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Appendix 5-A WASTEWATER LIFT STATION ANALYSIS AND EVALUATION

5 VOLUME 5: IDENTIFICATION AND EVALUATION OF ALTERNATIVE WASTEWATER SYSTEM SOLUTIONS

As part of the CGS Water and Wastewater Master Plan, alternative solutions have been developed and evaluated for each wastewater system, in response to the existing deficiencies determined through the gap analysis, outlined in Volume 3, and detailed in the Wastewater System Gap Analysis and Status Quo Reports for each system, contained in Appendix 3A. As outlined in Volume 1, alternatives developed as part of the Master Plan are weighed against evaluation criteria, prior to selecting a preferred solution.

Upon completion of the alternatives evaluation, preferred wastewater system servicing solutions were selected and are presented in Volume 7. Following the alternative solutions evaluation and preferred solution selection, a Capital Plan of the preferred alternatives was developed and is presented in Volume 8.

The following sections document the development and evaluation of wastewater treatment alternatives, the analysis regarding the inflow and infiltration in the City's wastewater systems and the Pollution Prevention Control Plan (PPCP) for each wastewater system. The development and evaluation of wastewater treatment alternatives included the following: 1) the alternatives developed to address capacity concerns to the 2041 growth scenario, 2) the evaluation of the servicing alternatives, and 3) the preferred recommended servicing solutions, identified by means of the evaluation process.

5.1 WASTEWATER TREATMENT SERVICING ALTERNATIVES

A number of treatment capacity deficiencies were identified through a gap analysis, described in the Wastewater System Gap Analysis and Status Quo Reports for each system, contained in Appendix 3A, and summarized in Volume 3. Treatment capacity gaps that required an evaluation of servicing alternatives to meet future growth projections were noted for the Chelmsford, Lively-Walden, and Sudbury Wastewater Systems.

The following subsections outline the alternative solutions developed to address the identified deficiencies in each system, and the evaluation undertaken to determine the preferred solution.

5.1.1 AZILDA WASTEWATER SYSTEM

The treatment infrastructure gap identified for the Azilda Wastewater System is summarized below, followed by a description of the alternative solutions developed to address the gap, and the evaluation undertaken in order to determine a preferred solution for future system treatment requirements.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The Azilda WWTP has sufficient capacity to treat Average Day Wastewater Flows generated by both existing and 2041 projected populations in the community of Azilda; however, there are concerns regarding the amount of peak wastewater flows collected in the system and conveyed to the Azilda WWTP. That is, the historical maximum day wastewater flows recorded at the plant are significantly higher than the average day flows in each given year. The average to peak flow ratio ranges from 3.61 to 6.08 in a given year (based on 2009 to 2013 data). Therefore, the facility is not able to treat the peak flows coming into the facility.

WASTEWATER TREATMENT SERVICING ALTERNATIVES – WET WEATHER FLOW

The City has undertaken a Schedule C Class EA, the Azilda Wastewater Plant and Collection System Class EA (R.V. Anderson, 2017), concurrently with the Master Plan to evaluate the options for continued wastewater treatment for wastewater flows generated in Azilda, as well as to address the solution for managing the high wet weather flows collected at the Azilda WWTP. The recommendations from the Azilda EA have been included in the Master Plan.

Various wastewater treatment alternatives for the community of Azilda were considered in R.V. Anderson's Class EA, including a solution to convey the wastewater flows generated within Azilda to the Chelmsford WWTP, given the proximity of the communities to one another and the fact that both the Azilda and Chelmsford WWTP's currently experience very high wastewater flows. The wastewater treatment servicing alternatives identified in the Class EA were as follows:

1. **Alternative 1: Expand the Azilda WWTP to Treat Wet Weather Flows**
2. **Alternative 2: Construct Wet Weather Flow Retention at the Azilda WWTP**
3. **Alternative 3: Construct Wet Weather Flow Retention at the Laurier Lift Station**
4. **Alternative 4: Construct Wet Weather Flow Retention at the Azilda WWTP and Laurier Lift Station**
5. **Alternative 5: Divert the Wastewater Flows from the Azilda WWTP to the Chelmsford WWTP and Retrofit the Azilda WWTP for Wet Weather Retention**
6. **Alternative 6: Do Nothing (Continue with Existing System As Is)**

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The recommended wastewater treatment solution for the Azilda Wastewater System is the **'Do Nothing'** solution. There is sufficient capacity within the Azilda WWTP to treat existing and future wastewater flows.

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW REQUIREMENTS

The recommended wastewater treatment solution for the community of Azilda is to construct Wet Weather Flow Retention at the Azilda WWTP (Alternative 2 per Azilda Wastewater Plant and Collection System Class EA). The total wastewater retention volume is estimated at 12,700 m^3, to be implemented as above grade tanks just north of the site for the existing Azilda WWTP.

5.1.2 CAPREOL WASTEWATER SYSTEM

The treatment infrastructure gap analysis for the Capreol Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The Gap analysis for the Capreol Wastewater System determined that the Capreol Lagoon has sufficient capacity to treat Average Day wastewater flows generated by both existing and 2041 projected populations in the community of Capreol. Wet weather flow management at Capreol Lagoon is also not currently a concern. That is, there is no current need to implement additional wet weather flow retention or treatment infrastructure.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The recommended wastewater treatment solution for the Capreol Wastewater System is the **'Do Nothing'** solution. There is sufficient capacity within the Capreol Lagoons to treat existing and future wastewater flows.

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW REQUIREMENTS

The recommended wastewater treatment solution for the Capreol Wastewater System is the **'Do Nothing'** solution. There is no current need for additional wet weather management infrastructure to be implemented within the system.

5.1.3 CHELMSFORD WASTEWATER SYSTEM

The treatment infrastructure gap identified for the Chelmsford Wastewater System is summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine the preferred solution for wastewater treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The Chelmsford WWTP has sufficient capacity to treat average day wastewater flows generated by existing populations, but not for long term projected populations to 2041 (an additional 356 m^3/d of treatment capacity was identified to be required for this time horizon). The recommendation in the Master Plan is to ensure additional wastewater treatment capacity is available by the year a given plant has reached 80% of its rated capacity for Average Day wastewater flows. Based on this approach, the planning of the Chelmsford WWTP expansion would need to commence by 2032. Please note, the WWTP has consistently met its concentration effluent limits.

In addition to the gap for servicing 2041 Average Day wastewater flows, there are concerns with the WWTP's ability to service wet weather flows given the variability in the Maximum Day wastewater flows recorded at the plant. That is, the high variability in wastewater flows suggests there is high inflow into the system.

WASTEWATER TREATMENT SERVICING ALTERNATIVES – AVERAGE DAY FLOW

The following alternatives were identified to address the gap in Average Day flow capacity at the Chelmsford WWTP.

Some of the alternatives explore the option to reduce the number of wastewater treatment facilities in the Valley and to centralize wastewater treatment as this was one of the main goals of the Master Plan.

Four wastewater treatment servicing alternatives were identified for the Chelmsford wastewater system, as follows:

1 **Alternative 1: Divert all Wastewater Flows from the Chelmsford WWTP to the Valley East WWTP**

- Construct a new Lift Station at the Chelmsford WWTP site and extend the forcemain and gravity sewer combination to convey all flows from the Chelmsford WWTP to the Valley East WW system.
- Decommission the Chelmsford WWTP (results in O&M savings at the Chelmsford WWTP and an increase in O&M costs at the Valley East WWTP to treat the increased flow).
- Expand the Valley East WWTP to service the flows diverted from the Chelmsford WWTP.
- There is a marginal cost saving by implementing the forcemain within the same corridor as the proposed feedermain between the Valley East and Chelmsford/Azilda water networks (a feedermain proposed as part of the Master Plan, as documented in Volume 4).

2 **Alternative 2: Divert all Wastewater Flows from the Chelmsford WWTP and the Azilda WWTP to the Valley East WWTP**

- Construct a new Lift Station at the Chelmsford WWTP site and extend the forcemain/sewer combination to convey all flows from the Chelmsford WWTP to the Valley East WW system.
- Implement a new Lift Station at the Azilda WWTP site and extend the forcemain/sewer combination to convey all flows from the Azilda WWTP to the Valley East WW system.
- Decommission the Chelmsford WWTP and Azilda WWTP (results in O&M savings at the Chelmsford and Azilda WWTP's and an increase in O&M costs at the Valley East WWTP to treat the increased flow).
- Expand the Valley East WWTP to service the flows diverted from the Chelmsford WWTP and Azilda WWTP.

— There is a marginal cost saving by implementing the forcemain within the same corridor as the proposed feedermain between the Valley East and Chelmsford/Azilda water networks (a feedermain proposed as part of the Master Plan, as documented in Volume 4).

3 **Alternative 3: Maintain use of the Chelmsford WWTP, Azilda WWTP and Valley East WWTP and expand the Chelmsford WWTP**

— Expand the Chelmsford WWTP

4 **Alternative 4: Do Nothing (Continue with Existing System As Is)**

— No expansions to the Chelmsford WWTP, Azilda WWTP or Valley East WWTP.

EVALUATION OF WASTEWATER TREATMENT SERVICING ALTERNATIVES – AVERAGE DAY FLOW

An evaluation of the servicing alternatives has been undertaken to determine the preferred servicing solution for providing the required treatment capacity within the Chelmsford Wastewater System. The summary of the evaluation is documented in Table 5-1. The **'Do Nothing'** alternative in this case did not satisfy the primary objective of the Master Plan to service existing and future population projections and was therefore screened out as a plausible option and not evaluated against the other three (3) servicing alternatives.

Table 5-1 Evaluation of Wastewater Treatment Alternatives for the Chelmsford Wastewater System

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Healthy Watersheds	The Valley East WWTP would need to be expanded, potentially causing an impact on the receiver (an assimilative capacity study would be required to validate this).	The Valley East WWTP would need to be expanded, potentially causing an impact on the receiver (an assimilative capacity study would be required to validate this). Will improve the quality of the Azilda WWTP receiver (Policy 2 receiver in terms of total phosphorus).	There is a potential of increasing the impact to the receiver for the Chelmsford WWTP receiver (an assimilative capacity study is required to validate this).
Natural Heritage	Construction is required therefore impacts on the Natural Environment. Trenchless technology will be used for creek crossings to avoid any impacts to the creeks. This option has more impact throughout the community due to the requirement for linear infrastructure between the Chelmsford WWTP and the Valley East WWTP.	Construction is required therefore impacts on the Natural Environment. Trenchless technology will be used for creek crossings to avoid any impacts to the creeks. This option has more impact throughout the community due to the requirement for linear infrastructure between both the Chelmsford and Azilda WWTP and the Valley East WWTP.	Construction is required therefore some impacts on the Natural Environment. No creek crossings are required for this alternative, unlike Alternatives 1 and 2. Also, construction will be localized to the plant site only and not along roads, unlike in Alternatives 1 and 2.

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Community Well Being	Significant impact to the community given that construction will take place within Chelmsford, Valley East and along the right of ways between the two communities.	Most significant impact to the community given that construction will take place within all three communities (Valley East, Azilda and Chelmsford) as well as along right of ways between said communities.	Some impact to the community, especially for individuals that reside near the Chelmsford WWTP, given the increase in trucks that will be required to enter and exit the site, also given the fact that there are numerous residential homes near the site.
Cost Effectiveness	More costly than Alternative 3 but less costly than Alternative 2. Total Capital Cost ($2016) = $105 M NPV Cost (25 yr analysis) = $140 M	Most costly option. Total Capital Cost ($2016) = $142 M NPV Cost (25 yr analysis) = $170 M	Least costly option. Total Capital Cost ($2016) = $15 M NPV Cost (25 yr analysis) = $86 M
Constructability and Ease of Integration	The Chelmsford WWTP site has constraints in terms of the amount of land available for the new LS. The Valley East WWTP has ample land surrounding it for an expansion.	The Chelmsford WWTP site has constraints in terms of the amount of land available for the new LS. The Valley East WWTP has ample land surrounding it for an expansion and the Azilda WWTP site has ample land for a new LS.	Existing Chelmsford WWTP site has constraints in terms of the amount of land available for the required expansion.
Operability	Operation and maintenance requirements are not significantly simplified since two wastewater treatment plants still need to be operated and maintained, as well as an additional lift station.	Operation and maintenance requirements are simplified since only one wastewater treatment plant needs to be maintained. However, it is important to note that two additional lift stations will also require operation and maintenance.	Operation and maintenance requirements are more complex than in alternatives 1 and 2 since three treatment plants still have to be maintained.

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Sustainability	Sustainable as a servicing option although it doesn't provide a clear advantage since although a treatment facility is decommissioned, an additional pumping facility is required.	Sustainable as a servicing option although it doesn't provide a clear advantage since although two (2) treatment facilities are decommissioned, two (2) additional pumping facilities are required.	Sustainable as a servicing option, but still requires the maintenance and operation of three (3) treatment facilities.
Summary	**Less preferred**	**Least preferred**	**Preferred**

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION – AVERAGE DAY FLOW

The recommendation for providing adequate treatment requirement at the Chelmsford WWTP is **Alternative 3: Maintain use of the Chelmsford WWTP, Azilda WWTP and Valley East WWTP and expand the Chelmsford WWTP**. An expansion to the plant will have to start being planned for in 2032.

WASTEWATER TREATMENT SERVICING ALTERNATIVES – WET WEATHER FLOW

The approach to wet weather flow management within the Master Plan is primarily focused on strategies and studies the City can undertake to ascertain the sources of I&I in the system. This approach is documented in Section 5.3. That said, based on historical bypass data at each treatment facility, it is clear that some systems are conveying high levels of I&I which is resulting in overflow events at the WWTP's. The determination of the appropriate wet weather management solution for each individual system will require a separate Class EA study. The Master Plan will therefore identify the need for such a study in each system that requires one, as well as reserve funding for the capital expenditure to implement a wet weather retention facility, based on a review of the historical flows. Note that a critical component of the future Class EA will be to establish the sizing of the wet weather retention or treatment facility based on a comprehensive review of overflow and flow monitoring data.

A cursory review of several wet weather management solutions has been undertaken for the Chelmsford WWTP given the existing WWTP's site constraints and the availability of an existing Lagoon that can be used for storage in the area. Please note, these alternatives and other wet weather management alternatives must still be reviewed in more detail as part of the future recommended Class EA.

Four servicing alternatives were identified to manage the increased max day and peak wet weather flows within the Chelmsford wastewater system, as follows:

1 **Alternative 1: New Lift Station on the Chelmsford WWTP Site to pump Max Day/Peak Instantaneous wastewater flows to the Chelmsford lagoons during wet weather events (i.e. heavy rain and snowmelt)**

— Implement a new Lift Station/Forcemain to pump peak wet weather flows from the Chelmsford WWTP site to the Chelmsford Lagoon Cell 2.

— Implement and program SCADA system for automating the control at the new lift station for peak wet weather flow events.

2 **Alternative 2: New Wet Weather Retention Tanks located at the Chelmsford WWTP Site**

— Construct new Wet Weather Retention Tanks at the Chelmsford WWTP site.

— Purchase Land near/adjacent to the Chelmsford WWTP (conservative estimate given the site constrains at the Chelmsford WWTP). Land availability is not guaranteed.

— Install pumps within the Wet Weather Retention Tanks and forcemain to pump wastewater flow out of the tanks, back into the Chelmsford WWTP, after a wet weather event has subsided.

- Continue use of Cell 2 of the Chelmsford Lagoons to divert wastewater flow from the Main LS during wet weather events.
- Implement and program SCADA system to continue pumping wet weather flows from the Main LS to the Chelmsford Lagoons Cell 2 during wet weather events.
- Implement a new sewer to convey wastewater flow from the Chelmsford WWTP site to the new Wet Weather Retention Tanks (assumed not to be on the Chelmsford WWTP site due to site constraints).

3 **Alternative 3: New Wet Weather Retention Tanks located throughout the Chelmsford wastewater system, notably at the Charette LS, Hazel LS and Chelmsford WWTP**

- Construct Wet Weather Retention Tanks at the Charette LS.
- Install pumps within the Wet Weather Retention Tanks at the Charette LS to pump wastewater flow out of the tanks and back into the Chelmsford wastewater network, after a wet weather event has subsided.
- Purchase land near the Charette LS site on which to site the proposed wet weather retention tanks (no existing space on the Charette LS site).
- Implement Wet Weather Retention Tanks at the Hazel LS.
- Jnstall pumps within the Wet Weather Retention Tanks at the Hazel LS to pump wastewater flow out of the tanks and back into the Chelmsford wastewater network, after a wet weather event has subsided.
- Purchase land near the Hazel LS site on which to site the proposed wet weather retention tanks (no existing space on the Hazel LS site).
- Construct Wet Weather Retention Tanks at the Chelmsford WWTP
- Install Pumps within the Wet Weather Retention Tanks at the Chelmsford WWTP to pump wastewater flow out of the tanks and back into the Chelmsford WWTP, after a wet weather event has subsided.
- Continue use of Cell 2 of the Chelmsford Lagoons to divert wastewater flow from the Main LS during wet weather events.
- Implement and program SCADA system to continue pumping wet weather flows to the Chelmsford Lagoons Cell 2 during wet weather events.

4 **Alternative 4: Do Nothing (Continue with Existing System As Is)**

- No expansion to the Chelmsford WWTP or additional wet weather retention implemented within the system to manage wet weather flows.

EVALUATION OF WASTEWATER TREATMENT SERVICING ALTERNATIVES – WET WEATHER FLOW

An evaluation of the servicing alternatives has been undertaken to determine the preferred servicing solution for managing peak wastewater flows within the Chelmsford Wastewater System. The summary of the evaluation is documented in Table 5-2. The **'Do Nothing'** alternative in this case did not satisfy one of the primary criteria to maintain healthy watersheds within the community and was therefore screened out as a plausible option and not evaluated against the other three servicing alternatives.

Table 5-2 Evaluation of Wet Weather Management Alternatives for the Chelmsford Wastewater System

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Healthy Watersheds	Provides option to reduce bypass events at the Chelmsford WWTP.	Provides option to reduce bypass events at the Chelmsford WWTP.	Provides option to reduce bypass events at the Chelmsford WWTP; however, it is less certain that the flows can be managed since there is not enough data currently to ascertain where in the system the major sources and locations of I&I.
Natural Heritage	No significant impacts to natural heritage is expected given that construction will be undertaken within urbanized areas that are already disturbed.	No significant impacts to natural heritage is expected given that construction will be undertaken within urbanized areas that are already disturbed.	No significant impacts to natural heritage is expected given that construction will be undertaken within urbanized areas that are already disturbed.
Community Well Being	More impact given the requirement for a forcemain through the community along road right of ways.	Least overall impact since construction will be localized near the Chelmsford WWTP, albeit the WWTP is encroached by multiple businesses and residential properties.	Most community impacts due to the requirement for multiple construction sites.
Cost Effectiveness	Least costly alternative. Total Capital Cost ($2016) = $12 M NPV Cost (25 yr analysis) = $11 M	More costly than Alternative 1 but less costly than Alternative 3. Total Capital Cost ($2016) = $16 M NPV Cost (25 yr analysis) = $15 M	Most costly alternative. Total Capital Cost ($2016) = $22 M NPV Cost (25 yr analysis) = $20 M
Constructability and Ease of Integration	Least complex given that the lagoon is already in place and the implementation of a LS on site is less complex than implementing wet weather storage tanks (i.e. this alternative can be more easily implemented given the site constraints).	Most complex since it is uncertain that the existing Chelmsford WWTP has the required land on site to accommodate the required wet weather retention tanks.	Less complex, but requires additional land at the LS sites to accommodate the new proposed tankage, which is not guaranteed to be available for sale.

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Operability	Least complex given that flows are only managed at one facility.	Increasingly complex given that flows are managed at two, instead of three facilities, as in the case of Alternative 3.	More complex given that controls are required to manage wet weather flows at three locations.
Sustainability	Most sustainable given the use of existing infrastructure (the existing Chelmsford lagoon) for storage.	Less sustainable given that a new tank has to be implemented on one site.	Least sustainable since a new tank has to be implemented on two sites which requires more capital and O&M costs.
Summary	**Most Preferred**	**Less Preferred**	**Least Preferred**

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION – WET WEATHER FLOW

The recommendation for managing excess wet weather flows within the Chelmsford Wastewater System, is **Alternative 1: New Lift Station on the Chelmsford WWTP Site to pump Max Day/Peak Instantaneous wastewater flows to the Chelmsford lagoons during wet weather events (i.e. heavy rain and snowmelt).** This is the result of a preliminary evaluation which should be undertaken in more detail through a future Class EA.

5.1.4 CONISTON WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis within the Coniston Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The Coniston WWTP has sufficient capacity to treat Average Day wastewater flows generated by both existing and 2041 projected populations in the community of Coniston; however, there are concerns with the WWTP's ability to manage wet weather flows. Whereas the facility does not have a rated capacity for Maximum Day flows, historical Maximum Day wastewater flows recorded at the plant range in variability and generally align with the bypass events documented by the City – thereby indicating that the facility is susceptible to wet weather events. Moreover, numerous bypass events have been reported in recent history, indicating that the plant is likely not rated to service the peaks in the flows currently experienced at the facility.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION – AVERAGE DAY FLOW

The recommended wastewater treatment solution for the Coniston Wastewater System is the **'Do Nothing'** solution. There is sufficient capacity within the Coniston WWTP to treat existing and future wastewater flows.

WASTEWATER TREATMENT SERVICING ALTERNATIVES – WET WEATHER FLOW

The approach to wet weather flow management within the Master Plan is primarily focused on strategies and studies the City can undertake to ascertain the sources of I&I in the system. This approach is documented in Section 5.3. That said, based on historical bypass data at each treatment facility, it is clear that some systems are conveying high levels of I&I which is resulting in overflow events at the WWTP's. The determination of the appropriate wet weather management solution for each individual system will require a separate Class EA study. The Master Plan will therefore identify the need for such a study in each system that requires one, as well as reserve funding for the capital expenditure to implement a wet weather retention facility, based on a review of the historical flows. Note that a critical component of the future Class

EA will be to establish the sizing of the wet weather retention or treatment facility based on a comprehensive review of overflow and flow monitoring data.

I&I initiatives are being recommended in the Master Plan, over the next five years, the Class EA to evaluate wet weather infrastructure should also be undertaken at the same time given there is no current certainty that I&I reduction will result in the elimination of the required peaks in the system to eliminate future overflow events therefore meaning wet weather management infrastructure will be required regardless of any gains on I&I reduction.

1 **Alternative 1: I&I Reduction Program**

— Implement I&I Reduction Program per Section 5.3

— Complete stress test to determine the plant's peak flow capacity

2 **Alternative 2: Construct New I&I Rentention Tanks or High Rate Treatment**

— Complete Class EA for new wet weather flow facilities. This would include finalizing the sizing of the new facilities.

— Construct new wet weather flow facilities

3 **Alternative 3: Expand WWTP to Handle Peak Flow**

— Upgrade the capacity of the WWTP to handle the peak wet weather flow events coming into the WWTP

4 **Alternative 4: Do Nothing (Continue with Existing System As Is)**

EVALUATION OF WASTEWATER TREATMENT SERVICING ALTERNATIVES – WET WEATHER FLOWS

An evaluation of the alternatives has been undertaken to determine the preferred servicing solution for managing peak wastewater flows within the Coniston Wastewater System. The summary of the evaluation is documented in Table 5-2. The **'Do Nothing'** alternative in this case did not satisfy one of the primary criteria to maintain healthy watersheds within the community and was therefore screened out as a plausible option and not evaluated against the other three alternatives.

Table 5-3 Evaluation of Wet Weather Management Alternatives for the Coniston Wastewater System

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Healthy Watersheds	Would improve the health of the watershed however there are concerns regarding effectiveness of eliminating all impacts to the watershed.	Would significantly reduce the probability of wet weather bypasses and improve the health of the watershed.	Would significantly reduce the probability of wet weather bypasses and improve the health of the watershed.
Natural Heritage	No significant impacts to natural heritage is expected given that construction would be limited to in pipe and maintenance hole work.	No significant impacts to natural heritage is expected given that construction will be undertaken within already disturbed areas.	No significant impacts to natural heritage is expected given that construction will be undertaken within already disturbed areas.
Community Well Being	There may still be concerns as it is uncertain if the majority of the I&I can be eliminated. However, eliminating any fraction of the I&I at the source is of overall benefit to the City.	Would reduce the potential for flooding in the community.	Would reduce the potential for flooding in the community.

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Cost Effectiveness	Least costly alternative. Approximately - $50,000 Stress Testing - $90,000	More costly than Alternative 1 but less costly than Alternative 3. Total Capital Cost ($2016) = $14 M	Most costly alternative. Total Capital Cost ($2016) = $20 M
Constructability and Ease of Integration	Least complex given that all the work is inside the existing wastewater network.	Complex since the location and size of the new tank is uncertain.	Complex since this would require a full treatment plant upgrade.
Operability	Least complex given that the high flows no longer need to be dealt with at the treatment plant and in the collection system.	Increasingly complex given that a new wet weather management facility will need to be operated.	Increasingly complex since the treatment plant will now be oversized to meet the average day flow requirements.
Sustainability	However, eliminating the I&I at the source is of greater overall benefit to the City as less wastewater will require pumping and treatment at the facility	Less sustainable given that a new tank has to be constructed.	Least sustainable since the treatment plant would need to be fully expanded.
Summary	**Most Preferred**	**Less Preferred**	**Least Preferred**

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION – WET WEATHER FLOWS

The preferred solution to address wet weather management alternatives by implementing a comprehensive I&I program in the catchment and closely monitoring the I&I into the system. Since it is understood that removing the I&I can be challenging (and at time impossible) it is recommended to conduct a separate Class EA to review the plausible wet weather management alternatives in concert with the I&I reduction program. The Master Plan also includes future funding for wet weather management facilities if the I&I reduction is not achieved.

5.1.5 COPPER CLIFF WASTEWATER SYSTEM

The treatment infrastructure gap identified within the Copper Cliff Wastewater System is summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

Additional wastewater treatment capacity was previously indicated as a gap in the Copper Cliff wastewater system. Vale, the owner of the WWTP that treats wastewater flows generated in Copper Cliff, indicated in recent years that the plant is approaching its capacity and that the City may therefore no longer be serviced by the plant. The City is therefore already in the process to plan for and implement a new forcemain at the Nickel LS, the lift station at which all wastewater flows generated in the community are collected, to convey all flows directly to the Sudbury WWTP.

There are no reported current concerns regarding managing peak wet weather flows collected at the Copper Cliff WWTP.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The wastewater treatment recommendation within the Copper Cliff system is for the City to continue with their current infrastructure plan, which is to divert wastewater flows collected in the Copper Cliff wastewater system to the Sudbury Wastewater System.

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW ISSUES

The recommended wastewater treatment solution for the Capreol Wastewater System is the **'Do Nothing'** solution. There is no current need for additional wet weather management infrastructure to be implemented within the system.

5.1.6 DOWLING WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis within the Dowling Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The Dowling WWTP has sufficient capacity to treat Average Day Wastewater Flows generated by both existing and 2041 projected populations within the community. There are also no concerns with regards to wet weather overflow events at the Dowling WWTP, therefore there was no requirement to consider wet weather management facilities such as wet weather retention tanks or high rate treatment at the facility's site.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The recommended wastewater treatment solution for the Dowling Wastewater System is the **'Do Nothing'** solution, to continue treating wastewater flows collected in the system by means of the Dowling WWTP.

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW REQUIREMENTS

The recommended wastewater treatment solution for the Dowling Wastewater System is the **'Do Nothing'** solution. There is no current need for additional wet weather management infrastructure to be implemented within the system.

5.1.7 FALCONBRIDGE WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis within the Falconbridge Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The Falconbridge WWTP has sufficient capacity to treat Average Day Wastewater Flows generated by both existing and 2041 projected populations in the community of Falconbridge.

There are also no concerns with regards to bypass events at the Falconbridge WWTP, therefore there was no requirement to consider wet weather management facilities such as wet weather retention tanks or high rate treatment at the WWTP.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The recommended wastewater treatment solution for the Falconbridge Wastewater System is the **'Do Nothing'** solution, to continue treating wastewater flows collected in the system by means of the Falconbridge WWTP.

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW REQUIREMENTS

The recommended wastewater treatment solution for the Falconbridge Wastewater System is the **'Do Nothing'** solution. There is no current need for additional wet weather management infrastructure to be implemented within the system.

5.1.8 GARSON WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis within the Garson Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The wastewater flows generated in the community of Garson are currently being conveyed and treated at the Sudbury WWTP, while the Garson Lagoons are being used to manage wet weather flows in the community. This system configuration was recommended as part of the City's Long Term Needs Study for the Garson Lagoons and the O'Neil Lift Station. As such, there is no wastewater treatment gap per se in the Garson collection system since the gap regarding wastewater treatment at the Sudbury WWTP is addressed in Section 5.1.12. There is however, a need to optimize the existing system by automating the system for draining the Garson lagoons after a wet weather event. The current operation is totally manual, which is not ideal and can be quite readily optimized.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The recommended wastewater treatment servicing solution for the Garson Wastewater System is the **'Do Nothing'** solution. In other words, continue treating wastewater flow by means of the Sudbury WWTP (alternatives for the Sudbury WWTP are addressed in Section 5.1.12).

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW REQUIREMENTS

The recommended wastewater treatment servicing solution for the Garson Wastewater System is the **'Do Nothing'** solution, to continue diverting wastewater flows to the Garson Lagoons during wet weather events. Additionally, it is recommended that this process be optimized through the installation and programming of a new SCADA system to automate the process for diverting wastewater flows (currently a manual process).

5.1.9 ONAPING-LEVACK WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis within the Onaping-Levack Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The Levack WWTP, which treats wastewater flows generated in the communities of Onaping and Levack, has sufficient capacity to treat Average Day and Maximum Day Wastewater Flows generated by both existing and 2041 projected populations in the community.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The recommended wastewater treatment solution for the Onaping-Levack Wastewater System is the **'Do Nothing'** solution, to continue treating wastewater flows collected in the system by means of the Levack WWTP.

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW REQUIREMENTS

The recommended wastewater treatment solution for the Onaping-Levack Wastewater System is the **'Do Nothing'** solution. There is no current need for additional wet weather management infrastructure to be implemented within the system.

5.1.10 LIVELY WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis within the Lively Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

It was determined that the Lively WWTP does not have sufficient capacity to treat Average Day Wastewater Flows generated by 2041 projected populations and there have also been concerns with the WWTP's ability to manage peak wet weather flows. Both of these capacity concerns have previously been addressed in the Lively/Walden Class EA Environmental Summary Report (ESR) (J.L. Richards 2013). The ESR evaluated several infrastructure alternatives to provide additional wastewater treatment capacity within the Lively Wastewater System, many of which included redirecting wastewater flows generated within the Lively/Walden Wastewater System to the Walden WWTP. The final recommendation in the ESR is to convey all flows collected within the community to the Walden WWTP. This solution will not only require upgrades to the Walden WWTP to increase its overall capacity, but also to the conveyance system through which the flows are conveyed, including sewers and the Jacob LS. These upgrades are documented in Section 5.2.

The general recommendation in the Master Plan is to ensure additional wastewater treatment capacity is available by the year a given plant has reached 80% of its rated capacity for Average Day wastewater flows. Based on this approach, wastewater flows would have needed to be redirected to the Walden WWTP starting in the year 2014. The recommendation is of course based on the projected wastewater flow data calculated for the Master Plan which was completed a few years past. Therefore, in practical terms, the redirection of wastewater flows from the Lively WWTP must occur in the next few years. Given that infrastructure upgrades are being recommended in five year increments, the Master Plan is recommending that the redirection of wastewater flows from the Lively WWTP be effective as of 2021. This requires that the Walden WWTP be upgraded to by this time frame to support the additional flows redirected from the Lively WWTP. The recommendation for the upgrades to the Walden WWTP are summarized in Section 5.1.11. The timing for the upgrade to the Walden WWTP is also for 2021.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The recommended solution for wastewater treatment for the Lively Wastewater System is to convey all wastewater flows collected in the community to the Walden WWTP and to upgrade the Walden WWTP. The previous J.L. Richard ESR's did not recommend the work be implemented by 2021; however, this is due to the previous study's use of different planning projections and unit wastewater rates. As such, the wastewater flows projected in J.L. Richard's previous study were smaller than those projected in the Master Plan. An additional recommendation in the Master Plan is therefore to complete an addendum to the 2013 Lively/Walden ESR to update the wastewater flow projection calculations and to update the conceptual design for the upgrades to the Walden WWTP.

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW REQUIREMENTS

No additional wet weather flow infrastructure is recommended in the Master Plan for the Lively Wastewater System given that the preferred solution to upgrade the Walden WWTP (to which wastewater flows from Lively will be diverted to in the future, per the recommendations of the J.L. Richards ESR) also includes designing the plant to treat peak wastewater flows.

5.1.11 WALDEN WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis for the Walden Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The general recommendation in the Master Plan is to ensure additional wastewater treatment capacity is available by the year a given plant has reached 80% of its rated capacity for Average Day wastewater flows. Based on this approach, the expansion of the Walden WWTP would have been required in 2011. The recommendation is of course based on the projected wastewater flow data calculated for the study which was completed a few years past as part of the Master Plan. Therefore, in practical terms, the redirection of wastewater flows from the Lively WWTP must occur as soon as possible. Given that infrastructure upgrades are being recommended in five year increments, the Master Plan is recommending that the redirection of wastewater flows from the Lively WWTP be effective as of 2021.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The recommended solution for wastewater treatment for the Walden Wastewater System is to upgrade the Walden WWTP by 2021. The previous J.L. Richard ESR's did not recommend the work be implemented by 2021; however, this is because different planning projections and unit wastewater rates were considered in that study. As such, the wastewater flows projected in that previous study were smaller than those projected in the Master Plan. An additional recommendation in the Master Plan is therefore to complete an addendum to the 2013 Lively/Walden ESR to update the wastewater flow projection calculations and to update the conceptual design for the upgrades to the Walden WWTP. This is recommended to occur as soon as possible, since the addendum must be completed before the City can proceed to the detailed design for the plant upgrade.

Also note that wastewater flow generated by the Whitefish First Nation will be treated at the Walden WWTP.

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW REQUIREMENTS

No additional wet weather flow infrastructure is recommended in the Master Plan for the Walden Wastewater System given that the preferred solution to upgrade the Walden WWTP includes designing the plant to treat peak wastewater flows.

5.1.12 SUDBURY WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis for the Sudbury Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The general recommendation in the Master Plan is to ensure additional wastewater treatment capacity is available by the year a given plant has reached 80% of its rated capacity for Average Day wastewater flows. Based on this approach, the expansion of the Sudbury WWTP would have been required by 2013. Considering the existing capacity of the WWTP isn't exceeded until 2034, this timing seems premature. That is, it is not practical to undertake upgrades to a facility that are required twenty years into the future. For the Sudbury Wastewater System, the Master Plan therefore recommends an upgrade to the WWTP by 2031 (that is, completed in 2031), when the plant has reached just over 90% of its total rated capacity. Therefore, no alternatives were developed or evaluated for the treatment requirements at the Sudbury WWTP given that Dennis Consultants previously completed an addendum to an ESR, titled Wastewater Treatment Options for the

City of Sudbury and Settlement of Garson in the Town of Nickel (Dennis Consultants, 2009), in 2009 to provide recommendations on the future upgrades required at the Sudbury WWTP to service existing and future populations in Sudbury and Garson. That said, the addendum to the ESR did recommend the implementation of Moving Bed Biofilm Reactors (MBBR's) at the plant for the next phase expansion; which the City intends to revisit through another addendum to the ESR, to reconsider the preferred conceptual design for the facility.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION – AVERAGE DAY FLOW

The Master Plan recommends undertaking a Class EA to evaluate future treatment design concepts at the Sudbury WWTP. The study should be undertaken to update the projected flows required for treatment and to re-evaluate previously examined design concepts, as well as any new design concepts. Since the implementation of the upgrades are not required until 2031, the Class EA study should be undertaken shortly after 2021. This approach ensures that the existing and future conditions are most up to date and that the recommendations are valid at the time the upgrades are undertaken - a proponent has ten years from the time a Class EA is deemed approved to start implementing the recommendations from the Class EA. That is, construction must begin (not be completed by) ten years from the date the Class EA is approved (i.e. after the public review process has been finalized).

