from the Cobbosseecontee Stream crossing. The extension of a separate storm drain was suggested in the Arcade area to separate any connected storm drains from downtown buildings. Cellar flooding in Water Street buildings had been reported in the past. The presence of possible sewer and storm drain cross-connections was based upon responses from questionnaires sent to property owners. Further investigation was recommended for future work in adjacent areas such as Harden and Middle Streets. The rehabilitation of several manholes in the study area was suggested to correct observed defects.

- 2019 WATER QUALITY & COMPLIANCE SERVICES CSO MASTER PLAN UPDATE

In 2019, Water Quality & Compliance Services prepared a CSO Master Plan Update for the City of Gardiner. The report noted that only a limited time had elapsed since the 410,000 gallon storage tank had been placed in service and that additional time was needed to fully evaluate the CSO reduction benefits of the tank. In the meantime, it was suggested that the City move forward to addressing issues in the upstream sewer system, particularly in areas of old clay pipe where specific defects had been identified. This included the repair of several manholes that had been recommended for repairs in previous evaluations. The report also suggested continuing efforts with Farmingdale and Randolph to identify and remove any sources of peak excess flow in their sewer systems.

In summary, the City has conducted numerous studies of its sewer system over the past five decades. The presence of excess wet weather flows in the system has been a common point of discussion as has been the age and condition of its many brick manholes and clay pipes. The City's recent focus to comply with CSO abatement regulations has been to provide additional storage, pumping and treatment capacity to minimize CSO losses. This approach has been successful in reducing CSO discharges by about 85 percent; however, the City has yet to reach the ultimate goal of zero discharges during a reasonable threshold storm event. Most of the previous sewer system studies have suggested that it will be necessary to remove excess flows upstream in the sewer system to completely eliminate CSO activity. Some of the earlier studies suggested that private inflow sources may need to be addressed in order to attain that goal. It is always difficult to completely remove private sources and this is often the least popular task of an excess flow removal program. Before taking that step, it makes more sense to first determine if any significant sources of excess flows are present and readily removable in the public side of the sewer system. Given the impact that inflow induced infiltration can have on allowing wet weather excess flows to enter a sewer system, at first glance, it would appear that the clay pipes and brick manhole sections of the system might present some good opportunities for excess flow removal. A detailed examination of the sewer system was conducted to evaluate that option.

5. EXCESS FLOW REDUCTION MEASURES COMPLETED TO-DATE

Since initial plans for the construction of Gardiner's wastewater treatment plant first started fifty years ago back in 1975, the presence of excess flows in the sewer system has been an ongoing topic of concern. At first, an evaluation of excess flows was needed in order to develop proposed sizing criteria for the new treatment plant. Excess flows above the treatment system's capacity were not a critical concern at that time given the ability to discharge peak wet weather flows out the CSO points. With the subsequent regulatory focus on the need to reduce and eventually eliminate CSO discharges, excess flow reduction has continued to be an ongoing issue.

Over the last five decades, the City has implemented many measures to reduce the volume of CSO losses. This has included many of the projects that are summarized below in Table 7.

TABLE 7: PREVIOUSLY IMPLEMENTED EXCESS FLOW REDUCTION MEASURES

YEAR	PROJECT
1975 to 1993	• Separated all known catchbasins from sanitary sewer system • Replaced 6,200 LF of sewer at Skechans Field • Replaced 6,500 LF of sewer in Route 24/Dresden Ave. area • Replaced 1,700 LF of sewer High Holborn Street • Replaced 1,500 LF of sewer and storm drain on Church Hill • Replaced 2,200 LF of sewer and drain on Highland Avenue • Upgraded 2,900 LF of storm drain on Middle Street • Upgraded 2,900 LF of storm drain on Spring Street • Upgraded 1,700 LF of storm drain on Fountain Street • Complete upgrade of 8,000 LF of Water Street sewer and drain
1995 to 1997	• Modified POTW headworks capacity from 2.5 to 4.5 MGD • Modified CSO No. 002 to improve interceptor storage • Relocated CSO No. 003 to Maine Avenue pump station • Improved Maine Avenue pump station peak flow efficiency • Separated 2,000 LF of sewer on Brunswick Avenue
1997 to 2000	• Separated/upgraded 1,400 LF of sewer and drain on Oak Street • Replaced 800 LF of sewer on Bartlett Street • Replaced 600 LF of sewer on Sherburne Avenue
2000 to 2006	• Upgraded POTW capacity to 9.7 MGD with secondary bypass • Upgraded Maine Avenue pump station capacity to 7.0 MGD • Upgraded interceptor sewer capacity to 9.0 MGD • Eliminated Rolling Dam Brook CSO No. 002

- Replaced 1,500 LF of River Road sewer
- Upgraded 650 LF of sewer and drain on Autumn Street
- Upgraded 500 LF of sewer and drain on Cherry Street
- Replaced 1,200 LF of sewer on Griffin Street
- Replaced 900 LF of sewer and drain on Clinton Street
- Replaced 200 LF of storm drain on Spring Street
- Replaced 1,350 LF of sewer on Fountain Street
- Replaced 700 LF of sewer on Plaisted Street
- Replaced 900 LF of sewer on Pope Street

2007 to 2015

- Relined 3,600 LF of sewer on Highland Avenue
- Relined 1,700 LF of sewer on Cobbossee Avenue
- Relined one section of Kingsbury Street sewer

2016 to 2025

- 410,000 gallon storage tank on-line
- Ongoing monitoring of storage tank impacts
- Spot clay line repairs on Chestnut Street
- Spot clay line repairs on Cannard Street
- Replace 900 LF on Church Street

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6. EVALUATION OF CURRENT SEWER SYSTEM EXCESS FLOW SOURCES

As discussed, Gardiner's wastewater collection and treatment infrastructure has been upgraded over the years such that it has sufficient capacity to process peak flows in the sewer system the majority of the time. Since the installation of the 410,000 gallon storage tank, the one remaining CSO at the Maine Avenue pump station has been active only five times per year at most. The average CSO loss on days of activity have been only 106,000 GPD/inch. Projecting ahead to a twenty-five year storm of 5.40 inches/day, this suggests that an average of 575,000 gallons will be discharged during a typical threshold event with the exact amount depending on the duration and intensity of the wet weather event. Other factors such as concurrent groundwater and snowpack levels during the wet weather event will also have an impact.

Excess flow removal projects in public areas of a sewer system are considered successful if they remove about fifty percent of the groundwater infiltration or the inflow induced infiltration. The remaining fifty percent is often from private sources that are more difficult to remove from a technical, practical and political level in addition to the added costs and risks of removing flow from private property. This suggests that Gardiner would need to target average sewer excess flow areas of at least 1.2 MGD of peak hourly flow in order to reach a zero CSO goal. CSO abatement is not an exact science and actual amounts may vary, but this provides a starting format for initial discussions as excess flow removal projects are planned.

In order to evaluate potential sources of excess flow in the sewer system, flow gauging of sanitary sewers throughout Gardiner and Farmingdale were conducted in March, April and May of 2025. Manhole inspections were completed throughout the system in order to assess the condition and construction material in each manhole. Available plans of the sewer system were reviewed to determine the size and materials of pipes in each area. A review of historical flow records shows that normal baseline infiltration during spring high peak remains within the system's hydraulic capacity. CSO events typically occur during extreme wet weather events and often with concurrent snowmelt. For this evaluation, peak flows throughout the sewer system were measured during two wet weather events, one on April 26, 2025 and a second on May 10, 2025. During the initial wet weather event, 0.85 inches of precipitation fell during the monitoring period. During the second storm, about 0.80 inch of rain fell. Flow measurements were taken at key nodes throughout the sewer system with raw data unitized to GPD/inch of rainfall. Measured flows throughout the sewer system were calibrated to match the metered flows that were recorded at the treatment plant. The results of the two storms were averaged to present an estimated value for each measured area. The purpose of this average was not intended to provide exact flow measurements at each location since there are many factors related to field measurement in sewers that can impact the accuracy of the readings. Instead, the goal was to develop relative readings between various areas of the sewer system such that potential excess flow reduction projects could be prioritized with those having the greatest CSO impact being scheduled first.

Given the age and condition of the sewer system, measurable sources of excess flow were identified in multiple areas. However, since the goal of a CSO Master Plan is to resolve CSO discharges, the priority of the excess flow removal projects should be based upon

high flow sources upstream of the Maine Avenue pump station's CSO No. 003. Areas of the sewer system below the pump station will need remediation as well, but unless structural issues move them up on the schedule, they should be planned as later capital improvements beyond the initial CSO Master Plan schedule.

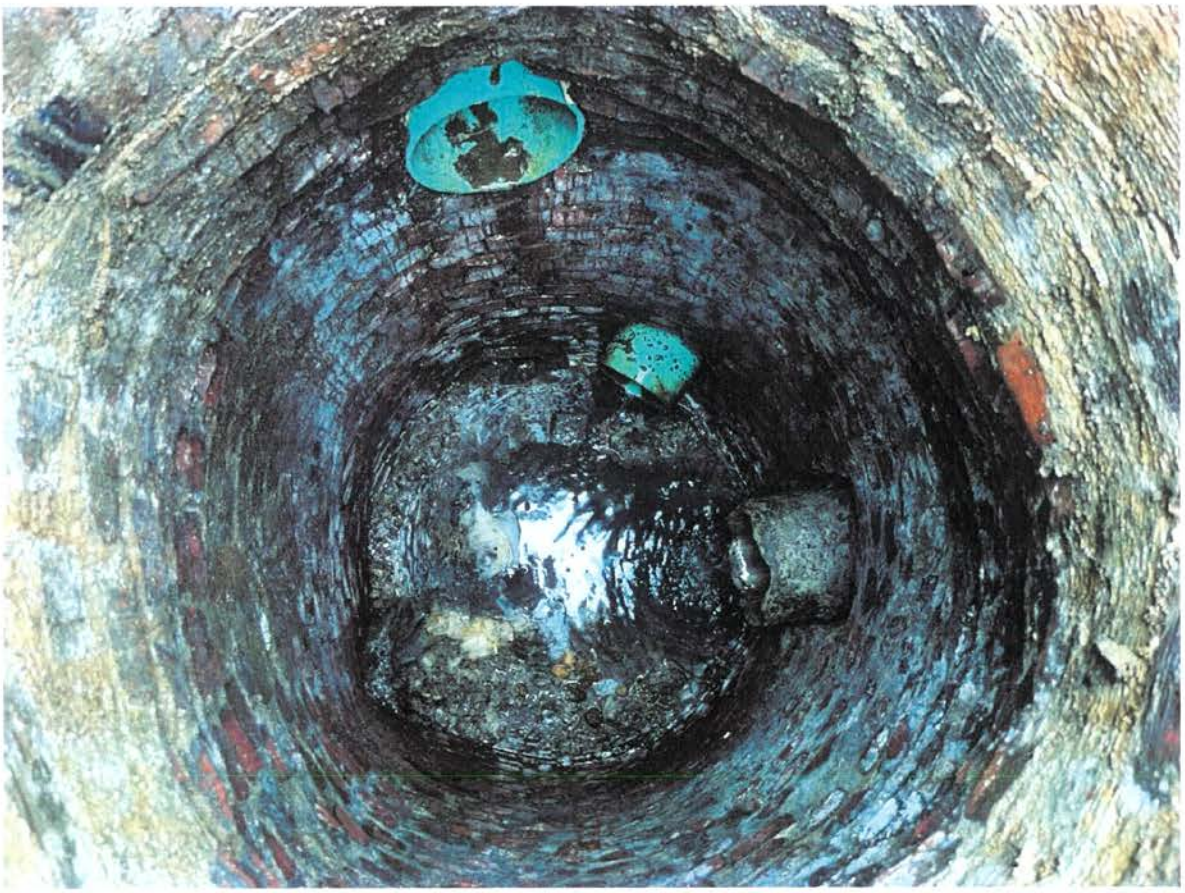
Table 8 presents the areas of excess flow that were measured upstream of CSO No. 003.

TABLE 8: PEAK EXCESS FLOW AREAS ABOVE CSO NO. 003

LOCATION	FLOW RATE (GPD/INCH OF RAIN)
Spring Street	406,000
Ash Street/West Hill	400,000
Central Street	320,000
Winter Street	150,000
Harden Street	100,000
Autumn Street	90,000
Harrison Avenue	90,000
Bowman Street	80,000
Plaisted Street Cross-Country	80,000
Fountain Street	70,000
Green Street	65,000
Middle Street	50,000
Mount Vernon	45,000
Oak Street	45,000
High Holborn Street	35,000
Griffin Street	30,000
Highland Avenue	25,000
West Street	20,000
Fairview Street	20,000
Clinton Street	15,000
West Hill Street	15,000
Pray Street	10,000
TOTALS	2,161,000 GPD/inch

As shown above in Table 8, we estimate peak flow contributions of 2,161,000 GPD per inch of rainfall in sewers upstream of the Maine Avenue pump station CSO. In our opinion, these areas should be the initial focus of the next phase of the City's CSO abatement program. The nine highest measured areas of excess flow above the CSO are as follows:

The **Spring Street sewer** in the area between Bridge Street and Clinton Street had measured peak flows of 406,000 GPD/inch. This sewer section has been identified as being problematic in several previous sewer studies. It was previously identified as being a candidate for relining but this work has not been completed. It appears that there are still areas of clay pipe and brick manholes. It appears that small sections have been patched in the past with PVC pipe. Given its age, condition and high flow rates, we recommend that it be replaced instead of relined. This decision can be revisited after further TV inspection work.



Spring Street Sewer

The **Ash Street/West Hill sewer** between Harrison Avenue and West Hill Road and towards the high school had measured flows of 400,000 GPD/inch. Some of the pipes and manholes on Ash Street are newer precast and it appears there are some sections of PVC pipe. There may be private inflow in this section. There may also be sections of clay pipe left on Ash Street. The West Hill Road section appears to be constructed of clay pipe. This entire sewer should be inspected with a television camera to look for defects in both the newer PVC and the older clay pipes. Previous sewer evaluations noted high flows in this area. For planning purposes, it will be assumed that minor improvements will be needed on Ash Street with major replacement on West Hill Road to just past the high school.

Ash Street Sewer

The **Central Street sewer** between Pine Street and Green Street had measured peak flows of 320,000 GPD/inch. This sewer section contains sections of old clay pipe and brick manholes. Many of the manholes do not appear to have properly formed bases and inverts.

Central Street Sewer

The **Winter Street sewer** had a measured peak flow of 150,000 GPD. There appears to be some sections of PVC pipe in this area, but manholes are of brick construction. This area should be inspected by television camera to look for defects. There may also be connected private inflow sources. During our flow gauging, there were signs of surcharging at the Summer Street manhole intersection which may impact these readings. Depending on the condition of the sewer, it may be a candidate for relining. For initial planning purposes and to be conservative, an open cut repair will be considered.

Winter Street Sewer

The **Harden Street sewer** had measured flows of 100,000 GPD/inch. It appears that this line has had new precast manholes and PVC pipe in the area near Winter Street. Some of this line is located in a cross-country area up to Fountain Street and may have defects. It will be assumed that the cross-country sewer is the likely source of the excess flow.

Harden Street Sewer

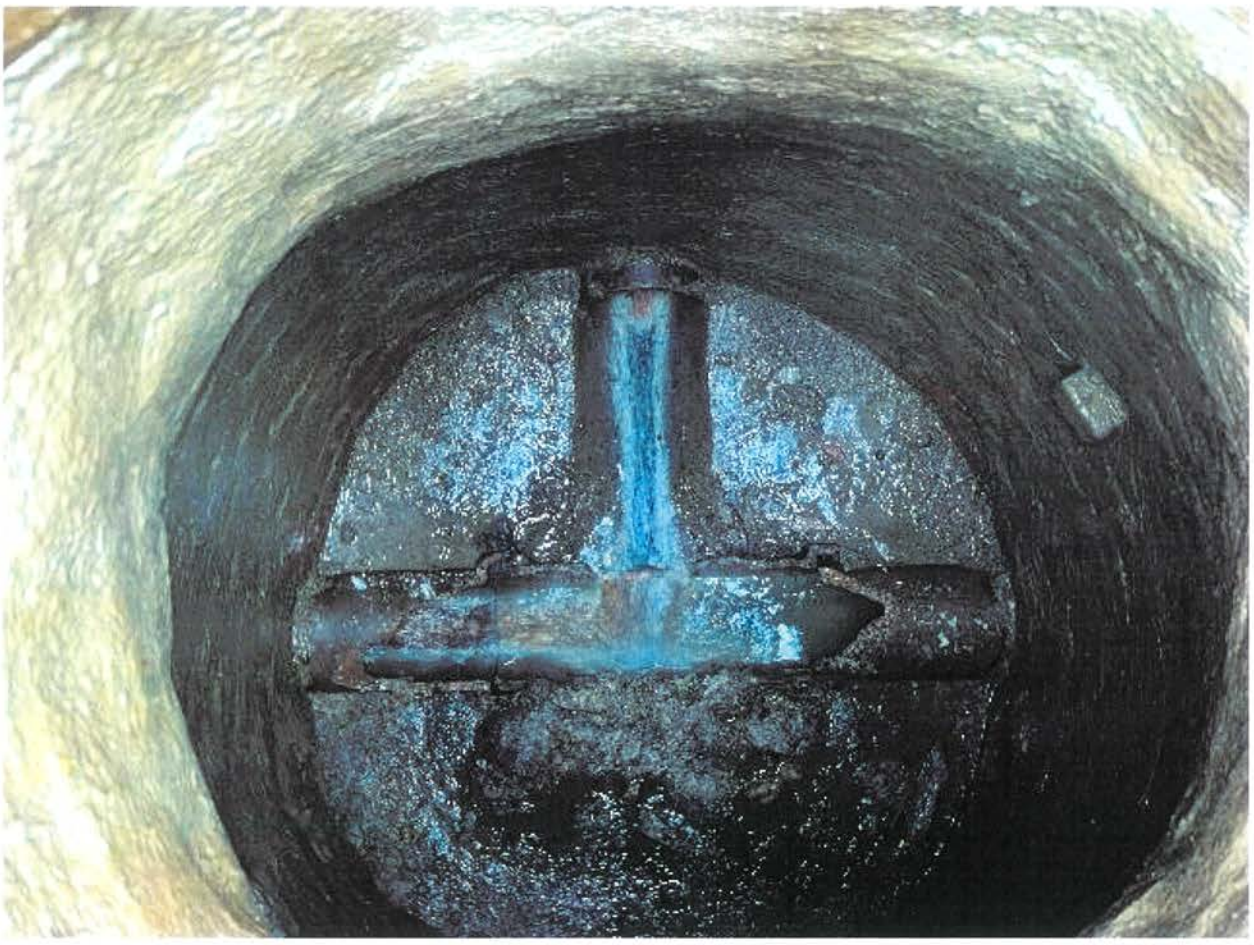
The **Autumn Street sewer** between Spring Street and Highland Avenue has been replaced in the past with new PVC pipe, but peak hourly wet weather flows of 90,000 GPD/inch were measured. This may be a source of private flow. We suggest that it be reviewed by television inspection.