WASTEWATER TREATMENT SERVICING ALTERNATIVES & EVALUATION – WET WEATHER FLOW

The approach to wet weather flow management within the Master Plan is primarily focused on strategies and studies the City can undertake to ascertain the sources of I&I in the system. This approach is documented in Section 5.3. That said, based on historical bypass data at the Sudbury WWTP, it is clear that the plant is experiencing high levels of I&I which is then resulting in overflow events. The determination of the appropriate wet weather management solution will require a separate Class EA study. The Master Plan will therefore identify the need for such a study for each system that requires one, as well as reserve fund for the approximate capital expenditure to implement a wet weather retention facility, based on a review of the highest bypass events experienced at each WWTP in recent years. Note that a critical component of the future Class EA will be to establish the sizing of the wet weather retention or treatment facility based on a comprehensive review of overflow and flow monitoring data.

I&I initiatives are being recommended in the Master Plan, over the next five years, the Class EA to evaluate wet weather infrastructure should also be undertaken at the same time given there is no current certainty that I&I reduction will result in the elimination of the required peaks in the system to eliminate future overflow events therefore meaning wet weather management infrastructure will be required regardless of any gains on I&I reduction.

1 **Alternative 1: I&I Reduction Program**

— Implement I&I Reduction Program per Section 5.3

— Complete stress test to determine the plant's peak flow capacity

2 **Alternative 2: Construct New I&I Storm Tanks or High Rate Treatment**

— Complete Class EA for new wet weather flow facilities. This would include finalizing the sizing of the new facilities.

— Construct new wet weather flow facilities

3 **Alternative 3: Expand WWTP to Handle Peak Flow**

— Upgrade the capacity of the WWTP to handle the peak wet weather flow events coming into the WWTP

4 **Alternative 4: Do Nothing (Continue with Existing System As Is)**

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION – WET WEATHER FLOW

An evaluation of the alternatives has been undertaken to determine the preferred servicing solution for managing peak wastewater flows within the Sudbury Wastewater System. The summary of the evaluation is documented in Table 5-2. The **'Do Nothing'** alternative in this case did not satisfy one of the primary criteria to maintain healthy watersheds within the community and was therefore screened out as a plausible option and not evaluated against the other three alternatives.

Table 5-4 Evaluation of Wet Weather Management Alternatives for the Sudbury Wastewater System

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Healthy Watersheds	Would improve the health of the watershed however there are concerns regarding effectiveness of eliminating all impacts to the watershed.	Would significantly reduce the probability of wet weather bypasses and improve the health of the watershed.	Would significantly reduce the probability of wet weather bypasses and improve the health of the watershed.
Natural Heritage	No significant impacts to natural heritage is expected given that construction would be limited to in pipe and maintenance hole work.	No significant impacts to natural heritage is expected given that construction will be undertaken within already disturbed areas.	No significant impacts to natural heritage is expected given that construction will be undertaken within already disturbed areas.
Community Well Being	There may still be concerns as it is uncertain if the majority of the I&I can be eliminated. However, eliminating any fraction of the I&I at the source is of overall benefit to the City.	Would reduce the potential for flooding in the community.	Would reduce the potential for flooding in the community.
Cost Effectiveness	Least costly alternative. Approximately - $200,000 Stress Testing - $90,000	More costly than Alternative 1 but less costly than Alternative 3. Total Capital Cost ($2016) = $44 M	Most costly alternative. Total Capital Cost ($2016) would be in excess of $400 M
Constructability and Ease of Integration	Least complex given that all the work is inside the existing wastewater network.	Complex since the location and size of the new tank is uncertain. Would be challenging to incorporate an overflow tank on the existing site.	Complex since this would require a full treatment plant upgrade. The plant has recently had an headworks upgrade and this would impact the same area.
Operability	Least complex given that the high flows no longer need to be dealt with at the treatment plant and in the collection system.	Increasingly complex given that a new wet weather management facility will need to be operated.	Increasingly complex since the treatment plant will now be oversized to meet the average day flow requirements.

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Sustainability	However, eliminating the I&I at the source is of greater overall benefit to the City as less wastewater will require pumping and treatment at the facility	Less sustainable given that a new tank has to be constructed.	Least sustainable since the treatment plant would need to be fully expanded.
Summary	**Most Preferred**	**Less Preferred**	**Least Preferred**

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION – WET WEATHER FLOWS

The preferred solution to address wet weather management alternatives by implementing a comprehensive I&I program in the catchment and closely monitoring the I&I into the system. Since it is understood that removing the I&I can be challenging (and at time impossible) it is recommended to conduct a separate Class EA to review the plausible wet weather management alternatives in concert with the I&I reduction program. The Master Plan also includes future funding for wet weather management facilities if the I&I reduction is not achieved.

5.1.13 VALLEY EAST WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis within the Valley East Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The Valley East WWTP has sufficient capacity to treat Average Day Wastewater Flows generated by both existing and 2041 projected populations in the community of Valley; however, there are concerns with the WWTP's ability to service peak wastewater flows. Albeit in 2036 and 2041 projected average day flows surpass the WWTP's rated capacity by 1.4%, this flow average is not deemed to be significant enough to require planning for additional Average Day treatment capacity. Instead, the wastewater flow rates collected at the plant would simply be monitored over time to ensure that actual Average Day flows are not surpassing the flow trends calculated.

Wet weather flows collected at the Valley East WWTP on the other hand, are currently a concern. Whereas the facility does not have a rated capacity for peak flows, historical maximum day wastewater flows recorded at the plant range in variability, indicating there may be significant inflow into the system.

The major infrastructure gap at the Valley East WWTP is that the facility is not currently designed to service the existing and future Maximum Day and Peak Instantaneous wastewater flows and therefore requires the implementation of wet weather management infrastructure.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION – AVERAGE DAY FLOWS

The recommended wastewater treatment solution for the Valley East Wastewater System is the **'Do Nothing'** solution. There is sufficient capacity within the Valley East WWTP to treat existing and future wastewater flows.

WASTEWATER TREATMENT SERVICING ALTERNATIVES – WET WEATHER FLOW

The approach to wet weather flow management within the Master Plan is primarily focused on strategies and studies the City can undertake to ascertain the sources of I&I in the system. This approach is documented in Section 5.3. That said, based on historical bypass data at each treatment facility, it is clear that some systems are conveying high levels of I&I which is resulting in overflow events at the WWTP's. The determination of the appropriate wet weather management solution for each individual system will require a separate Class EA study. The Master Plan will therefore identify the need for such a study in each system that requires one, as well as reserve funding for the capital expenditure to implement a wet weather retention facility, based on a review of the historical flows. Note that a critical component of the future Class EA will be to establish the sizing of the wet weather retention or treatment facility based on a comprehensive review of overflow and flow monitoring data.

I&I initiatives are being recommended in the Master Plan, over the next five years, the Class EA to evaluate wet weather infrastructure should also be undertaken at the same time given there is no current certainty that I&I reduction will result in the elimination of the required peaks in the system to eliminate future overflow events therefore meaning wet weather management infrastructure will be required regardless of any gains on I&I reduction.

1 **Alternative 1: I&I Reduction Program**

— Implement I&I Reduction Program per Section 5.3

— Complete stress test to determine the plant's peak flow capacity

2 **Alternative 2: Construct New I&I Rentention Tanks or High Rate Treatment**

— Complete Class EA for new wet weather flow facilities. This would include finalizing the sizing of the new facilities.

— Construct new wet weather flow facilities

3 **Alternative 4: Do Nothing (Continue with Existing System As Is)**

EVALUATION OF WASTEWATER TREATMENT SERVICING ALTERNATIVES – WET WEATHER FLOWS

An evaluation of the alternatives has been undertaken to determine the preferred servicing solution for managing peak wastewater flows within the Coniston Wastewater System. The summary of the evaluation is documented in Table 5-2. The **'Do Nothing'** alternative in this case did not satisfy one of the primary criteria to maintain healthy watersheds within the community and was therefore screened out as a plausible option and not evaluated against the other three alternatives.

Table 5-5 Evaluation of Wet Weather Management Alternatives for the Valley Wastewater System

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2
Healthy Watersheds	Would improve the health of the watershed however there are concerns regarding effectiveness of eliminating all impacts to the watershed.	Would significantly reduce the probability of wet weather bypasses and improve the health of the watershed.
Natural Heritage	No significant impacts to natural heritage is expected given that construction would be limited to in pipe and maintenance hole work.	No significant impacts to natural heritage is expected given that construction will be undertaken within already disturbed areas.
Community Well Being	There may still be concerns as it is uncertain if the majority of the I&I can be eliminated. However, eliminating any fraction of the I&I at the source is of overall benefit to the City.	Would reduce the potential for flooding in the community.
Cost Effectiveness	Least costly alternative. Approximately - $50,000 Stress Testing - $90,000	More costly than Alternative 1 but less costly than Alternative 3. Total Capital Cost ($2016) = $22 M

EVALUATION CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2
Constructability and Ease of Integration	Least complex given that all the work is inside the existing wastewater network.	Complex since the location and size of the new tank is uncertain.
Operability	Least complex given that the high flows no longer need to be dealt with at the treatment plant and in the collection system.	Increasingly complex given that a new wet weather management facility will need to be operated.
Sustainability	However, eliminating the I&I at the source is of greater overall benefit to the City as less wastewater will require pumping and treatment at the facility	Less sustainable given that a new tank has to be constructed.
Summary	**Most Preferred**	**Less Preferred**

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION – WET WEATHER FLOWS

The preferred solution to address wet weather management alternatives by implementing a comprehensive I&I program in the catchment and closely monitoring the I&I into the system. Since it is understood that removing the I&I can be challenging (and at time impossible) it is recommended to conduct a separate Class EA to review the plausible wet weather management alternatives in concert with the I&I reduction program. The Master Plan also includes future funding for wet weather management facilities if the I&I reduction is not achieved.

5.1.14 WAHNAPITAE WASTEWATER SYSTEM

The findings of the treatment infrastructure gap analysis within the Wahnapitae Wastewater System are summarized below, followed by a description of the alternative solutions developed to address the gap and the evaluation undertaken in order to determine a preferred solution for treatment in the system.

WASTEWATER TREATMENT INFRASTRUCTURE GAP

The Wahnapitae Lagoons have sufficient capacity to treat Average Day Wastewater Flows generated by both existing and 2041 projected populations within the community. There are also no concerns with regards to wet weather flow management at the Lagoons.

RECOMMENDED WASTEWATER TREATMENT SERVICING SOLUTION

RECOMMENDATION FOR ADDRESSING AVERAGE DAY FLOW TREATMENT REQUIREMENTS

The recommended wastewater treatment solution for the Wahnapitae Wastewater System is the **'Do Nothing'** solution, to continue treating wastewater flows collected in the system by means of the Wahnapitae Lagoons.

RECOMMENDATION FOR ADDRESSING WET WEATHER FLOW REQUIREMENTS

The recommended wastewater treatment solution for the Wahnapitae Wastewater System is the **'Do Nothing'** solution. There is no current need for additional wet weather management infrastructure to be implemented within the system. The City should continue monitoring levels in the Lagoons as well as the overflow events in case these increase. If the flows conveyed to the Lagoons reach near or over their capacity, the City should undertake a Class EA to evaluate servicing alternative to manage the wet weather flows collected in the system.

5.2 WASTEWATER CONVEYANCE ALTERNATIVES

The analysis of the City' wastewater systems as part of the Master Plan also included evaluating the capacity of the conveyance system elements in each system. These included wastewater lift stations and sewers. A number of wastewater conveyance capacity concerns were identified through gap analysis, presented in Volume 3.

5.2.1 WASTEWATER LIFT STATIONS

An analysis of all the lift stations in the City of Sudbury was undertaken to determine the hydraulic capacity gaps based on existing and future flow conditions. For all lift stations that required upgrades, infrastructure alternatives were considered and evaluated. This process for all lift stations is clearly documented in Appendix 5-A. All the recommended infrastructure resulting from this analysis is documented in Volume 7.

5.2.2 SEWERS

As part of the Gap Analysis process, all undersized sewers within the City were identified based on existing and future projected (2041) flow conditions. The required upgrades to the pipes were documented as part of the Master Plan. These are listed in Volume 7.

The alternatives with regards to the wastewater collection system were either to **'Extend and/or Enlarge the Sewage Collection System'**, or, to **'Do Nothing'**. Given that several gaps were identified regarding the sizing of wastewater collection system, as documented in Volume 3, the **'Do Nothing'** alternative did not address the problem statement which the Water & Wastewater Master Plan is purposed with addressing. Therefore, the 'Do Nothing' alternative was screened out and the preferred solution is to **'Extend and/or Enlarge the Sewage Collection System'**. The sewers requiring upgrades were selected based on the hydraulic modeling analysis conducted as part of the Study.

5.3 INFLOW AND INFILTRATION REDUCTION

Infiltration and Inflow (I&I) is a term generally used to designate flows that enter the sanitary sewer system from sources other than municipal wastewater. Infiltration typically enters the system through the pipe joints or cracks as a result of saturated soil, for example following a rainfall event or from a high water table. Inflows may enter the system through the lift holes in manhole covers (typically at roadway low points or in floodplains) or enter the system from direct connections, such as roof leaders or foundation drains connected to the sanitary system. Both infiltration and inflow correlate to rainfall intensity and duration.

The following sections will describe the methodology used to analyze the I&I in each of the CGS's wastewater collection systems. Findings of the analysis and recommendations to address I&I concerns are presented along with recommended action plans and associated costing.

5.3.1 METHODOLOGY

I&I flows within the wastewater collection systems were determined using a number of strategies, including the collection of measured flow monitoring data and the use of a mass balance with recorded treatment plant flows. Flow monitoring was completed in Sudbury, Valley, and Lively Wastewater Systems, and a mass water balance, based on industry standard sanitary generation rates (60%-80%) of total billed water consumption, was used to determine sanitary flows in the remaining systems.

In order to determine I&I values, a comparison was conducted of base dry weather flow volumes against those wet weather volumes recorded through the flow monitoring exercise.

I&I rates coinciding with a 2-year rain-on-snow event captured on April 14, 2014 were the largest obtained during the monitoring period and were used as input into sanitary system modelling. Further details of the I&I analysis can be found in the following subsections.

I&I RATE CALCULATION: SYSTEMS WITH FLOW MONITORING DATA

Flow monitoring data was reviewed to identify relationships between rain event occurrences and wastewater flows in the systems. As a preliminary analysis of I&I in the systems with flow monitoring data, high levels of inflow were assumed where the fluctuation pattern of wastewater flows was related to the rain events noted. By examining the delay between a rain event and wastewater flow increase, infiltration was recognized. If, for twelve (12) to twenty-four (24) hours after a rain event ends, wastewater flow continues to increase, it was noted that infiltration was occurring in the system.

As mentioned, flow monitoring data from previous studies was reviewed and used in the I&I analysis for the CGS. The following studies were reviewed for use in the I&I analysis:

- City of Greater Sudbury Sanitary Sewer Flow Monitoring Study – Final Report, R.V. Anderson, January 14th, 2014
  - Based on flows seen in this study, most monitoring locations in the Sudbury system observed I&I rates higher than design standards for existing developed areas. As such, the Sudbury wastewater system is analysed further in this report to specify areas of concern and develop recommendations. Refer to Section 5.3.2 for details regarding the Sudbury wastewater system I&I details.
- Lively and Walden Inflow and Infiltration Study Report #1, J.L. Richards and Associates Limited, August, 2011
- Valley East Inflow and Infiltration Study – Final Report, R.V. Anderson Associates Limited, February 13th, 2015

I&I RATE CALCULATION: SYSTEMS WITH NO FLOW MONITORING DATA

In order to define I&I rates for areas within the CGS that did not have flow monitoring available, soil and system conditions were reviewed. The I&I rates, determined for the communities with flow monitoring, were averaged and assigned to the communities that had no flow monitoring, based on similarities between the systems' conditions. The average of the I&I values determined for the Sudbury system was assigned to Wahnapitae, Coniston, Copper Cliff and Garson. The Valley monitoring I&I rates were averaged, and this value was assigned to Onaping-Levack, Dowling, Chelmsford, Vermilion and Falconbridge.

5.3.2 I&I ANALYSIS

Table 5-6 summarizes the range of I&I rates for each wastewater system. The ranges have been grouped into categories and assigned a representative value for analysis purposes. Categories 1 and 2 represent the lowest observed I&I rates, and are at or below normally expected I&I. Category 3 represents I&I rates slightly above normal and, although not considered a major issues, should be investigated for mitigation. Categories 4 and 5 represent the highest I&I rates which were considered to be substantially above normal, and immediate effort should be placed on the investigation and remediation of I&I in these areas.

In other words, I&I rates that fall into Categories 4 and 5 are high or extremely high and therefore these areas should be a focus of corrective measures. "Secondary priority" was assigned to areas with I&I rates corresponding to Categories 1, 2, and 3.

Table 5-6 I&I Rate Categories

CATEGORY	FROM (L/S/M PIPE)	REPRESENTATIVE VALUE (L/S/M PIPE)	TO (L/S/M PIPE)	ANALYSIS
1	0.00115	0.00185	0.00478	I&I rates are minimal.
2	0.00478	0.00772	0.01253	I&I rates are within acceptable range.

CATEGORY	FROM (L/S/M PIPE)	REPRESENTATIVE VALUE (L/S/M PIPE)	TO (L/S/M PIPE)	ANALYSIS
3	0.01253	0.01651	0.02531	I&I rates are above typical levels and should be investigated for mitigation.
4	0.02531	0.03117	0.04174	I&I rates are high and should be investigated for mitigation.
5	0.04174	0.04583	0.05818	I&I rates are extremely high and corrective measures are necessary.

Table 5-7 summarizes each of the areas that were hydraulically modelled and their corresponding I&I rates and priority. As can be seen, Sudbury is the only wastewater system with I&I rates greater than 0.02531 L/s/m_{pipe}, and therefore contains the main areas of concern. The Sudbury wastewater system I&I rates and area priorities are broken down in Table 5-8, which should be read in conjunction with Figure 5-1.

It should be noted that a central portion of the Sudbury Wastewater System was not included in the I&I monitoring analysis due to its close proximity to the rock tunnel. The tunnel has capacity to store the I&I before slowly releasing it to the Sudbury WWTP, and therefore this area was not seen as a priority for I&I reduction strategies at this point in time. A red outline on Figure 5-1 identifies the area for which I&I monitoring was not undertaken.

Table 5-7 Wastewater System I&I Rates and Prioritiy

COMMUNITY	PRIORITY (OR RECOMMENDATION)
Azilda[1]	-
Chelmsford[1]	-
Coniston	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
Copper Cliff	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
Dowling	Based on the calculated average day per capita wastewater generation rate of 900 L / Capita / d there is a concern regarding infiltration in the system which should be addressed.
Falconbridge	No immediate action.
Garson	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
Lively-Walden[2]	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
Onaping-Levack	No immediate action.
Valley	Monitor every 5 years and maintain overall I&I using key repairs.
Wanapitei	Identify inflow locations in the field, such as catch-basins or poor surface drainage.

[1]Azilda and Chelmsford were analysed, as described in Section 5.3.1 using an average of the I&I rates from monitored areas. The Azilda Water Treatment Plant and Collection System Class Environmental Assessment (June of 2016), being completed by R.V. Anderson, should be referenced regarding I&I issues that have been identified following the analysis undertaken by the Master Planning team. (See Footnote 3 of ***Table 5-12****).*

[2]Additional studies are required for Mikkola, a community within the Lively-Walden system, to further define the suspected areas of significant I&I.

Table 5-8 Sudbury Wastewater System I&I Rates and Priority (corresponds with Figure 5-1)

MAP LABEL	PRIORITY (OR RECOMMENDATION)
1	Monitor every 5 years and maintain overall I&I using key repairs.
2	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
3	Identify inflow locations in the field, such as catch-basins or poor surface drainage. Perform smoke testing and CCTV Inspection for I&I monitoring to target repairs to worst sewer branches.
4	No immediate action.
5	Monitor every 5 years and maintain overall I&I using key repairs.
6	Identify inflow locations in the field, such as catch-basins or poor surface drainage. Perform smoke testing and CCTV Inspection for I&I monitoring to target repairs to worst sewer branches.
7	Monitor every 5 years and maintain overall I&I using key repairs.
8	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
9	Monitor every 5 years and maintain overall I&I using key repairs.
10	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
11	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
12	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
13	Monitor every 5 years and maintain overall I&I using key repairs.
14	Monitor every 5 years and maintain overall I&I using key repairs.
15	Monitor every 5 years and maintain overall I&I using key repairs.
16	Identify inflow locations in the field, such as catch-basins or poor surface drainage.

MAP LABEL	PRIORITY (OR RECOMMENDATION)
18	Identify inflow locations in the field, such as catch-basins or poor surface drainage. Perform smoke testing and CCTV Inspection for I&I monitoring to target repairs to worst sewer branches. Downspout and foundation drain disconnections, combined sewer separation and overland drainage improvements.
19	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
20	Monitor every 5 years and maintain overall I&I using key repairs.
21	No immediate action.
22	Monitor every 5 years and maintain overall I&I using key repairs.
23	Identify inflow locations in the field, such as catch-basins or poor surface drainage. Perform smoke testing and CCTV Inspection for I&I monitoring to target repairs to worst sewer branches.
24	Identify inflow locations in the field, such as catch-basins or poor surface drainage. Perform smoke testing and CCTV Inspection for I&I monitoring to target repairs to worst sewer branches.
25	Monitor every 5 years and maintain overall I&I using key repairs.
26	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
27	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
28	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
29	Identify inflow locations in the field, such as catch-basins or poor surface drainage.
30	Monitor every 5 years and maintain overall I&I using key repairs.

Figure 5-1 is a map of the Sudbury Wastewater System hydraulic modeling, with colour coding representing the levels of I&I as identified in Table 5-8.

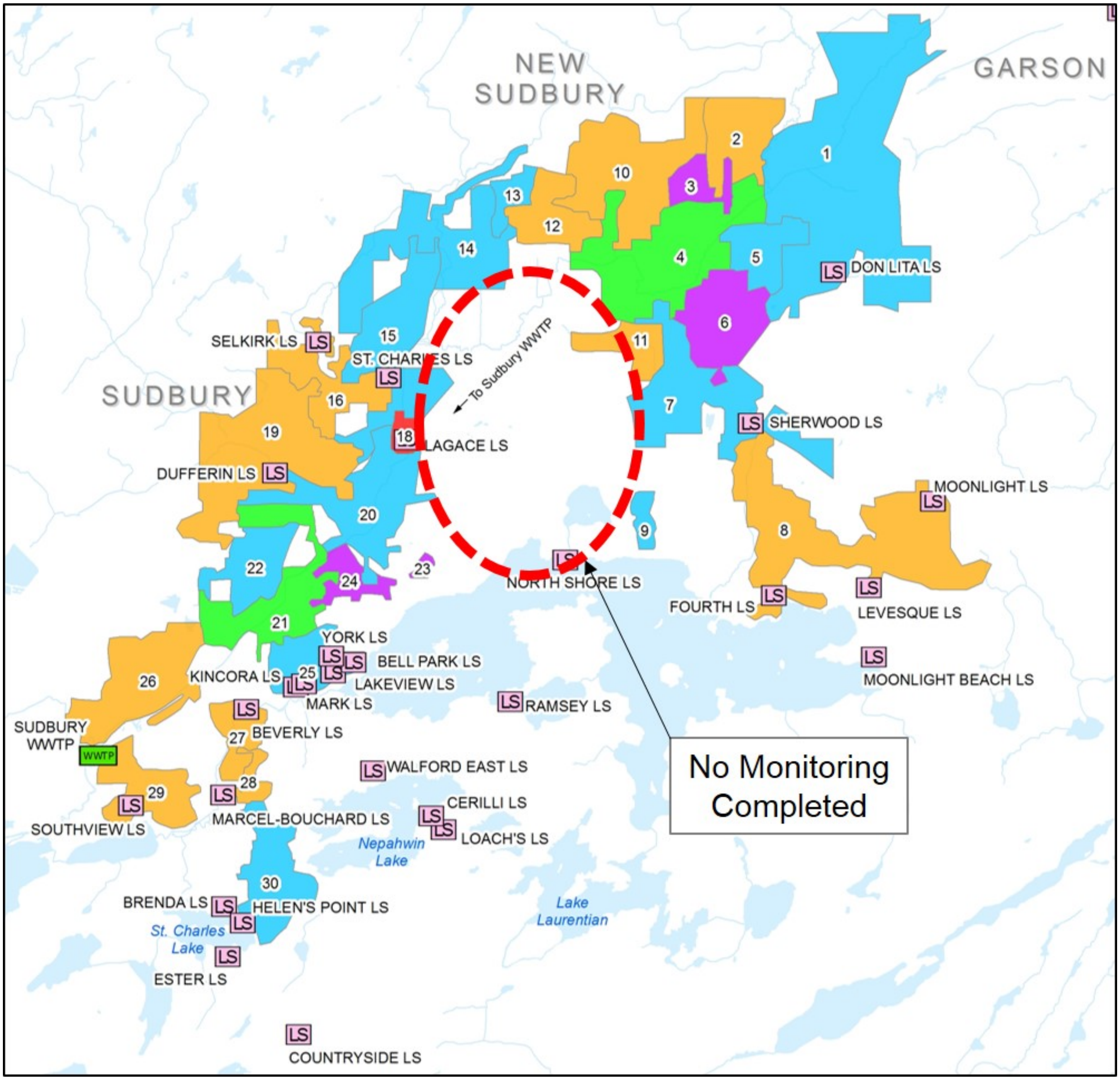

Figure 5-1 Sudbury I&I Monitoring Results and Associated Categories

5.3.3 COST TO TREAT I&I

The annual operating costs and for each WWTP from 2010 to 2015 were analyzed in order to gauge the cost impacts associated with the treatment of I&I in each system. Table 5-9 summarizes the cost to treat each cubic meter of wastewater, including I&I, per community, and provides an estimated total cost of treatment for I&I flows.

Table 5-9 Treatment Costs Associated with I&I

PLANT	AVERAGE WASTEWATER TREATMENT COST ($/M^3)	COST TO TREAT I&I ($/YEAR)
Azilda WWTP	0.15	$47,800
Chelmsford WWTP	0.11	$57,600
Coniston WWTP	0.10	$13,950
Dowling WWTP	0.11	$18,400
Falconbridge WWTP	0.03	$800[1]
Levack WWTP	0.31	$22,200
Lively WWTP	0.12	$17,600
Sudbury WWTP	0.06	$403,900
Valley East WWTP	0.11	$32,900
Walden WWTP	0.13	$26,800
Total Cost to Treat I&I ($/Year)	**$642,100**	

[1] Costs to treat I&I were calculated based on the CGS 2010-2015 operational costs and budgeting. It is recognized that Falconbridge WWTP may be an outlier, but was included based on the available data.

5.3.4 CONCLUSIONS AND RECOMMENDATIONS

Upon completion of the I&I rate analysis for each of the wastewater systems, based on flow monitoring and a mass wastewater balance, the following conclusions and recommendations can be made:

— R.V. Anderson is currently completing the *Azilda Water Treatment Plant and Collection System Class Environmental Assessment* and this study should be referenced for I&I rates and recommendations to be used for further analysis of the system. It is recommended that I&I within the Azilda and Chelmsford Wastewater Systems be studied further.

— It is also recommended that Mikkola, a community within the Lively-Walden Wastewater System, should be studied further in order to fully understand and quantify the suspected high levels of I&I.

— Areas with minimal to average I&I require no further action. They include:

  — Onaping-Levack

  — Falconbridge

— Installation of permanent flow monitoring and analysis on a five (5) year cycle is recommended for areas approaching average I&I and higher. These areas include:

  — Valley (2 new monitoring stations*)

  — Sudbury (4 new monitoring stations*)

  — Lively (2 New monitoring stations*)

  — Chelmsford (2 new monitoring stations*)

**Monitoring locations to be determined based on further analysis.*

— Areas with I&I above typical levels should be addressed by identifying inflow locations in the field such as catch-basins or poor surface drainage locations. Communities where higher than average I&I exists and reduction efforts could be identified include:

- — Coniston
- — Copper Cliff
- — Dowling
- — Garson
- — Lively-Walden
- — Wanapitei

— For areas with high I&I, it is recommended that inflow locations be identified in the field and comprehensive investigation methods be carried out such as smoke testing and/or CCTV inspection to target repairs to the worst sewer branches. These areas are:

- — Areas within Sudbury (as identified in Table 5-8 and on Figure 5-1)

— Where I&I is extremely high, field identification and intensive investigation methods are recommended. Downspout/foundation drain disconnection programs should be implemented and combined sewer separation should be completed wherever possible. Overland drainage improvements in these areas are also required. Areas include:

- — Areas within Sudbury (as identified in Table 5-8 and on Figure 5-1)
- — Azilda (See Footnote 3 of Table 5-12)

Table 5-10 summarizes the programs and associated incentives offered by other municipalities relating to basement flooding prevention and/or downspout disconnection.

Table 5-10 Incentives Offered by Other Municipalities in Ontario

LOCATION	DESCRIPTION OF PROGRAM	MAXIMUM INSENTIVE PER HOUSEHOLD
Region of Peel	Downspout Disconnection Program	$100
	Financial Assistance Program: Low Income Homes	$1,000
	Basement Flooding Subsidy Program: Installation of flood protection devices such as backwater valves (BWV), sump pumps, storm pipe severance and capping	$3,400
City of Toronto	Mandatory Downspout Disconnection Financial Assistance Program	$500
City of Markham	Financial Assistance Program: 80% of downspout disconnection cost	$500
	Financial Assistance Program: 100% of rain barrel purchase	$150
City of Windsor	Basement Flooding Protection Subsidy Program: Installation of sump pump with overflow and/or BWV and/or disconnection of foundation drains from floor drain	$2,800

LOCATION	DESCRIPTION OF PROGRAM	MAXIMUM INSENTIVE PER HOUSEHOLD
City of Kingston	Preventative Plumbing Program: Installation of BWV and/or sump pit and pump, capping of foundation drain, disconnection of existing sump pump	$3,000
City of Niagara Falls	Weeping Tile Disconnection	$3,000
	Installation of BWV	$900

Table 5-12 summarizes the total costs to be incurred should the City choose to implement all of the investigation and reduction recommendations outlined above. These strategies and programs will not result in the elimination of 100% of the I&I entering the City's collection system, but could have the effect of reducing flows that are being unnecessarily treated at the wastewater treatment plants. An investment in I&I reduction strategies should be focused on the areas of greatest potential impact based on a cost benefit analysis.

Focusing on system wide I&I reduction is considered a positive climate change adaptation strategy. While the Master Plan did not include a detailed regression analysis of the frequency of heavy rainfall and freeze/thaw events in the City, nor of the amount of water associated with those events, it is commonly accepted that I&I reduction strategies such as the ones recommended in this Master Plan will serve as a climate change adaptation strategies, working towards reducing the number of by-passes / overflows in the wastewater systems. Therefore, by implementing infrastructure solutions to reduce the amount of inflow and infiltration collected within the wastewater collection the system, the City is taking steps to mitigate against future adverse impacts on the wastewater system, private property and the environment that may be caused by changes to the climate in the City.

Pipe lengths that were used to calculate reduction measure costs in Table 5-12, are summarized in Table 5-11.

Table 5-11 Pipe Lengths Included in I&I Study Efforts Costing

PIPE LENGTHS (M)	
Azilda	24,414
Category 4	50,437
Category 5	7,982
Total	**82,833**

Table 5-12 General I&I Study and Reduction Measures

ITEM	2017	2018	2019	2020	2021
Sudbury – Implementation of Permanent Flow Monitoring[1]	$74,400	$48,000	$48,000	$48,000	$48,000
Valley – Implementation of Permanent Flow Monitoring[1]	$37,200	$24,000	$24,000	$24,000	$24,000
Chelmsford – Implementation of Permanent Flow Monitoring[1]	$37,200	$24,000	$24,000	$24,000	$24,000
Lively – Implementation of Permanent Flow Monitoring[1]	$37,200	$24,000	$24,000	$24,000	$24,000
Addition I&I Reduction Activities in Category 5 areas[2,3]	$562,000	$531,000	$531,000	$531,000	$531,000
Sub Total	$748,000	$651,000	$651,000	$651,000	$651,000

ITEM	2017	2018	2019	2020	2021
I&I Study Efforts (Smoke Testing, CCTV Inspection, etc.)[4]	$ 207,000				
Total	**$3,560,000**				

[1]Inspection and installation was assumed to be $600, monthly services (including cellular services) were assumed to be $12,000/year, and the price of the flow monitor was assumed to be $6,000.
[2]Assumes implemented program is mandatory and therefore every existing building in the Category 5 areas participates in the incentives program. The program is assumed to be implemented in phases (20% participation in each of the 5 forecasted years). The first year cost also includes the field study required to determine the number of connections that exist ($8.77/property). Incentives were assigned as $750/household.
[3]The Azilda Water Treatment Plant and Collection System Class Environmental Assessment, being completed by R.V. Anderson (June of 2016) specifies annual operations and maintenance costing for I&I reduction measures including public consultation, inspection activities, replacement or relining of sewers, removal of weeping tile, sump pump, and roof leader connections, and flow monitoring for the 20 year planning period. These actions were most consistent with our Category 5 recommended activities and therefore we have analyzed Azilda as a Category 5 I&I area.
[4]A test cost of $2.50/$m_{pipe}$ was assumed for Category 4 and 5 areas, as well as Azilda.

5.4 POLLUTION PREVENT CONTROL PLANS

5.4.1 POLLUTION PREVENTION CONTROL PLAN OUTLINE

In addition to documenting the treatment infrastructure required in each of the City's wastewater systems, a Pollution Prevention Control Plan (PPCP) has been developed and documented for each wastewater system, per the requirements outlined in the MOECC's Procedure F-5-5. The objective of a PPCP is to document existing pollution problems caused by overflow events in a Combined Sewer System (CSS), to propose remedial measures to address the pollution problems and to provide a program to implement these measures. A review of the Procedure F-5-5 policy is provided in Section 5.4.2.

Not all requirements of Procedure F-5-5, as documented in Section 5.4.2, could be addressed in the PPCP for the City's wastewater systems. It is important to note that the City does not have any CSS's, that is, systems in which the stormwater and wastewater conveyance networks are interconnected; therefore, no recommendations were made with regards to Combined Sewer Overflows (CSO's), since there are none. Furthermore, the procedure includes the requirement for a review of receiving water quality data which could not be completed for the City's Master Plan since such data was not available for review. The PPCP's have been completed to provide recommendations to optimize the use of existing wastewater infrastructure and plan for additional infrastructure requirements to manage high wet weather flows. The City has documented several overflow events at multiple wastewater treatment plants and lift stations in recent years and therefore, there is a need to develop a plan to address how the City can mitigate and/or eliminate the negative impacts caused by such events on their wastewater infrastructure and the environment.