Autumn Street Sewer

The **Harrison Avenue sewer** between Pray Street and Fountain Street had a measured peak wet weather flow of 90,000 GPD/inch. While some areas of the sewer have reportedly been updated, it appears that some sections of old clay pipe still remain.

Harrison Avenue Sewer

The **Plaisted Street cross-country sewer** flows overland between Plaisted Street and Mount Vernon Street. The sewer flow in this area had a measured peak flow of 80,000 GPD/inch. The cross-country sewer, as well as the Mount Vernon Street sewer, appear to be constructed of old clay pipes and brick manholes.



Plaisted Street Cross-Country Sewer

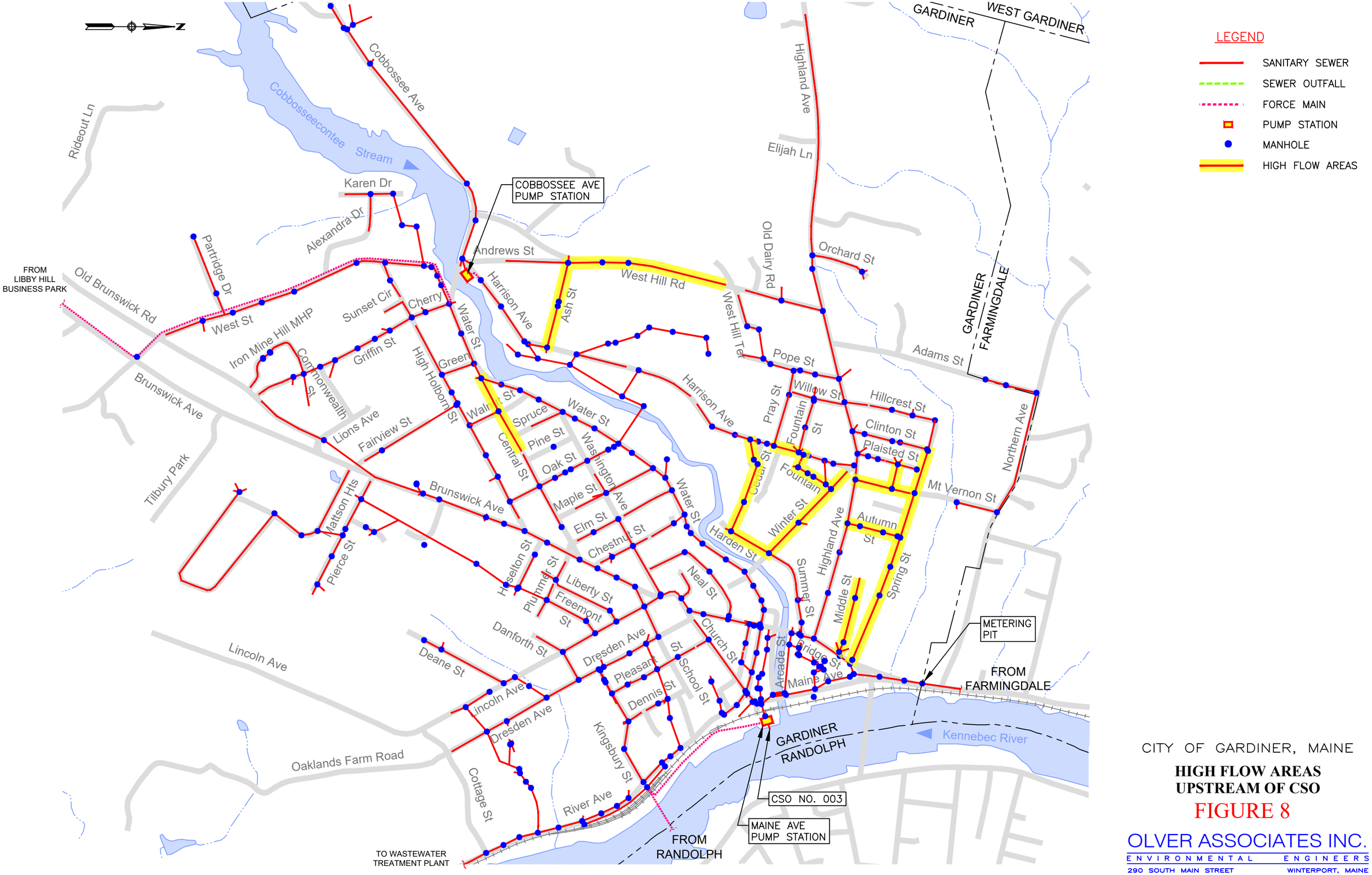
The **Bowman Street sewer** in Farmingdale had a measured wet weather peak flow of 80,000 GPD/inch. The sewer line is fairly new PVC, so there may be private inflow sources.

Bowman Street Sewer

Figure 8 shows the sewer areas upstream of the Maine Avenue pump station's CSO No. 003 where the highest excess flows were measured. Sewer remediation in these areas should be the focus for the next phase of the City's CSO abatement efforts. These flow reduction projects will also address structural deficiencies in critical areas of the sewer system. As will be discussed, it may not be necessary to address all nine areas for CSO abatement purposes. We suggest that the City begin with the top three areas. Once CSO issues are resolved, the remaining sewer deficiencies should be addressed as part of a long term capital plan.

While there are other sewer sections above the CSO that had measured excess wet weather flows as shown above in Table 8, the nine areas detailed above appear to have the most significant impact on CSO activity. If these sewer areas are addressed sequentially, it appears that this should eventually lead to greatly reduced CSO activity at the Maine Avenue pump station up to a threshold storm of a twenty-five year frequency.

Once CSO discharges are reduced to an acceptable level, the City should continue its sewer system capital improvements by addressing deteriorated, high flow sewer sections downstream of the CSO as shown in Table 9. Some of the excess flows in these sewers are significant. While they do not directly contribute to CSO losses, they do result in bypasses of the secondary treatment system. The upgrade of some of these sewers will have the dual benefit of stabilizing the City's sewer system for the future while also reducing the volume of flow not receiving secondary treatment. In addition, there may be hydraulic connections between the two zones causing the Maine Avenue pump station to occasionally be throttled which would impact CSO activity. This sometimes occurs during extreme excess flow events that are greater than the storm events that were monitored during the present study.



CITY OF GARDINER, MAINE

HIGH FLOW AREAS UPSTREAM OF CSO

FIGURE 8

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ENVIRONMENTAL ENGINEERS
290 SOUTH MAIN STREET WINTERPORT, MAINE

TABLE 9: PEAK EXCESS FLOW AREAS BELOW CSO NO. 003

LOCATION	FLOW RATE (GPD/INCH OF RAIN)
School/Pleasant/Dennis Street Cross-Country	520,000
Danforth/ Kingsbury Streets	295,000
Lincoln Avenue	250,000
Cannard Street	90,000
Hesselton Street	60,000
School Street	45,000
Fremont Street	40,000
Brunswick Avenue	30,000
Johnson Street	25,000
Bartlett Street	10,000
Sherburne Avenue	10,000
Deane Street	5,000
TOTALS	1,380,000 GPD/inch

As shown above in Table 9, we estimate about 1,380,000 GPD/inch of excess flow in sewer sections downstream of CSO No. 003. The remediation of these areas should be part of a longer term capital impact plan once upstream CSO discharges are addressed. It may also be beneficial to address the first listed project after completing the most significant upstream projects due to possible hydraulic connections between the two regions that can lead to throttling of the Maine Avenue pump station. The seven highest flow areas are summarized below:

The **School/Pleasant/Dennis Streets** cross-country sewer and adjacent sewer sections on these streets extends between the River Road and School Street. It runs parallel to a cross-country storm drain and had measured peak flows estimated at 520,000 GPD/inch of rain. This was the highest flows in the entire sewer system, but its location downstream of the CSO structure gave its remediation a lower priority.

Cross-country sewer at Pleasant Street

The **Danforth/Kingsbury Streets sewer** between River Avenue and Dresden Street had an estimated peak wet weather flow of 295,000 GPD/inch. The sewer appears to be constructed of clay pipe with brick manholes.

Kingsbury Sewer at River Avenue

Kingsbury Sewer at Dennis Street

The **Lincoln Avenue sewer** between School and Danforth Streets had a measured peak flow of 250,000 GPD/inch of rain. This sewer appears to have mostly clay pipes and brick manholes with some possible PVC patches.

Lincoln Avenue Sewer

The **Cannard Street sewer** had a measured peak wet weather flow of 90,000 GPD/inch of rain. It appears to be constructed of clay pipes with brick manholes. Some of the inverts are poorly formed.

Cannard Street Sewer

The **Hesselton Street sewer** had a peak wet weather flow of about 60,000 GPD/inch of rain. The sewer appears to be constructed with clay pipe and brick manholes.

Hesselton Street Sewer

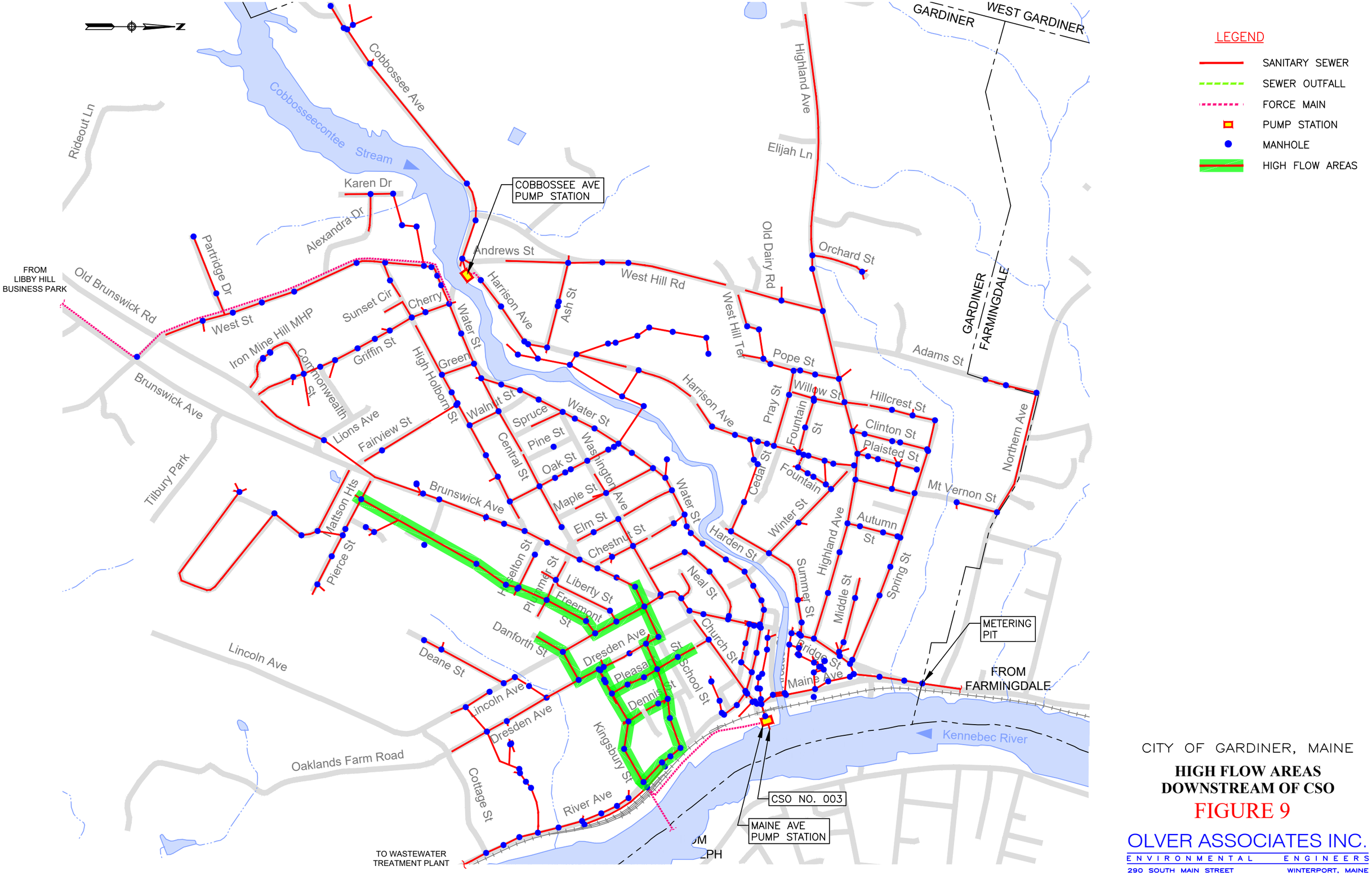
The **School Street sewer** between Brunswick Avenue and Pleasant Street had a peak wet weather flow of 45,000 GPD/inch of rain. The sewer appears to be constructed with clay pipe and brick manholes.

School Street Sewer

The **Fremont Street sewer** between Plummer Street and Lincoln Avenue had a peak wet weather flow of 40,000 GPD/inch of rain. The sewer appears to be constructed with clay pipe and brick manholes.

Fremont Street Sewer

Figure 9 shows the locations of the high inflow sewer areas below the CSO as listed above in Table 9.



CITY OF GARDINER, MAINE

HIGH FLOW AREAS DOWNSTREAM OF CSO

FIGURE 9

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290 SOUTH MAIN STREET WINTERPORT, MAINE

Previous CSO Master Plans and sewer studies identified downtown buildings in the Water Street and Arcade area where stormwater is believed to enter the sanitary sewer system. It was suggested that this could add about 11,000 GPD/inch of rain into the sewer system. There were also reports of past cellar flooding of these buildings from potential cross-connections between the storm sewer and sanitary sewer. In addition to the possibility of connected roof drains due to a lack of storm sewers throughout the entire area, it was also noted that separated roof drains discharging their flows across the parking lot could cause some flow entering into the sanitary manhole covers.

As part of the present evaluation, all property owners in this area were contacted and asked to allow crews to conduct inspections of their roof and cellar drains. Survey crews were able to gain access into the cellars of half of these downtown buildings. Their observations recorded no direct connection of cellar or roof drains to the sewer system. It appears that many roof drains have been modified to discharge out onto the ground outside of the buildings instead of into the sanitary sewers. Because the storm drains in this area do not cover the entire Arcade, previous proposals have suggested constructing a project to extend the storm drain system. It has also been suggested that the addition of locking manhole covers on the sanitary sewer system in this area would help alleviate past flooding issues. In our opinion, the proposed drain project has merit for consideration as a separate project apart from the CSO Master Planning process. As shown by the current evaluation, there are many areas of the sewer system where wet weather flows have the potential to create a greater CSO impact than these downtown buildings. We suggest that the City consider the Arcade area drainage project as a potential stormwater improvement project apart from the CSO abatement program.

In summary, the recent sewer system monitoring program identified numerous areas of the sewer system where peak excess flows originate. The systematic removal of these flows in a prioritized sequence with the highest flow areas done first should be the next phase of the City's CSO remediation program. Since the City is currently having only one to five CSO events per year, it would seem that the completion of sewer remediation projects in the worst high flow areas should have a major impact on CSO activity reduction.

It is important to note that not every point of excess flow entry was identified in the present study. Some of the surcharged sewers in the downtown and interceptor areas could not be measured during the present evaluation process. As excess flows are removed from the

worst areas upstream, some of these areas will no longer be submerged and may be much easier to measure in the future.

It is also important to note that no proposals are being made at this time to address private inflow sources throughout the community. While previous studies suggested private sources as the next issue to address, it is our opinion that the deteriorated condition of much of the older clay sewers and brick manholes makes them a much more fruitful target for excess flow removal. The goal of the CSO abatement program is to reduce or eliminate wet weather discharge to the river. If this goal can be achieved without causing the disruptions associated with private inflow removal, our experience has been that is usually makes more sense to address the public sources first. Given Gardiner's 100 year old sewer system with many areas where high inflow induced infiltration was measured, we believe that significant amounts of excess flow can be reduced to the benefit of the CSO Master Planning process. Private inflow sources can be addressed later if necessary. The City's sewer system has many sections in poor condition, leaking and in need of repair. This should be addressed consistent with the ongoing CSO Master Plan.

7. UPDATED MASTER PLAN FOR CSO ABATEMENT

CSO abatement programs typically consist of removing excess flows from the sewer system, building additional wastewater treatment plant and sewer system capacity to leave the excess flows in, or building storage to collect the peak flows and metering them back into the system over time. The City of Gardiner has done all three of these steps with some limited past sewer rehabilitation, expansion of the Maine Avenue pump station and treatment plant, and the construction of a 410,000 gallon wet weather storage tank. The least implemented approach to-date has been upstream excess flow reduction. In the past, when the treatment plant was expanded and the storage tank constructed, design documents at that time indicated that further upstream excess flow removal would eventually be needed to fully address Gardiner's CSO discharges. The time has now arrived to once again focus on the removal of excess flows from the sewer system. While this work is essentially being mandated by DEP under CSO reduction requirements, it is important to note that the poor condition of many parts of the Gardiner sewer system where these excess flows originate need capital improvements to maintain their structural integrity. The CSO reduction program will accomplish both goals.

When the storage tank was constructed in 2016, it was not sized to fully contain all CSO discharges. It was noted that the selected 410,000 gallon tank volume would have a significant impact on CSO reduction, but that a much larger 2.9 MG tank would have been needed to fully eliminate all CSO discharges. If the 0.41 MG tank that was built is removed from this estimate, the City is about 2.5 MG short of stopping all CSO discharges during a reasonable twenty-five year frequency threshold storm. This suggests that the City would need to remove an additional 2.5 MG of excess flow from the sewer system during a 5.4 inch/day storm event.

Similarly, as noted back on Table 3, there is an estimated typical peak flow of 13.22 MGD in the Gardiner sewer system during a twenty-five year storm event. If this is compared to the stated sewer system's maximum peak flow design capacity of 9.7 MGD as shown back on Figure 4, there is an excess of about 3.11 MGD of peak flow in the sewer system after adjusting for the 0.41 MG storage tank.

Finally, average CSO losses after the construction of the storage tank have been about 0.100 MG/inch of rain. The highest recorded year in 2023 showed 0.391 MG/inch of rain. This suggests about 2.1 MGD of CSO discharge might occur during a rainfall event of 5.4 inches/day.

Obviously, CSO volume loss estimates are not an exact science. Many variables can impact the amount of excess flow in the sewer system including the frequency, duration and intensity of the storm in addition to ambient conditions such as snowpack loss and groundwater saturation levels. Nonetheless, it is safe to conclude that the removal of between 2 and 3 MGD of excess flow from the sewer system would have a very beneficial impact on reducing CSO activity in Gardiner.