The requirements for developing a PPCP has therefore been used as the guideline for developing the City's plan to mitigate the occurrence of overflow events at the City's wastewater facilities. The characterization of the pollution problems within each system is focused on the quantity of overflow events, given that water quality data for each receiver was not available. The overflow events documented were those caused by wet weather events only. Events which included mechanical failures or equipment malfunctions were not reported as part of the PPCP. The rationale for excluding these events is that the purpose of the analysis is to focus on remedial actions for managing wet weather flows. Equipment upgrades and maintenance is to be addressed through the City's asset management strategy. It is also important to note that overflow events were documented irrespective of whether there was an impact to the facility's receiver. The rationale for this approach is again, that the analysis is focused on proposing remedial actions for managing wet weather flows. If a receiver is not impacted by a particular overflow event, it is not to say that there was no potential for it to be impacted. The recommendations in the PPCP's are supplementary to the analysis conducted in the Master Plan for the additional treatment capacities required within each wastewater treatment system based on the facilities' capacity and future wastewater flow projections, as documented in Sections 5.1.1 to 5.1.14.

5.4.2 POLICY REVIEW

The MOECC regulates municipal infrastructure in Ontario and has established many guidelines regarding the control and discharge of contaminants in wastewater systems. Procedure F-5-5 *"Determination of Treatment Requirements for Municipal and Private Combined and Partially Separated Sewer Systems"*, a subdocument of Guideline F-5-5 *"Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters"*, is the guiding document for works regarding CSOs and PPCPs.

MOECC PROCEDURE F-5-5

Procedure F-5-5 outlines the guidelines for the treatment of combined and partially separated sewers in municipal and private areas. The objectives of the procedure are as follows:

1. Eliminate the occurrence of dry-weather overflows
2. Minimize the potential for impacts on human health and aquatic life resulting from CSOs
3. Achieve as a minimum, compliance with body contact recreational water quality objectives (Provincial Water Quality Objectives (PWQO) for Escherichia coli (E.coli)) at beaches impacted by CSOs for at least 95% of the four-month period (June 1 to September 30) for an average year

The Ministry requires that the municipality/operating authority of the system satisfies the following:

1. Develop a Pollution Prevention and Control Plan (PPCP)
2. Meet minimum CSO controls
3. Provide additional controls
   - For beaches impaired by CSOs where water not meeting the PQWO for E. coli
   - Where required by receiving water quality conditions as specified in Procedure B-1-1 *"Water Management – Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy, July 1994"*

The procedure details a Pollution Prevention and Control Plan, minimum CSO controls, level of treatment, effluent disinfection, beach protection, monitoring, new sanitary and storm connections to combined sewer systems, and enforcement.

With respect to the City's wastewater systems, the focus of the recommendations in the PPCP's has been to address the means by which wet weather flows can be managed within the system. An analysis of receiving water quality data could not be undertaken given that current quality data is not available for review. Moreover, the major concern with the City's wastewater systems is their ability to convey and manage flows during wet weather events. No analysis or comment could be made with regards to CSO's since the City's wastewater systems do not contain any.

MINIMUM CSO CONTROLS

The following are the minimum CSO controls outlined by Procedure F-5-5:

1. Eliminate CSOs during dry-weather periods except under emergency conditions
2. Establish and implement Pollution Prevention programs that focus on pollutant reduction activities at the source
3. Establish and implement proper operation and regular inspection and maintenance programs for the combined sewer system in order to ensure continued proper system operation
4. Establish and implement a floatables control program to control coarse solids and floatable materials
5. Maximize the use of the collection system for the storage of wet-weather flows which are conveyed to the Sewage Treatment Plant for treatment when capacity is available
6. Maximize the flow to the Sewage Treatment Plant for the treatment of wet-weather flows

With respect to volume, durations and frequency, Procedure F-5-5 requires the following:

1 During a 7 month period starting within 15 days of April 1st, capture and treat 90% wet-weather volume (for an average year) above the dry-weather flow.
2 Controlling overflow to not more than 2 events per season (June 1 – September 30) for an average year.
3 Combined total duration of CSO events at any one CSO location shall not exceed 48hrs.
4 An additional overflow event may be permitted provided that the PWQO for E.coli based on a geometric mean at beaches is not exceeded for 95% of the four-month season between (June 1 – September 30).

The minimum level of service (LOS) for the CSOs is to satisfy these requirements and continue to reduce the volume of bypass events during an average year.

PPCP MOECC PROCEDURE F-5-5 REQUIREMENTS

A PPCP should outline the nature, cause, and extent of pollution issues, analyze alternatives and suggested remedial measures, as well as recommend a program for implementation. More specifically, the following is to be completed to assess the impact of CSOs:

1 Characterization of the combined sewer system (CSS):

- Location and physical description of CSO outfalls in the collection system, emergency overflows at pumping stations, and bypass locations at STPs
- Location and identification of receiving water bodies for all combined sewer outfalls
- Combined sewer system flow and STP treatment capacities; present and future expected peak flow rates during dry and wet-weather
- Capacity of all regulators
- Location of cross connections
- Combined sewer maintenance programs
- Regulator inspection and maintenance programs

2 Additional control alternatives:

- Source control
- Inflow/infiltration reduction
- Operation and maintenance improvements
- Control structure and collection system improvements
- Storage and treatment technologies
- Sewer separation

3 An implementation plan with cost estimates and schedule for all measures to eliminate dry-weather overflows and minimize wet-weather overflows.

5.4.3 AZILDA WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

A total of twelve overflow events have been reported at the Azilda WWTP, based on data collected from January 2014 to November 2016. Wet weather events are either heavy rainfall events, snowmelt, or a mixture of heavy rainfall and snowmelt. The receiving waters for the Azilda WWTP is the Pilon Drain, known as the Azilda Creek, which discharges into the Whitson River.

Table 5-13 Overflow Events at the Azilda WWTP Caused by Wet Weather Events

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
14-Apr-14	2,232	30	Whitson River	Y
31-Aug-14	541	21.25	Whitson River	Y
16-Oct-14	879	98	Whitson Creek	Y
16-Oct-14	8,249	22	Whitson Creek	Y
24-Nov-14	3,560	14	Whitson Creek	Y
10-Apr-15	928	3.25	Pilon Creek	Y
20-Apr-15	646	43	Pilon Creek	Y
12-May-15	137.9	23.75	Pilon Creek	Y
14-Dec-15	4,921	65	Whitson River	Y
15-Dec-15	4,355	41	Whitson River	Y
16-Mar-16	888	17.9	Pilon Creek	Y
31-Mar-16	3,115	61.9	Pilon Creek	Y

A total of seven overflow events have been reported between the Laurier and Laundry Lift Stations in the Azilda Wastewater System, based on data collected from January 2014 to November 2016.

Table 5-14 Overflow Events at Lift Stations within the Azilda Wastewater System Caused by Wet Weather Events

LIFT STATION	DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
Laurier LS	14-Apr-14	4,471	14.5	Whitewater Lake	Y
Laurier LS	31-Aug-14	2,390	7.8	Whitewater Lake	Y
Laurier LS	16-Oct-14	7,710	25	Whitewater Lake	Y
Landry LS	16-Oct-14	151	42.5	Charlebois Creek	Y
Laurier LS	14-Dec-15	2,500	22	Whitewater Lake	Y
Laurier LS	16-Mar-16	500	7	Whitewater Lake	Y
Landry LS	16-Mar-16	40	4	Charlebois Creek	Y

PROPOSED SYSTEM CONTROLS

The number of overflows at the Azilda WWTP caused by wet weather events for a period just under two years indicates that wet weather management strategies are required within the Azilda Wastewater System. The Water and Wastewater Master Plan has addressed the programs and infrastructure required reduce and manage wet weather flows in the system. The recommendations are listed below.

1 New Physical Infrastructure

- The implementation of Wet Weather Retention Tanks is required to manage the wet weather peaks experienced at the plant, per the Azilda Wastewater Plant and Collection System Class EA recommendation. The solution includes the installation of above grade tanks estimated at 12,700 m^3 just north of the site of the existing Azilda WWTP.

2 Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

- Data collection through field investigations are required to ascertain sources of inflow in the system to prioritize future disconnections in the system.
- The implementation of a downspout and foundation drain disconnection program is required to reduced inflows into the wastewater system.

The costs for the above programs and infrastructure are listed in Volume 7. While the recommendation to proceed with a downspout and foundation disconnection program may lead to a reduction in I&I which in turn may result in the need for less wet weather retention storage, it is recommended that the implementation of the wet weather retention tank project proceeds in parallel. The approach is based on the fact that there are a significant number of overflows at the Azilda WWTP and therefore infrastructure is required in the short term to eliminate the occurrence of any additional overflows. Furthermore, the process of eliminating I&I in wastewater system may take years and it is not possible to ascertain at the very beginning of such an undertaking, especially when the sources of I&I are not yet identified, to ascertain how much of the I&I can be removed from the system.

5.4.4 CAPREOL WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

There was no data available to determine if there have been any overflow events at the Capreol Lagoons. Discussions with the City have indicated that there are currently no issues with regards to storage concerns at the wells for existing wastewater flows collected in the system.

PROPOSED SYSTEM CONTROLS

No remedial actions are recommended for the Capreol system at this time.

5.4.5 CHELMSFORD WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

A total of twelve overflow events have been reported at the Chelmsford WWTP, based on data collected from January 2014 to November 2016, as documented in Table 5-15. Wet weather events are either heavy rainfall events, snowmelt, or a mixture of heavy rainfall and snowmelt. The receiving waters for the Chelmsford WWTP is the Whitson River.

Table 5-15 Overflow Events at the Chelmsford WWTP Caused by Wet Weather Events

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
15-Oct-14	8,371	120	Whitson Creek	Y

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
24-Nov-14	1,400	72	Whitson River	Y
10-Apr-15	278	8.75	Whitson Creek	Y
10-Apr-15	8,985	360	Whitson Creek	Y
11-May-15	652	26	Whitson River	Y
30-May-15	2,341	41	Whitson River	Y
6-Nov-15	202.5	6.4	Whitson River	Y
12-Nov-15	380	22	Whitson River	Y
27-Nov-15	94	6	Whitson River	Y
14-Dec-15	3,523	30	Whitson River	Y
16-Mar-16	1,769	32.5	Whitson River	N
31-Mar-16	687.5	19	Whitson River	Y

One overflow event has been reported at the Lift Stations within the Chelmsford Wastewater System, as documented in Table 5-16.

Table 5-16 Overflow Events at Lift Stations within the Chelmsford Wastewater System Caused by Wet Weather Events

LIFT STATION	DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
Belanger Street LS	17-Oct-14	9.3	0.5	Whitson Creek	Y

PROPOSED SYSTEM CONTROLS

The number of overflows at the Chelmsford WWTP caused by wet weather events for a period just under two years indicates that wet weather management strategies are required within the Chelmsford Wastewater System. The Water and Wastewater Master Plan has addressed the programs and infrastructure required reduce and manage wet weather flows in the system. The recommendations are listed below.

1 New Physical Infrastructure

- A Class EA study is required to determine the recommended wet weather management infrastructure required within the Chelmsford Wastewater System. The Master Plan's evaluation of alternatives indicated that a plausible solution would be to use the Chelmsford Lagoons as storage during wet weather events. While the City currently uses the lagoons to store wet weather flows, only wastewater flows from a portion of the community are pumped to the Lagoons, those which are collected at the Main LS. The proposal in the Master Plan is to implement a new lift station at the Chelmsford WWTP which would pump all excess flows conveyed to the plant, to the Lagoons.

This recommendation is preliminary and must be studied further through a Class EA, followed by the implementation of the recommended infrastructure solution.

2 Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

- Installation of permanent flow monitoring to determine the true levels of I&I in the system and subsequently tailor an appropriate program to eliminate sources of high inflow.

The costs for the above programs and infrastructure are listed in Volume 7. While future recommendations to proceed with I&I reduction programs may lead to a reduction in I&I which in turn may result in the need for less wet weather retention storage, it is recommended that the planning for and implementation of the wet weather infrastructure proceeds in parallel with I&I reduction programs. The approach is based on the fact that there are a significant number of overflows at the Chelmsford WWTP and therefore infrastructure is required in the short term to eliminate the occurrence of any additional overflows. As stated above, the process of eliminating I&I in wastewater system may take years and it is not possible to ascertain at the very beginning of such an undertaking, especially when the sources of I&I are not yet identified, to ascertain how much of the I&I can be removed from the system.

5.4.6 CONISTON WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

A total of nineteen overflow events have been reported at the Coniston WWTP, based on data collected from January 2014 to November 2016, as documented in Table 5-17. Wet weather events are either heavy rainfall events, snowmelt, or a mixture of heavy rainfall and snowmelt. The receiving water for the Coniston WWTP is Coniston Creek.

Table 5-17 Overflow Events at the Coniston WWTP Caused by Wet Weather Events

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
14-Apr-14	2,810	14.5	Coniston Creek	Y
15-Oct-14	3	149	Coniston Creek	Y
24-Nov-14	1,900	43	Coniston Creek	Y
25-Dec-14	500	4	Coniston Creek	Y
10-Apr-15	508	4	Coniston Creek	Y
20-Apr-15	2,673	36	Coniston Creek	Y
11-May-15	381	3	Coniston Creek	Y
30-May-15	1,390	22	Coniston Creek	Y
27-Nov-15	207	12	Coniston Creek	Y
14-Dec-15	5,651	77	Coniston Creek	Y
18-Dec-15	7,387	76.5	Coniston Creek	Y
9-Mar-16	1,050	13.1	Coniston Creek	Y
12-Mar-16	4,114	201	Coniston Creek	Y

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
16-Mar-16	2,815	26	Coniston Creek	N
28-Mar-16	1,640	96	Coniston Creek	Y
31-Mar-16	3,429	27	Coniston Creek	Y
15-Apr-16	4,601	226	Coniston Creek	N
16-May-16	48	10.75	Coniston Creek	N
9-Jul-16	1,327	15	Coniston Creek	N

Two overflow events have been reported at the Lift Stations within the Coniston Wastewater System, as documented inTable 5-18.

Table 5-18 Overflow Events at Lift Stations within the Coniston Wastewater System Caused by Wet Weather Events

LIFT STATION	DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
Government LS	14-Apr-14	3,900	14	Coniston Creek	Y
Government LS	31-Mar-16	40	6.5	Coniston Creek	Y

PROPOSED SYSTEM CONTROLS

The number of overflows at the Coniston WWTP caused by wet weather events for a period just under two years indicates that wet weather management strategies are required within the Coniston Wastewater System. The Water and Wastewater Master Plan has addressed the programs and infrastructure required reduce and manage wet weather flows in the system. The recommendations are listed below.

1 New Physical Infrastructure

- A Class EA study is required to determine the recommended wet weather management infrastructure required within the Coniston Wastewater System. The implementation of the recommended wet weather management infrastructure is to follow the completion of the Class EA.

2 Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

- Program to identify inflow locations in the field, such as catchbasins or poor surface drainage, and subsequently plan for infrastructure to mitigate the source of inflow.

The costs for the above programs and infrastructure are listed in Volume 7. While future recommendations to proceed with I&I reduction programs may lead to a reduction in I&I which in turn may result in the need for less wet weather retention storage, it is recommended that the planning for and implementation of the wet weather infrastructure proceeds in parallel with I&I reduction programs. The approach is based on the fact that there are a significant number of overflows at the Coniston WWTP and therefore infrastructure is required in the short term to eliminate the occurrence of any additional overflows. As stated above, the process of eliminating I&I in wastewater system may take years and it is not possible to ascertain at the very beginning of such an undertaking, especially when the sources of I&I are not yet identified, to ascertain how much of the I&I can be removed from the system.

5.4.7 COPPER CLIFF WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

There was no data available to determine if there have been any overflow events at the Copper Cliff WWTP. As noted in Volume 3, the WWTP is owned and operated by Vale and therefore the City does not have a record of all operational data for the facility. That said, the City does own and operate Lift Stations within the Copper Cliff Wastewater System. Based on a review of overflow data from January 2014 to November 2016, one overflow event occurred within the system, as documented in Table 5-19.

Table 5-19 Overflow Events at Lift Stations within the Copper Cliff Wastewater System Caused by Wet Weather Events

LIFT STATION	DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
Nickel LS	14-Apr-14	2200.0	10.0	Copper Cliff Creek	Y

PROPOSED SYSTEM CONTROLS

Albeit no data is currently available regarding the number of and volume of overflows at the Copper Cliff WWTP, through the assessment of I&I in the City's system, documented in Section 5.3, and the review of overflow events at the wastewater lift stations within the network, it was determined that the Copper Cliff wastewater conveyance network exhibits high I&I rates above typical levels and that it should be investigated further. On that pretext, the recommendation is to implement an inflow and infiltration reduction program.

1 Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

Program to identify inflow locations in the field, such as catch-basins or poor surface drainage, and subsequently plan for infrastructure to mitigate the source of inflow.

5.4.8 DOWLING WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

No overflow events were reported at the Dowling WWTP for the period of January 2014 to November 2016. Additionally, based on the I&I assessment conducted as part of the Master Plan, the wastewater conveyance network exhibits low levels of I&I.

PROPOSED SYSTEM CONTROLS

No programs or infrastructure are proposed since there are no existing concerns in the system.

5.4.9 FALCONBRIDGE WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

No overflow events were reported at the Falconbridge WWTP for the period of January 2014 to November 2016. Additionally, based on the I&I assessment conducted as part of the Master Plan, the wastewater conveyance network exhibits low levels of I&I.

PROPOSED SYSTEM CONTROLS

No programs or infrastructure are proposed since there are no existing concerns in the system.

5.4.10 GARSON WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

The Garson Wastewater System does not contain any wastewater treatment facilities being used for treatment (i.e. the existing Lagoons are used for storage in the event of a wet weather event. All wastewater flows generated in Garson are conveyed to the Sudbury Wastewater System and therefore treated at the Sudbury WWTP.

PROPOSED SYSTEM CONTROLS

Through the assessment of I&I in the City's system, documented in Section 5.3, it was determined that the Garson wastewater conveyance network exhibits high I&I rates above typical levels and that it should be investigated further. On that pretext, the recommendation is to implement an inflow and infiltration reduction program.

1 Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

Program to identify inflow locations in the field, such as catch-basins or poor surface drainage, and subsequently plan for infrastructure to mitigate the source of inflow.

5.4.11 ONAPING-LEVACK WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

No overflow events were reported at the Levack WWTP for the period of January 2014 to November 2016. Additionally, based on the I&I assessment conducted as part of the Master Plan, the wastewater conveyance network exhibits low levels of I&I.

PROPOSED SYSTEM CONTROLS

No programs or infrastructure are proposed since there are no existing concerns in the system.

5.4.12 LIVELY WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

A total of seventeen overflow events have been reported at the Lively WWTP, based on data collected from January 2014 to November 2016. Wet weather events are either heavy rainfall events, snowmelt, or a mixture of heavy rainfall and snowmelt. The receiving water for the Lively WWTP is Meatbird Creek.

Table 5-20 Overflow Events at the Lively WWTP Caused by Wet Weather Events

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
14-Apr-14	15,595	14.9	Meatbird Creek	Y
15-May-14	6,757	6.5	Meatbird Creek	Y
17-Oct-14	4,079	96	Meatbird Creek	Y
24-Nov-14	5,853	72	Meatbird Creek	Y
10-Apr-15	390	3	Meatbird Creek	Y
21-Apr-15	683	10	Meatbird Creek	Y

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
11-May-15	318	2.5	Meatbird Creek	Y
30-May-15	292	7	Meatbird Creek	Y
21-Aug-15	60	2.5	Meatbird Creek	Y
14-Dec-15	3,683	29	Meatbird Creek	Y
9-Mar-16	116	3.5	Meatbird Creek	Y
12-Mar-16	371	5.75	Meatbird Creek	Y
15-Mar-16	4,826	38	Meatbird Creek	Y
31-Mar-16	1,460	23	Meatbird Creek	Y
31-Mar-16	2,201	17.3	Meatbird Creek	Y
9-Jul-16	100	2.05	Meatbird Creek	N
30-Aug-16	832	13	Meatbird Creek	Y

Two overflow events have been reported at the Lift Stations within the Lively Wastewater System, as documented in Table 5-21.

Table 5-21 Overflow Events at Lift Stations within the Lively Wastewater System Caused by Wet Weather Events

LIFT STATION	DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
Anderson LS	14-Apr-14	3,800	11	Meatbird Creek	Y
Anderson LS	14-Dec-15	80	3.8	Meatbird Creek	Y

PROPOSED SYSTEM CONTROLS

The number of overflows at the Lively WWTP caused by wet weather events for a period just under two years indicates that wet weather management strategies are required within the Lively Wastewater System. The Water and Wastewater Master Plan has addressed the programs and infrastructure required reduce and manage wet weather flows in the system. The recommendations are listed below.

Whereas the recommendation for other wastewater systems that experienced overflows at their treatment facilities was to implement wet weather management infrastructure, the proposed course of action for managing wet weather flows in the Lively-Walden wastewater system is to design the future expansion of the Walden WWTP (to which wastewater flows generated in the Lively Wastewater System will be conveyed in the future) such that it can treat all peak flows collected in the system. This recommendation was made in the Lively-Walden ESR (J.L Richards, 2013).

1 Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

  - Program to identify inflow locations in the field, such as catch-basins or poor surface drainage, and subsequently plan for infrastructure to mitigate the source of inflow.

- Installation of permanent flow monitoring to determine the true levels of I&I in the system and subsequently tailor an appropriate program to eliminate sources of high inflow.

The additional flow monitoring data could be used to ascertain the levels of inflow and infiltration as part of the amendment to the Lively-Walden ESR. The costs for the above program is listed in Volume 7.

5.4.13 WALDEN WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

A total of thirteen overflow events have been reported at the Walden WWTP, based on data collected from January 2014 to November 2016, as documented in Table 5-22. Wet weather events are either heavy rainfall events, snowmelt, or a mixture of heavy rainfall and snowmelt.

Table 5-22 Overflow Events at the Walden WWTP Caused by Wet Weather Events

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
14-Apr-14	18,500	6.5	Junction Creek	Y
15-May-14	1,155	5.25	Simon Lake Waterway	Y
15-Oct-14	1,447	24	Junction Creek	Y
24-Nov-14	5,438	36	Junction Creek	Y
10-Apr-15	2,400	12	Simon Creek	Y
11-May-15	972	6	Simon Creek	Y
30-May-15	450	3	Simon Creek	Y
21-Aug-15	983	8.3	Junction Creek	Y
14-Dec-15	1,600	24	Simon Creek	Y
12-Mar-16	995	4.75	Simon Creek	Y
15-Mar-16	3,251	30	Simon Creek	Y
31-Mar-16	755	24	Simon Creek	Y
30-Aug-16	981	3	Simon Creek	Y

PROPOSED SYSTEM CONTROLS

The number of overflows at the Walden WWTP caused by wet weather events for a period just under two years indicates that wet weather management strategies are required within the Walden Wastewater System. The Water and Wastewater Master Plan has addressed the programs and infrastructure required reduce and manage wet weather flows in the system. The recommendations are listed below.

Whereas the recommendation for other wastewater systems that experienced overflows at their treatment facilities was to implement wet weather management infrastructure, the proposed course of action for managing wet weather flows in the Lively-Walden wastewater system is to design the future expansion of the Walden WWTP such that it can treat all peak flows collected in the system. This recommendation was made in the Lively-Walden ESR (J.L Richards, 2013).

1 Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

- Program to identify inflow locations in the field, such as catch-basins or poor surface drainage, and subsequently plan for infrastructure to mitigate the source of inflow.

The additional flow monitoring data could be used to ascertain the levels of inflow and infiltration as part of the amendment to the Lively-Walden ESR. The costs for the above program is listed in Volume 7.

5.4.14 SUDBURY WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

A total of ten overflow events have been reported at the Sudbury WWTP, based on data collected from January 2014 to November 2016, as documented in Table 5-23. Wet weather events are either heavy rainfall events, snowmelt, or a mixture of heavy rainfall and snowmelt. The receiving water body for the Sudbury WWTP is Junction Creek.

Table 5-23 Overflow Events at the Sudbury WWTP Caused by Wet Weather Events

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
13-Apr-14	176,200	39.5	Junction Creek	Y
30-Aug-14	10,875	37	Junction Creek	Y
3-Oct-14	4,950	4.75	Junction Creek	Y
10-Apr-15	56,002	65.25	Junction Creek	Y
10-Apr-15	79.2	12.25	Junction Creek	Y
21-Apr-15	16,817	4.1	Junction Creek	Y
12-May-15	8,000	15	Junction Creek	Y
14-Dec-15	148,890	39	Junction Creek	Y
16-Mar-16	123,515	50.4	Junction Creek	Y
31-Mar-16	93,907	25.5	Junction Creek	Y

Three overflow events have been reported at the Lift Stations within the Sudbury Wastewater System, as documented in Table 5-24.

Table 5-24 Overflow Events at Lift Stations within the Sudbury Wastewater System Caused by Wet Weather Events

LIFT STATION	DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
Garson-Coniston LS	14-Apr-14	306.6	3.0	Coniston Creek	Y
Moonlight Avenue LS	14-Apr-14	1.0	0.5	Rumford Creek	Y
Moonlight Avenue LS	15-May-14	7.0	3.5	Rumford Creek	Y

PROPOSED SYSTEM CONTROLS

The number of overflows at the Sudbury WWTP caused by wet weather events for a period just under two years indicates that wet weather management strategies are required within the Sudbury Wastewater System. The Water and Wastewater Master Plan has addressed the programs and infrastructure required to reduce and manage wet weather flows in the system. The recommendations are listed below.

1 New Physical Infrastructure

- A Class EA study is required to determine the recommended wet weather management infrastructure required within the Sudbury Wastewater System. The implementation of the recommended wet weather management infrastructure is to follow the completion of the Class EA.

2 Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

- Program to identify inflow locations in the field, such as catch-basins or poor surface drainage, and subsequently plan for infrastructure to mitigate the source of inflow.
- Program to carry out comprehensive investigation methods such as smoke testing and/or CCTV inspection repairs.
- Program for downspout and foundation drain disconnections.
- Installation of permanent flow monitoring to determine the true levels of I&I in the system and subsequently tailor an appropriate program to eliminate sources of high inflow.

3 Investigate Using the Sudbury Wastewater Tunnel as Additional Storage

- Undertake a hydraulic modeling assessment to determine the optimal operating procedure for the lift station at the Sudbury WWTP to maximize the use of the existing tunnel as storage (assessment is currently being undertaken by the City)

The costs for the above programs and infrastructure are listed in Volume 7. While future recommendations to proceed with I&I reduction programs may lead to a reduction in I&I which in turn may result in the need for less wet weather retention storage, it is recommended that the planning for and implementation of the wet weather infrastructure proceeds in parallel with I&I reduction programs. The approach is based on the fact that there are a significant number of overflows at the Sudbury WWTP and therefore infrastructure is required in the short term to eliminate the occurrence of any additional overflows. Furthermore, the process of eliminating I&I in wastewater system may take years and it is not possible to ascertain at the very beginning of such an undertaking, especially when the sources of I&I are not yet identified, to ascertain how much of the I&I can be removed from the system.

5.4.15 VALLEY EAST WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

A total of five overflow events have been reported at the Valley East WWTP, based on data collected from January 2014 to November 2016, as documented in Table 5-25. Wet weather events are either heavy rainfall events, snowmelt, or a mixture of heavy rainfall and snowmelt. The receiving water for the Valley East WWTP is the Vermillion River.

Table 5-25 Overflow Events at the Valley East WWTP Caused by Wet Weather Events

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
16-Mar-16	3,405	2	Vermillion River	Y
17-Mar-16	5,031	6.5	Vermillion River	Y
19-Mar-16	8,874	96	Vermillion River	Y
31-Mar-16	13,115	96	Vermillion River	Y
16-Apr-16	49,992	264	Whitson River	N

PROPOSED SYSTEM CONTROLS

The number of overflows at the Valley East WWTP caused by wet weather events for a period just under two years indicates that wet weather management strategies are required within the Valley Wastewater System. The Water and Wastewater Master Plan has addressed the programs and infrastructure required reduce and manage wet weather flows in the system. The recommendations are listed below.

1 New Physical Infrastructure

- A Class EA study is required to determine the recommended wet weather management infrastructure required within the Sudbury Wastewater System. The implementation of the recommended wet weather management infrastructure is to follow the completion of the Class EA.

2 Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

- Installation of permanent flow monitoring to determine the true levels of I&I in the system and subsequently tailor an appropriate program to eliminate sources of high inflow.

The costs for the above programs and infrastructure are listed in Volume 7. While future recommendations to proceed with I&I reduction programs may lead to a reduction in I&I which in turn may result in the need for less wet weather retention storage, it is recommended that the planning for and implementation of the wet weather infrastructure proceeds in parallel with I&I reduction programs. The approach is based on the fact that there are a significant number of overflows at the Valley East WWTP and therefore infrastructure is required in the short term to eliminate the occurrence of any additional overflows. As stated above, the process of eliminating I&I in wastewater system may take years and it is not possible to ascertain at the very beginning of such an undertaking, especially when the sources of I&I are not yet identified, to ascertain how much of the I&I can be removed from the system.

5.4.16 WAHNAPITAE WASTEWATER SYSTEM

RECORD OF OVERFLOW EVENTS

One overflow event been reported at the Wahnapitae Lagoon, based on data collected from January 2014 to November 2016, as documented in Table 5-26. Wet weather events are either heavy rainfall events, snowmelt, or a mixture of heavy rainfall and snowmelt. The receiving water for the Wahnapitei Lagoon is the Wanapitei River.

Table 5-26 Overflow Events at the Wahnapitae Lagoon Caused by Wet Weather Events

DATE	OVERFLOW VOLUME (M^3)	DURATION OF OVERFLOW (HRS)	RECEIVER	RECEIVER IMPACTED (Y/N)
4-May-15	450	264	Wahnapitae River	Y

PROPOSED SYSTEM CONTROLS

In discussions with the City it was indicated that this was an atypical event and that the City has not experienced repeated issues in past with managing the amount of flow conveyed to the Lagoons. The PPCP therefore does not recommend any additional studies at this time to investigate the need for additional wet weather management infrastructure within the Wahnapitae Wastewater System. That said, the City should continue to monitor the lagoons for any overflow events. In the case that an increase of overflow events is noted, it is recommended that the City undertake a Class EA to investigate the means by which additional wet weather infrastructure may be implemented within the system to manage the flows.

Through the assessment of I&I in the City's system, documented in Section 5.3, it was determined that the Wahnapitae wastewater conveyance network exhibits high I&I rates above typical levels and that it should be investigated further. On that pretext, the recommendation is to implement an inflow and infiltration reduction program.

1. Inflow and Infiltration Reduction Program (refer to detailed recommendations provided in Section 5.3)

Program to identify inflow locations in the field, such as catch-basins or poor surface drainage, and subsequently plan for infrastructure to mitigate the source of inflow.

5.4.17 PROGRAMS REQUIRED ACROSS ALL SYSTEMS

In addition to the system-specific requirements documented in Sections 5.4.3 to 5.4.16., there are a number of actions that the City should undertake with respect to all wastewater systems, in order to generate data for the next update to the Pollution Prevention Control Plans (PPCP's). These actions are as follows:

1. Continue monitoring and documenting data regarding all overflow events at the City's wastewater facilities
2. Initiate a program to monitor water quality parameters in all receiving water bodies
   a. The first step should be to consult with the Nickel District Conservation Authority to determine if such monitoring data would be equally beneficial to their organization and estalish a monitoring program that benefits both parties.
   b. Once receiving water quality data is collected for a few years, the City's next update to the PPCP's may include an analysis on the health of the receiving waters.

APPENDIX 5-A

WASTEWATER LIFT STATION ANALYSIS AND EVALUATION

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Laurier lift station	Author:	Jinbo Yang
Catchment:	Azilda	Date:	1/13/2017
		Pg No.	2

Overview

Location:	322 Laurier Street West
Construction Date:	1973 (Based on ECA)
Previous ECA:	3-0375-92-006
Previous ECA issue date:	13-Apr-92
Current ECA:	3-0375-92-007
Current ECA issue date:	1-Sep-92
Flow From:	Maple, Landry, and Marier lift stations
Pumping to:	Azilda WWTP

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well		
Pumps:	3		
Power:	45 hp		
Drawdown Test:	2090.88 GPM	Total Rate	Date: June, 2010
Firm, two pump (2014):	90.10 L/s		
2015:	N/A		
ECA:	90.1 L/s		

Current Theoretical Peak Flow to Lift Station

Existing Peak Flow:	296.10 L/s	Based on a 1 hour averages from April 13 to 15, 2014 storm event Documented in Azilda WWTP Class EA, January 20, 2017

Future Flow Requirements

2041 Flow Requirement:	311.200 L/s	Growth?	YES
Ultimate Flow Requiremer	311.200 L/s		YES

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	221.10 L/s	Capacity Required?	YES

Additional Information/Comments

* Based on the Azilda WWTP and Collection System Class EA Milestone Report #3, the station has been subject to wastewater releases to Whitewater Lake in recent years due to high wet weather flows.

Problem Statement

The Environmental Assessment for this work is nearing completion (September 2017). The upgrades to the PS have been included in the EA.

Pumping Station: Laurier lift station
Catchment: Azilda

Author: Jinbo Yang
Date: 1/13/2017

Figures

Figure 1 - Laurier Lift Station located at 322 Laurier Street West

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Landry lift station
Catchement: Azilda

Author: Jinbo Yang
Date: 1/16/2017

Pg No.

Overview

Location:	294 Landry Street
Construction Date:	1973
Previous ECA:	Not Available
Previous ECA issue date:	Not Available
Current ECA:	Not Available
Current ECA issue date:	Not Available
Flow From:	Maple lift station
Pumping to:	Laurier lift station

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well		
Pumps:	2		
Power:	12 hp		
Drawdown Test:	980 GPM	Total Rate	Date:May, 2010
Firm,one pump (2012):	41.30 L/s		
2015:	Not Available		
ECA:	41.30		

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 106.10 L/s — Based on a 1 hour averages from April 13 to 15, 2014 storm event
Documented in Azilda WWTP Class EA, January 20, 2017

Future Flow Requirements

2041 Flow Requirement:	107.100	L/s	Growth?	Limited Growth
Ultimate Flow Requiremer	107.700	L/s		Limited Growth

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: 64.80 L/s

Capacity Required? YES

Additional Information/Comments

* Based on the Azilda WWTP and Collection System Class EA Milestone Report #2, the station has experienced one wastewater releases to Whitewater Lake in the last 5 years (2014) due to a wet weather event.

Problem Statement

The Environmental Assessment for this work is nearing completion (September 2017). The upgrades to the PS have been included in the EA.

Pumping Station:	Landry lift station	Author:	Jinbo Yang
Catchement:	Azilda	Date:	1/16/2017
		Pg No.	2

Figures

Figure 1 - Landry Lift Station located at 294 Landry Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Maple lift station
Catchement: Azilda

Author: Jinbo Yang
Date: 1/16/2017

Pg No.

Overview

Location:	2360 Maple Street
Construction Date:	9-Jun-05
Previous ECA:	Not available
Previous ECA issue date:	Not available
Current ECA:	3-0383-88-006
Current ECA issue date:	Not available
Flow From:	Residential Area
Pumping to:	Landry lift station

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	9.4 hp	
Drawdown Test:	280 GPM	Total Rate Date:Novmber, 2010
Firm,one pump (2012):	17.80 L/s	
2015:	N/A	
ECA:	17.8 L/s	Documented in Azilda WWTP and Collection System EA, February, 2016 Technical Memo 2

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 2.01 L/s

Future Flow Requirements

2041 Flow Requirement:	2.057 L/s	Growth?	Limited Growth
Ultimate Flow Requiremer	2.139 L/s		Limited Growth

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: -15.74 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

Problem Statement

The Environmental Assessment for this work is nearing completion (September 2017). No upgrades are required for this station.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Maple lift station	Author:	Jinbo Yang
Catchement:	Azilda	Date:	1/16/2017
		Pg No.	2

Figures

Figure 1 - Maple lift station located at 2360 Maple Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Marier lift station
Catchement: Azilda

Author: Jinbo Yang
Date: 1/16/2017

Pg No.