As previously discussed, and as shown again below in Table 10, there are three areas of the sewer system that were measured as being the origin of large amounts of excess flow above CSO No. 003:

TABLE 10: HIGHEST AREAS OF EXCESS FLOW ABOVE CSO NO. 003

LOCATION	MEASURED GPD/INCH	EXTRAPOLATED TO 5.40 INCHES
Spring Street	406,000	2.19 MGD
Ash Street/West Hill	400,000	2.16 MGD
Central Street	320,000	1.73 MGD
TOTALS	1,126,000	6.08 MGD

The total excess flow measured in these three areas was 6.08 MGD. Additional television inspection work is needed in these, as well as other, areas of the sewer system to clarify the accuracy and validity of these measurements. However, at first glance, it suggests that if 50% of these flows could be reduced by an excess flow remediation project as typically is the case, an excess sewer system flow reduction of about 3.04 MGD might occur during a twenty-five year storm. This would certainly be a good starting point for the next phase of the City's CSO abatement program.

Beyond that, there are additional areas listed on Table 8 where peak flows where identified above CSO No. 003. These areas could be the basis of later peak flow reduction work if needed. With CSO issues aside, these areas would certainly be good candidates for a long term capital improvement plan for the City to address the structural condition of its aging sewer system. However, if additional flow reduction projects are needed after the completion of the three projects defined above in Table 10, we would recommend that the City focus on two projects below CSO No. 003 from Table 9, namely the School/Pleasant/Dennis Streets cross-country sewer with an estimated peak excess flow rate of about 520,000 GPD/inch of rain and the Danforth/Kingsbury Street sewers with a measured flow rate of about 295,000 GPD/inch of rain. During our field flow gauging work, we found these sewers to be in very poor condition in addition to it having high rates of flow. In our opinion, it makes sense to begin with sewer abatement projects above CSO No. 003 as these will likely be the first to impact the Maine Avenue pump station and to fill the CSO storage tank. However, there may be a hydraulic connection between the pump station's output and flows in the downstream interceptor. As the secondary treatment plant and interceptor sewers' hydraulic capacities are reached, the secondary bypass will be activated. In addition, the Maine Avenue pump station may need to be throttled back to reduce the downstream flow. Removing excess flows from the interceptor sewer below

CSO No. 003 would allow the output of the Maine Avenue pump station to be sustained. The largest sources of excess flow below the pump station are the School/Pleasant/Dennis Streets cross-country line and the Danforth/Kingsbury Street sewers where only minor patchwork remediation has been completed in the past. Since the Maine Avenue pump station has a maximum output capacity of 7.0 MGD, the removal of peak flows above the station should be the first priority. Once this is completed, the next phase of work should be to reduce the worst flows in the downstream interceptor by addressing the deteriorated conditions of these two areas.

Based on the above discussion, we recommend that the City of Gardiner consider the following approach to the next phase of its CSO abatement program:

- Submit this draft CSO Master Plan to DEP by July 31, 2025 as required and await its approval.

- Conduct television inspections of key areas of the sewer system including those defined in Table 10 of this report as well as other areas where high flows were noted.

- Over the next five years, focus on the three sewer projects for excess flow removal as listed above in Table 10. Television inspection of these areas should be a priority before design work.

- Conduct a CSO Master Plan Update at the completion of these three projects to access their excess flow reduction benefits.

- The next excess flow remediation project, whether it be as part of the CSO program (if needed), or whether it be considered as a sewer system capital improvement project given its condition, should be the School/Pleasant/Dennis cross-country sewer and the Danforth/Kingsbury sewers below CSO No. 003.

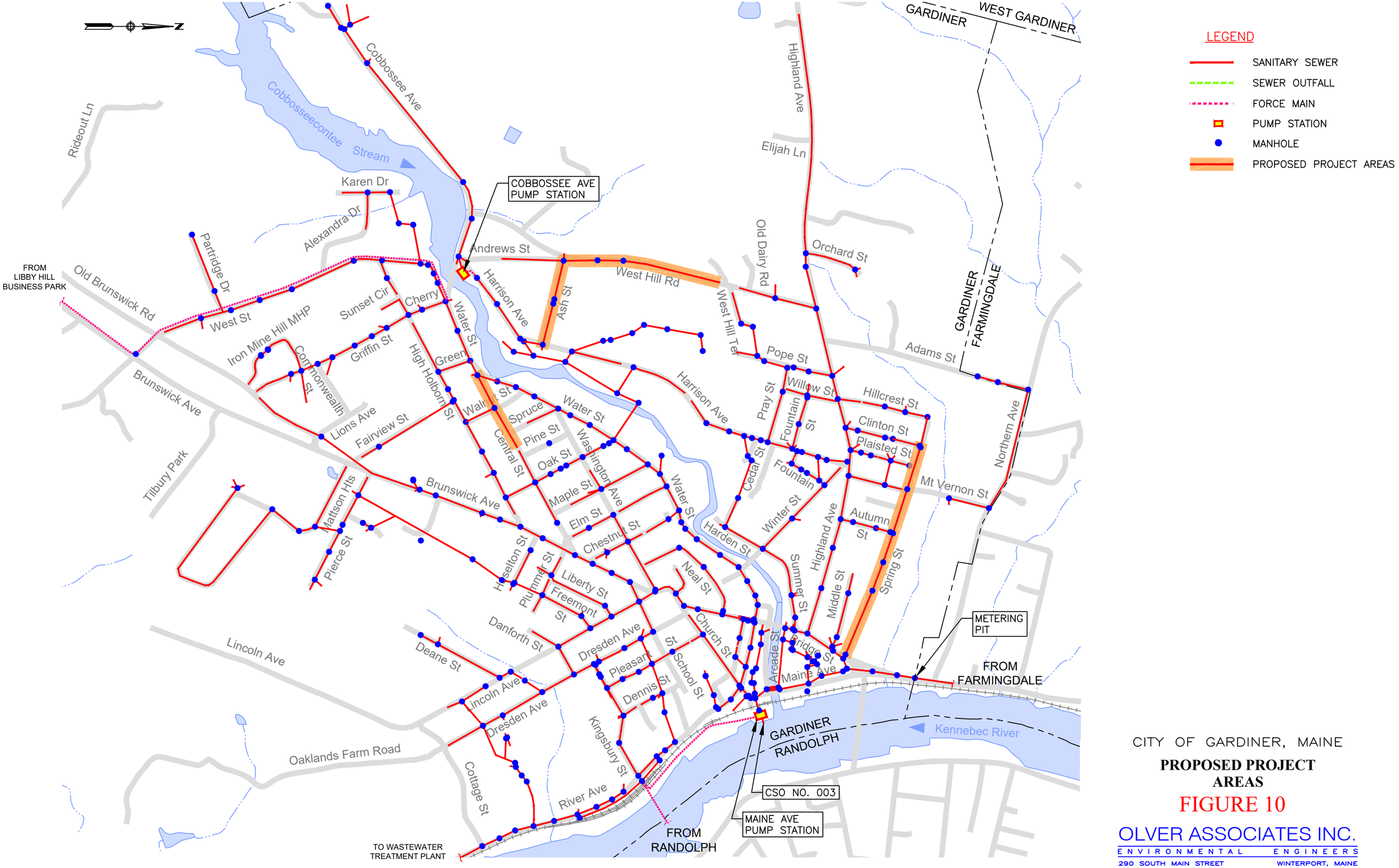
Figure 10 shows the areas of the above proposed projects.

Table 11 below summarizes the recommended CSO Master Plan Update Schedule for the City subject to DEP's approval and the City Council's concurrent with DEP's response:

TABLE 11: PROPOSED UPDATED CSO MASTER PLAN SCHEDULE

YEAR	DESCRIPTION OF ACTIVITIES
2025	Complete CSO Master Plan Update for DEP /City Council Approval
2026	Television inspection of sewer system critical areas Design Spring Street project
2027	Construct Spring Street project Design Ash/West Hill project
2028	Construct Ash/West Hill project Design Central Street project
2029	Construct Central Street project
2030	Conduct CSO Master Plan Update

In order to assist in the financial planning for the above sewer remediation projects, preliminary order-of-magnitude cost estimates were prepared for each project in 2025 dollars. These cost estimates were generally based on open cut remediation of the sewers. In some areas, the proposed television inspection work may reveal lower cost sewer relining to be an option. Given the age and condition of some of the sewered areas as shown on previous photographs in this report, using open cut for initial budgeting purposes is believed to be a conservative approach. These estimates include allowances for design, construction, administration, inspection and contingency.



CITY OF GARDINER, MAINE

PROPOSED PROJECT AREAS

FIGURE 10

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Table 12 presents a summary of cost estimates for each project slated to be on the Master Plan Schedule. More detailed estimates for these and other future projects are presented in Appendix B. It should be noted that these planning level costs are not based on detailed takeoffs from design plans. They should be updated at the completion of design plans. The final cost at the time of bidding will be dependent on the construction market and economy at that time and on the prospective bidder's perception of the complexity of each project.