Overview

Location:	69 Marier Street
Construction Date:	Not available
Previous ECA:	Not available
Previous ECA issue date:	Not available
Current ECA:	Not available
Current ECA issue date:	Not available
Flow From:	Local residential area
Pumping to:	Laurier lift station

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	3.7 hp	
Drawdown Test:	262 GPM	Total Rate Date:August, 2010
Firm,one pump (2012):	10.80 L/s	
2015:	N/A	
ECA:	10.8 L/s	Documented in Azilda WWTP and Collection System EA, February, 2016 Technical Memo 2

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 14.69 L/s

Future Flow Requirements

2041 Flow Requirement:	14.809	L/s	Growth?	Limited Growth
Ultimate Flow Requiremer	15.046	L/s		Limited Growth

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: 4.01 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Additional Information/Comments

This station wasn't included in the Azilda WWTP and Collection System Class EA Milestone Report #3, however based on the hydraulic analysis requires upgrading.

Additional flow monitoring is suggested in advance of the new pumps being installed.

Problem Statement

Pumping Station: Marier lift station
Catchement: Azilda

Author: Jinbo Yang
Date: 1/16/2017

Figures

Figure 1 - Marier lift station located at 69 Marier Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Principale lift station
Catchement: Azilda

Author: Jinbo Yang
Date: 1/16/2017

Pg No.

Overview

Location:	250 Montee Principale
Construction Date:	1973
Previous ECA:	Not Available
Previous ECA issue date:	Not Available
Current ECA:	1-0108-67-730-646
Current ECA issue date:	14-Jun-73
Flow From:	residential and municipal properties
Pumping to:	Azilda WWTP

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	12 hp	
Drawdown Test:	627 GPM	Total Rate Date:August, 2010
Firm,one pump (2012):	32.90 L/s	
2015:	N/A	
ECA:	32.9 L/s	Documented in Azilda WWTP and Collection System EA, February, 2016 Technical Memo 2

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 12.10 L/s

Future Flow Requirements

2041 Flow Requirement:	12.462 L/s	Growth?	Limited Growth
Ultimate Flow Requiremer	16.746 L/s		Limited Growth

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: -20.44 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Principale lift station
Catchement: Azilda

Author: Jinbo Yang
Date: 1/16/2017

Figures

Figure 1 - Principale Lift Station, 250 Montee Principale

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Belanger Lift Station	Author:	Michelle Albert
Catchement:	Chelmsford	Date:	7/1/2016
		Pg No.	1

Overview

Location:	24 Belanger Street
Construction Date:	1974
Previous ECA:	N/A
Previous ECA issue date:	N/A
Current ECA:	3-1197-73-006
Current ECA issue date:	December 13,1973
Flow From:	Residential Area
Pumping to:	MH 8-306

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	N/A hp	
Drawdown Test:	99 GPM	Date: December 2010
Firm, one pump (2010):	6.25 L/s	
2015:	N/A	
ECA:	6.25 L/s	Based on the Firm Capacity

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 8.82 L/s

Future Flow Requirements

2041 Flow Requirement:	9.07 L/s	Growth?	Limited Growth
Ultimate Flow Requiremer	9.17 L/s		Limited Growth

Feasibility of Consolidation or Elimination

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	2.82 L/s	Capacity Required?	YES

Additional Information/Comments

Problem Statement

New pumps are required in the existing pumping station to meet the station peak flow requirements.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Brookside Lift Station	Author:	Michelle Albert
Catchement:	Chelmsford	Date:	7/1/2016
		Pg No.	1

Overview

Location:	257 Brookside Road	
Construction Date:	1976	Based on ECA
Previous ECA:		
Previous ECA issue date:		
Current ECA:	3-0916-76-006	
Current ECA issue date:	September 14, 1976	
Flow From:	N/A	
Pumping to:	Chelmsford WWTP	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	5 hp	
Drawdown Test:	213.76 GPM	Date: July, 2010
Firm, one pump (2010):	13.5 L/s	
2015:	N/A	
ECA:	13.5 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	6.09 L/s

Future Flow Requirements

2041 Flow Requirement:	6.09 L/s	Growth?	NO
Ultimate Flow Requirement:	6.10 L/s		Limited Growth

Feasibility of Consolidation

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-7.40 L/s	Capacity Required?	NO

Additional Information/Comments

Recommendations

There is no required infrastucture for growth and no deficiencies in current infrastructure have been identified. Therefore, no upgrades or changes need to be made.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Charette Lift Station
Catchement: Chelmsford

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	258 Charette Road	
Construction Date:	1973	Based on ECA
Previous ECA:	3-1197-73-006	
Previous ECA issue date:	December 13,2973	
Current ECA:	3-0131-75-006	
Current ECA issue date:	March 7, 1975	
Flow From:	Residential Area	
Pumping to:	Chelmsford WWTP	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	5 hp	
Drawdown Test:	235.39 GPM	Date: July, 2010
Firm, one pump (2010):	14.9 L/s	
2015:	N/A	
ECA:	14 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 2.33 L/s

Future Flow Requirements

2041 Flow Requirement:	2.33 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	2.35 L/s		Limited Growth

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations. Additionally, there are typography constraints in the catchment area which restrict the ability to consolidate.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-11.67 L/s	Capacity Required?	NO

Additional Information/Comments

Recommendations

There is no required infrastucture for growth and no deficiencies in current infrastructure have been identified. Therefore, no upgrades or changes need to be made.

Pumping Station: Charette Lift Station
Catchement: Chelmsford

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Charette Lift Station located at 258 Charette Road

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Hazel Lift Station
Catchement: Chelmsford

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	2 Hazel Street
Construction Date:	1988 Orginial LS
Previous ECA:	N/A
Previous ECA issue date:	N/A
Current ECA:	300042-88-006
Current ECA issue date:	January 25, 1988
Flow From:	Residential Neighbourhoo
Pumping to:	MH 5-8

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	10 hp
Drawdown Test:	820 GPM Date: May, 2010
Firm, one pump (2010):	51.73 L/s
2015:	N/A
ECA:	51.73 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 16.50 L/s

Future Flow Requirements

2041 Flow Requirement:	30 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	31 L/s		YES *

* Future residential development

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: -21.84 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

There is no required infrastucture for growth and no deficiencies in current infrastructure have been identified. Therefore, no upgrades or changes need to be made.
made.

Pumping Station:	Hazel Lift Station	Author:	Michelle Albert
Catchement:	Chelmsford	Date:	7/1/2016
		Pg No.	#REF!

Figures

Figure 1 - Hazel LS, 2 Hazel Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Main Lift Station
Catchement: Chelmsford

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	19 Emile Street	
Construction Date:	N/A	Based on ECA
Previous ECA:	N/A	
Previous ECA issue date:	N/A	
Current ECA:	3-1225-78-796	
Current ECA issue date:	23-Jul-79	
Flow From:	N/A	
Pumping to:	Chelmsford WWTP or Lagoon	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	88 hp	
Drawdown Test:	635 GPM	Date: November, 2010
Firm, one pump (2010):	40.1 L/s	
2015:	N/A	
ECA:	40.1 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 32.91 L/s

Future Flow Requirements

2041 Flow Requirement:	33.34 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	33.70 L/s		Limited Growth

Feasibility of Consolidation

Additional Capacity

Additional capacity required at peak flow: -6.73 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

Recommendations

There is no required infrastucture for growth and no deficiencies in current infrastructure have been identified. Therefore, no upgrades or changes need to be made.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Radisson Lift Station	Author:	Michelle Albert
Catchement:	Chelmsford	Date:	7/1/2016
		Pg No.	1

Overview

Location:	400 Radisson Avenue	
Construction Date:	1998	Based on ECA
Previous ECA:	N/A	
Previous ECA issue date:	N/A	
Current ECA:	3-1720-98-006	
Current ECA issue date:	Novermber 26, 1998	
Flow From:	Residential Neighbourhood	
Pumping to:	Chelmsford WWTP	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	3 hp	
Drawdown Test:	103 GPM	Date: November 2010
Firm, one pump (2010):	6.5 L/s	
2015:	N/A	
ECA:	6.5 L/s	Based on the drawdown test figures

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 1.12 L/s

Future Flow Requirements

2041 Flow Requirement:	9.70 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	9.88 L/s		YES

Feasibility of Consolidation

Consolidation is not possible due to constraints in the catchment system. In order for consolidation to be possible, the catchment system would need to be significantly redesigned.

Additional Capacity

Additional capacity required at peak flow:	3.21 L/s	Capacity Required?	YES
(2041 Flow Requirement - ECA)			

Additional Information/Comments

Recommendations

A new Lift Station will be required when development occurs

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Keith Lift Station
Catchement: Chelmsford

Author: Michelle Albert
Date: 7/1/2016

Overview

Location:	3497 Keith Street	
Construction Date:	1979	Based on ECA
Previous ECA:	N/A	
Previous ECA issue date:	N/A	
Current ECA:	3-1452-77-796	
Current ECA issue date:	January 15, 1979	
Flow From:	Residential Neighbourhood	
Pumping to:	Chelmsford WWTP	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	20 hp	
Drawdown Test:	717 GPM	Date: March, 2011
Firm, one pump (2010):	45.2 L/s	
2015:	N/A	
ECA:	45.2 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 4.18 L/s

Future Flow Requirements

2041 Flow Requirement:	4.18 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	4.41 L/s		Limited Growth

Feasibility of Consolidation

Consolidation is not possible due to constraints in the catchment system. In order for consolidation to be possible, the catchment system would need to be significantly redesigned.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-41.06 L/s	Capacity Required?	NO

Additional Information/Comments

Recommendations

There is no required infrastucture for growth and no deficiencies in current infrastructure have been identified. Therefore, no upgrades or changes need to be made.

Pumping Station: Keith Lift Station
Catchement: Chelmsford

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Keith Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Whitson Lift Station
Catchement: Chelmsford

Author: Michelle Albert
Date: 7/1/2016

Overview

Location:	3205 Hwy 144	
Construction Date:	1976	Based on ECA
Previous ECA:	N/A	
Previous ECA issue date:	N/A	
Current ECA:	2-183-76-006	
Current ECA issue date:	August 9, 1976	
Flow From:	Residential Neighbourhood	
Pumping to:	Chelmsford WWTP	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	5 hp	
Drawdown Test:	325 GPM	Date: March, 2011
Firm, one pump (2010):	20.5 L/s	
2015:	N/A	
ECA:	20.5 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 4.32 L/s

Future Flow Requirements

2041 Flow Requirement:	4.32 L/s	Growth?	NO
Ultimate Flow Requirement:	4.32 L/s		NO

Feasibility of Consolidation

Consolidation is not possible due to constraints in the catchment system. In order for consolidation to be possible, the catchment system would need to be significantly redesigned.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-16.19 L/s	Capacity Required?	NO

Additional Information/Comments

Recommendations

There is no required infrastucture for growth and no deficiencies in current infrastructure have been identified. Therefore, no upgrades or changes need to be made.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Edward lift station
Catchment: Coniston

Author: Jinbo Yang
Date: 1/13/2017

Pg No. 2

Overview

Location:	Edward Avenue N & Government Road
Construction Date:	22-Apr-69
Previous ECA:	2-0000-00-690131
Previous ECA issue date:	24-May-71
Current ECA:	2-0259-69-710726
Current ECA issue date:	
Flow From:	Residential Area
Pumping to:	Coniston WWTP

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well		
Pumps:	3		
Power:	5 hp		
Drawdown Test:	344 GPM	Total Rate	Date: June, 2010
Firm, two pump (2014):	78.65 L/s		
2015:	N/A		
ECA:	78.65 L/s		

Current Theoretical Peak Flow to Lift Station

Existing Peak Flow: 106.86 L/s

Future Flow Requirements

2041 Flow Requirement:	107.232	L/s	Growth?	Limited Growth
Ultimate Flow Requiremer	108.937	L/s		Limited Growth

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: 28.58 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Additional Information/Comments

There are I&I concerns in the area. The City has reported that there are sump pumps and eve throughs hooked up to the sewer system.

The station has been observed to be at full capacity during a rainstorm.

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Edward lift station
Catchement: Coniston

Author: Michelle Albert
Date: 7/1/2016

Pg No. 4

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)
Healthy Watersheds	Would still have concerns with lack of Capacity at the LS	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding lack of capacity at the LS	Reduce the Risk of Overflows	Reduce the Risk of Overflows
Cost Effectiveness	Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than upgrading the LS. However, due to the age of the LS, reinvestment into the existing assets are required.	This option would include the installation of two new high capacity pumps in the same structure.
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist	Would require limited construction.	The existing site is large and therefore would be able to facilitate construction
Operability	Lack of peak capacity would still existing	Would improve operability of the Station. However, would still have concerns with aging pumps.	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.
Preferred Alternative	No	Yes - I&I reduction in the catchment would be beneficial and could delay the upgrades required to the station.	Yes - the installation of new pumps would limit the potential for surcharges / overflows.

Initial Actions

Pumping Station: Edward lift station
Catchment: Coniston

Author: Jinbo Yang
Date: 1/13/2017

Pg No.

Figures

Figure 1 - Edward Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Government Road Lift Station
Catchment: Coniston

Author: Jinbo Yang
Date: 1/13/2017

Overview

Location:	3 Government Road
Construction Date:	5-Jun-05
Previous ECA:	
Previous ECA issue date:	
Current ECA:	3-04727-83-006
Current ECA issue date:	27-May-83
Flow From:	Residential Area
Pumping to:	Coniston WWTP

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	5 hp	
Drawdown Test:	GPM	Total Rate
Firm, two pump (2014):	18.10 L/s	
2015:	N/A	
ECA:	18.10 L/s	

The drawdown test in the Wastewater lift station manual is not correct

Current Theoretical Peak Flow to Lift Station

Existing Peak Flow: 125.50 L/s

Future Flow Requirements

2041 Flow Requirement:	137.3 L/s	Growth? Limited Growth
Ultimate Flow Requiremer	138.7 L/s	YES

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: 119.20 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Additional Information/Comments

There are I&I concerns in the area. The City has reported that there are sump pumps and eve throughs hooked up to the sewer system.

The station has been observed to be at full capacity during a rainstorm.

There was a detailed condition assessment completed for Government Road Lift Station. The detailed lift station analysis didn't include the need to upgrade the LS however there were several other upgrades that have been included in the recommendations of the Master Plan.

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Orford Lift Station	Author:	Jinbo Yang
Catchment:	Copper Cliff	Date:	1/13/2017
		Pg No.	1

Overview

Location:	26 Orford Street
Construction Date:	2000
Previous ECA:	
Previous ECA issue date:	June 30, 1999
Current ECA:	8-6040-99-006
Current ECA issue date:	
Flow From:	Residential Area
Pumping to:	Nickel LS

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	6 hp
Drawdown Test:	358 GPM
Firm, two pump (2014):	22.6 L/s
2015:	N/A
ECA:	18.9 L/s

Current Theoretical Peak Flow to Lift Station

Existing Peak Flow:	12.4 L/s

Future Flow Requirements

2041 Flow Requirement:	17.5	L/s	Growth?	NO
Ultimate Flow Requiremer	17.5	L/s		YES

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-1.40 L/s	Capacity Required?	NO

Additional Information/Comments

There are I&I concerns in the area. The City has reported that there are sump pumps and eve throughs hooked up to the sewer system.

The station has been observed to be at full capacity during a rainstorm.

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Orford Lift Station
Catchment: Copper Cliff

Author: Jinbo Yang
Date: 1/13/2017

Pg No.

Figures

Figure 1 - Orford Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Nickel Lift Station
Catchment: Copper Cliff

Author: Jinbo Yang
Date: 1/13/2017

Pg No. 1

Overview

Nickel Lift Station is currently getting upgraded to pump flow to the Sudbury WWTP.

Current Lift Station Firm Capacity

Current Theoretical Peak Flow to Lift Station

Future Flow Requirements

Feasibility of Consolidation or Elimination

Additional Capacity

Additional Information/Comments

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Lionel LS
Catchment: Dowling

Author: Jinbo Yang
Date: 1/13/2017

Pg No. 1

Overview

Location:	88 Lionel Street
Construction Date:	1979
Previous ECA:	
Previous ECA issue date:	
Current ECA:	1-633-79-006
Current ECA issue date:	June 28, 2979
Flow From:	Residential Area
Pumping to:	Wahnapitae Lagoons

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	5 hp
Drawdown Test:	295 GPM
Firm, two pump (2014):	18.6 L/s
2015:	N/A
ECA:	18.6 L/s

Current Theoretical Peak Flow to Lift Station

Existing Peak Flow: 9.3 L/s

Future Flow Requirements

2041 Flow Requirement:	9.3	L/s	Growth?	Limited Growth
Ultimate Flow Requiremer	10.4	L/s		Limited Growth

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: -9.31 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

There is a problem at the lift station with inflow from the Onaping River

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Fraser LS
Catchment: Levack

Author: Jinbo Yang
Date: 1/13/2017

Pg No. 1

Overview

Location:	208 Fraser Avenue
Construction Date:	1993
Previous ECA:	3-1631-87-896
Previous ECA issue date:	31-May-95
Current ECA:	8-5084-95-006
Current ECA issue date:	1-Aug-95
Flow From:	Residential Area
Pumping to:	Levack WWTP

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well
Pumps:	2
Power:	20 hp
Drawdown Test:	424 GPM
Firm, two pump (2014):	26.8 L/s
2015:	N/A
ECA:	27.0 L/s

Current Theoretical Peak Flow to Lift Station

Existing Peak Flow: 36.8 L/s

Future Flow Requirements

2041 Flow Requirement:	38.1 L/s	Growth?	Limited Growth
Ultimate Flow Requiremer	38.7 L/s		Limited Growth

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: 11.10 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Additional Information/Comments

Flow monitoring should be installed at the station to analyze the flow to the station.

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Fraser LS
Catchement: Levack

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)
Healthy Watersheds	Would still have concerns with lack of Capacity at the LS	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding lack of capacity at the LS	Reduce the Risk of Flooding	Reduce the Risk of Flooding
Cost Effectiveness	Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than upgrading the LS.	This option would only include the installation of two new high capacity pumps in the same structure.
Constructability and Ease of Integration	Challenges with the potential for basement surcharges and lack of Peak Capacity would still exist	Would require limited construction.	The existing site is large and therefore would be able to facilitate construction
Operability	Lack of peak capacity would still existing	Would improve operability of the Station. Operations staff have not raised concerns regarding the condition of the station. There is new piping in the station.	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.
Preferred Alternative	No	Yes - I&I reduction in the catchment would be beneficial and could delay the upgrades required to the station.	Yes - the installation of new pumps would limit the potential for surcharges / overflows.

Initial Actions

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Sherwood LS
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	1955 Kingsway
Construction Date:	1966
Previous ECA:	3-1167-73-006
Previous ECA issue date:	27043
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	N/A
Pumping to:	Rock Tunnel

There is no previous ECA on record

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well
Pumps:	2
Power:	30 hp
Drawdown Test:	520 GPM
Firm, one pump (2011):	32.81 L/s
ECA:	30.00 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	24.68 L/s

Future Flow Requirements

2041 Flow Requirement:	53.2 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	53.2 L/s		YES *

* Future residential development

Feasibility of Consolidation

Lift Station Invert Elevation:	263 m
Reference Invert:	267 m
Reference Location:	MH # 11-173
Reference Distance:	329.794 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow:	28.5 L/s	Capacity Required?	YES

(2041 Flow Requirement - ECA)

Additional Information/Comments

* There are no capacity concerns - no capacity upgrades required
* The capacity upgrade is driven by development

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: North Shore LS
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	1249 North Shore Drive
Construction Date:	N/A
Previous ECA:	N/A
Previous ECA issue date:	N/A
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	N/A
Pumping to:	Rock Tunnel

There is no previous ECA on record

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	9.4 hp
Drawdown Test:	234 GPM
Firm, one pump (2010):	14.76 L/s
ECA:	11.40 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	4.23 L/s

Future Flow Requirements

2041 Flow Requirement:	4.2 L/s	Growth?	NO
Ultimate Flow Requirement:	4.2 L/s		NO *

* Future residential development

Feasibility of Consolidation

Lift Station Invert Elevation:	248 m
Reference Invert:	258 m
Reference Location:	MH #10-216
Reference Distance:	383.4 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-7.16 L/s	Capacity Required?	NO

Additional Information/Comments

* There are no capacity concerns - no capacity upgrades required

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: North Shore LS
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

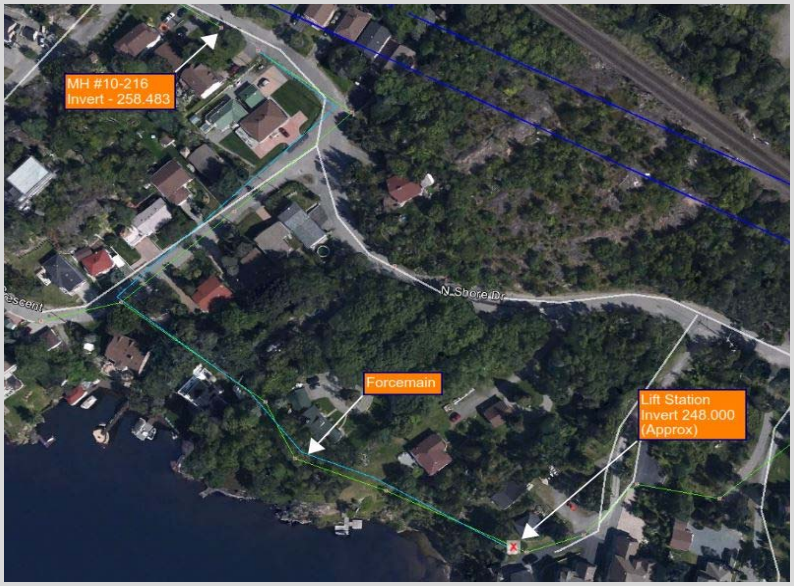

Figure 1 - Catchment Area

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Moonlight Beach Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	537 Moonlight Beach Road
Construction Date:	N/A
Previous ECA:	N/A
Previous ECA issue date:	N/A
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	N/A
Pumping to:	Levesque LS

There is very little information available for the station

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	9.4 hp
Drawdown Test:	N/A
Firm, one pump (2010):	N/A
ECA:	N/A

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: N/A

Future Flow Requirements

2041 Flow Requirement:	Unknown	Growth?	#VALUE!
Ultimate Flow Requirement:	Unknown		#VALUE! *

* Future residential development

Feasibility of Consolidation

Lift Station Invert Elevation:	251.155 m
Reference Invert:	267.42 m
Reference Location:	MH #12-87
Reference Distance:	513.588 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: #VALUE! L/s
(2041 Flow Requirement - ECA)

Capacity Required? #VALUE!

Additional Information/Comments

*There are capacity concerns during high flow events.
*Additional information regarding the LS needs to be gathered.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Moonlight Beach Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

Figure 1 - Moonlight Beach LS - 537 Moonlight Beach Road

Figure 2 - Catchment Area

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Fourth Lift Station	Author:	Michelle Albert
Catchement:	Sudbury	Date:	7/1/2016
		Pg No.	1

Overview

Location:	340 Fourth Street	
Construction Date:	1980	Based on ECA
Previous ECA:	3-1056-80-006	
Previous ECA issue date:	15-Sep-80	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	Rock Tunnel	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	9.4 hp	
Drawdown Test:	356 GPM	Date: May, 2010
Firm, one pump (2010):	22.46 L/s	
ECA:	15.2 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	31.24 L/s

Future Flow Requirements

2041 Flow Requirement:	31 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	32 L/s		Limited Growth *

* Future residential development

Feasibility of Consolidation

Lift Station Invert Elevation:	246.65 m
Reference Invert:	75.179 m
Reference Location:	MH #11-152
Reference Distance:	262.128 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	16.06 L/s	Capacity Required?	YES

Additional Information/Comments

* There is an immediate capacity requirement to expand the station as well as upgrade existing deficiencies

Pumping Station: Fourth Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Fourth LS - 340 Fourth Avenue

Figure 2 - Catchment Area

City of Greater Sudbury - Condition Assessment of Three Sewage Pumping Stations
Fourth PS Conceptual Design Cost Estimate

Associated Engineering GLOBAL PERSPECTIVE. LOCAL FOCUS.

Date: 13-May-16

Conceptual Design Cost Summary - Option 1: Relocate Electrical Equipment

Div.	Description			Amount	%
1	Structural upgrades (including concrete repair and resurfacing, replace ladders and replace grating system)		$	87,000	12.5%
6	Relocate pump control panel and disconnect switches outside the access gazebo		$	3,000	0.4%
2	Temporary pumping during construction		$	120,000	17.2%
3	Geotechnical investigations for new valve and meter chamber		$	25,000	3.6%
4	Below grade flow meter and valve chamber, including civil works, precast concrete chamber, valves, pipes, flow meter and service water connection (including backflow preventer, heating and lighting).		$	240,000	34.4%
5	Remove and replace existing pumps including VFDs, replace existing PVC pipe with stainless steel, and level transmitter. Relocate plumbing (backflow preventer and piping) into valve and meter chamber. Ventilation upgrade.		$	100,000	14.3%
7	Dedicated PLC complete with Allen Bradley Compact Logix Controller & HMI (to monitor equipment status, flow rates, water levels, etc.) in the generator building		$	50,000	6.5%
8	Supply and install a 60kW, 600V generator		$	50,000	6.5%
9	Wiring and conduits, equipment tagging, and wet well and access gazebo LED lighting and controls		$	22,000	2.9%
	Sub- total excluding General Contractor's O/H & Profit		**$**	**697,000**	**100.0%**
	General Contractor's Profit	10%		70,000	10.0%
	Sub-Total Construction Capital Cost		**$**	**767,000**	**110.0%**
	Contingency	50%		384,000	55.1%
	Sub-Total Construction Capital Cost		**$**	**1,151,000**	**165.1%**
	Engineering	25%		288,000	
	CONSTRUCTION CAPITAL COST(Excluding HST)		**$**	**1,439,000**	

Figure 3 - Outcome of the Fourth Lift Station Condition Assessment

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Don Lita Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	2226 Hudson Street	
Construction Date:	1967	Based on ECA
Previous ECA:	67-A-868	
Previous ECA issue date:	16-Oct-67	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	Rock Tunnel	

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	25 hp	
Drawdown Test:	455 GPM	Date: May, 2010
Firm, one pump (2010):	28.71 L/s	
ECA:	30.3 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 52.06 L/s

Future Flow Requirements

2041 Flow Requirement:	55 L/s	Growth?	YES	
Ultimate Flow Requirement:	72 L/s		YES	*

* Future residential development

Feasibility of Consolidation

Lift Station Invert Elevation:	264.359 m
Reference Invert:	267.69 m
Reference Location:	ME #5-460
Reference Distance:	753.161 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: 24.56 L/s — Capacity Required? YES
(2041 Flow Requirement - ECA)

Additional Information/Comments

* There is an immediate capacity requirement as well as a requirement to expand the LS to meet development in 2031 to 2036

Pumping Station: Don Lita Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Don Lita LS - 2226 Hudson Street

Figure 2 - Catchment Area

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Don Lita Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 4

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)
Healthy Watersheds	Would still have concerns with lack of Capacity at the LS	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding lack of capacity at the LS	Reduce the Risk of Basement Floodings	Reduce the Risk of Basement Floodings
Cost Effectiveness	Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than upgrading the LS.	This option would only include the installation of two new high capacity pumps in the same structure.
Constructability and Ease of Integration	Challenges with the potential for basement surcharges and lack of Peak Capacity would still exist	Would require limited construction.	The existing site is large and therefore would be able to facilitate construction
Operability	Lack of peak capacity would still existing	Would improve operability of the Station. However, would still have concerns with aging pumps.	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.
Preferred Alternative	No	Yes - I&I reduction in the catchment would be beneficial and could delay the upgrades required to the station.	Yes - the installation of new pumps would limit the potential for surcharges / overflows.

Initial Actions

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Countryside Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	165 Countryside Drive
Construction Date:	1991 — Orginial LS
Previous ECA:	3-1788-91-006
Previous ECA issue date:	20-Nov-91
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	N/A
Pumping to:	Rock Tunnel

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	5 hp
Drawdown Test:	227 GPM — Date: May, 2010
Firm, one pump (2010):	14.32 L/s
2015:	N/A
ECA:	7.6 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 3.79 L/s

Future Flow Requirements

2041 Flow Requirement:	9 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	13 L/s		YES *

* Future residential development

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: 1.45 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Additional Information/Comments

*The area has surcharging problems as well.
*After review is was determined that an extension of the forcemain could alleviate the surcharging and eliminate the need for a LS upgrade.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Countryside Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Countryside LS 165 Countryside Drive

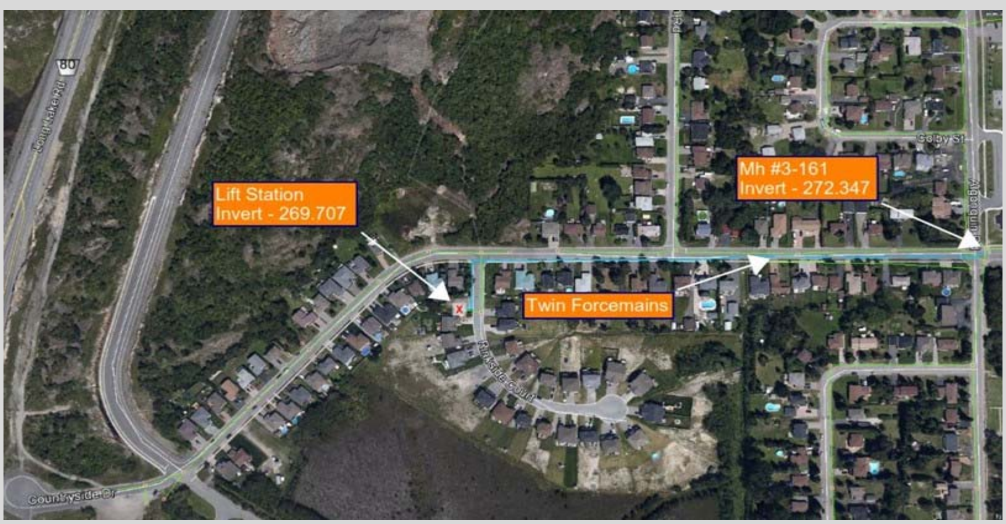

Figure 2 - Catchment Area

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: St. Charles Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	255 St. Charles St.
Construction Date:	1930 — Orginial LS
Previous ECA:	N/A
Previous ECA issue date:	N/A
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	Selkirk LS
Pumping to:	Rock Tunnel

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	77 hp
Drawdown Test:	7248 GPM — Date: June, 2010
Firm, one pump (2010):	457.28 L/s
2015:	N/A
ECA:	383 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 254.44 L/s

Future Flow Requirements

2041 Flow Requirement:	520 L/s	Growth?	NO
Ultimate Flow Requirement:	520 L/s		YES *

* Future residential development

Feasibility of Consolidation

There is an Environmental Assessment completed in November 2011 regarding the St. Charles LS.
In that City the consultant looked at the possibility of eliminating the need for a lift station by installing a deep sewer from this point to the rock tunnel.
It was determined that this wasn't feasible.
The conclusion of the study was to construct a new St. Charles LS on the same site with a new forcemain to the tunnel

Additional Capacity

Additional capacity required at peak flow: 137.00 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Pumping Station: St. Charles Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - St. Charles LS located at 255 St. Charles Street

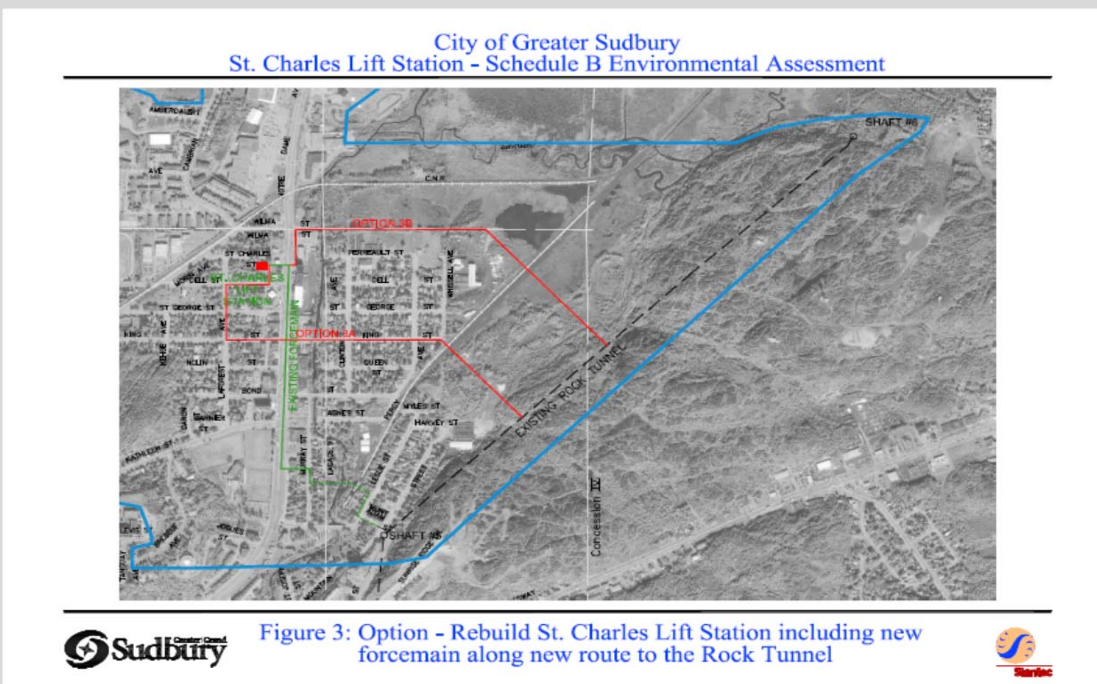

Figure 2 - Preferred approach for the St. Charles LS (Option 3B)

Option 3b - Opinion of Probable Cost (Class C)
Description: New pump station and new forcemain to new discharge location

Project: St. Charles Lift Station EA
Client: City of Greater Sudbury
Project Number: 163400926

Life Cycle	Item #	Description	Units	Quantity (Estimated)	Unit Cost (Estimated)	Cost (Estimated)	Comments
Initial Capital Cost	1	Pump Station Building (1 Storey)	m2	100	$ 2,800	$ 280,000	Gross building cost based on 2008 Yardsticks: includes basic building, lighting, roof, doors, building mechanical, finishes
	2	Wetwell (excavation, concrete, backfill)	LS	1	$ 800,000	$ 800,000	Sheet piling, well points
	3	Wetwell metals	LS	1	$ 250,000	$ 250,000	guidebars, discharge elbows, landings, stairs
	4	Pumps	ea	3	$ 100,000	$ 300,000	includes VFD and controls
	5	Generator	LS	1	$ 350,000	$ 350,000	includes controls, louvres, etc
	6	Decommission old PS, transition to new PS	LS	1	$ 600,000	$ 600,000	includes moving 3 Museum buildings to new site
	7	Process Piping	LS	1	$ 200,000	$ 200,000	
	8	Electrical	LS	1	$ 100,000	$ 100,000	
	9	Instrumentation	LS	1	$ 75,000	$ 75,000	including milltronics and float backup
	10	Mobilization and Demobilization	LS	1	$ 100,000	$ 100,000	
	11	Clearing and Grubbing	m3	7000	$ 5	$ 35,000	
	12	Erosion and Sediment Control	LS	1	$ 15,000	$ 15,000	
	13	Access Road	m	1000	$ 75	$ 75,000	
	14	Odour Control	LS	1	$ 100,000	$ 100,000	
	15	Directional drilling under creek	m	60	$ 2,000	$ 120,000	
	16	Jacking and boring under CN rail	m	30	$ 2,500	$ 75,000	
	17	400mm Forcemain in built-up area	m	240	$ 2,250	$ 540,000	twin pipes
	18	400mm Forcemain in green field	m	1000	$ 1,700	$ 1,700,000	twin pipes
	19	Air-release valves and chambers	ea	2	$ 12,000	$ 24,000	
	20	Connection to tunnel- 400mm vertical rock bore	m	20	$ 5,000	$ 100,000	vertical connection - no access shaft
	21	Land Acquisition allowance	LS	1	$ 100,000	$ 100,000	
	22	Trench Dewatering allowance	LS	1	$ 40,000	$ 40,000	
	23	Contingency	25%			$ 1,494,750	
					Total Capital Cost	**$ 7,473,750**	
Engineering	1	Detailed Design and Construction Administration	%	1	20%	**$ 1,494,750**	20% of Capital Cost

Figure 3 - Cost Estimat from EA Report (Option 3B)

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Moonlight Lift Station	Author:	Michelle Albert
Catchement:	Sudbury	Date:	7/1/2016
		Pg No.	1

Overview

Location:	358 Moonlight Avenue	
Construction Date:	1967	Based on ECA
Previous ECA:	67-A-889	
Previous ECA issue date:	Sept 20th, 1967	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	Levesque LS	

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	7.5 hp	
Drawdown Test:	295 GPM	Date: June, 2010
Firm, one pump (2010):	18.61 L/s	
2015:	N/A	
ECA:	16.3 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	19.73 L/s

Future Flow Requirements

2041 Flow Requirement:	20.20 L/s	Growth?	NO
Ultimate Flow Requirement:	20.20 L/s		Limited Growth *

* Future residential development

Feasibility of Consolidation

Lift Station Invert Elevation:	267.46 m
Reference Invert:	273.61 m
Reference Location:	MH #12-24
Reference Distance:	414.83 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	3.90 L/s	Capacity Required?	YES

Net Present Value 40 -Year Evaluation

Interest Rate:	4 %
Inflation Rate:	2 %
Capital Cost of New Gravity Sewer:	$1,800,000
Pumping Station 40-year Net Present Value:	$700,000

As presented above, the elimination of the exisiting pumping station and the 40-year NPV are comparable in cost. The current LS should be maintained.

Pumping Station:
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

Figure 1 - Moonlight Pumping Station located at 358 Moonlight Avenue

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Moonlight LS
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 4

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)	New Gravity Sewer
Healthy Watersheds	Would still have concerns with lack of Capacity at the LS	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding lack of capacity at the LS	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows. Would require the installation of a gravity sewer which would impact the neighbourhood.
Cost Effectiveness	Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than upgrading the LS. However, due to the age of the LS, reinvestment into the existing assets are required.	This option would only include the installation of two new high capacity pumps in the same structure.	Approximately $1,800,000.
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist	Would require limited construction.	The existing site is large and therefore would be able to facilitate construction	The new gravity sewer would be located on the Kingsway. This would cause a distruption to traffic on the Kingsway.
Operability	Lack of peak capacity would still existing	Would improve operability of the Station. However, would still have concerns with aging pumps.	Improved Operations	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.	This would reduce the City's annual O&M costs (including energy).
Preferred Alternative	No	Yes - I&I reduction in the catchment would be beneficial and could delay the upgrades required to the station.	Yes - the installation of new pumps would limit the potential for surcharges / overflows.	No

Initial Actions

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Levesque Lift Station	Author:	Michelle Albert
Catchement:	Sudbury	Date:	7/1/2016
		Pg No.	1

Overview

Location:	2811 Bancroft Drive	
Construction Date:	1967	Based on ECA
Previous ECA:	67-A-372	
Previous ECA issue date:	May 17th, 1967	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	Moonlight LS, Moonlight Beach LS	
Pumping to:	North Tunnel	

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	75 hp	
Drawdown Test:	2685 GPM	Date: June, 2010
Firm, one pump (2010):	169.40 L/s	
2015:	N/A	
ECA:	167.6 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	176.83 L/s

Future Flow Requirements

2041 Flow Requirement:	191.09 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	195.52 L/s		YES

Feasibility of Consolidation

Lift Station Invert Elevation:	255.12 m
Reference Invert:	268.1 m
Reference Location:	MH #11-181
Reference Distance:	1043.026 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	23.49 L/s	Capacity Required?	YES

Additional Information/Comments

* The current lift station is very old
* The lift station is currently servicing a large number of properties
* The forcemain should be evaluated along with the Lift Station

Problem Statement

Levesque Lift Station does not have sufficient capacity to meet future flow demands. The Lift Station requires expansion in order to satisfy future requirements

Pumping Station: Levesque Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

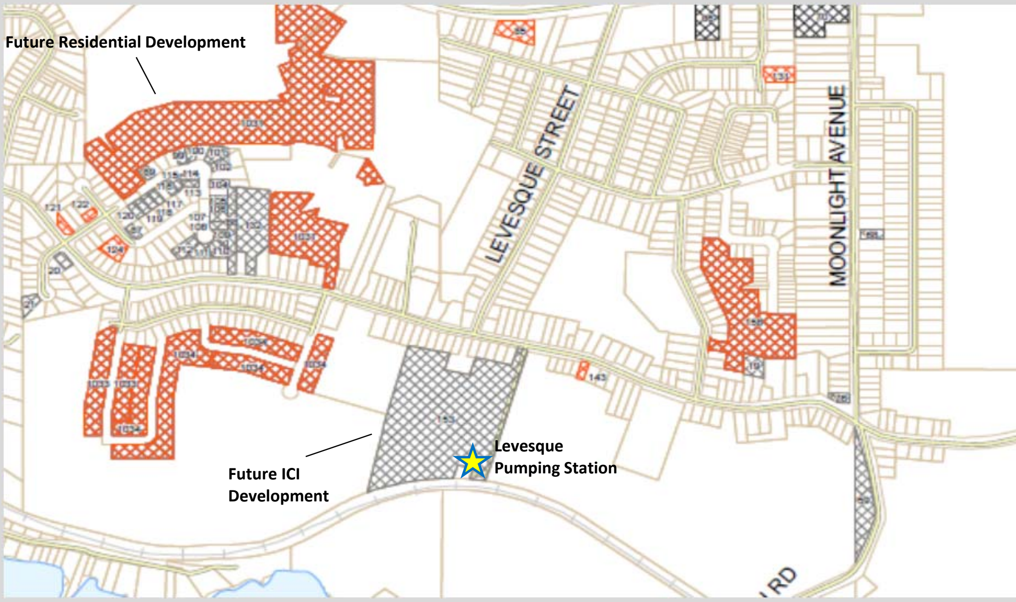

Figure 1 - Levesque Pumping Station located at 2811 Bancroft Drive showing future residential developmen in red and future ICI development in black

Figure 2 - Manhole location, invert, and proposed development locations surrounding Levesque Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Levesque Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 3

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)	Wet Weather Flow Retention Tank	New PS
Healthy Watersheds	Would still have concerns with spills	Would reduce the potential for overflows at the LS	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding WW spills	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows
Cost Effectiveness	Would still be reactive to flooding concerns. Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than the construction of a new LS. However, due to the age of the LS, reinvestment into the existing assets are required. ~ $40,000	This option would only include the installation of two new high capacity pumps in the same structure. ~ $320,000	Most costly option to reduce flooding risk.	The existing LS is close to exceeding its current service life and will require replacement. The new LS would be designed to eliminate any flooding concerns. ~ 5,000,000
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist	Would require limited construction.	The existing site is large and therefore would be able to facilitate construction	Would have to find a site for a new wet weather flow tank in the area.	Would have to find a new LS site. There is land adjacent to the station which could be acquired.
Operability	Challenges with flooding and lack of Peak Capacity would still exist	Would improve operability of the Station. However, would still have concerns with aging equipment.	Improved Operations	Would still have challenges with operations due to the reuse of the existing LS	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Peak to Dry Weather flow very high and therefore more I&I reduction measures should be investigated. Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.	This would improve the management of wet weather flows in the system.	Would meet all the City's Sustainability requirements.
Preferred Alternative	No	Yes - In the short term the LS catchment should be reviewed to identify I&I reduction possibilities	Yes	No	No

Initial Actions

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Mark Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	7 Mark Street
Construction Date:	1999 Based on ECA
Previous ECA:	3-1284-99-006
Previous ECA issue date:	Oct 28th, 1999
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	York LS, Lakeview LS
Pumping to:	North Tunnel

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well
Pumps:	2
Power:	47 hp
Drawdown Test:	722 GPM Date: September, 2010
Firm, one pump (2010):	45.6 L/s
2015:	N/A
ECA:	41.7 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 17.22 L/s

Future Flow Requirements

2041 Flow Requirement:	17.27 L/s	Growth?	NO
Ultimate Flow Requirement:	17.27 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	255.12 m
Reference Invert:	279.75 m
Reference Location:	MH #15-37
Reference Distance:	384.05 m

Investigate opportunities to decomission Mark Lift Station and flow by gravity directly to Kincora Lift Station

Additional Capacity

Additional capacity required at peak flow: -24.43 L/s Capacity Required? NO
(2041 Flow Requirement - ECA)

Additional Information/Comments

* The option to go to Kincora from Mark Lift Station (or vice versa) was evaluated. There is currently no easement to connect the two stations.
Investigated both decommissioning Mark and decommissioning Kincora. Decided that decomissioning Kincora was the best option.

Recommendations

Mark Lift Station has sufficient capacity to meet the current flow requirements.

Pumping Station: Mark Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Mark Lift Station located at 7 Mark Street

Figure 2 - Manhole location, invert, and forcemain locations surrounding Mark Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Lakeview Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	2 Lakeview Drive
Construction Date:	1956 (Based on ECA)
Previous ECA:	N/A
Previous ECA issue date:	N/A
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	N/A
Pumping to:	Mark LS

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well
Pumps:	2
Power:	15 hp
Drawdown Test:	333 GPM (Date: March, 2011)
Firm, one pump (2010):	21.0 L/s
2015:	N/A
ECA:	20.9 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 0.64 L/s

Future Flow Requirements

2041 Flow Requirement:	0.65 L/s	Growth?	NO
Ultimate Flow Requirement:	0.65 L/s		NO

Feasibility of Consolidation

Lift Station Invert Elevation:	254.49 m
Reference Invert:	257.95 m
Reference Location:	MH #15-50
Reference Distance:	90.83 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: -20.25 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

* The potential to remove Lakeview LS and connect directly to York LS should be considered

Recommendations

Lakeview Lift Station has sufficient capacity to met the current flow requirements, however could eliminate the station by constructing a gravity sewer and diverting to York LS.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Lakeview Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

Figure 1 - Lakeview Lift Station located at 2 Lakeview Drive

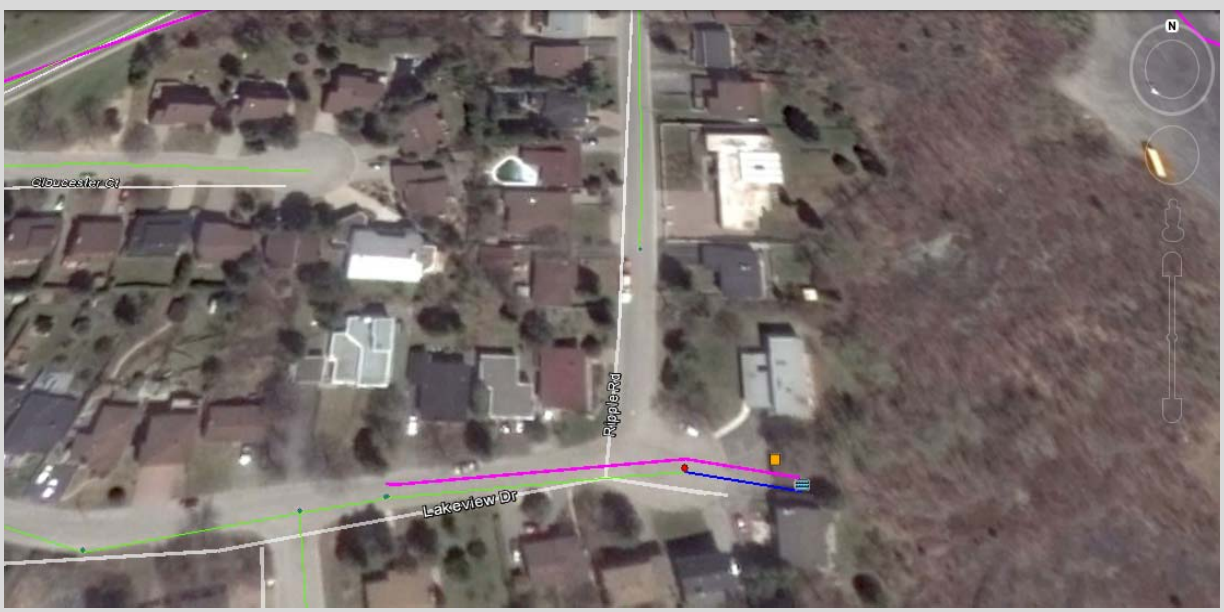

Figure 2 - Area surrounding Lakeview Lift Station

Project	Sudbury Master Plan
Location	Sudbury
Subject	Elimination of Lakeview LS

Interest rate	*4.0%*
Inflation rate	*2.0%*

Existing Costs to Operate the Station

Capital Cost for new Gravity Sewer $ 87,000.00

Year		Capital cost	Replacement Cost	Operation Annual Cost	TOTAL	Discount rate	Discounted value
0	2016			$ 16,000	$ 16,000	1.00	$ 16,000
1	2017			$ 16,000	$ 16,000	0.98	$ 15,692
2	2018			$ 16,000	$ 16,000	0.96	$ 15,391
3	2019			$ 16,000	$ 16,000	0.94	$ 15,095
4	2020			$ 16,000	$ 16,000	0.93	$ 14,804
5	2021			$ 16,000	$ 16,000	0.91	$ 14,520
6	2022			$ 16,000	$ 16,000	0.89	$ 14,240
7	2023			$ 16,000	$ 16,000	0.87	$ 13,967
8	2024			$ 16,000	$ 16,000	0.86	$ 13,698
9	2025			$ 16,000	$ 16,000	0.84	$ 13,434
10	2026		105,000 $	$ 16,000	$ 121,000	0.82	$ 99,645
11	2027			$ 16,000	$ 16,000	0.81	$ 12,923
12	2028			$ 16,000	$ 16,000	0.79	$ 12,674
13	2029			$ 16,000	$ 16,000	0.78	$ 12,431
14	2030			$ 16,000	$ 16,000	0.76	$ 12,191
15	2031			$ 16,000	$ 16,000	0.75	$ 11,957
16	2032			$ 16,000	$ 16,000	0.73	$ 11,727
17	2033			$ 16,000	$ 16,000	0.72	$ 11,502
18	2034			$ 16,000	$ 16,000	0.71	$ 11,280
19	2035			$ 16,000	$ 16,000	0.69	$ 11,063
20	2036		105,000 $	$ 16,000	$ 121,000	0.68	$ 82,058
21	2037			$ 16,000	$ 16,000	0.67	$ 10,642
22	2038			$ 16,000	$ 16,000	0.65	$ 10,437
23	2039			$ 16,000	$ 16,000	0.64	$ 10,237
24	2040			$ 16,000	$ 16,000	0.63	$ 10,040
25	2041			$ 16,000	$ 16,000	0.62	$ 9,847
26	2042			$ 16,000	$ 16,000	0.60	$ 9,657
27	2043			$ 16,000	$ 16,000	0.59	$ 9,472
28	2044			$ 16,000	$ 16,000	0.58	$ 9,289
29	2045			$ 16,000	$ 16,000	0.57	$ 9,111
30	2046		105,000 $	$ 16,000	$ 121,000	0.56	$ 67,576
31	2047			$ 16,000	$ 16,000	0.55	$ 8,764
32	2048			$ 16,000	$ 16,000	0.54	$ 8,595
33	2049			$ 16,000	$ 16,000	0.53	$ 8,430
34	2050			$ 16,000	$ 16,000	0.52	$ 8,268
35	2051			$ 16,000	$ 16,000	0.51	$ 8,109
36	2052			$ 16,000	$ 16,000	0.50	$ 7,953
37	2053			$ 16,000	$ 16,000	0.49	$ 7,800
38	2054			$ 16,000	$ 16,000	0.48	$ 7,650
39	2055			$ 16,000	$ 16,000	0.47	$ 7,503
40	2056			$ 16,000	$ 16,000	0.46	$ 7,359
						TOTAL 40 years	$ 673,029

Date	1-Dec-16
Provided By:	MA
Page:	3

Assumptions

Energy Cost	$1,000	
Equipment Operation & Maintenance Cost	$10,000	
Building and Structure Cost	$5,000	
Total Annual O&M Cost	**$16,000**	
Replacement Cost	$700,000	
Reinvestment	$105,000	Every 10 years

Capital Cost for new Gravity Sewer

Description	Diameter	Length	Unit rate	Total	
Gravity Sewer	200	63	430	$	27,000.00
Decommissioning the station (re-routing exisiting sewers)					$60,000
Total				$	87,000.00

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: York Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	14 York Street	
Construction Date:	1980	Based on ECA
Previous ECA:	7283-4F3SGV	
Previous ECA issue date:	January 5, 2000	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	Bell Park LS	
Pumping to:	Mark LS	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	15 hp	
Drawdown Test:	226 GPM	Date: N/A
Firm, one pump (2010):	14.3 L/s	Date: May 1st, 2010
2015:	N/A	
ECA:	13.2 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 25.00 L/s

Future Flow Requirements

2041 Flow Requirement:	25.00 L/s	Growth?	NO
Ultimate Flow Requirement:	25.00 L/s		NO

Feasibility of Consolidation

Lift Station Invert Elevation:	254.495 m
Reference Invert:	257.952 m
Reference Location:	MH #15-50
Reference Distance:	90.83 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	11.80 L/s	Capacity Required?	YES

Additional Information/Comments

* Condition concerns exisit with the York PS
* The existing forcemain is in poor condition
* Communication upgrade is required

Problem Statement

Under current conditions, the York Pumping Station does not have sufficient capacity to meet the current flow requirements and will require upgrading

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: York Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps) and rehabilitate forcemain deficiencies	Wet Weather Flow Retention Tank	New PS
Healthy Watersheds	Would still have concerns with spills	Would reduce the potential for overflows at the LS	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding WW spills	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows
Cost Effectiveness	Would still be reactive to flooding concerns. Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than the construction of a new LS. However, due to the age of the LS, reinvestment into the existing assets are required.	This option would only include the installation of two new high capacity pumps in the same structure.	Most costly option to reduce flooding risk.	The existing LS is close to exceeding its current service life and will require replacement. The new LS would be designed to eliminate any flooding concerns.
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist	There is a concern with the condition of the forcemain from the Lift Station. I&I reduction would do little to mitigate this concern	The existing site is large and therefore would be able to facilitate construction. Would be construction challenges rehabilitating the forcemain. Bypass pumping maybe required.	Would have to find a site for a new wet weather flow tank in the area. Would be challenging to use the existing PS with a new wet weather storage tank.	Would have to find a new LS site. There is land adjacent to the station which could be acquired.
Operability	Challenges with flooding and lack of Peak Capacity would still exist	Would improve operability of the Station. However, would still have concerns with aging equipment.	Improved Operations	Would still have challenges with operations due to the reuse of the existing LS	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Peak to Dry Weather flow very high and therefore more I&I reduction measures should be investigated. Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.	There is no space on site for a wet weather detention tank. The lift station is very close to the creek and any construction will be difficult.	Would meet all the City's Sustainability requirements.
Preferred Alternative	No	Yes - In the short term the LS catchment should be reviewed to identify I&I reduction possibilities	Yes	No	No

Initial Actions

Pumping Station:	York Lift Station	Author:	Michelle Albert
Catchement:	Sudbury	Date:	7/1/2016
		Pg No.	3

Figures

Figure 1 - York Pumping Station located at 14 York Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Lagace Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

CANNOT BE CONSOLIDATED

Location:	334 Lagace Street	
Construction Date:	N/A	Based on ECA
Previous ECA:	N/A	
Previous ECA issue date:	N/A	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	North Tunnel	

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	15 hp	
Drawdown Test:	291 GPM	Date: May, 2010
Firm, one pump (2010):	18.4 L/s	
2015:	N/A	
ECA:	14 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 56.95 L/s

Future Flow Requirements

2041 Flow Requirement:	56.95 L/s	Growth?	NO
Ultimate Flow Requirement:	56.95 L/s		NO

Feasibility of Consolidation

Lift Station Invert Elevation:	254.495 m
Reference Invert:	257.952 m
Reference Location:	MH #9-965
Reference Distance:	3.35 m

Investigated the option of going directly to the North Tunnel but it isn't feasible.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	42.95 L/s	Capacity Required?	YES

Additional Information/Comments

* The option of directly entering the North Tunnel should be considered - This was reviewed in detail and isn't feasible.
* Communication upgrade is required
* The Lagace LS does not create flooding of nearby homes

Problem Statement

Under current conditions, the Lagace Pumping Station does not have sufficient capacity to meet the current flow requirements and will require upgrading

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Lagace Lift Station
Catchment: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps) and Rehabiliation of the Forcemain	Wet Weather Flow Retention Tank	New PS
Healthy Watersheds	Would still have concerns with spills	Would reduce the potential for overflows at the LS	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding WW spills	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows
Cost Effectiveness	Would still be reactive to flooding concerns. Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than the construction of a new LS.	This option would only include the installation of two new high capacity pumps in the same structure.	Most costly option to reduce flooding risk.	The existing LS is close to exceeding its current service life and will require replacement. The new LS would be designed to eliminate any flooding concerns.
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist	Would require limited construction.	The existing station has empty adjacent land and therefore would be able to facilitate construction	Would have to find a site for a new wet weather flow tank in the area. Would be challenging to use the existing PS with a new wet weather storage tank.	Would have to find a new LS site. There is land adjacent to the station which could be acquired.
Operability	Challenges with flooding and lack of Peak Capacity would still exist	Would improve operability of the Station. However, would still have concerns with aging equipment.	Improved Operations	Would still have challenges with operations due to the reuse of the existing LS	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Peak to Dry Weather flow very high and therefore more I&I reduction measures should be investigated. Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.	There is no space on site for a wet weather detention tank. The lift station is very close to the creek and any construction will be difficult.	Would meet all the City's Sustainability requirements.
Preferred Alternative	No	Yes - In the short term the LS catchment should be reviewed to identify I&I reduction possibilities	Yes	No	No

Initial Actions

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Lagace Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Lagace Pumping Station located at 334 Lagace Street

Pumping Station:	Lagace Lift Station	Author:	Michelle Albert
Catchement:	Sudbury	Date:	7/1/2016
		Pg No.	4

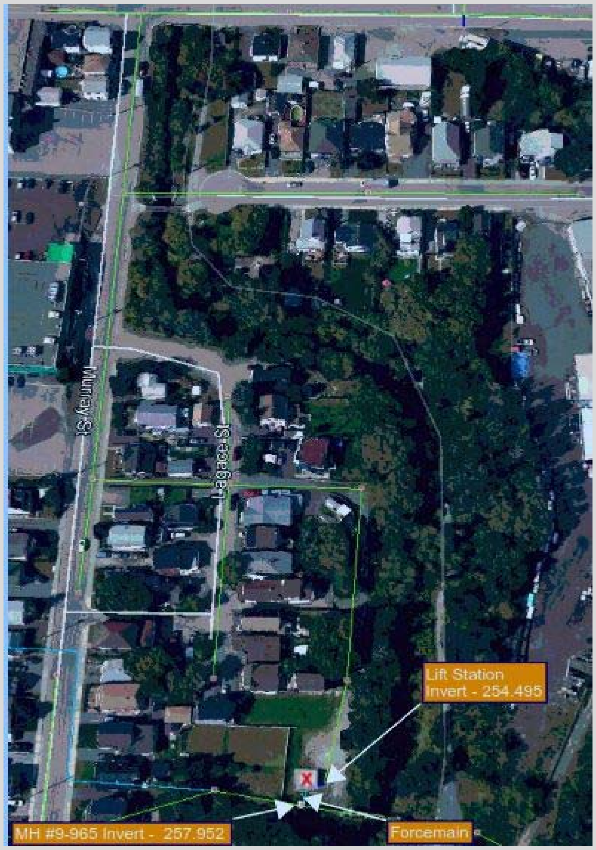

Figure 2 - Manhole location, invert, and forcemain locations surrounding Lagace Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Kincora Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	66A Kincora Court	
Construction Date:	N/A	Based on ECA
Previous ECA:	N/A	
Previous ECA issue date:	N/A	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	North Tunnel	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	9 hp	
Drawdown Test:	100 GPM	Date: July, 2010
Firm, one pump (2010):	6.3 L/s	
2015:	N/A	
ECA:	8.7 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 2.91 L/s

Future Flow Requirements

2041 Flow Requirement:	2.92 L/s	Growth?	NO
Ultimate Flow Requirement:	2.92 L/s		NO

Feasibility of Consolidation

Lift Station Invert Elevation:	273.08 m
Reference Invert:	283.73 m
Reference Location:	MH #15-19
Reference Distance:	307.54 m

Consolidation may be possible

Additional Capacity

Additional capacity required at peak flow: -5.78 L/s   Capacity Required? NO
(2041 Flow Requirement - ECA)

Additional Information/Comments

* Condition Assessment is required
* Communication upgrade is required

* The presence of an easement behind the surrounding homes should be determined in order to assess the possibility of connecting Kincora PS to Mark PS

Net Present Value 40 -Year Evaluation

Interest Rate:	4 %
Inflation Rate:	2 %
Capital Cost of New Gravity	$2,300,000
Pumping Station 40-year Net Present Value:	$2,662,325

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Kincora Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

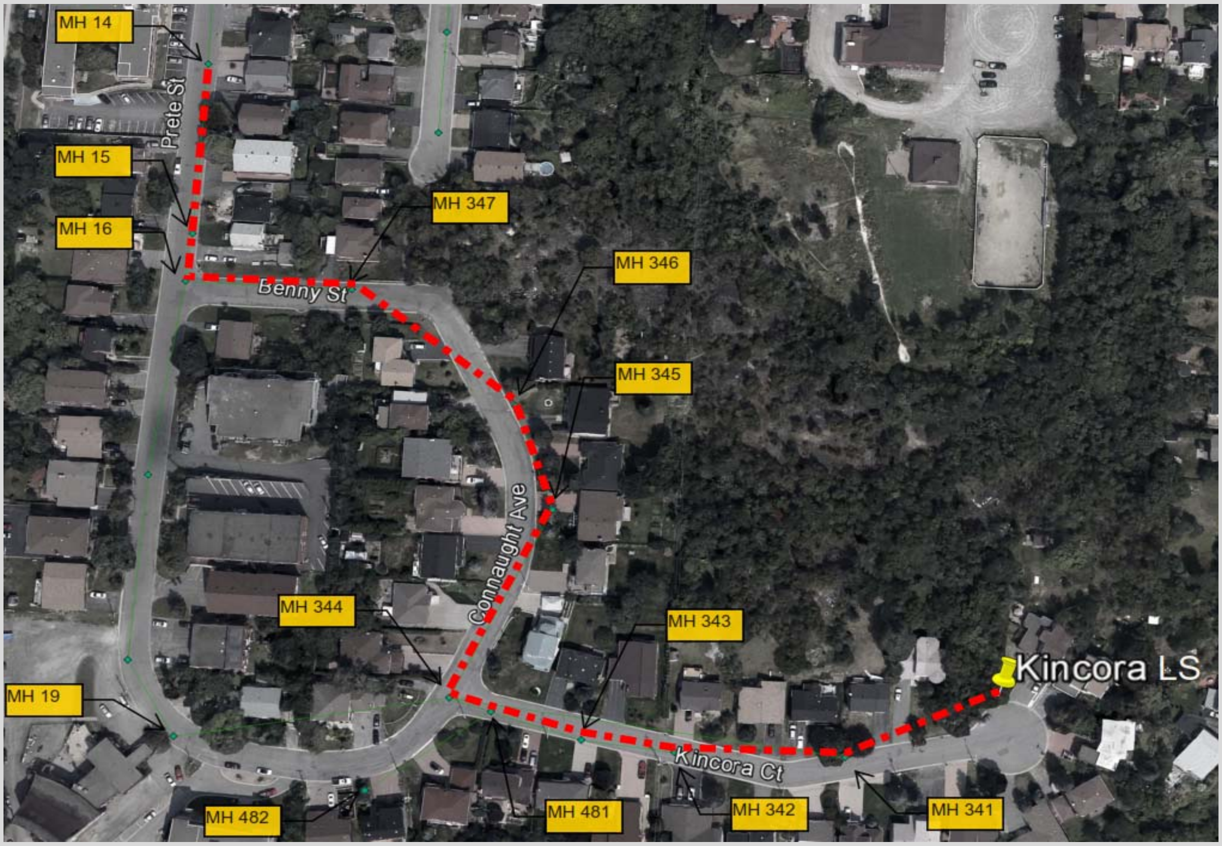

Figure 1 - Kincora Pumping Station located at 66A Kincora Court, showing surrounding Manhole locations

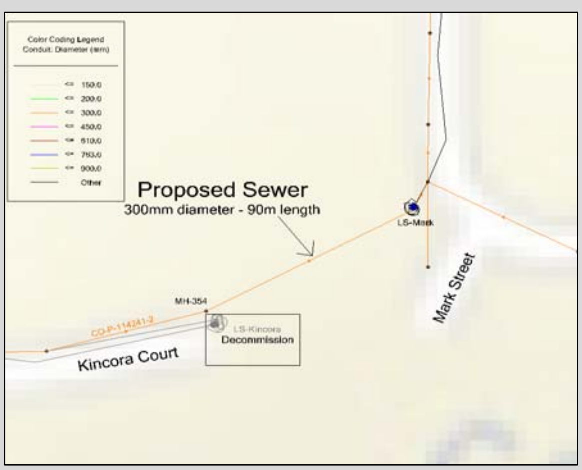

Figure 2 - A screen capture of the SewerGEMS model demonstrating the proposed Kincora LS decommissioning alternative. All grey attributes are to be decommissioned

Project	Sudbury Master Plan
Location	Sudbury
Subject	Elimination of Kincora LS

Interest rate	*4.0%*
Inflation rate	*2.0%*

Existing Costs to Operate the Station

Capital Cost for new Gravity Sewer $ 195,000.00

Year		Capital cost	Replacement Cost	Operation Annual Cost	TOTAL	Discount rate	Discounted value
0	2016			$ 16,000	$ 16,000	1.00	$ 16,000
1	2017			$ 16,000	$ 16,000	0.98	$ 15,692
2	2018			$ 16,000	$ 16,000	0.96	$ 15,391
3	2019			$ 16,000	$ 16,000	0.94	$ 15,095
4	2020			$ 16,000	$ 16,000	0.93	$ 14,804
5	2021			$ 16,000	$ 16,000	0.91	$ 14,520
6	2022			$ 16,000	$ 16,000	0.89	$ 14,240
7	2023			$ 16,000	$ 16,000	0.87	$ 13,967
8	2024			$ 16,000	$ 16,000	0.86	$ 13,698
9	2025			$ 16,000	$ 16,000	0.84	$ 13,434
10	2026		105,000 $	$ 16,000	$ 121,000	0.82	$ 99,645
11	2027			$ 16,000	$ 16,000	0.81	$ 12,923
12	2028			$ 16,000	$ 16,000	0.79	$ 12,674
13	2029			$ 16,000	$ 16,000	0.78	$ 12,431
14	2030			$ 16,000	$ 16,000	0.76	$ 12,191
15	2031			$ 16,000	$ 16,000	0.75	$ 11,957
16	2032			$ 16,000	$ 16,000	0.73	$ 11,727
17	2033			$ 16,000	$ 16,000	0.72	$ 11,502
18	2034			$ 16,000	$ 16,000	0.71	$ 11,280
19	2035			$ 16,000	$ 16,000	0.69	$ 11,063
20	2036		105,000 $	$ 16,000	$ 121,000	0.68	$ 82,058
21	2037			$ 16,000	$ 16,000	0.67	$ 10,642
22	2038			$ 16,000	$ 16,000	0.65	$ 10,437
23	2039			$ 16,000	$ 16,000	0.64	$ 10,237
24	2040			$ 16,000	$ 16,000	0.63	$ 10,040
25	2041			$ 16,000	$ 16,000	0.62	$ 9,847
26	2042			$ 16,000	$ 16,000	0.60	$ 9,657
27	2043			$ 16,000	$ 16,000	0.59	$ 9,472
28	2044			$ 16,000	$ 16,000	0.58	$ 9,289
29	2045			$ 16,000	$ 16,000	0.57	$ 9,111
30	2046		105,000 $	$ 16,000	$ 121,000	0.56	$ 67,576
31	2047			$ 16,000	$ 16,000	0.55	$ 8,764
32	2048			$ 16,000	$ 16,000	0.54	$ 8,595
33	2049			$ 16,000	$ 16,000	0.53	$ 8,430
34	2050			$ 16,000	$ 16,000	0.52	$ 8,268
35	2051			$ 16,000	$ 16,000	0.51	$ 8,109
36	2052			$ 16,000	$ 16,000	0.50	$ 7,953
37	2053			$ 16,000	$ 16,000	0.49	$ 7,800
38	2054			$ 16,000	$ 16,000	0.48	$ 7,650
39	2055			$ 16,000	$ 16,000	0.47	$ 7,503
40	2056			$ 16,000	$ 16,000	0.46	$ 7,359
						TOTAL 40 years	$ 673,029

Date 1-Dec-16
Provided By: MA

Assumptions

Energy Cost	$1,000	
Equipment Operation & Maintenance Cost	$10,000	
Building and Structure Cost	$5,000	
Total Annual O&M Cost	**$16,000**	
Replacement Cost	$700,000	
Reinvestment	$105,000	Every 10 years

Capital Cost for new Gravity Sewer

Description	Diameter	Length	Unit rate	Total
Gravity Sewer	300	90	1500	$ 135,000.00
Decommissioning the station (re-routing exisiting sewers)				$60,000
Total				$ 195,000.00

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Helen's Point Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	425 Helen's Point
Construction Date:	1979 Based on ECA
Previous ECA:	3-0535-79-006
Previous ECA issue date:	May 31st, 1979
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	N/A
Pumping to:	South Tunnel

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	5 hp
Drawdown Test:	124 GPM Date: September, 2010
Firm, one pump (2010):	7.8 L/s
2015:	N/A
ECA:	7.6 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 5.99 L/s

Future Flow Requirements

2041 Flow Requirement:	5.99 L/s	Growth?	NO
Ultimate Flow Requirement:	5.99 L/s		NO

Feasibility of Consolidation

Lift Station Invert Elevation:	261.06 m
Reference Invert:	270.47 m
Reference Location:	MH #3-58
Reference Distance:	382.52 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations. In order for consolidation to be feasible, the catchment system would need to be significantly redesigned

Additional Capacity

Additional capacity required at peak flow: -1.61 L/s Capacity Required? NO
(2041 Flow Requirement - ECA)

Additional Information/Comments

* Condition Assessment is required
* A lifecyle cost analysis for the station should be completed
* New pumps are present, requiring a review of the forcemain

Recommendations

Helen's Point Lift Station has sufficient capacity to met the current flow requirements. The area is fully developed; therefore, no changes need to be made.