TABLE 12: PLANNING LEVEL COST ESTIMATES OF PROPOSED PROJECTS

PROJECT	BUDGET ESTIMATE
Television inspection of key sewer areas	$ 100,000
Spring Street sewer remediation	3,635,000
Ash/West Hill sewer remediation	2,060,000
Central Street sewer remediation	1,300,000
CSO Master Plan Update	100,000
TOTAL	$ 7,195,000

8. FINANCIAL IMPACT OF PROPOSED CSO ABATEMENT PROJECTS

The proposed five-year schedule for the next phase of CSO abatement projects will cost about $7,195,000 in 2025 dollars as shown in Table 12. It may be possible for the City to resolve its CSO issues without doing all these projects, but to be conservative, it is assumed that all three will be needed. The City may be eligible for some grant funding, if available, to help offset these costs. In the absence of grants, if the City borrowed $7.195 million dollars at 2.5% interest over a twenty-year term, the annual debt service would be about $462,000 per year. The City's current wastewater budget is $2,115,122 per year. If this debt service is added, the budget will increase to about $2,577,000 per year, an increase of about 22%. Since the proposed projects will be scheduled over a five-year period, this would add about 4.4% per year over the five years in addition to other budget increases that will occur for wastewater operating costs.

About $470,000 of the proposed 2026 budget is paid by Farmingdale and Randolph leaving about $1,645,000 to be paid by Gardiner sewer users. If the sewer remediation work is borne solely by Gardiner sewer users, Gardiner's budget share would increase to about $2,107,000. If the new budget was spread evenly over Gardiner's 1,507 connected sewer users, the average sewer bill per user would be about $1,400 per year, or about $350 per

quarter. The published mean household income (MHI) for Gardiner is about $58,152 per year. An average user fee of $1,400 per year would represent about $2.41% of MHI. This is beyond the 2% MHI limit which EPA has historically established as representing financial hardship. This suggests that Gardiner would need significant grant funding to make these projects feasible.

The City is eligible for various grant funding sources and should immediately apply to all possible agencies including DEP, RD, EPA, CDS and NBRC in order to reduce the potential cost impact on the sewer users.

9. REVIEW OF FARMINGDALE'S FLOW CONTRIBUTIONS

The Town of Farmingdale has an intermunicipal agreement with the City of Gardiner for the treatment of wastewater. Farmingdale is allowed to discharge a peak hourly flow of 1.57 MGD into the Gardiner sewer system. This is equivalent to a maximum rate of about 1,100 GPM. Unfortunately, the Parshall flume flow meter that measures their total loading into the Gardiner sewer system pegs out at 500 GPM. This makes it impossible to determine the exact input of Farmingdale's flows off of their flow chart.

Farmingdale's sewer system connects to the Gardiner system upstream of the Maine Avenue and Water Street interceptor. The Farmingdale sewer configuration consists of an interceptor sewer along Maine Avenue with perpendicular laterals that serve a number of side streets. Peak flows in these sewers were measured in this study during both storm events. The only sewer in Farmingdale that consistently showed excess peak flows was Bowman Street with a peak flow rate of about 80,000 GPD/inch of rain as was presented back in Table 8. This sewer is constructed of new PVC pipe. The Town should consider television inspection in this area as this sewer is upstream of the CSO. Other than Bowman Street, we did not find other areas of excess flow during the two monitoring events that we conducted. In previous studies conducted by Dirigo Engineering, the reliability of the flow meter was questioned because it appears to become surcharged by downstream flows in the Gardiner sewer system. During one of our monitoring events, we noted that the Farmingdale meter had pegged out above 500 GPM with an estimate of perhaps 700 GPM based upon the flow charts' curve slopes. This coincided with field measured flows of about 250,000 to 300,000 GPD (175 to 210 GPM) in the interceptor sewer. We believe that the best path forward for Farmingdale is to consider television inspection work on Bowman Street while concurrently conducting a hydraulic evaluation of the Parshall flume flow

meter. If the flume is being surcharged at peak flows, it should be modified to allow it to reach flows without pegging.

It should also be noted that the Farmingdale sewer system has five upstream pump stations. It is possible that storage in their wet wells mitigated some of the peak flows during our field measurement work. During our two monitoring events, peak rainfall was just under one inch per day. These were significant storm events in order to obtain good excess flow data, but it would be interesting to conduct a Farmingdale flow gauging event during a much larger storm. Given the tight timeframe needed to complete this study to allow its submission by July 31, 2025, there was no opportunity to conduct additional flow monitoring during a much larger storm.

In summary, excess flows were measured in the Bowman Street area of Farmingdale during two monitoring events. While the flow meter was pegged, upstream flows in the interceptor sewer were within the contracted peak flow limits. The one area of consistently high flow was Bowman Street at 80,000 GPD/inch. The sewers in this area appear to be constructed of newer PVC with precast manholes. Private inflow may be an issue. While television inspection may provide more information, the Farmingdale sewer system, as a whole, did not appear to be as great a factor with regard to CSO discharges as other sewered areas of Gardiner.

10. CLOSURE

This updated CSO Master Plan has been prepared to address the City's DEP requirement to update the previous Master Plan no later than July 31, 2025. After the City has had the opportunity to review this plan in detail, we recommend that we schedule meetings with DEP and all other funding agencies in order to move the program forward. In the meantime, please call if you have any questions or if you need additional information.

As always, we appreciate this opportunity to be of professional engineering service to the City of Gardiner.

Very truly yours,

OLVER ASSOCIATES INC.

William M. Olver P.E., President
Senior Managing Partner

WMO/sb

2754/1000

CC: Mr. Michael Riley, P.E., DEP
Mr. Fred Knight, DEP
Mr. Scott Emery, RD

APPENDIX A

DEP CORRESPONDENCE REGARDING THIS CSO MASTER PLAN UPDATE

Bill Olver

From: Chuck Applebee <chuck@waterqualityme.com>
Sent: Monday, September 30, 2024 4:16 PM
To: Bill Olver
Subject: CSO Master Plan Update

Sincerely,
Charles M. Applebee
chuck@waterqualityme.com
207.882.5476 cell 207.380.4261

From: Riley, Michael S <Michael.S.Riley@maine.gov>
Sent: Thursday, March 14, 2024 10:30 AM
To: Chuck Applebee <chuck@waterqualityme.com>; Andrew Carlton <ACarlton@gardinermaine.com>; JCameron@gardinermaine.gov
Cc: Parker, Pamela D <Pamela.D.Parker@maine.gov>; Rice, Jonathan E <Jonathan.E.Rice@maine.gov>; Clark, Camden T <Camden.T.Clark@maine.gov>; Blaisdell, Breanne <Breanne.Blaisdell@maine.gov>; Knight, James E <James.E.Knight@maine.gov>
Subject: CSO Master Plan Update

Good morning Chuck, Andy and John,
Thank you for meeting with us yesterday to discuss CSO abatement in Gardiner. We found the meeting informative and are confident that the team in place can make significant progress on this issue over the next five years.

After further internal DEP discussions, and to be consistent with what we've done for other CSO communities, we're prepared to give the City of Gardiner an extension until July 31, 2025 to submit their next CSO Master Plan Update. This will give the City two wet seasons, fall 2024 and Spring 2025 to conduct flow monitoring and field investigation. Upon completion of the Spring 2025 monitoring season at the end of April, the City would have 90 days to develop and submit

the CSO abatement plan before the end of July deadline. This is the same offer we've made to several CSO communities that needed to complete additional flow monitoring to develop an informed abatement plan.

It's also the best offer we can make under the circumstances, considering the amount of progress Gardiner has made on CSO abatement since 2018. We trust the extension we're granting will result in a detailed abatement plan that hits the target in the most cost effective manner.

In the meeting yesterday, we were heartened to hear that the City has adopted a new, more aggressive philosophy on infrastructure renewal. The investment the City has tied up in their sewer collection system is in the millions of dollars. I know City management wouldn't let any other multi-million dollar investment go without renewal for indefinite periods.

As we've found in other CSO communities, collection systems often get little attention until something fails. They need a champion to advocate for smart investment and renewal. We have our doubts whether any Public Works Director has the time to play that role because they have too many duties already. But they should at a minimum, designate one of the Public Works staff to be the champion for the sewer collection system so that it doesn't get short shrift on investment compared to pump stations and treatment plants.

I wanted to pass our decision along before you got too far into your response letter, so there are no misunderstandings on the timetable for the extension. Of course the weather has to cooperate at some point in the two allotted wet seasons for you to collect the flow data necessary. If for some reason, the weather doesn't cooperate, we'll address that, if and when it happens.