Pumping Station: Helen's Point Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Helen's Point Lift Station located at 425 Helen's Point

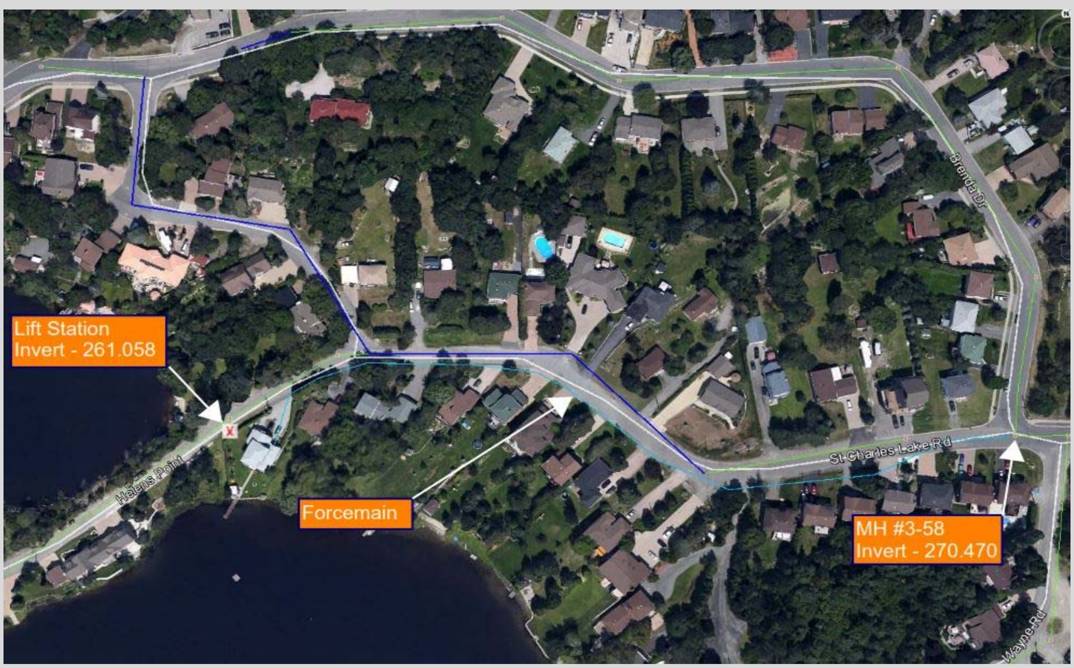

Figure 1 - Manhole location, invert, and forcemain locations surrounding Helen's Point Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Ester Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	517 Ester Street	
Construction Date:	1980	Based on ECA
Previous ECA:	3-1288-78-806	
Previous ECA issue date:	Feburary 28, 1980	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	South Tunnel	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	9.4 hp	
Drawdown Test:	545 GPM	Date: N/A
Firm, one pump (2010):	34.4 L/s	Date: May 1st, 2010
2015:	N/A	
ECA:	28.4 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 13.98 L/s

Future Flow Requirements

2041 Flow Requirement:	14.96 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	17.99 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	260.415 m
Reference Invert:	270.489 m
Reference Location:	MH #3-70
Reference Distance:	211.23 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations. In order for consolidation to be feasible, the catchment system would need to be significantly redesigned

Additional Capacity

Additional capacity required at peak flow: -13.44 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

* Communication upgrade is required
* No stand-by power

Recommendations

Ester Lift Station has sufficient capacity to met the current and future flow requirements. In order for capacity to remain sufficient, no future development can occur

Pumping Station: Ester Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Ester Lift Station located at 517 Ester Street

Figure 1 - Manhole location, invert, and forcemain locations surrounding Ester Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Dufferin Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location: 169 Dufferin Street
Construction Date: N/A
Previous ECA: N/A
Previous ECA issue date: N/A
Current ECA: 1978-9CXQJL
Current ECA issue date: May 27th, 2014
Flow From: N/A
Pumping to: North Tunnel

Current Lift Station Firm Capacity

Configuration: Dry Well/Wet Well
Pumps: 1
Power: 3 hp

Drawdown Test: 443 GPM Date: 2010
Firm, one pump (2010): 27.9 L/s
2015: N/A
ECA: 6.4 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 4.80 L/s

Future Flow Requirements

2041 Flow Requirement: 4.80 L/s Growth? NO
Ultimate Flow Requirement: 4.80 L/s NO

Feasibility of Consolidation

Lift Station Invert Elevation: 258.659 m
Reference Invert: 259.665 m
Reference Location: MH #9-634
Reference Distance: 71.32 m

Consolidation is not possible under current conditions, as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: -1.60 L/s Capacity Required? NO
(2041 Flow Requirement - ECA)

Additional Information/Comments

* Communication upgrade is required
* A back-up pump is recommended
* Condition Assessment is required

Recommendations

Dufferin Lift Station has sufficient capacity to met the current flow requirements. An additional pump should be added to increase reliability of the station.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Dufferin Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Dufferin Lift Station located at 169 Dufferin Street

Figure 1 - Manhole location, invert, and forcemain locations surrounding Dufferin Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Beverly Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	973 Beverly Drive
Construction Date:	1960 (Based on ECA)
Previous ECA:	3-0451-88-006
Previous ECA issue date:	April 26th, 1988
Current ECA:	1978-9CZQJL
Current ECA issue date:	May 27th, 2014
Flow From:	N/A
Pumping to:	Marchel Bouchard LS

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	15 hp	
Drawdown Test:	561 GPM	Date: July, 2010
Firm, one pump (2010):	35.39 L/s	
2015:	N/A	
ECA:	28.8 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 36.62 L/s

Future Flow Requirements

2041 Flow Requirement:	36.62 L/s	Growth?	Limited Growth
Ultimate Flow Requiremer	36.99 L/s		Limited Growth

Feasibility of Consolidation or Elimination

Lift Station Invert Elevation:	246.467 m	Manhole: MH 14-219
Martindale Invert Elevation:	248.72 m	
Ramsey View Invert Elevation:	249.85 m	

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: 7.82 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Additional Information/Comments

* There are problems with Lily Creek flooding in the station. The station needs to be flood proofed
* There is sufficient downstream pump capacity
* Additional drawdown test completed August 2012, indicating drawdown of 25 L/s
* Hatch combing is required immediately

Problem Statement

Beverly LS has limited capacity to handle wet weather flow events. The Creek also is able to rise and flood the station. Station is also approximately 60 years old and some of the Lift Station components have exceeded their recommended service life.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Beverly Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps) and rehabilitation of the existing forcemain	Wet Weather Flow Retention Tank	New LS
Healthy Watersheds	Would still have concerns with the health of Lilly Creek	Would reduce the potential for overflows at the LS	Would reduce the potential for spills to the Creek	Would reduce the potential for spills to the Creek	Would reduce the potential for spills to the Creek
Community Well Being	Would still have concerns regarding WW spills	Reduce the Risk of Basement Flooding Events	Reduce the Risk of Basement Flooding Events	Reduce the Risk of Basement Flooding Events	Reduce the Risk of Basement Flooding Events
Cost Effectiveness	Would still be reactive to flooding concerns. Would be incurring costs in emergency situations.	Costs would be incurred to implement I&I Reduction measures. These costs would be less than the construction of a new LS. However, due to the age of the LS, reinvestment into the existing assets are required.	LS required flood protection and the pumps to be upgraded	Most costly option to reduce flooding risk.	The existing LS is close to exceeding its current service life and will require replacement. The new LS would be designed to eliminate any flooding concerns.
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist.	Would require limited construction.	There will be challenges to expand on the existing site due to the site constraints.	Would have to find a site for a new wet weather flow tank in the area. Would be challenging to use the existing PS with a new wet weather storage tank.	Would have to find a new LS site. The new site would have to be out of the floodplain for Lily Creek
Operability	Challenges with flooding and lack of Peak Capacity would still exist	Would improve operability of the Station. However, would still have concerns with aging equipment.	May still have challenges due to the location of the station and its proximity to the Creek.	Would still have challenges with operations due to the reuse of the existing LS	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist.	Already undertaking I&I Reduction measures - Sealing MH lids. Peak to Dry Weather flow very high and therefore more I&I reduction measures should be investigated. Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs.	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.	There is no space on site for a wet weather detention tank. The lift station is very close to the creek and any construction will be difficult.	New LS would meet all the City's Sustainability requirements.
Preferred Alternative	No	Yes - In the short term the LS catchment should be reviewed to identify I&I reduction possibilities.	Yes - The LS should be upgraded to include flood proofing measures and higher capacity pumps. Condition assessment of the forcemain is to be completed and any forcemain concerns resolved.	No	No

Initial Actions

* I&I Reduction should proceed
* Anlyze midnight flow information

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Beverly Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 3

Figures

Figure 1 - Beverly Pumping Station located at 973 Beverly Drive

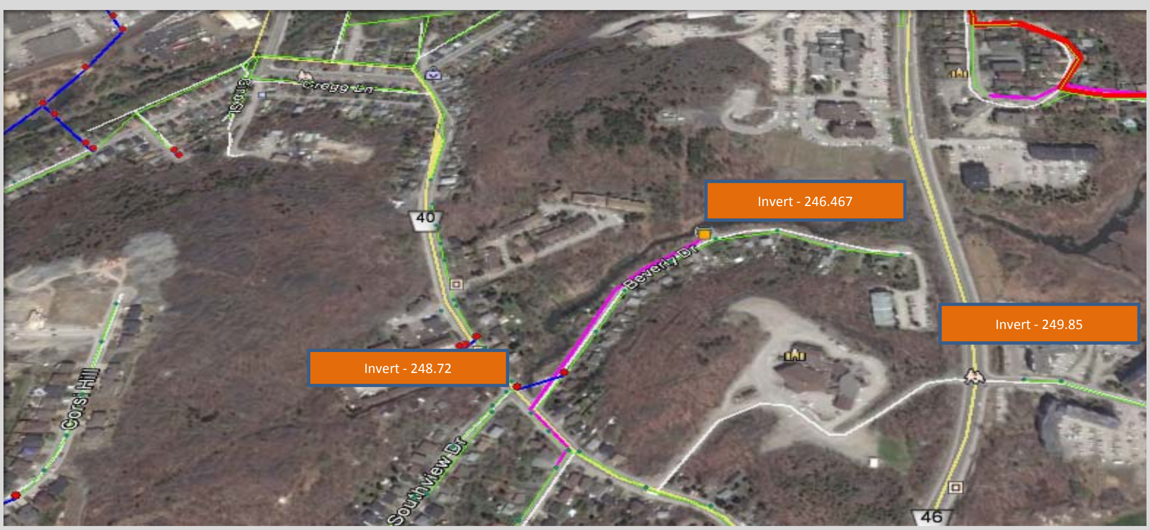

Figure 2 - Invert Elevations surrounding Beverly Pump Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Marcel-Bouchard Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	1425 Marcel Street	
Construction Date:	1972	Based on ECA
Previous ECA:	3-1213-72-006	
Previous ECA issue date:	August 10th, 1972	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	Beverly LS	
Pumping to:	South Tunnel	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	1	
Power:	77 hp	
Drawdown Test:	4111.4	Date: November, 1993
Firm, one pump (2010):	259.4	
2015:	N/A	
ECA:	303.3 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: N/A

Future Flow Requirements

2041 Flow Requirement:	N/A	Growth?	N/A
Ultimate Flow Requirement:	N/A		N/A

Feasibility of Consolidation

Lift Station Invert Elevation:	N/A
Reference Invert:	N/A
Reference Location:	N/A
Reference Distance:	N/A

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	N/A	Capacity Required?	YES

Additional Information/Comments

* Building can be modified for alternate use
* Existing building could possibly be used for equipment storage

Recommendations

The Marcel-Bouchard Lift Station is no longer being used and decomissioning is recommended. Decommissioning strategies should be reviewed with the City of Sudbury's City Real Estate group.

Pumping Station: Marcel-Bouchard Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Marcel-Bouchard Lift Station located at 1425 Marcel Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Southview Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

CANNOT BE CONSOLIDATED

Location:	1865 Southview Drive	
Construction Date:	1964	Based on ECA
Previous ECA:	N/A	
Previous ECA issue date:	N/A	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	South Tunnel	

Current Lift Station Firm Capacity

Configuration:	Dry Well	
Pumps:	2	
Power:	40 hp	
Drawdown Test:	1328 GPM	Date: 2010
Firm, one pump (2010):	83.8 L/s	
2015:	30.8	
ECA:	58.8 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 108.13 L/s

Future Flow Requirements

2041 Flow Requirement:	108.13 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	108.82 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	246.47 m	Manhole: MH 14-219
Martindale Invert Elevation:	248.72 m	
Ramsey View Invert Elevation:	249.85 m	

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow:	49.33 L/s	Capacity Required?	YES
(2041 Flow Requirement - ECA)			

Additional Information/Comments

* Communication upgrade is required
* The existing forcemain is rough. Rehabilitation or replacement may be required to increase flow
* Forcemain material needs to be identified

Problem Statement

Under current conditions, Southview Pumping Station has limited capacity to handle wet weather flow events and has been known to flood homes in the area. Additionally, the station is approximately 60 years old and many components of the system have exceeded their recommended service life.

City of Sudbury Master Plan

Lift Station Review

Pumping Station: Southview Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Evaluation Matrix

	Do Nothing	I&I Reduction	LS Expansion (up sizing the pumps) and rehabilitation of the existing forcemain	Wet Weather Flow Retention Tank	New LS with a New Forcemain
Healthy Watersheds	Would still have concerns with the health of Lilly Creek	Would reduce the potential for spills in the long term	Would reduce the potential for spills to the Creek	Would reduce the potential for spills to the Creek	Would reduce the potential for spills to the Creek
Community Well Being	Would still have concerns regarding WW spills	Improved Community well being	Improved Community well being	Improved Community well being	Improved Community well being
Cost Effectiveness	Would still be reactive to flooding concerns. Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than the construction of a new LS. However, due to the age of the LS, reinvestment into the existing assets are required.	It will be expensive to expand on site due to current site constraints.	Most costly option to reduce flooding risk.	The existing LS is close to exceeding its current service life and will require replacement. The new LS would be designed to eliminate any flooding concerns.
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist	Would require limited construction.	Will be challenging to construct on the current site .	Would have to find a site for a new wet weather flow tank in the area. Would be challenging to use the existing PS with a new wet weather storage tank.	Would have to find a new LS site. The new site would have to be out of the floodplain for Lily Creek
Operability	Challenges with flooding and lack of Peak Capacity would still exist	Would improve operability of the Station. However, would still have concerns with aging equipment.	Would still have challenges with operations due to the location of the station.	Would still have challenges with operations due to the reuse of the existing LS	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Already undertaking I&I Reduction measures - Sealing MH lids. Peak to Dry Weather flow very high and therefore more I&I reduction measures should be investigated	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.	There is no space on site for a wet weather detention tank. The lift station is very close to the creek and any construction will be difficult.	New LS would meet all the City's Sustainability requirements.
Preferred Alternative	No	Yes - In the short term the LS catchment should be reviewed to identify I&I reduction possibilities	Yes - Condition assessment of the forcemain is to be completed and any forcemain concerns resolved. Once additional information is gathered regarding the forcemain new pumps should be installed to meet the capacity requirements of the LS.	No	No

Initial Actions

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Southview Lift Station	Author:	Michelle Albert
Catchement:	Sudbury	Date:	7/1/2016
		Pg No.	3

Figures

Figure 1 - Southview Pumping Station located at 1865 Southview Drive

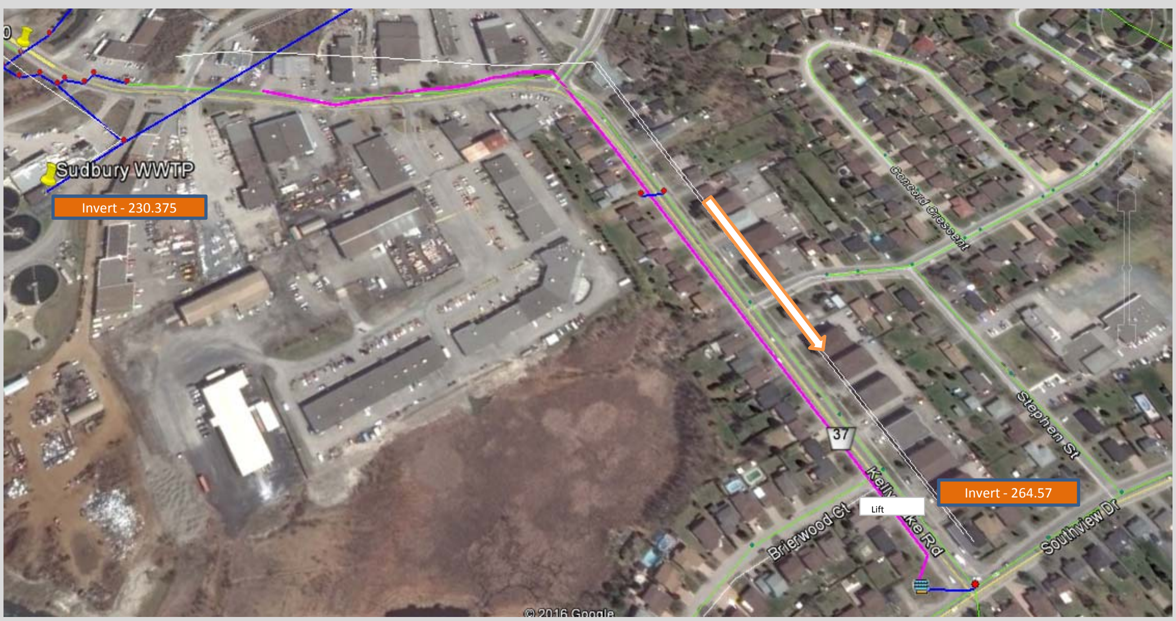

Figure 2 -Invert Elevations surrounding the Southview Pumping Station

Pumping Station: Southview Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Drawdown Test Data obtained from Mike Jensen on June 2 2015 (below and summarised to the right):

DATE	2011/10/01		Southview
	PP #1	PP #2	2 pp's
Wet Well Volume (1ft)	64	64	64
1 Cubic foot of H20	7.5	7.5	7.5
Volume in US Gallons	480	480	480
Time to fill w/ PP's Off	4.45	4.45	4.45
US Gallons per Minute In	107.8652	107.8652	107.8652
Time to PP Down	0.9	1.26	0.63
USGPM Out	641.1985	488.8175	869.7699
Imp GPM Out	534	407	724
Imperial Gallon=	1.201	1.201	1.201
1 US Gallon =	0.003785	0.003785	0.003785
Amount Pp'd in M3 =	2.43	1.85	3.3
litres =	2427.2	1850.4	3292.4
litres per second =	40.5	30.8	54.9

Wet Well Info: 8x8x20.5
Took Readings from: 2.9'-3.9'

Drawdown Test Date	Wet Well Range (m)	Wet Well Area (sq. m)	Lead Pump Flow (L/s)	Lag Pump Flow (L/s)	Two Pump Flow (L/s)
2011/10/01	0.30	5.95	30.76	40.35	54.73

Wet Well Volume	cu.ft	1312.00	37.2 cu.m	
Wet Well Surface Area	sq.ft	64.00		
Active Depth	ft	1.00		
Active Volume	US gal.	478.75		
Time for Inflows to Fill Active Volume	min.	4.45	(pumps all off)	
Inflow Rate	US gpm	107.58		
Time to Pump Down Active Volume	min.	0.9	1.26	0.63
Total Pumping Rate (active volume+inflow)	US gpm	639.53	487.55	867.51
Total Pumping Rate (active volume+inflow)	L/s	40.35	30.76	54.73
Inflow Rate	L/s	6.79	6.79	6.79
Inflows as Percent of Outflow Rate	%	16.8%	22.1%	12.4%
Active Volume	cu.m	1.81		
Total Volume Pumped (active volume+inflow)	cu.m	2.18	2.33	2.07
		2.18	2.33	2.07
Wet Well Depth	ft	20.5	6.25 m	
Wet Well Diameter	ft	n/a		
Wet Well Length	ft	8	2.44 m	
Wet Well Width	ft	8	2.44 m	

Figure 3 - Drawdown test results for Southview Pumping Station

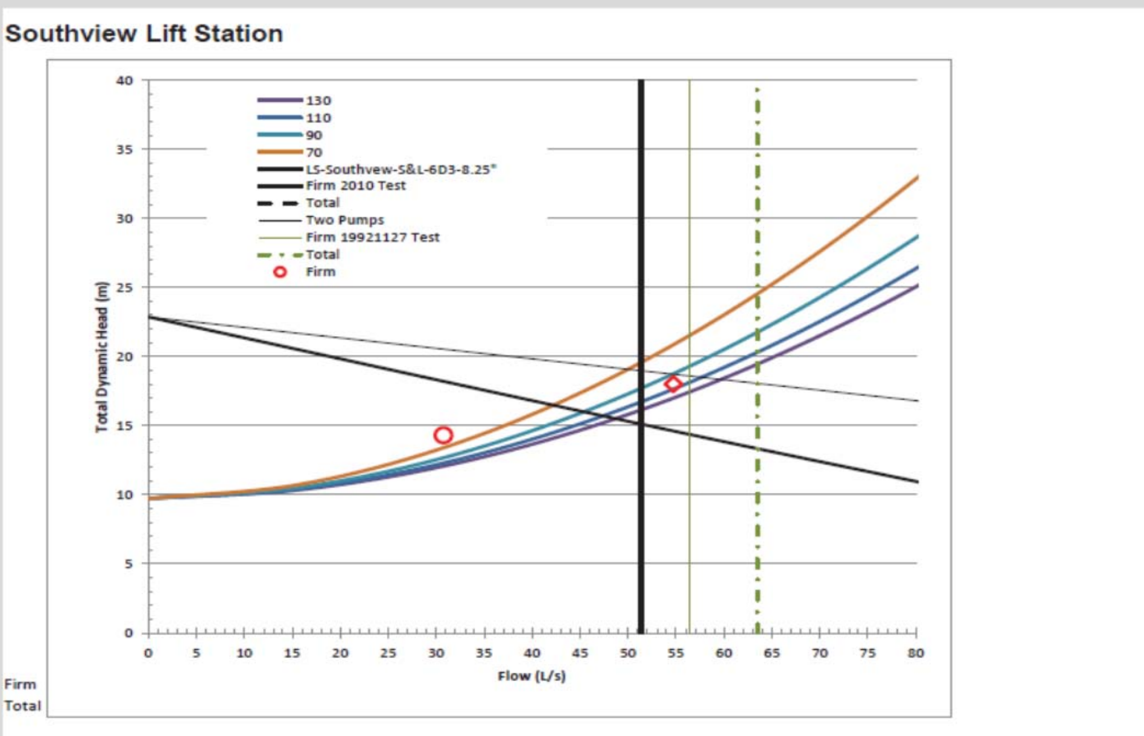

Figure 4 - Total Dynamic Head curves for Southview Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Brenda Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	502 Brenda Drive	
Construction Date:	1988	Based on ECA
Previous ECA:	8-5044-88-006	
Previous ECA issue date:	September 28, 1988	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	South Tunnel	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	9.4 hp	
Drawdown Test:	284.26 GPM	Date: May, 2010
Firm, one pump (2010):	17.9 L/s	
2015:	N/A	
ECA:	13.3 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 7.28 L/s

Future Flow Requirements

2041 Flow Requirement:	7.28 L/s	Growth?	NO
Ultimate Flow Requirement:	7.29 L/s		NO

* No growth in the catchment; however, there is growth in the area

Feasibility of Consolidation

Lift Station Invert Elevation:	264.97 m	Manhole: MH 14-219
Brenda Invert Elevation:	274.44 m	
Moonrock View Invert Elevation:	279 m	

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations. The possiblity of consolidation should be revisited in the future based on the Development Plans in the area. If a new Lift Station is required, flows from the Brenda Lift Station to the catchment should be incorporated into the new design.

Additional Capacity

Additional capacity required at peak flow: -6.02 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

* Communication upgrade is required

Recommendations

Brenda Lift Station has sufficient capacity to met the current and future flow requirements. There is no required infrastucture for growth and no deficiencies in current infrastructure have been identified. Therefore, no upgrades or changes need to be made.

Pumping Station: Brenda Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

Figure 1 - Brenda Pumping Station located at 502 Brenda Drive

Figure 2 - Invert elevations surrounding the Brenda Pumping Station

Pumping Station: Cerilli Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	43 Cerilli Crescent
Construction Date:	1979 Based on ECA
Previous ECA:	3-1282-79-006
Previous ECA issue date:	October 15th, 1979
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	N/A
Pumping to:	Loach's LS

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	5 hp
Drawdown Test:	235.39 GPM Date: July, 2010
Firm, one pump (2010):	14.9 L/s
2015:	N/A
ECA:	14 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 2.33 L/s

Future Flow Requirements

2041 Flow Requirement:	2.33 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	2.35 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	260.34 m	Manhole: MH 14-219
Loaches Invert Elevation:	262.84 m	

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations. Additionally, there are typography constraints in the catchment area which restrict the ability to consolidate.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-11.67 L/s	Capacity Required?	NO

Additional Information/Comments

Recommendations

Cerilli Lift Station has sufficient capacity to met the current and future flow requirements. There is no required infrastucture for growth and no deficiencies in current infrastructure have been identified. Therefore, no upgrades or changes need to be made.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Cerilli Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Cerilli Pumping Station located at 43 Cerilli Crescent

Figure 2 - Invert elevations surrounding the Cerilli Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Loach's Lift Station	Author:	Michelle Albert
Catchement:	Sudbury	Date:	7/1/2016
		Pg No.	1

Overview

Location:	790 Loach's Road	
Construction Date:	1960	Based on ECA
Previous ECA:	60-A-720	
Previous ECA issue date:	September 20th, 1960	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	Cerilli LS	
Pumping to:	South Tunnel	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	9 hp	
Drawdown Test:	204 GPM	Date: June, 2010
Firm, one pump (2010):	12.9 L/s	
2015:	N/A	
ECA:	12.1 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	5.44 L/s

Future Flow Requirements

2041 Flow Requirement:	5.44 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	5.45 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	260.34 m	Manhole: MH 14-219
Loaches Invert Elevation:	262.84 m	

Consolidation is not possible under current conditions, as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-6.66 L/s	Capacity Required?	NO

Additional Information/Comments

* There is an exisiting I&I issue at this Pumping Station. An I&I investigation is recommended.
* The exisiting station is old and any new infrastructure should be sited away from the Creek.

Recommendations

Loach's Lift Station has sufficient capacity to met the current and future flow requirements. However, the lift station is close to reaching its expected service life and expenditures have been allocated inside the asset management plan.

Pumping Station: Loach's Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Loach's Lift Station located opposite to 790 Loach's Road

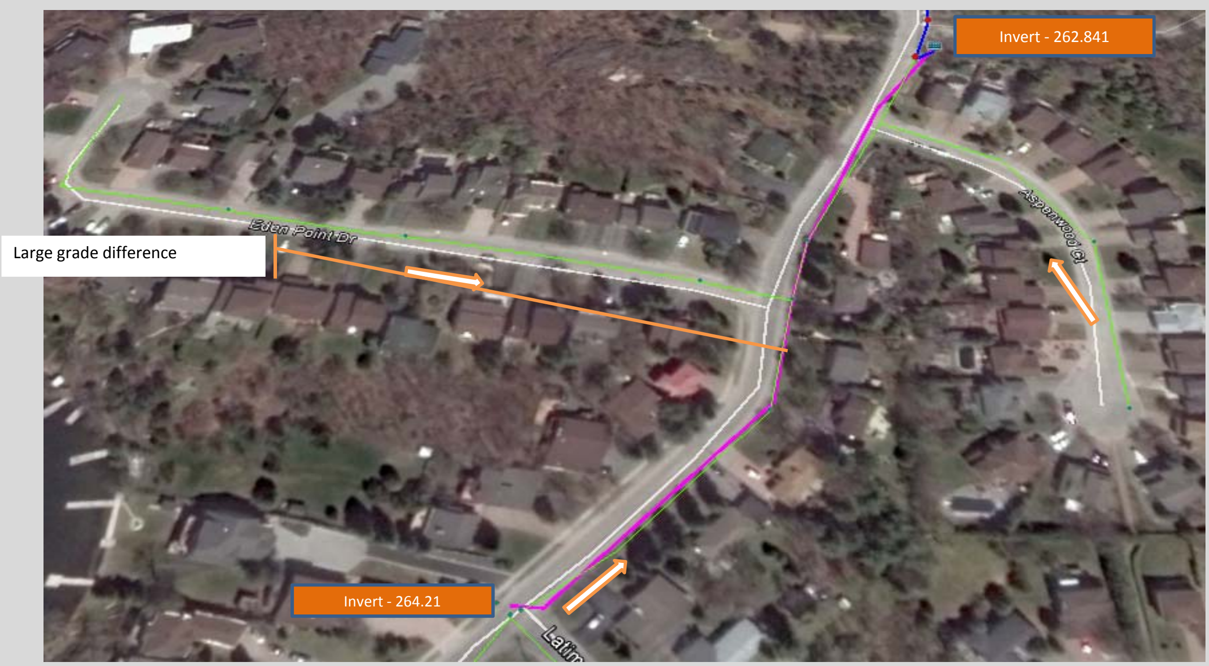

Figure 2 - Manhole location, invert, and forcemain locations surrounding Loach's Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Selkirk Lift Station	Author:	Michelle Albert
Catchement:	Sudbury	Date:	7/1/2016
		Pg No.	1

Overview

Location:	40 Selkirk Avenue	
Construction Date:	1979	Based on ECA
Previous ECA:	3-1107-94-006	
Previous ECA issue date:	August 25, 1994	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	St. Charles LS	

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	10 hp	
Drawdown Test:	521 GPM	Date: December, 2010
Firm, one pump (2010):	32.9 L/s	
2015:	N/A	
ECA:	38.7 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 31.65 L/s

Future Flow Requirements

2041 Flow Requirement:	31.80 L/s	Growth?	NO
Ultimate Flow Requirement:	31.80 L/s		Limited Growth

* Long term growth has been identified in this area.

Feasibility of Consolidation

Lift Station Invert Elevation:	N/A
Loaches Invert Elevation:	N/A

Consolidation is not possible due to topography constraints in the catchment area.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-6.90 L/s	Capacity Required?	NO

Additional Information/Comments

* Additional I&I and drainage improvements are required.
* Landscaping needs to be undertaken to deal with I&I constraints.
* Enforcement team is required to report on I&I concerns.

Recommendations

Pumping Station: Selkirk Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

Figure 1 - Selkirk Lift Station located at 40 Selkirk Avenue

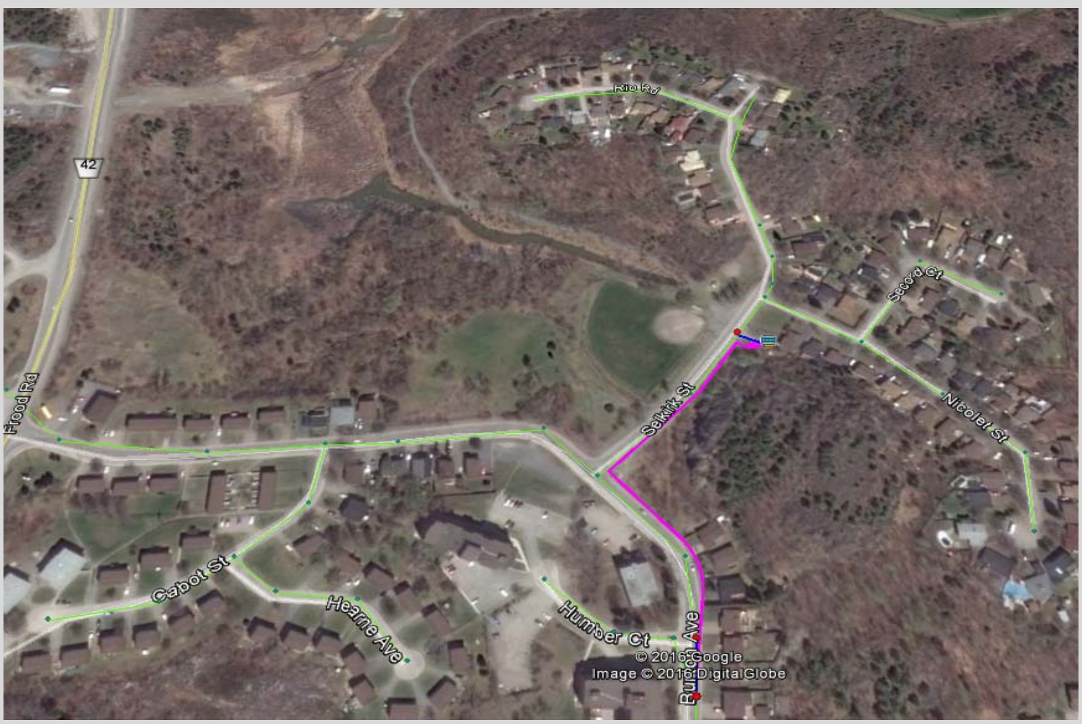

Figure 2 - Area surrounding Selkirk Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Walford East Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	285 Walford Road
Construction Date:	1960
Previous ECA:	3-0507-71-006
Previous ECA issue date:	June 30, 1971
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	Ramsey LS
Pumping to:	South Tunnel

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	50 hp	
Drawdown Test:	3249 GPM	Date: June, 2010
Firm, one pump (2010):	204.98 L/s	
2015:	N/A	
ECA:	127 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 77.985 L/s

Future Flow Requirements

2041 Flow Requirement:	80.18 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	82.24 L/s		Limited Growth

Feasibility of Consolidation or Elimination

Consolidation is possible. A new gravity sewer could be installed from Walford East Lift Station to the South Tunnel

Additional Capacity

Additional capacity required at peak flow: -46.82 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Net Present Value 40 -Year Evaluation

Interest Rate:	4 %
Inflation Rate:	2 %
Capital Cost of New Gravity Sewer:	$4,500,000
Pumping Station 40-year Net Present Value:	$5,730,009

As presented above, the elimination of the exisiting pumping station is the most cost-effective option. The Walford East Lift Station is to be replaced by a Gravity Sewer

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Walford East Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

Figure 1 - Walford East Pumping Station located at 285 Walford Road

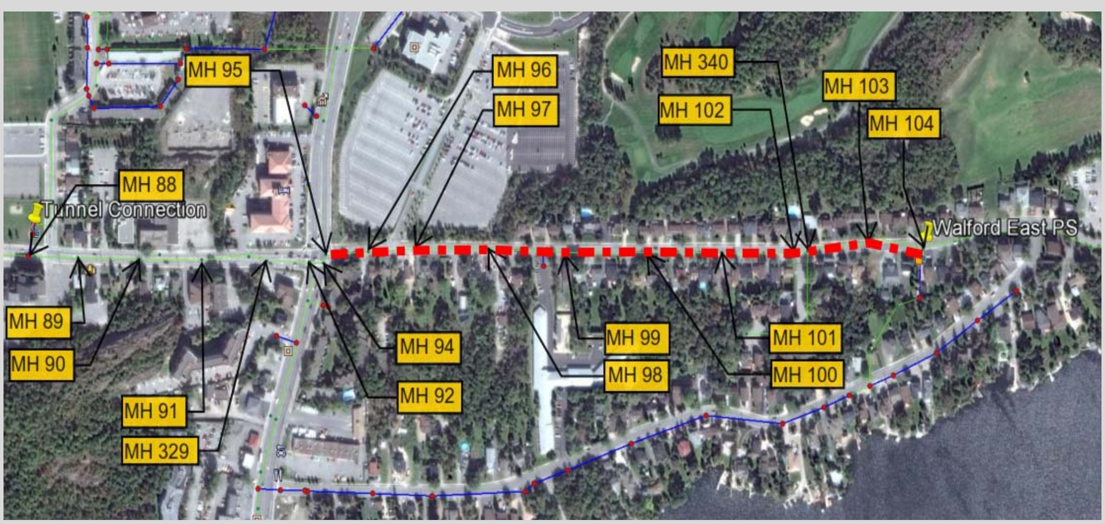

Figure 2 - Manhole locations surrounding Walford East Pumping Station

Project	Sudbury Master Plan
Location	Sudbury
Subject	Elimination of Walford East LS

Interest rate	*4.0%*
Inflation rate	*2.0%*

Existing Costs to Operate the Station

Capital Cost for new Gravity Sewer $ 1,375,000.00

Year		Capital cost	Replacement Cost	Operation Annual Cost	TOTAL	Discount rate	Discounted value
0	2016		300,000 $	$ 30,000	$ 330,000	1.00	$ 330,000
1	2017			$ 30,000	$ 30,000	0.98	$ 29,423
2	2018			$ 30,000	$ 30,000	0.96	$ 28,857
3	2019			$ 30,000	$ 30,000	0.94	$ 28,302
4	2020			$ 30,000	$ 30,000	0.93	$ 27,758
5	2021			$ 30,000	$ 30,000	0.91	$ 27,224
6	2022			$ 30,000	$ 30,000	0.89	$ 26,701
7	2023			$ 30,000	$ 30,000	0.87	$ 26,187
8	2024			$ 30,000	$ 30,000	0.86	$ 25,684
9	2025			$ 30,000	$ 30,000	0.84	$ 25,190
10	2026		300,000 $	$ 30,000	$ 330,000	0.82	$ 271,758
11	2027			$ 30,000	$ 30,000	0.81	$ 24,230
12	2028			$ 30,000	$ 30,000	0.79	$ 23,764
13	2029			$ 30,000	$ 30,000	0.78	$ 23,307
14	2030			$ 30,000	$ 30,000	0.76	$ 22,859
15	2031			$ 30,000	$ 30,000	0.75	$ 22,419
16	2032			$ 30,000	$ 30,000	0.73	$ 21,988
17	2033			$ 30,000	$ 30,000	0.72	$ 21,565
18	2034			$ 30,000	$ 30,000	0.71	$ 21,151
19	2035			$ 30,000	$ 30,000	0.69	$ 20,744
20	2036		300,000 $	$ 30,000	$ 330,000	0.68	$ 223,795
21	2037			$ 30,000	$ 30,000	0.67	$ 19,954
22	2038			$ 30,000	$ 30,000	0.65	$ 19,570
23	2039			$ 30,000	$ 30,000	0.64	$ 19,194
24	2040			$ 30,000	$ 30,000	0.63	$ 18,825
25	2041			$ 30,000	$ 30,000	0.62	$ 18,463
26	2042			$ 30,000	$ 30,000	0.60	$ 18,108
27	2043			$ 30,000	$ 30,000	0.59	$ 17,759
28	2044			$ 30,000	$ 30,000	0.58	$ 17,418
29	2045			$ 30,000	$ 30,000	0.57	$ 17,083
30	2046		300,000 $	$ 30,000	$ 330,000	0.56	$ 184,297
31	2047			$ 30,000	$ 30,000	0.55	$ 16,432
32	2048			$ 30,000	$ 30,000	0.54	$ 16,116
33	2049			$ 30,000	$ 30,000	0.53	$ 15,806
34	2050			$ 30,000	$ 30,000	0.52	$ 15,502
35	2051			$ 30,000	$ 30,000	0.51	$ 15,204
36	2052			$ 30,000	$ 30,000	0.50	$ 14,912
37	2053			$ 30,000	$ 30,000	0.49	$ 14,625
38	2054			$ 30,000	$ 30,000	0.48	$ 14,344
39	2055			$ 30,000	$ 30,000	0.47	$ 14,068
40	2056			$ 30,000	$ 30,000	0.46	$ 13,797
						TOTAL 40 years	$ 1,774,383

Date 1-Dec-16
Provided By: MA

Assumptions

Energy Cost	$5,000
Equipment Operation & Maintenance Cost	$15,000
Building and Structure Cost	$10,000
Total Annual O&M Cost	**$30,000**

Replacement Cost	$2,000,000	
Reinvestment	$300,000	Every 10 years

Capital Cost for new Gravity Sewer

Description	Diameter	Length	Unit rate	Total
Gravity Sewer	500	750	1500	$ 1,125,000.00
Decommissioning the station (re-routing exisiting sewers)				$250,000
Total				$ 1,375,000.00

Pumping Station: Walford East Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

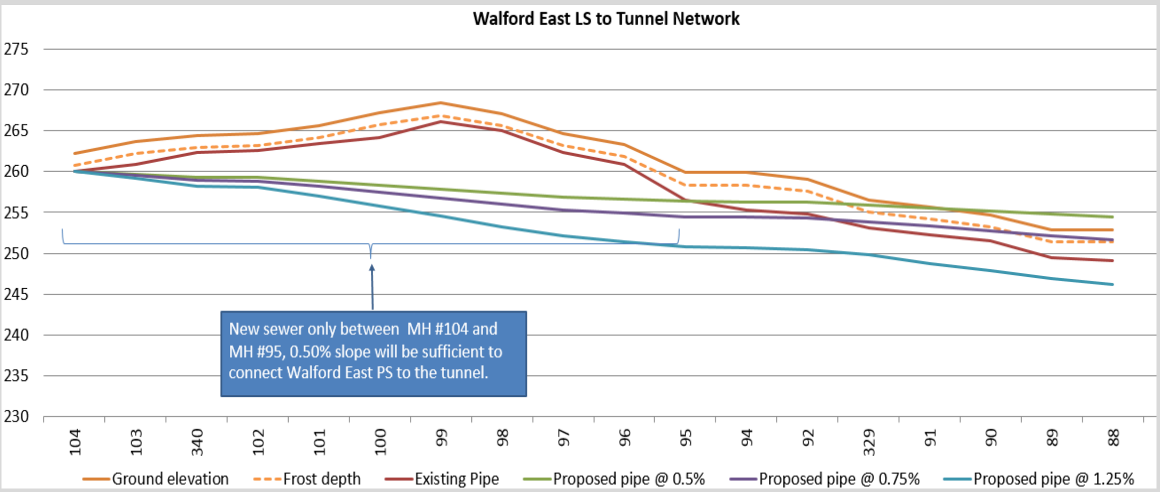

Figure 3 - Walford East Pumping Station Tunnel Network Elevations

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Ramsey Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	975 Ramsey Lake Road	
Construction Date:	1984	Based on ECA
Previous ECA:	3-1076-84-006	
Previous ECA issue date:	November 16, 1984	
Current ECA:	1978-9CXQJL	
Current ECA issue date:	May 27th, 2014	
Flow From:	N/A	
Pumping to:	Walford East LS	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	25 hp	
Drawdown Test:	785 GPM	Date: June, 2010
Firm, one pump (2010):	49.5 L/s	
2015:	N/A	
ECA:	32.2 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	46.43 L/s

Future Flow Requirements

2041 Flow Requirement:	48.63 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	50.63 L/s		Limited Growth

Feasibility of Consolidation

Consolidation is not possible under current conditions.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	16.43 L/s	Capacity Required?	YES

Additional Information/Comments

* The nearby University is currently expanding. An agreement has been made to provide capacity to the University via Ramsey Lift Station.
* Ramsey LS is a critical station
* There are exisiting development-driven system deficiencies.

Problem Statement

Under current conditions, Ramsey Pumping Station has limited capacity to handle wet weather flow events and has been known to flood homes in the area. Additionally, the station is approximately 60 years old and many components of the system have exceeded their recommended service life.

City of Sudbury Master Plan

Lift Station Review

Pumping Station: Ramsey Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)	Wet Weather Flow Retention Tank	New PS
Healthy Watersheds	Would still have concerns with lack of LS capacity	Would free up capacity for future development	Would reduce the potential for spills to the Creek	Would reduce the potential for spills to the Creek	Would ensure sufficient capacity available
Community Well Being	Would still have concerns regarding inadquate capacity to faciliate growth.	Improved Community well being	Improved Community well being	Improved Community well being	Improved Community well being
Cost Effectiveness	Would still be reactive to flooding concerns. Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than the construction of a new LS.	Difficult to expand on the current site	Most costly option	The existing LS is located very close to the road. Moving the station should be investigated.
Constructability and Ease of Integration	Lack of Peak Capacity would still exist. Growth would not be able to proceed	Would require limited construction.	Difficult to expand on the current site	Would have to find a site for a new wet weather flow tank in the area. Would be challenging to use the existing LS with a new wet weather storage tank.	Would have to find a new LS site. This could be challenging.
Operability	Lack of Peak Capacity would still exist	Would improve operability of the Station. However, would still have concerns with aging equipment.	Would still have challenges with operations due to the location of the station.	Would still have challenges with operations due to the reuse of the existing LS	Improved Operations
Sustainability	Lack of Peak Capacity would still exist	Would improve the long term sustainability of the infrastructure	Difficult to expand the existing PS due to its current configuration and location.	There is no space on site for a wet weather detention tank.	New LS would meet all the City's Sustainability requirements.
Preferred Alternative	No	Yes - In the short term the LS catchment should be reviewed to identify I&I reduction possibilities	No	No	Yes - A new PS should be sited and constructed. This will be a Schedule B project.

Initial Actions

* I&I Reduction

Pumping Station: Ramsey Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Ramsey Lift Station located at 975 Ramsey Lake Road

Figure 2 -Area surrounding the Ramsey Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Gar-Con Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	179A Garson-Coniston Road
Construction Date:	1978 Based on ECA
Previous ECA:	3-1105-78-006
Previous ECA issue date:	November 28, 1978
Current ECA:	1978-9CXQJL
Current ECA issue date:	May 27th, 2014
Flow From:	N/A
Pumping to:	O'Neil LS

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	N/A hp
Drawdown Test:	233 GPM Date: March, 2011
Firm, one pump (2010):	14.7 L/s
2015:	N/A
ECA:	24.3 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 18.52 L/s

Future Flow Requirements

2041 Flow Requirement:	18.97 L/s	Growth?	NO
Ultimate Flow Requirement:	18.97 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	275 m
Reference Invert:	259.598 m
Reference Location:	N/A
Reference Distance:	N/A

Consolidation is not possible due to constraints in the catchment system. In order for consolidation to be possible, the catchment system would need to be significantly redesigned.

Additional Capacity

Additional capacity required at peak flow: -5.33 L/s Capacity Required? NO
(2041 Flow Requirement - ECA)

Additional Information/Comments

* Gar-Con station has a history of problems.
* Landscaping needs to be undertaken to deal with I&I constraints.
* Enforcement team is required to report on I&I concerns.

Recommendations

Pumping Station: Gar-Con Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Gar-Con Lift Station

Pumping Station: Gar-Con Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 3

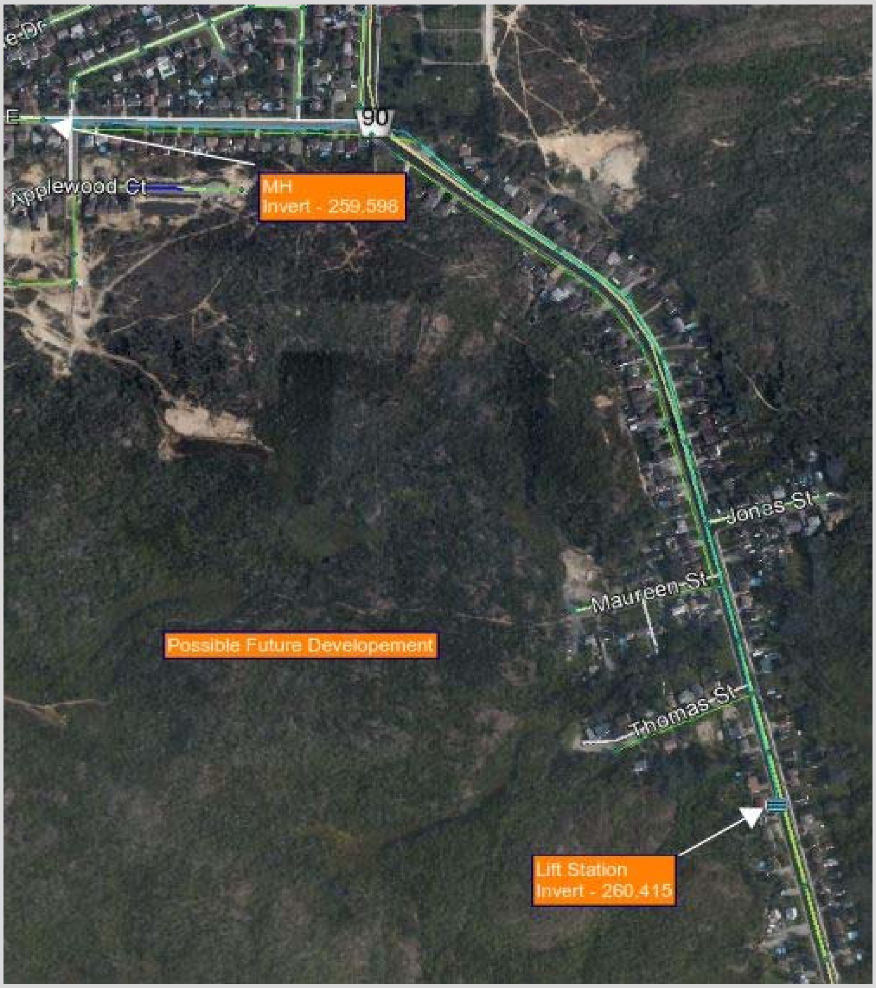

Figure 2 - Manhole location and invert elevations surrounding Gar-Con Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Fleming Lift Station
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	2233 Fleming Street	
Construction Date:	1980	Based on ECA
Current ECA:	3-0470-80-006	
Current ECA issue date:	May 16, 1980	
Flow From:	N/A	
Pumping to:	Helene LS	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	20 hp	
Drawdown Test:	495.76 GPM	Date: 2010
Firm, one pump (2010):	31.28 L/s	
2015:	N/A	
ECA:	25.10 L/s	Valley East Inflow and Infiltration Study, RVA, February 13, 2015

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 6.59 L/s

Future Flow Requirements

2041 Flow Requirement:	6.60 L/s	Growth?	NO
Ultimate Flow Requirement:	6.61 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	292.76 m
Reference Invert:	309.27 m
Reference Location:	MH #7-02
Reference Distance:	699 m

Consolidation is not possible as the lift station invert is significantly lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: -24.68 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

* Overflow event indicates the need for additional capacity.
* The area is completely developed. There is no future residential or ICI development.

Problem Statement

Pumping Station:	Fleming Lift Station	Author:	Michelle Albert
Catchement:	Valley East	Date:	7/1/2016
		Pg No.	2

Figures

Figure 1 - Fleming Lift Station located at 2233 Fleming Street

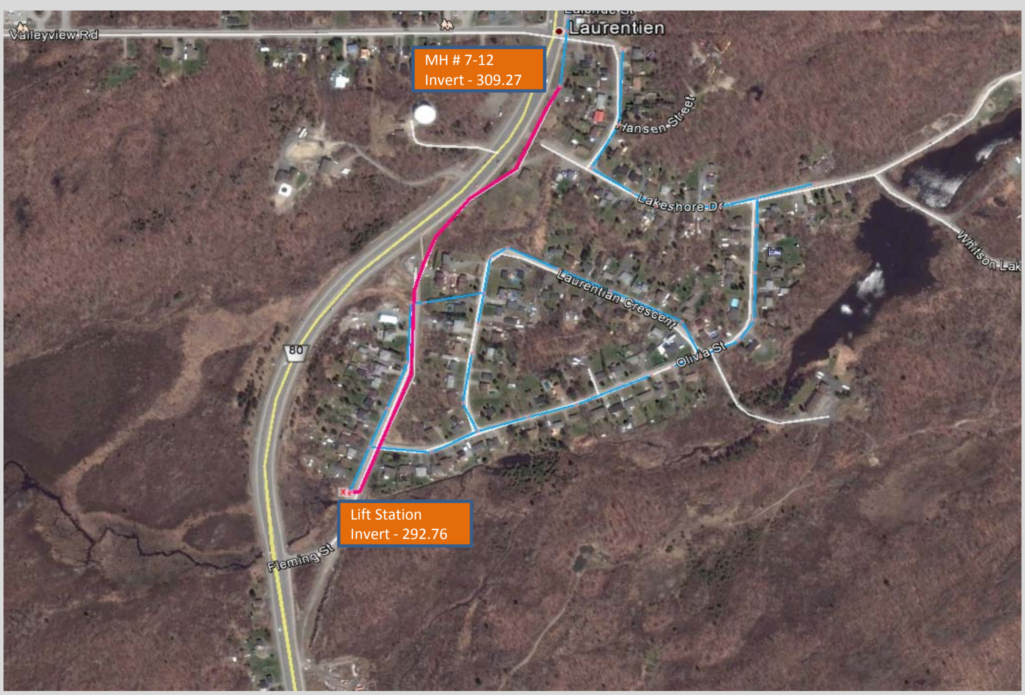

Figure 2 - Manhole location and invert elevations surrounding Fleming Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Helene Lift Station	Author:	Michelle Albert
Catchement:	Valley East	Date:	7/1/2016
		Pg No.	1

Overview

Location:	1706 Helene Street	
Construction Date:	N/A	Based on ECA
Current ECA:	N/A	
Current ECA issue date:	N/A	
Flow From:	Tena LS, Fleming LS	
Pumping to:	Valley East WWTP	

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	12 hp	
Drawdown Test:	757 GPM	Date: June, 2010
Firm, one pump (2010):	47.76 L/s	
2015:	N/A	
ECA:	40.30 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 92.43 L/s

Future Flow Requirements

2041 Flow Requirement:	111.85 L/s	Growth?	YES
Ultimate Flow Requirement:	122.43 L/s		YES

Feasibility of Consolidation

Lift Station Invert Elevation:	284.47 m
Reference Invert:	284.63 m
Reference Location:	MH #2-56
Reference Distance:	876.83 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	64.09 L/s	Capacity Required?	YES

Additional Information/Comments

* The option to bypass Tena and go directly to Helene via gravity sewer should be considered.
* Future residential development may require additional capacity. Further analysis should be completed.
* The Lift Station is not meeting current flow requirements. Additional capacity is required

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Helene Lift Station
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)	Wet Weather Flow Retention Tank	New PS
Healthy Watersheds	Would still have concerns with spills	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding WW spills	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows
Cost Effectiveness	Would still be reactive to flooding concerns. Would be incurring costs in emergency situations	Costs would be incurred to implement I&I reduction measures.	Costs would include the installation of two new high capacity pumps in the same structure.	Most costly option to reduce flooding risk.	The existing LS is close to exceeding its current service life and will require replacement. The new LS would be designed to eliminate any flooding concerns. ~ 5,000,000
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist	Would require limited construction.	The existing site is large and therefore would be able to facilitate construction	Would have to find a site for a new wet weather flow tank in the area. Would be challenging to use the existing PS with a new wet weather storage tank.	Would have to find a new LS site. There is land adjacent to the station which could be acquired.
Operability	Challenges with flooding and lack of Peak Capacity would still exist	Improved Operations	Improved Operations	Would still have challenges with operations due to the reuse of the existing LS	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Peak to Dry Weather flow very high and therefore more I&I reduction measures should be investigated. Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.	There is no space on site for a wet weather detention tank. The lift station is very close to the creek and any construction will be difficult.	Would meet all the City's Sustainability requirements.
Preferred Alternative	No	Yes - In the short term the LS catchment should be reviewed to identify I&I reduction possibilities	Yes	No	No

Initial Actions

Pumping Station: Helene Lift Station
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

Figure 1 - Helene Lift Station located at 1706 Helene Street

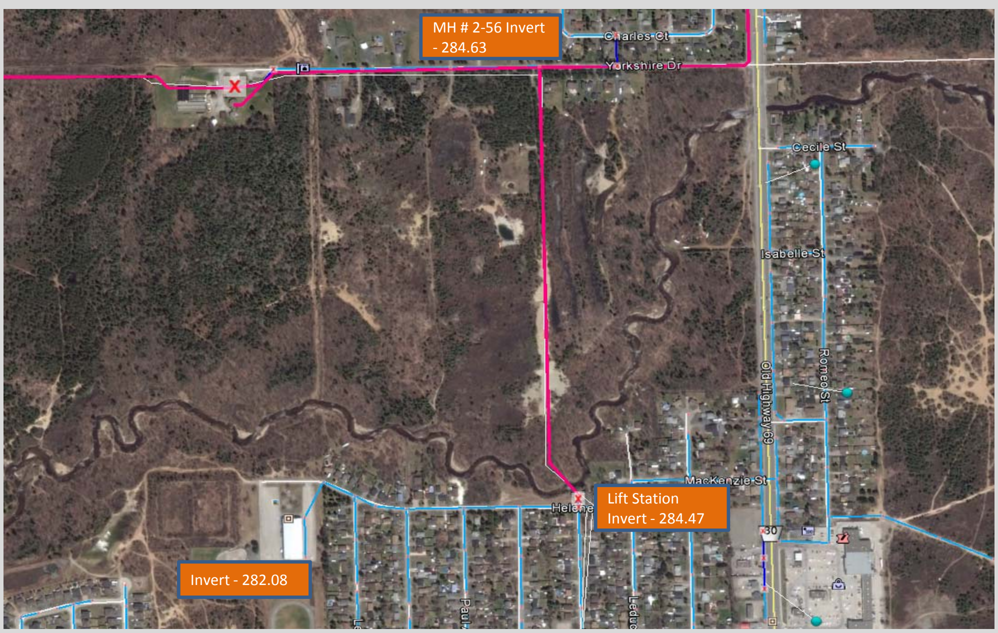

Figure 2 - Manhole location and invert elevations surrounding Helene Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Helene Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 3

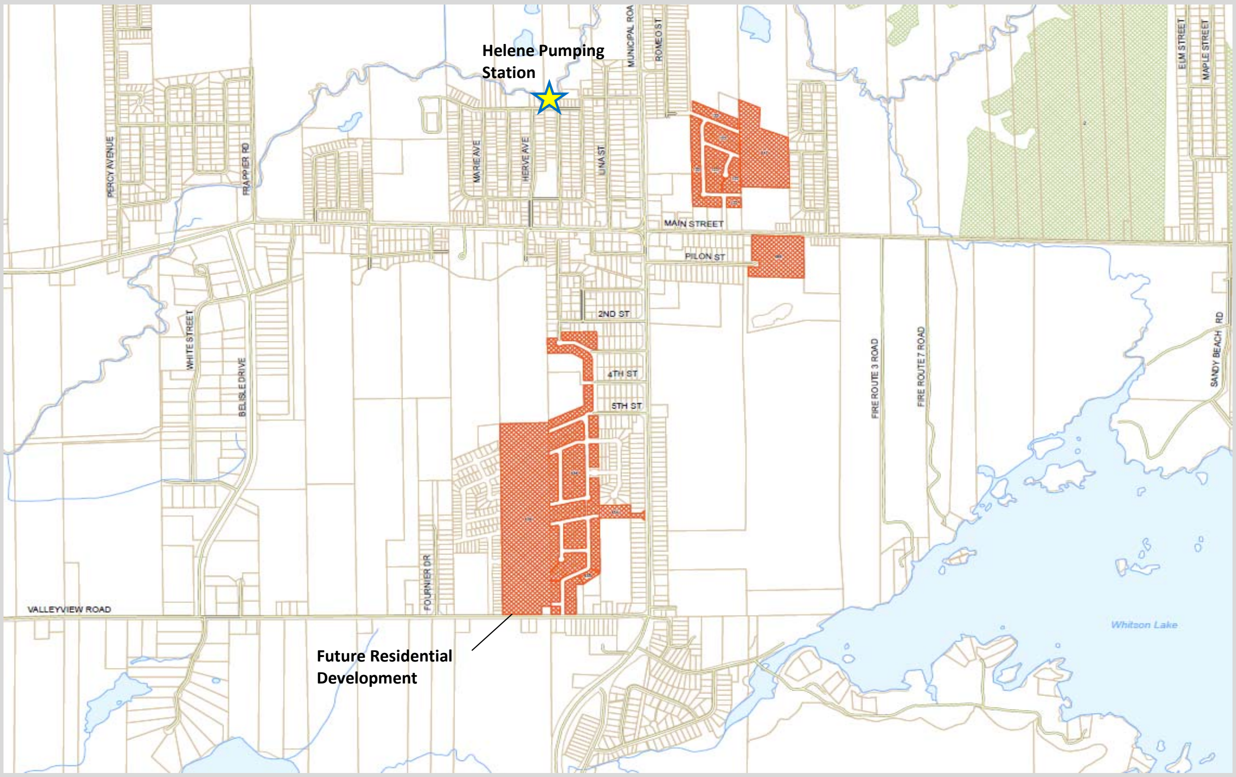

Figure 2 - Future ICI and Residential development surrounding Helene Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Hillsdale Lift Station	Author:	Michelle Albert
Catchement:	Valley East	Date:	7/1/2016
		Pg No.	1

Overview

Location:	3069 Hillsdale Court	
Construction Date:	N/A	Based on ECA
Current ECA:	3-0804-81-006	
Current ECA issue date:	July 29, 1981	
Flow From:	N/A	
Pumping to:	Valley East WWTP	

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	20 hp	
Drawdown Test:	969 GPM	Date: 2010
Firm, one pump (2010):	61.13 L/s	
2015:	N/A	
ECA:	52.20 L/s	Valley East Inflow and Infiltration Study, RVA, February 13, 2015

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	9.08 L/s

Future Flow Requirements

2041 Flow Requirement:	21.10 L/s	Growth?	NO
Ultimate Flow Requirement:	21.09 L/s		YES

Feasibility of Consolidation

Lift Station Invert Elevation:	277.51 m
Reference Invert:	283.07 m
Reference Location:	MH #2-35
Reference Distance:	545.36 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow:	-40.03 L/s	Capacity Required?	N/A

(2041 Flow Requirement - ECA)

Additional Information/Comments

Problem Statement

Pumping Station:	Hillsdale Lift Station	Author:	Michelle Albert
Catchement:	Valley East	Date:	7/1/2016
		Pg No.	2

Figures

Figure 1 - Hillsdale Lift Station located at 3069 Hillsdale Court

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Tena Lift Station
Catchement:	Valley East
Author:	Michelle Albert
Date:	7/1/2016
Pg No.	1

Overview

Location:	2988 Tena Street	
Construction Date:	N/A	Based on ECA
Current ECA:	3-0374-92-007	
Current ECA issue date:	September 1, 1992	
Flow From:	N/A	
Pumping to:	Helene Street LS	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	5 hp	
Drawdown Test:	349 GPM	Date: 2010
Firm, one pump (2010):	22.02 L/s	
2015:	N/A	
ECA:	22.00 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow:	1.75 L/s

Future Flow Requirements

2041 Flow Requirement:	2.00 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	2.05 L/s		Limited Growth

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-20.02 L/s	Capacity Required?	NO

Additional Information/Comments

Problem Statement

Pumping Station: Tena Lift Station
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 -Tena Lift Station located at 1706 Helene Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Madeleine Lift Station	Author:	Michelle Albert
Catchement:	Valley East	Date:	7/1/2016
		Pg No.	1

Overview

Location:	4479 Madeleine Crescent
Construction Date:	1977
Current ECA:	3-0564-77-006
Current ECA issue date:	July 6, 1977
Flow From:	N/A
Pumping to:	Spruce St. LS

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	5 hp	
Drawdown Test:	445 GPM	Date: 2010
Firm, one pump (2010):	28.08 L/s	
2015:	N/A	
ECA:	15.18 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 2.99 L/s

Future Flow Requirements

2041 Flow Requirement:	2.99 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	3.10 L/s		Limited Growth

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-25.08 L/s	Capacity Required?	NO

Additional Information/Comments

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Jeanne D'Arc
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location: 1029 Jeanne D'Arc St.
Construction Date: 1975 Based on ECA
Current ECA: 10039-66-753466
Current ECA issue date: October 1, 1975
Flow From: N/A
Pumping to: MH 11-138

Current Lift Station Firm Capacity

Configuration: Dry Well/Wet Well
Pumps: 2
Power: 12 hp

Drawdown Test: 1122 GPM Date: 2010
Firm, one pump (2010): 70.79 L/s
2015: N/A
ECA: 110.00 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 170.14 L/s

Future Flow Requirements

2041 Flow Requirement: 171.79 L/s Growth? YES
Ultimate Flow Requirement: 179.98 L/s YES

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: 61.79 L/s Capacity Required? YES
(2041 Flow Requirement - ECA)

Additional Information/Comments

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Jeanne D'Arc
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)	Wet Weather Flow Retention Tank	New PS
Healthy Watersheds	Would still have concerns with spills	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding WW spills	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows
Cost Effectiveness	Would still be reactive to flooding concerns. Would be incurring costs in emergency situations	Costs would be incurred to implement I&I reduction measures.	Costs would include the installation of two new high capacity pumps in the same structure.	Most costly option to reduce flooding risk.	The existing LS is close to exceeding its current service life and will require replacement. The new LS would be designed to eliminate any flooding concerns. ~ 5,000,000
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist	Would require limited construction.	The existing site is large would be able to facilitate construction	Would have to find a site for a new wet weather flow tank in the area. Would be challenging to use the existing PS with a new wet weather storage tank.	Would have to find a new LS site. There is land adjacent to the station which could be acquired.
Operability	Challenges with flooding and lack of Peak Capacity would still exist	Improved Operations	Improved Operations	Would still have challenges with operations due to the reuse of the existing LS	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Peak to Dry Weather flow very high and therefore more I&I reduction measures should be investigated. Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.	There is no space on site for a wet weather detention tank. The lift station is very close to the creek and any construction will be difficult.	Would meet all the City's Sustainability requirements.
Preferred Alternative	No	Yes - In the short term the LS catchment should be reviewed to identify I&I reduction possibilities	Yes	No	No

Initial Actions

Pumping Station: Jeanne D'Arc
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 -Jeanne D'Arc Lift Station located at 1029 Jeanne D'Arc St

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: St. Isidore
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location: 89 St. Isidore Street
Construction Date: N/A
Current ECA: N/A
Current ECA issue date: N/A
Flow From: Local neighbourhood
Pumping to: MH 8-19

Current Lift Station Firm Capacity

Configuration: Submersible
Pumps: 2
Power: 5 hp

Drawdown Test: 442 GPM Date: 2010
Firm, one pump (2010): 27.89 L/s
2015: N/A
ECA: N/A L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 18.03 L/s

Future Flow Requirements

2041 Flow Requirement: 18.51 L/s Growth? Limited Growth
Ultimate Flow Requirement: 21.71 L/s Limited Growth

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: -9.86 L/s Capacity Required? NO
(2041 Flow Requirement - ECA)

Additional Information/Comments

Problem Statement

Pumping Station: St. Isidore
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 -St. Isidore Lift Station located at 89 St. Isidore St.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Tupper Lift Station
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location: 271 Tupper Street
Construction Date: 1975
Current ECA: 8-6038-99-007
Current ECA issue date: November 9, 1999
Flow From: Local neighbourhood
Pumping to: Flows to Madeleine

Current Lift Station Firm Capacity

Configuration: Submersible
Pumps: 2
Power: 4.7 hp

Drawdown Test: 149 GPM Date: 2010
Firm, one pump (2010): 9.40 L/s
2015: N/A
ECA: 9.40 L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 0.94 L/s

Future Flow Requirements

2041 Flow Requirement: 2.71 L/s Growth? Limited Growth
Ultimate Flow Requirement: 2.97 L/s Limited Growth

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: -8.46 L/s Capacity Required? NO
(2041 Flow Requirement - ECA)

Additional Information/Comments

Problem Statement

Pumping Station: Tupper Lift Station
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 -Tupper Lift Station located at 271 Tupper Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Spruce Lift Station
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	191 Spruce Street
Construction Date:	1998
Current ECA:	N/A
Current ECA issue date:	N/A
Flow From:	Tupper, Madeleine, St. Isidore
Pumping to:	Valley WWTP

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	30 hp	
Drawdown Test:	862 GPM	Date: 2010
Firm, one pump (2010):	54.38 L/s	
2015:	N/A	
ECA:	74.00 L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 119.26 L/s

Future Flow Requirements

2041 Flow Requirement:	126.15 L/s	Growth?	YES
Ultimate Flow Requirement:	143.97 L/s		YES

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: 45.26 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Additional Information/Comments

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Spruce Lift Station
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)	Wet Weather Flow Retention Tank	New PS
Healthy Watersheds	Would still have concerns with spills	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding WW spills	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows	Reduce the Risk of Overflows
Cost Effectiveness	Would still be reactive to flooding concerns. Would be incurring costs in emergency situations	Costs would be incurred to implement I&I reduction measures.	Costs would include the installation of two new high capacity pumps in the same structure.	Most costly option to reduce flooding risk.	The existing LS is close to exceeding its current service life and will require replacement. The new LS would be designed to eliminate any flooding concerns.
Constructability and Ease of Integration	Challenges with flooding and lack of Peak Capacity would still exist	Would require limited construction.	The existing site would be able to facilitate construction	Would have to find a site for a new wet weather flow tank in the area. Would be challenging to use the existing PS with a new wet weather storage tank.	There is land adjacent to the station which could be used for a new station.
Operability	Challenges with flooding and lack of Peak Capacity would still exist	Improved Operations	Improved Operations	Would still have challenges with operations due to the reuse of the existing LS	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Peak to Dry Weather flow very high and therefore more I&I reduction measures should be investigated. Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.	The option would include the construction of a large tank.	Would meet all the City's Sustainability requirements.
Preferred Alternative	No	Yes - In the short term the LS catchment should be reviewed to identify I&I reduction possibilities	Yes	No	No

Initial Actions

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Spruce Lift Station
Catchement: Valley East

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 -Spruce Street Lift Station located at 191 Spruce Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Lloyd Lift Station
Catchement: Capreol

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	1A Lloyd Street	
Construction Date:	1976	Based on ECA
Current ECA:	3-0200-76-006	
Current ECA issue date:	July 16, 2976	
Flow From:	N/A	
Pumping to:	Vermillion Lift Station	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	10 hp	
Drawdown Test:	181 GPM	Date: 2010
Firm, one pump (2010):	11.42 L/s	
2015:	N/A	
ECA:	N/A L/s	

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 6.23 L/s

Future Flow Requirements

2041 Flow Requirement:	6.32 L/s	Growth?	NO
Ultimate Flow Requirement:	6.32 L/s		Limited Growth

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow:	5.19 L/s	Capacity Required?	NO
(2041 Flow Requirement - ECA)			

Additional Information/Comments

Problem Statement

Pumping Station: Lloyd Lift Station
Catchement: Capreol

Author: Michelle Albert
Date: 7/1/2016

Figures

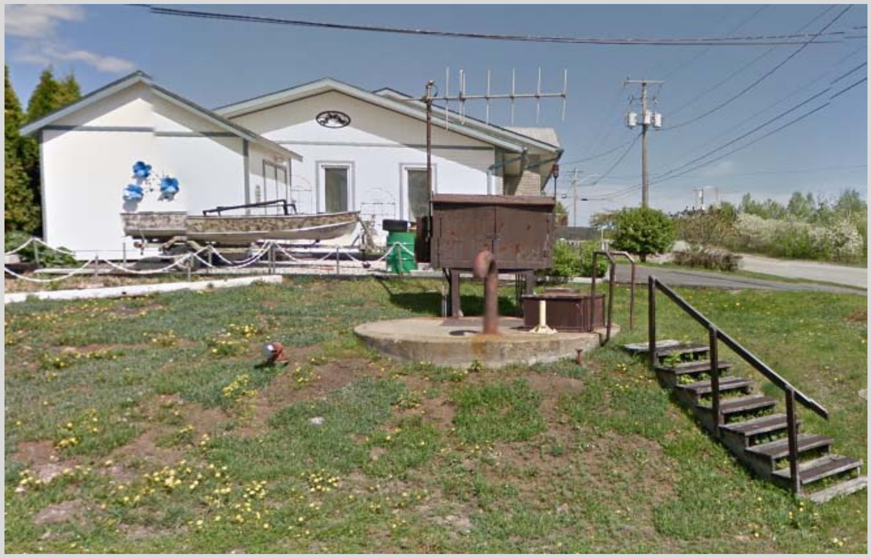

Figure 1 - Lloyd Lift Station located at 1A Lloyd Street

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Vermilion Lift Station
Catchement: Capreol

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	99 Lakeshore Street
Construction Date:	1976 (Based on ECA)
Current ECA:	3-0376-92-007
Current ECA issue date:	September 1, 1992
Flow From:	Lloyd Lift Station
Pumping to:	Capreol Lagoons

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well
Pumps:	2
Power:	30 hp
Drawdown Test:	1584 GPM (Date: 2010)
Firm, one pump (2010):	99.93 L/s
2015:	N/A
ECA:	N/A L/s

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 75.84 L/s

Future Flow Requirements

2041 Flow Requirement:	78.09 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	81.32 L/s		YES

Feasibility of Consolidation

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: 24.09 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Riverside LS
Catchment: Wahnapitae

Author: Jinbo Yang
Date: 1/13/2017

Pg No. 1

Overview

Location:	60 Riverside Drive
Construction Date:	1979
Previous ECA:	3-0545-79-006
Previous ECA issue date:	Sept 19, 1979
Current ECA:	3-1509-79-806
Current ECA issue date:	March 25, 1980
Flow From:	Residential Area
Pumping to:	Wahnapitae Lagoons

Current Lift Station Firm Capacity

Configuration:	Submersible
Pumps:	2
Power:	35 hp
Drawdown Test:	830 GPM
Firm, two pump (2014):	52.4 L/s
2015:	N/A
ECA:	52.4 L/s

Current Theoretical Peak Flow to Lift Station

Existing Peak Flow: 141.7 L/s

Future Flow Requirements

2041 Flow Requirement:	141.9	L/s	Growth?	NO
Ultimate Flow Requiremer	141.9	L/s		Limited Growth

Feasibility of Consolidation or Elimination

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations

Additional Capacity

Additional capacity required at peak flow: 89.54 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Additional Information/Comments

There is a significant difference between the projected flow to the LS and the LS capacity

Problem Statement

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Riverside LS
Catchement: Wahnapitae

Author: Michelle Albert
Date: 7/1/2016

Pg No. 4

Evaluation Matrix

	Do Nothing	I&I Reduction	PS Expansion (up sizing the pumps)
Healthy Watersheds	Would still have concerns with lack of Capacity at the LS	Would reduce the potential for spills	Would reduce the potential for spills
Community Well Being	Would still have concerns regarding lack of capacity at the LS	Reduce the Risk of Flooding	Reduce the Risk of Flooding
Cost Effectiveness	Would be incurring costs in emergency situations	Costs would be incurred to implement I&I Reduction measures. These costs would be less than upgrading the LS.	This option would only include the installation of two new high capacity pumps in the same structure.
Constructability and Ease of Integration	Challenges with the potential for basement surcharges and lack of Peak Capacity would still exist	Would require limited construction.	The existing site is large and therefore would be able to facilitate construction
Operability	Lack of peak capacity would still existing	Would improve operability of the Station. Operations staff have not raised concerns regarding the condition of the station. There is new piping in the station.	Improved Operations
Sustainability	Challenges with flooding and lack of Peak Capacity would still exist	Reducing the amount of flow that would be pumped from the station, therefore reducing energy costs	This option would only include the installation of two new high capacity pumps and therefore energy efficiency would remain a concern.
Preferred Alternative	No	Yes - I&I reduction in the catchment would be beneficial and could delay the upgrades required to the station.	Yes - the installation of new pumps would limit the potential for surcharges / overflows.