Let me know if you want to discuss further.
Regards,

Mike Riley, P.E.,
Senior Environmental Engineer
CSO Abatement & FSP Coordinator
Department of Environmental Protection
Division of Water Quality Management
(207) 719 - 0809 (work cell)

APPENDIX B

DETAILED PRELIMINARY PLANNING LEVEL COST ESTIMATES FOR HIGHEST EXCESS FLOW PROJECT AREAS

APPENDIX B.1 - PRELIMINARY ORDER-OF-MAGNITUDE PLANNING COST ESTIMATE FOR SPRING STREET SEWER IMPROVEMENTS

QUANTITY	DESCRIPTION	ESTIMATE
LS	Traffic control/mobilization @ $120,000/LS	$ 120,000
100 EA	Test pits @ $1,000/EA	100,000
LS	Temporary erosion control @ $45,000/LS	45,000
10 EA	Precast structure removal @ $1,500/EA	15,000
3,000 LF	8"Ø PVC sewer @ $300/LF	900,000
2,700 LF	4"Ø PVC building sewer @ $250/LF	675,000
10 EA	4'Ø precast manholes @ $10,000/EA	100,000
500 Tons	3" Trench pavement @ $300/Ton	150,000
700 Tons	1 ¼" Roadway pavement @ $300/Ton	210,000
7,500 SF	Trench insulation @ $10/SF	75,000
LS	Loam and seed @ $120,000/LS	120,000
LS	Owner's testing allowance @ $10,000/LS	10,000
LS	General conditions @ $240,000/LS	240,000
	Subtotal	$ 2,760,000
LS	Additional television inspection allowance	15,000
LS	Ledge probing allowance	10,000
LS	Design allowance	195,000
LS	Contract administration allowance	110,000
LS	Inspection allowance	220,000
LS	Ledge removal allowance	50,000
LS	Contingency allowance	275,000
	Estimate	$ 3,635,000

APPENDIX B.2 - PRELIMINARY ORDER-OF-MAGNITUDE PLANNING COST ESTIMATE FOR ASH STREET/WEST HILL SEWER IMPROVEMENTS

QUANTITY	DESCRIPTION	ESTIMATE
LS	Traffic control/mobilization @ $80,000/LS	$ 80,000
30 EA	Test pits @ $1,000/EA	30,000
LS	Temporary erosion control @ $30,000/LS	30,000
7 EA	Precast structure removal @ $1,500/EA	11,000
2,000 LF	8"Ø PVC sewer @ $300/LF	600,000
700 LF	4"Ø PVC building sewer @ $250/LF	175,000
200 LF	6"Ø PVC building sewer @ $300/LF	60,000
7 EA	4'Ø precast manholes @ $10,000/EA	70,000
350 Tons	3" Trench pavement @ $300/Ton	105,000
650 Tons	1 ¼" Roadway pavement @ $300/Ton	195,000
5,000 SF	Trench insulation @ $10/SF	50,000
LS	Loam and seed @ $15,000/LS	15,000
LS	Owner's testing allowance @ $5,000/LS	5,000
LS	General conditions @ $140,000/LS	140,000
	Subtotal	$ 1,566,000
LS	Additional television inspection allowance	10,000
LS	Ledge probing allowance	5,000
LS	Design allowance	110,000
LS	Contract administration allowance	60,000
LS	Inspection allowance	125,000
LS	Ledge removal allowance	28,000
LS	Contingency allowance	156,000
	Estimate	$ 2,060,000

APPENDIX B.3 - PRELIMINARY ORDER-OF-MAGNITUDE PLANNING COST ESTIMATE FOR CENTRAL STREET SEWER IMPROVEMENTS

QUANTITY	DESCRIPTION		ESTIMATE
LS	Traffic control/mobilization @ $40,000/LS	$	40,000
40 EA	Test pits @ $1,000/EA		40,000
LS	Temporary erosion control @ $15,000/LS		15,000
4 EA	Precast structure removal @ $1,500/EA		6,000
1,000 LF	8"Ø PVC sewer @ $300/LF		300,000
1,000 LF	4"Ø PVC building sewer @ $250/LF		250,000
4 EA	4'Ø precast manholes @ $10,000/EA		40,000
200 Tons	3" Trench pavement @ $300/Ton		60,000
350 Tons	1 ¼" Roadway pavement @ $300/Ton		105,000
2,500 SF	Trench insulation @ $10/SF		25,000
LS	Loam and seed @ $10,000/LS		10,000
LS	Owner's testing allowance @ $5,000/LS		5,000
LS	General conditions @ $90,000/LS		90,000
	Subtotal	$	976,000
LS	Additional television inspection allowance		5,000
LS	Ledge probing allowance		5,000
LS	Design allowance		70,000
LS	Contract administration allowance		40,000
LS	Inspection allowance		80,000
LS	Ledge removal allowance		20,000
LS	Contingency allowance		104,000
	Estimate	$	1,300,000

APPENDIX B.4 - PRELIMINARY ORDER-OF-MAGNITUDE PLANNING COST ESTIMATE FOR SCHOOL/PLEASANT/DENNIS STREETS CROSS-COUNTRY SEWER IMPROVEMENTS

QUANTITY	DESCRIPTION	ESTIMATE
LS	Traffic control/mobilization @ $80,000/LS	$ 80,000
70 EA	Test pits @ $1,000/EA	70,000
LS	Temporary erosion control @ $50,000/LS	50,000
14 EA	Precast structure removal @ $1,500/EA	21,000
1,400 LF	8"Ø PVC sewer @ $300/LF	420,000
2,000 LF	12"Ø PVC sewer @ $400/LF	800,000
1,800 LF	4"Ø PVC building sewer @ $250/LF	450,000
14 EA	4'Ø precast manholes @ $10,000/EA	140,000
350 Tons	3" Trench pavement @ $300/Ton	105,000
550 Tons	1 ¼" Roadway pavement @ $300/Ton	165,000
8,000 SF	Trench insulation @ $10/SF	80,000
LS	Loam and seed @ $135,000/LS	135,000
LS	Owner's testing allowance @ $10,000/LS	10,000
LS	General conditions @ $250,000/LS	250,000
	Subtotal	$ 2,776,000
LS	Additional television inspection allowance	20,000
LS	Ledge probing allowance	15,000
LS	Design allowance	195,000
LS	Contract administration allowance	100,000
LS	Inspection allowance	220,000
LS	Ledge removal allowance	49,000
LS	Contingency allowance	280,000
	Estimate	$ 3,655,000

APPENDIX B.5 - PRELIMINARY ORDER-OF-MAGNITUDE PLANNING COST ESTIMATE FOR DANFORTH/KINGSBURY STREETS SEWER IMPROVEMENTS

QUANTITY	DESCRIPTION	ESTIMATE
LS	Traffic control/mobilization @ $105,000/LS	$ 105,000
50 EA	Test pits @ $1,000/EA	50,000
LS	Temporary erosion control @ $40,000/LS	40,000
10 EA	Precast structure removal @ $1,500/EA	15,000
1,700 LF	8"Ø PVC sewer @ $300/LF	510,000
950 LF	12"Ø PVC sewer @ $400/LF	380,000
1,400 LF	4"Ø PVC building sewer @ $250/LF	350,000
10 EA	4'Ø precast manholes @ $10,000/EA	100,000
300 Tons	3" Trench pavement @ $300/Ton	90,000
650 Tons	1 ¼" Roadway pavement @ $300/Ton	195,000
5,000 SF	Trench insulation @ $10/SF	50,000
LS	Loam and seed @ $75,000/LS	75,000
LS	Owner's testing allowance @ $10,000/LS	10,000
LS	General conditions @ $200,000/LS	200,000
	Subtotal	$ 2,170,000
LS	Additional television inspection allowance	15,000
LS	Ledge probing allowance	10,000
LS	Design allowance	150,000
LS	Contract administration allowance	80,000
LS	Inspection allowance	175,000
LS	Ledge removal allowance	20,000
LS	Contingency allowance	215,000
	Estimate	$ 2,835,000

APPENDIX B.6 - PRELIMINARY ORDER-OF-MAGNITUDE PLANNING COST ESTIMATE FOR WINTER STREET SEWER IMPROVEMENTS

QUANTITY	DESCRIPTION	ESTIMATE
LS	Traffic control/mobilization @ $50,000/LS	$ 50,000
50 EA	Test pits @ $1,000/EA	50,000
LS	Temporary erosion control @ $20,000/LS	20,000
4 EA	Precast structure removal @ $1,500/EA	6,000
1,300 LF	8"Ø PVC sewer @ $300/LF	390,000
1,200 LF	4"Ø PVC building sewer @ $250/LF	300,000
4 EA	4'Ø precast manholes @ $10,000/EA	40,000
200 Tons	3" Trench pavement @ $300/Ton	60,000
260 Tons	1 ¼" Roadway pavement @ $300/Ton	78,000
3,000 SF	Trench insulation @ $10/SF	30,000
LS	Loam and seed @ $15,000/LS	15,000
LS	Owner's testing allowance @ $5,000/LS	5,000
LS	General conditions @ $106,000/LS	106,000
	Subtotal	$ 1,150,000
LS	Additional television inspection allowance	8,000
LS	Ledge probing allowance	5,000
LS	Design allowance	80,000
LS	Contract administration allowance	40,000
LS	Inspection allowance	95,000
LS	Ledge removal allowance	20,000
LS	Contingency allowance	117,000
	Estimate	$ 1,515,000

APPENDIX B.7 - PRELIMINARY ORDER-OF-MAGNITUDE PLANNING COST ESTIMATE FOR HARDEN STREET SEWER IMPROVEMENTS

QUANTITY	DESCRIPTION	ESTIMATE
15 EA	Test pits @ $1,000/EA	$ 15,000
LS	Temporary erosion control @ $40,000/LS	40,000
6 EA	Precast structure removal @ $1,500/EA	9,000
1,100 LF	8"Ø PVC sewer @ $300/LF	330,000
400 LF	4"Ø PVC building sewer @ $250/LF	100,000
6 EA	4'Ø precast manholes @ $10,000/EA	60,000
50 Tons	3" Trench pavement @ $300/Ton	15,000
3,000 SF	Trench insulation @ $10/SF	30,000
LS	Loam and seed @ $40,000/LS	40,000
LS	Owner's testing allowance @ $6,000/LS	6,000
LS	General conditions @ $65,000/LS	65,000
	Subtotal	$ 710,000
LS	Additional television inspection allowance	5,000
LS	Ledge probing allowance	10,000
LS	Design allowance	50,000
LS	Contract administration allowance	30,000
LS	Inspection allowance	60,000
LS	Ledge removal allowance	20,000
LS	Contingency allowance	70,000
	Estimate	$ 955,000