Initial Actions

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Riverside LS	Author:	Jinbo Yang
Catchment:	Wahnapitae	Date:	1/13/2017
		Pg No.	

Figures

Figure 1 - Riverside Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station:	Anderson Lift Station	Author:	Michelle Albert
Catchement:	Lively	Date:	7/1/2016
		Pg No.	1

Overview

Location:	247 Anderson Drive	
Construction Date:	1974	Based on ECA
Current ECA:	3-1537-75-766	
Current ECA issue date:	January 27, 1976	
Flow From:	N/A	
Pumping to:	Lively WWTP	

Current Lift Station Firm Capacity

Configuration:	Dry Well/Wet Well	
Pumps:	2	
Power:	30 hp	
Drawdown Test:	2954.12 GPM	Date: August, 2010
Firm, one pump (2010):	186.38 L/s	Date: August, 2010
2015:	N/A	
ECA:	97.80 L/s	This is based on the Lively / Walden ESR Page 12, 2013

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 173.20 L/s

Future Flow Requirements

2041 Flow Requirement:	174.06 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	177.88 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	259 m
Reference Invert:	263.787 m
Reference Location:	MH #2-81
Reference Distance:	22.73 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-12.32 L/s	Capacity Required?	NO

Additional Information/Comments

* The existing lift station is very old
* The Lift Station is planned to be taken offline in the year 2019

Problem Statement

Anderson Lift Station will be decomissioned. Flow will be directed by gravity to the Walden system

Pumping Station: Anderson Lift Station
Catchement: Lively

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Anderson Lift Station located at 247 Anderson Drive

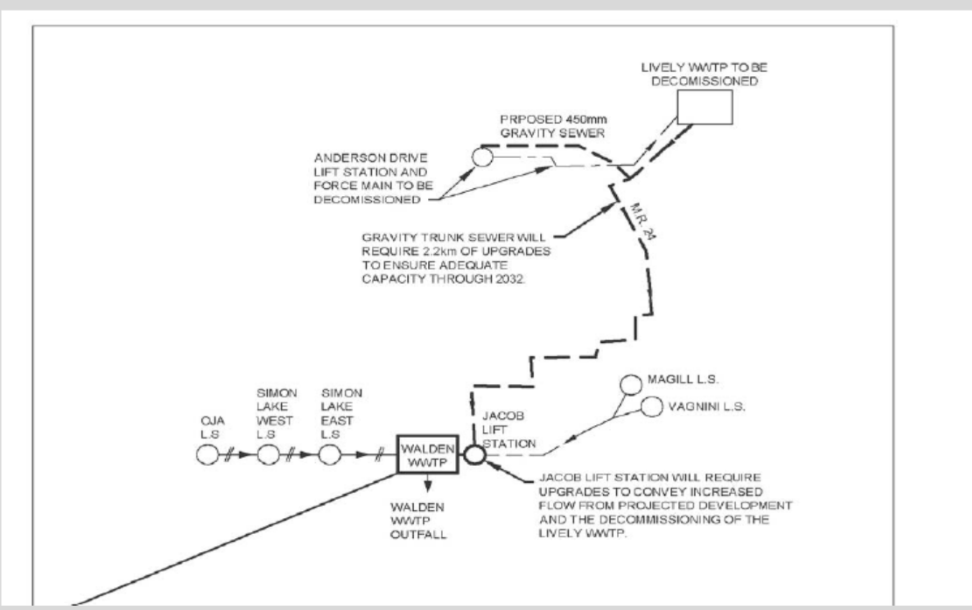

Figure 2 - New Sewer System Configuration From the Lively / Walden ESR (JL Richards, 2013)

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Oja Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	35 Oja Street	
Construction Date:	1986	Based on ECA
Current ECA:	3-1587-86-006	
Current ECA issue date:	October 21, 1986	
Flow From:	N/A	
Pumping to:	Simon Lake West LS	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	20 hp	
Drawdown Test:	244 GPM	Date: 2010
Firm, one pump (2010):	15.39 L/s	Date: 2010
ECA:	15.39 L/s	Utilized the draw down test values as the there is no flow value in the ECA

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 5.26 L/s

Future Flow Requirements

2041 Flow Requirement:	6.12 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	6.47 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	229.69 m
Reference Invert:	235.629 m
Reference Location:	MH #7-11
Reference Distance:	80 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: -9.27 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

* Residential expansion in the area may require additional future capacity

Problem Statement

Pumping Station: Oja Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Pg No. #REF!

Figures

Figure 1 - Oja Lift Station located at 35 Oja Street

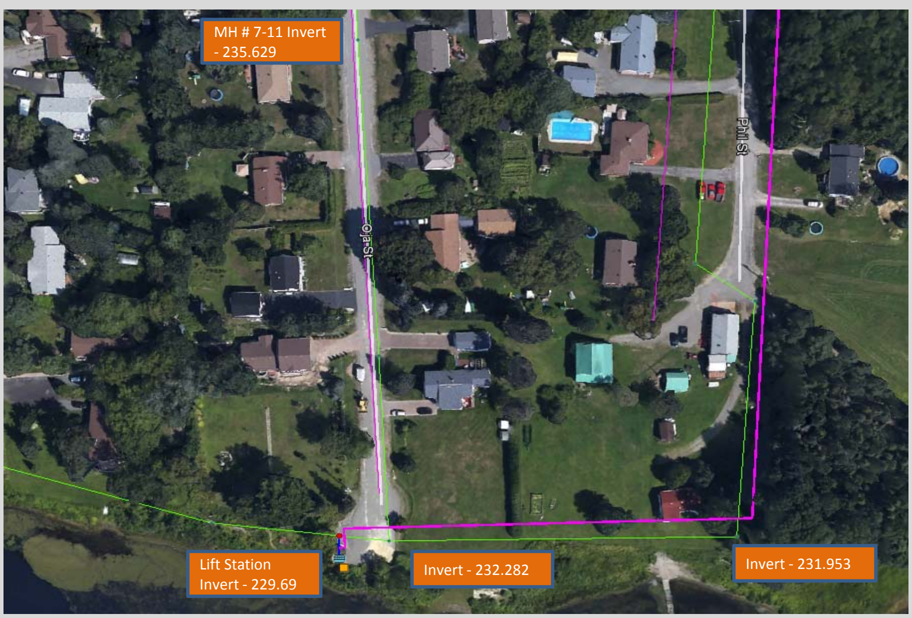

Figure 2 - Manhole location and invert elevations surrounding Oja Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Simon Lake West Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	261 Simon Lake Drive
Construction Date:	N/A — Based on ECA
Current ECA:	N/A
Current ECA issue date:	N/A
Flow From:	Oja LS
Pumping to:	Simon Lake East LS

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	20 hp	
Drawdown Test:	600 GPM	Date: November, 2010
Firm, one pump (2010):	37.85 L/s	
ECA:	37.85 L/s	Utilized the draw down test values as the there is no flow value in the ECA

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 13.52 L/s

Future Flow Requirements

2041 Flow Requirement:	14.52 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	14.87 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	234.98 m
Reference Invert:	237.671 m
Reference Location:	MH #8-52
Reference Distance:	242.12 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: -23.33 L/s
(2041 Flow Requirement - ECA)

Capacity Required? NO

Additional Information/Comments

Problem Statement

Simon Lake West Lift Station has sufficient capacity to meet the current flow requirements.

Pumping Station: Simon Lake West Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

Figure 1 - Simon Lake West Pumping Station located at 261 Simon Lake Drive

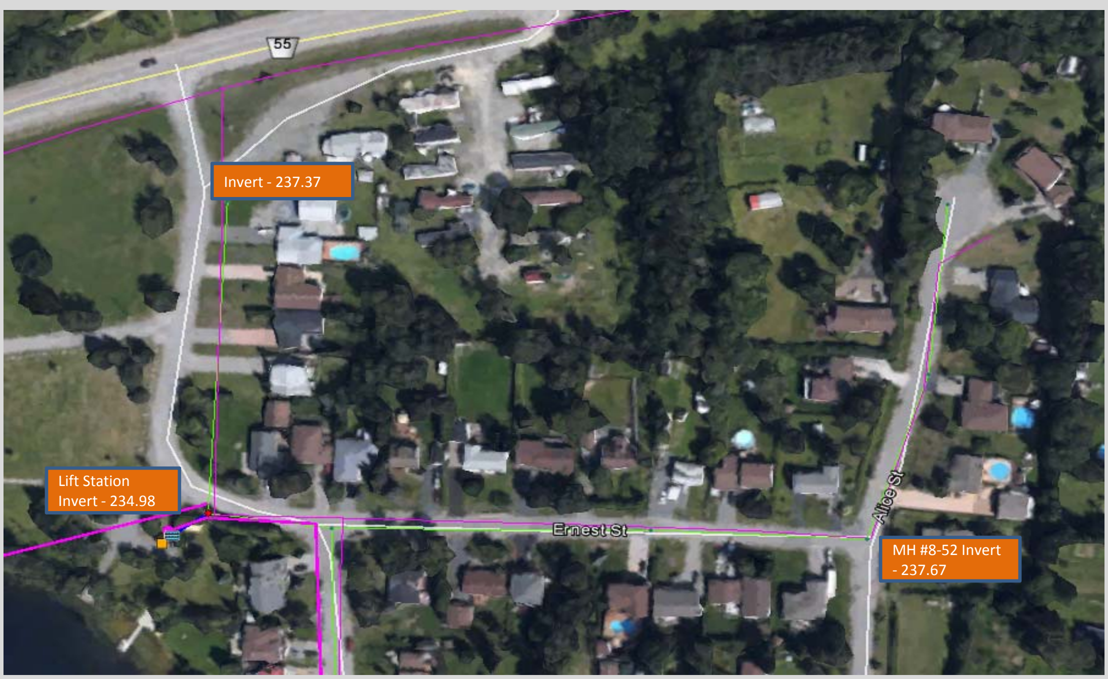

Figure 2 - Manhole location and invert elevations surrounding Simon Lake West Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Simon Lake East Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	35 Simon Lake Drive	
Construction Date:	1984	Based on ECA
Current ECA:	3-1007-84-006	
Current ECA issue date:	October 3, 1984	
Flow From:	Simon Lake West LS	
Pumping to:	Walden WWTP	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	15 hp	
Drawdown Test:	652 GPM	Date: 2010
Firm, one pump (2010):	41.13 L/s	Date: 2010
ECA:	39.40 L/s	This is based on the Lively / Walden ESR Page 12, 2013

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 34.07 L/s

Future Flow Requirements

2041 Flow Requirement:	35.93 L/s	Growth?	Limited Growth
Ultimate Flow Requirement:	36.27 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	232.14 m
Reference Invert:	233.84 m
Reference Location:	MH #8-13
Reference Distance:	220 m

Consolidation is not possible as the lift station invert is lower than the surrounding invert elevations.

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-5.21 L/s	Capacity Required?	NO

Additional Information/Comments

* The option of going directly to the WWTP was considered. The required forcemain length would be costly.

Problem Statement

Pumping Station: Simon Lake East Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Pg No. 2

Figures

Figure 1 - Simon Lake East Lift Station located at 35 Simon Lake Drive

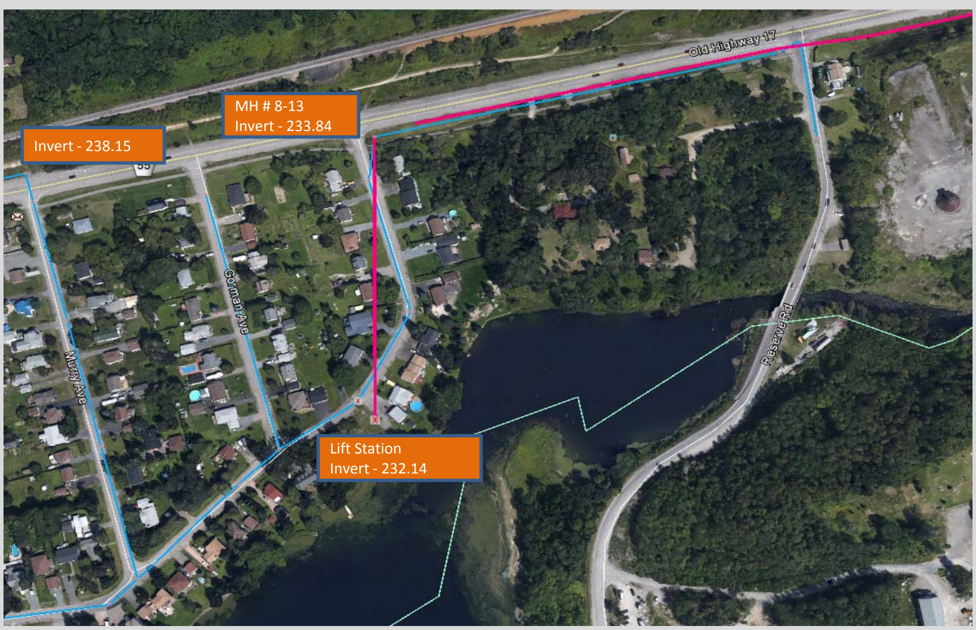

Figure 2 - Manhole location and invert elevations surrounding Simon Lake East Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Magill Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	95 Magill Street	
Construction Date:	1976	Based on ECA
Current ECA:	3-0459-76-006	
Current ECA issue date:	June 16, 1976	
Flow From:	N/A	
Pumping to:	Jacob LS	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	5 hp	
Drawdown Test:	319 GPM	Date: August 2010
Firm, one pump (2010):	20.13 L/s	
ECA:	20.10 L/s	This is based on the Lively / Walden ESR Page 12, 2013

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 0.40 L/s

Future Flow Requirements

2041 Flow Requirement:	2.66 L/s	Growth?	NO
Ultimate Flow Requirement:	2.66 L/s		Limited Growth

Feasibility of Consolidation

Lift Station Invert Elevation:	258.29 m
Reference Invert:	255.82 m
Reference Location:	MH #3-43
Reference Distance:	363.82 m

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-17.47 L/s	Capacity Required?	NO

Additional Information/Comments

Problem Statement

ICI growth has been identified in the area doesn't require additional PS capacity.

Pumping Station: Magill Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Magill Lift Station located at 95 Magill Street

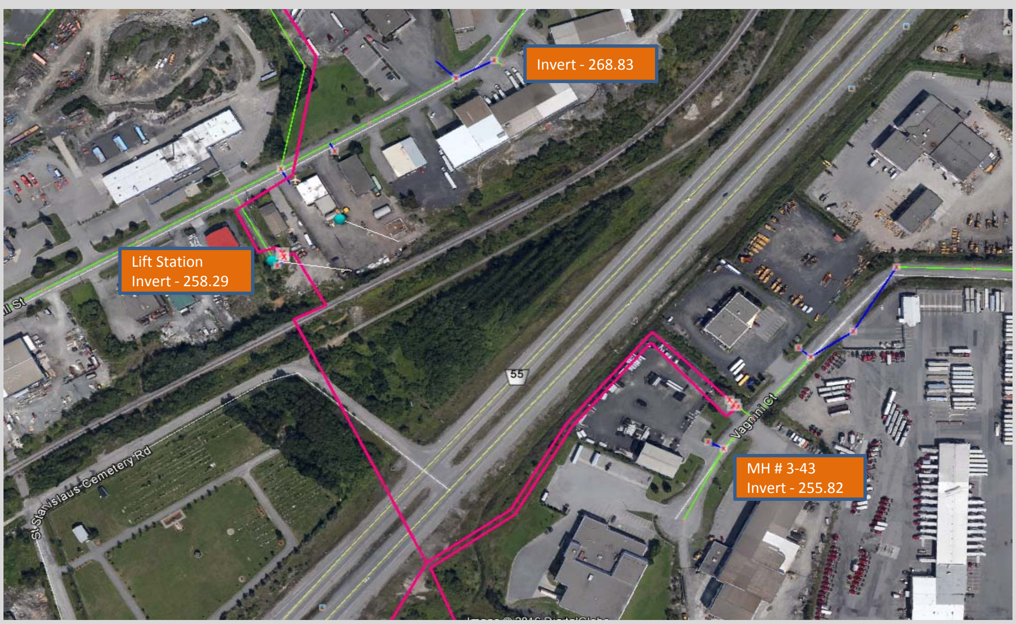

Figure 2 - Manhole location, invert, and proposed development locations surrounding Magill Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Magill Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 3

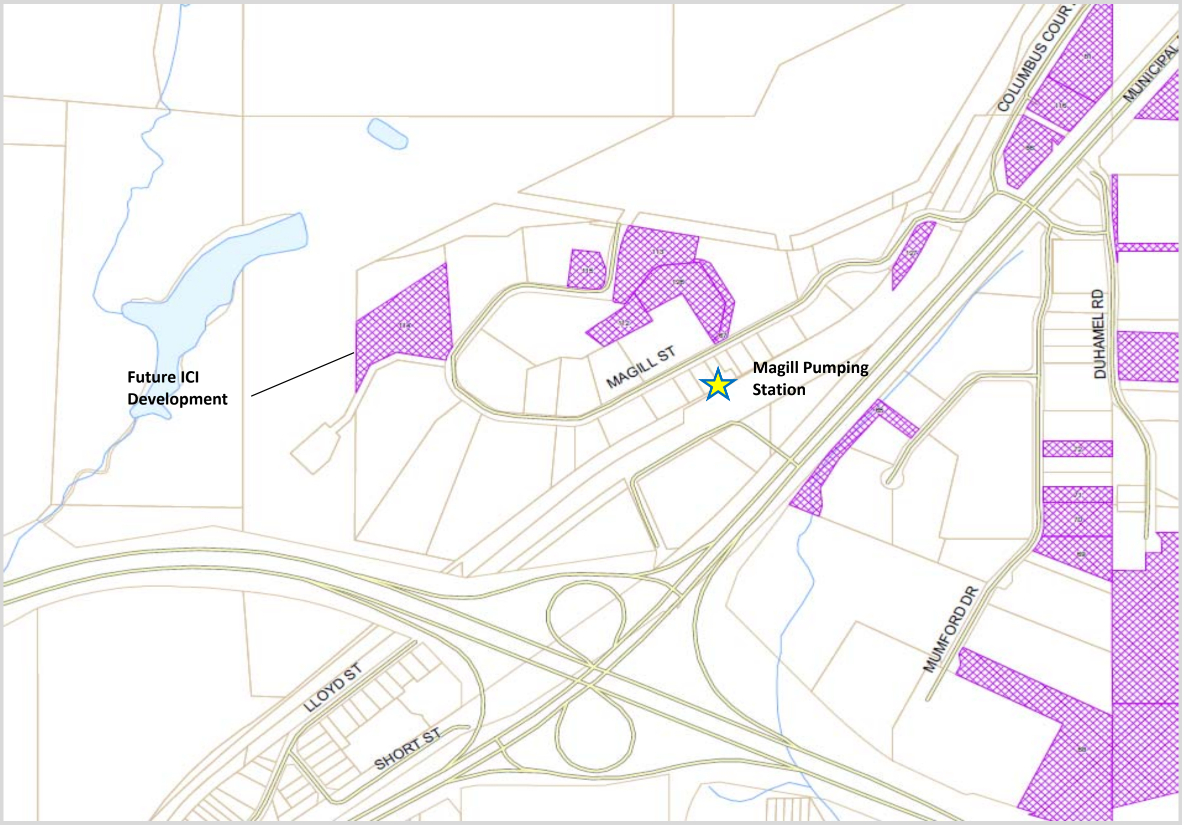

Figure 2 - Future ICI development surrounding Magill Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Vagnini Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	36 Vagnini Court	
Construction Date:	1977	Based on ECA
Current ECA:	3-0261-77-006	
Current ECA issue date:	June 13, 1977	
Flow From:	N/A	
Pumping to:	Jacob LS	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	2	
Power:	20 hp	
Drawdown Test:	515.92 GPM	Date: November, 2010
Firm, one pump (2010):	32.55 L/s	
ECA:	32.50 L/s	This is based on the Lively / Walden ESR Page 12, 2013

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 2.44 L/s

Future Flow Requirements

2041 Flow Requirement:	10.26 L/s	Growth?	NO
Ultimate Flow Requirement:	10.26 L/s		YES

Feasibility of Consolidation

Lift Station Invert Elevation:	254.46 m
Reference Invert:	256.11 m
Reference Location:	MH #3-42
Reference Distance:	119.64 m

Additional Capacity

Additional capacity required at peak flow: (2041 Flow Requirement - ECA)	-22.29 L/s	Capacity Required?	NO

Additional Information/Comments

Problem Statement

ICI growth has been identified in the area doesn't require additional PS capacity.

Pumping Station: Vagnini Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Vagnini Lift Station located at 36 Vagnini Court

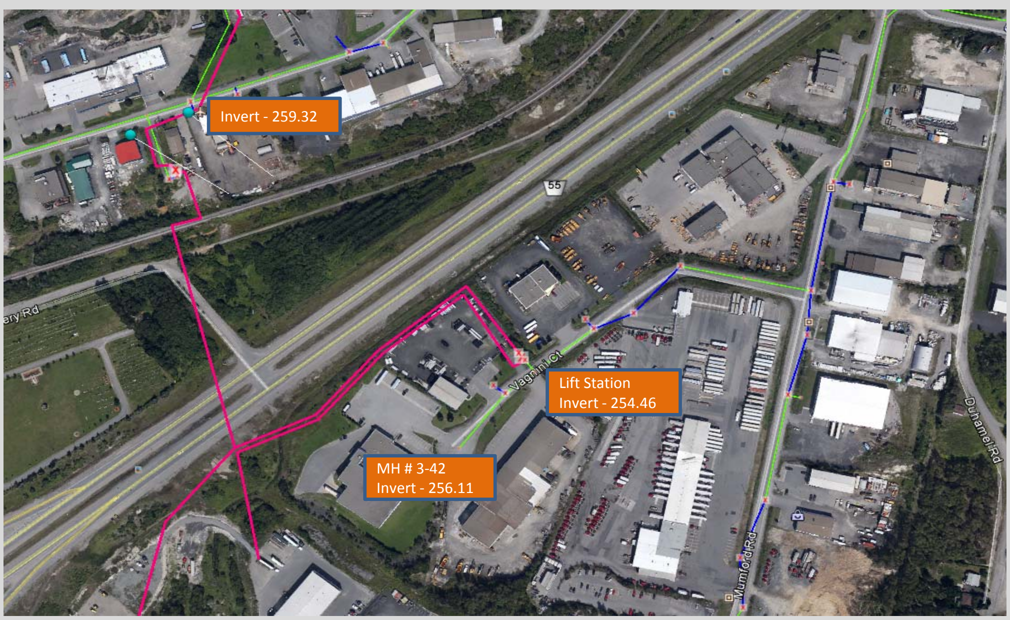

Figure 2 - Manhole location, invert, and proposed development locations surrounding Vagnini Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Vagnini Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

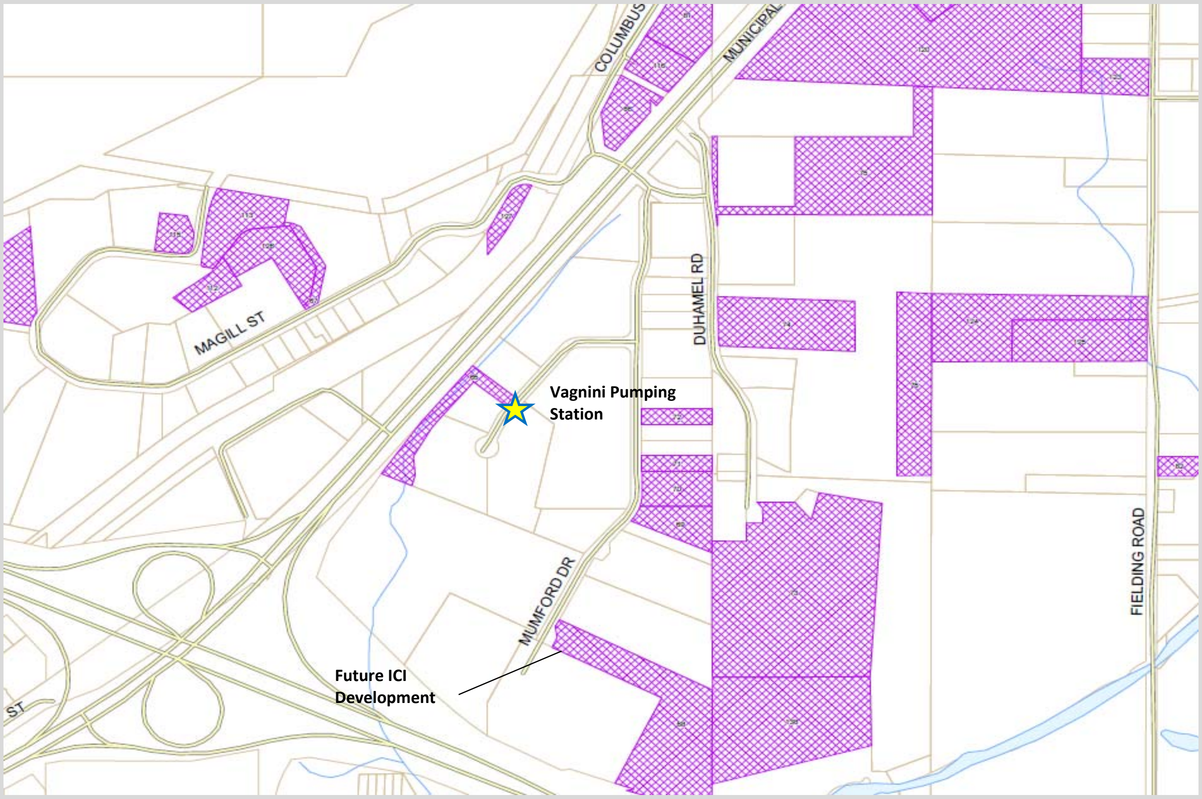

Figure 2 - Future ICI development surrounding Vagnini Lift Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Jacob Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Pg No. 1

Overview

Location:	50 Joseph Avenue	
Construction Date:	1980	Based on ECA
Current ECA:	3-0373-92-007	
Current ECA issue date:	August 28, 1992	
Flow From:	Vagnini LS, Magill LS	
Pumping to:	Walden WWTP	

Current Lift Station Firm Capacity

Configuration:	Submersible	
Pumps:	3	
Power:	30 hp	
Drawdown Test (PUMP#3):	N/A GPM	Date: August 2010
Firm, one pump (2010):	N/A L/s	
ECA:	138.90 L/s	This is based on the Lively / Walden ESR Page 12, 2013

Current Theoretial Peak Flow to Lift Station

Existing Peak Flow: 622.49 L/s

Future Flow Requirements

2041 Flow Requirement:	638.91 L/s	Growth?	YES
Ultimate Flow Requirement:	651.08 L/s		YES

Feasibility of Consolidation

Lift Station Invert Elevation:	236.92 m
Reference Invert:	243.17 m
Reference Location:	MH #6-77
Reference Distance:	124.79 m

Conoslidation is not possible under current conditions

Additional Capacity

Additional capacity required at peak flow: 500.01 L/s
(2041 Flow Requirement - ECA)

Capacity Required? YES

Additional Information/Comments

* The Lift Station is not meeting current flow requirements. Additional capacity is required
* The option of going directly to the WWTP was considered. The required length of gravity sewer would be costly

Problem Statement

Consolidation is not possible under existing conditions. Existing flow conditions are not being met and future ICI and residential development will require additional capacity. Based on the Lively / Walden Environmental Servicing Report (J.L. Richards 2013) the Anderson LS is recommended to be decommissioned.

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Jacob Lift Station
Catchement: Walden

Author: Michelle Albert
Date: 7/1/2016

Figures

Figure 1 - Jacob Lift Station located at 50 Joseph Avenue

Figure 2 - Manhole location, invert, and proposed development locations surrounding Jacob Pumping Station

City of Sudbury Master Plan

Pumping Station Review

Pumping Station: Jacob Lift Station
Catchement: Sudbury

Author: Michelle Albert
Date: 7/1/2016

Pg No. 3

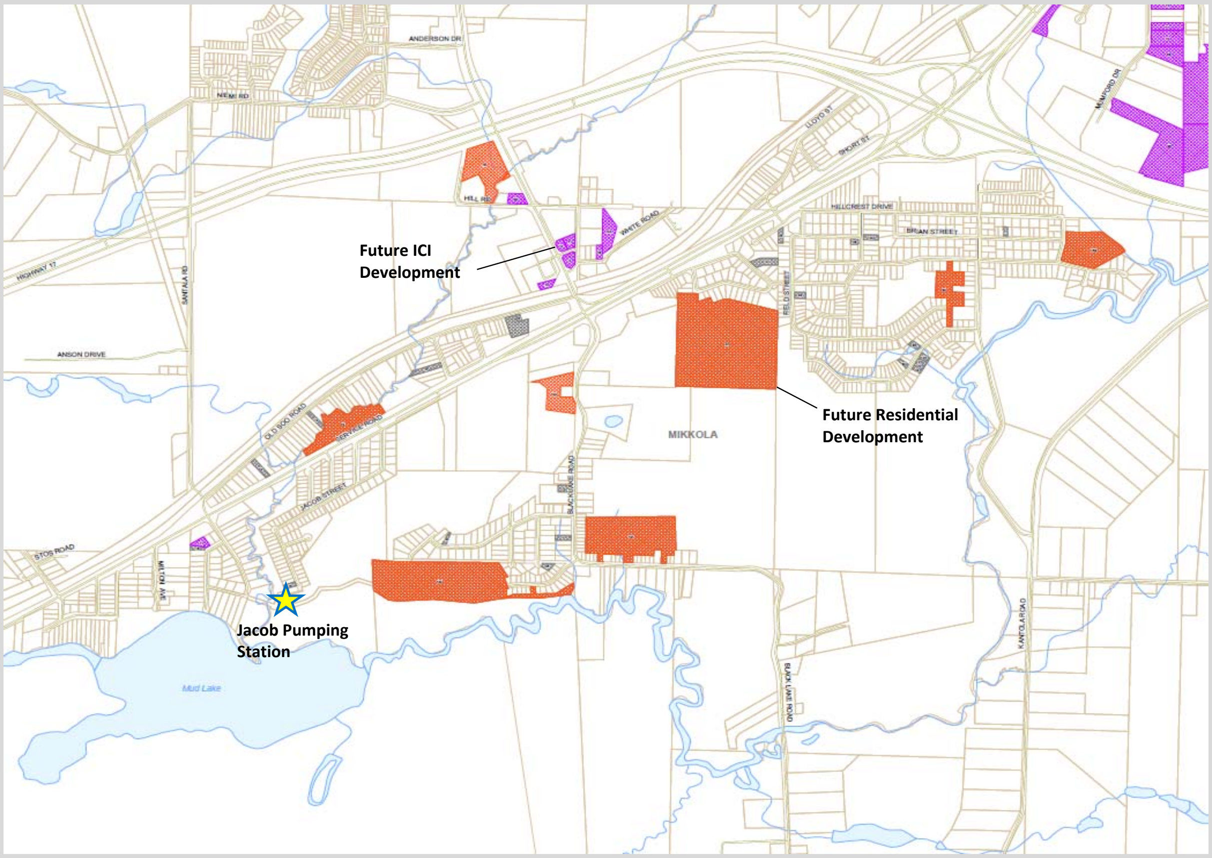

Figure 2 - Future ICI and Residential development surrounding Jacob Lift Station

City of Sudbury Master Plan

Lift Station Review

Evaluation Flowchart

The following flow chart was used in order to evaluate the pumping requirements and feasibility of consolidation for all lift stations in Greater Sudbury