APPENDIX B.8 - PRELIMINARY ORDER-OF-MAGNITUDE PLANNING COST ESTIMATE FOR HARRISON STREET SEWER IMPROVEMENTS

QUANTITY	DESCRIPTION		ESTIMATE
LS	Traffic control/mobilization @ $15,000/LS	$	15,000
20 EA	Test pits @ $1,000/EA		20,000
LS	Temporary erosion control @ $5,000/LS		5,000
2 EA	Precast structure removal @ $1,500/EA		3,000
350 LF	8"Ø PVC sewer @ $300/LF		105,000
1,000 LF	4"Ø PVC building sewer @ $250/LF		250,000
2 EA	4'Ø precast manholes @ $10,000/EA		20,000
100 Tons	3" Trench pavement @ $300/Ton		30,000
120 Tons	1 ¼" Roadway pavement @ $300/Ton		36,000
1,000 SF	Trench insulation @ $10/SF		10,000
LS	Loam and seed @ $15,000/LS		15,000
LS	Owner's testing allowance @ $3,000/LS		3,000
LS	General conditions @ $50,000/LS		50,000
	Subtotal	$	562,000
LS	Additional television inspection allowance		2,000
LS	Ledge probing allowance		3,000
LS	Design allowance		40,000
LS	Contract administration allowance		25,000
LS	Inspection allowance		45,000
LS	Ledge removal allowance		5,000
LS	Contingency allowance		58,000
	Estimate	$	740,000

APPENDIX B.9 - PRELIMINARY ORDER-OF-MAGNITUDE PLANNING COST ESTIMATE FOR PLAISTED CROSS-COUNTRY/MT. VERNON SEWER IMPROVEMENTS

QUANTITY	DESCRIPTION	ESTIMATE
LS	Traffic control/mobilization @ $28,000/LS	$ 28,000
40 EA	Test pits @ $1,000/EA	40,000
LS	Temporary erosion control @ $15,000/LS	15,000
4 EA	Precast structure removal @ $1,500/EA	6,000
1,000 LF	8"Ø PVC sewer @ $300/LF	300,000
1,000 LF	4"Ø PVC building sewer @ $250/LF	250,000
4 EA	4'Ø precast manholes @ $10,000/EA	40,000
80 Tons	3" Trench pavement @ $300/Ton	24,000
170 Tons	1 ¼" Roadway pavement @ $300/Ton	51,000
2,500 SF	Trench insulation @ $10/SF	25,000
LS	Loam and seed @ $40,000/LS	40,000
LS	Owner's testing allowance @ $5,000/LS	5,000
LS	General conditions @ $85,000/LS	85,000
	Subtotal	$ 909,000
LS	Additional television inspection allowance	5,000
LS	Ledge probing allowance	3,000
LS	Design allowance	65,000
LS	Contract administration allowance	35,000
LS	Inspection allowance	75,000
LS	Ledge removal allowance	5,000
LS	Contingency allowance	93,000
	Estimate	$ 1,190,000

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JANET T. MILLS
GOVERNOR

MELANIE LOYZIM
COMMISSIONER

September 18, 2025

Mr. Steve Aievoli
Wastewater Superintendent
City of Gardiner
540 River Avenue
Gardiner, ME 04345

RE: 2025 CSO Master Plan Update from the City of Gardiner

Dear Steve,

First and foremost, I'd like to express our gratitude to the City of Gardiner staff and your consultant, Olver Associates, for attending our recent meeting to discuss the CSO Master Plan the City recently submitted. The discussion was informative and answered the remaining questions we had regarding the plan to upgrade Gardiner's wastewater collection system, while simultaneously removing excess water from the sewer upstream of CSO 003.

The meeting also reinforced the idea that Gardiner, with only one active CSO, is positioned to exit the CSO program once it can attain a 10-year level of control at CSO 003. The primary question we had coming into the meeting was, would the three sewer rehabilitation projects proposed in the 2025 MPU remove sufficient excess water to achieve that level of control?

Although we recognize there are no guarantees when predicting the volume of inflow and infiltration that can be removed by a particular group of sewer rehab projects, Olver Associates analysis allows us to be cautiously optimistic that implementation of the three projects will increase the level of control, i.e. zero CSO discharge, to a 10-year storm and under a best case scenario, a 25-year storm.

Once the three projects are completed over the next five years, a suitable period of monitoring will be conducted to determine the size storm that can be handled with zero discharge. If monitoring confirms a ten-year level of control has been achieved, the City would be eligible to transition CSO 003 to an emergency overflow. The overflow would act as a permanent hydraulic relief for the collection system to prevent basements from being filled in a 100 to 500-year storm.

Although we want communities to continue removal of I/I until they reach a 25-year level of control, we do provide the opportunity to exit with a 10-year level of control and then finish the abatement effort on the City's schedule as opposed to DEP's. One discharge every ten years is

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

website: www.maine.gov/dep

considered a frequency of discharge that wouldn't cause a regulatory burden for the City, as any discharge from an emergency overflow would be considered an illicit sanitary sewer overflow and subject to 24-hour reporting requirements.

Because we want to ensure the projects are implemented according to the proposed schedule in the MPU, Gardiner's MEPDES permit renewal will include completion deadlines for the Spring Street project (December 31, 2027), the Ash Street/West Hill project (December 31, 2028) and the Central Street project (December 31, 2029).

Submission of the next CSO Master Plan Update is scheduled for July 31, 2030 in the MEPDES permit renewal. Whether that will provide enough monitoring time to fully assess the impact of the three projects, with the Central Street project scheduled for completion only 7 months prior, is debatable. DEP will allow flexibility if a longer monitoring period is warranted to fully inform the next CSO MPU.

If monitoring shows CSO activity for less than 10-year storms, it suggests additional I/I removal work is needed before exiting. If monitoring confirms that a 10-year level of control has been achieved the MPU might recommend the City exit the program and complete the abatement effort on the City's schedule as part of its' sewer replacement program.

Having completed our review of the draft CSO Master Plan Update (MPU) submitted by City of Gardiner to DEP on July 31, 2025, we're happy to approve the plan as submitted. Please proceed in making the draft the final copy of the 2025 CSO MPU. Should you have any questions concerning this approval letter please don't hesitate to contact our office.

Sincerely,

Mike Riley

Michael Riley, P.E.
CSO Abatement Coordinator
Maine DEP
Division of Water Quality Management
207-719-0809
michael.s.riley@maine.gov

CITY OF Gardiner
Moving Forward

September 30, 2025

MR. Mike Riley
CSO Abatement Coordinator
Maine DEP
Division of Water Quality Management
17 State House Station
Augusta, ME 04333

RE: CSO MPU Approval Letter Response

Mr. Riley,

Thank you for your letter of September 18, 2025 in which the Department has issued its approval of the draft CSO Master Plan Update as submitted by the City in compliance with the July 31, 2025 submission deadline. The letter asks the City to move forward to making the draft into a final document. Please note that on Page 65 of the draft plan, it is noted that the proposed plan and schedule were prepared and submitted to DEP as a draft subject to both the Department's approval and the City Council's approval. The intent was to review the draft with the Council concurrent with the receipt of DEP's response to the draft plan. Your September 18 letter has provided that response which will now be taken to the Council for discussion.

Current average sewer user rates in Gardiner are at 1.88% MHI. The draft plan proposed a preliminary schedule on Page 65 followed by a discussion on Page 68 that indicated that the debt service to meet the CSO schedule would put the average sewer user rate in Gardiner at 2.41% MHI. This would represent a financial burden on the City in exceedance of the 2.00 % MHI threshold for hardship that has historically been used. Therefore, it was concluded on Page 68 of the draft that significant grant funding would be required to make the completion of these projects feasible. The City is currently in the process of seeking funding to complete much needed upgrades at the Maine Avenue pump station and the downstream wastewater treatment plant. Depending on the success of these outstanding funding applications, the completion of the three proposed sewer remediation projects, in addition to the treatment plant upgrade, could bring average user fees to between 2.51% MHI and 2.59% MHI.

City of Gardiner Wastewater Treatment Facility
540 River Avenue Gardiner, ME 04345
207-582-1351
www.GardinerMaine.com

The City has been advised that the Department is currently in the process of drafting a renewal of Gardiner's wastewater discharge permit. Your September 18 letter indicates that the new permit will include completion dates for each of the three projects defined in the draft Master Plan Update. The City is concerned that these dates may be inserted into the permit before the City has had the opportunity to finalize the draft plan with detailed discussions on its financial implications to its sewer rates.

The City respectfully asks that the Department allow the City to review this schedule in more detail before a draft permit renewal is issued. The City also requests that additional discussions with DEP be scheduled to determine potential funding options that Gardiner can pursue to reduce the financial burden on its sewer users. In light of the Department's comments that the City appears to be getting close to exiting the CSO program at some point in the future, the City would like to be given sufficient time to seek outside funding for each project with the possibility of extending the schedule out to allow review time after the completion of each project to fully assess its flow reduction impact. As discussed in a previous meeting, the City shares the Department's interests in eventually exiting the CSO program, but it is not in the position to do so until it has data showing that it can meet the excess flow reduction thresholds mandated by the Department.

We look forward to working with the Department to achieve our common goals in a manner that does not create a financial burden on the City. Towards that end, we will continue to apply for all potential funding opportunities that may become available. We would like to schedule a follow-up meeting to discuss these concerns in more detail before finalizing the CSO Master Plan Update.

The Master Plan Update and your letter of September 18th is scheduled to be presented to City Council at their regular meeting on October 15th at 6:00pm

Respectfully,

Steve Aievoli
Wastewater Superintendent
City of Gardiner
207-582-1351