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# Wastewater Treatment Plant Upgrade Plan

## City of Thompson Departmental Water Utility Implementation Phase

Prepared for  
**City of Thompson**

November 2009

**Project No. 395876**

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November 9, 2009

Mr. Randy Patrick  
City Manager  
226 Mystery Lake Rd.  
Thompson, MB R8N 1S6

Subject: City of Thompson, Technical Memorandum on the Wastewater Treatment Plant Implementation Plan

Dear Randy:

Please find attached a Technical Memorandum providing the background and considerations leading to our recommendation for the City of Thompson's Wastewater Treatment Plant Implementation Plan.

We have based our assessment on previous works we have completed under the Water Utility Study, which was completed on and reported on in our final report of November 2008. We are of the opinion that the water metering program, inflow and infiltration studies and program planning should proceed immediately as priority projects, and be carried out prior to and in support of commencing the wastewater treatment plant project.

We believe this submission provides the answers to project specific questions included in Manitoba Conservation's letter of October 9, 2009.

Please advise if we can be of further assistance.

Sincerely,

A handwritten signature in cursive script that reads "Ed Sharp".

Ed Sharp, P.Eng  
Project Manager



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## Summary

The City of Thompson requested CH2M HILL to prepare a short-term plan for their wastewater treatment plant upgrading project. The request was in response to an October 9, 2009 letter from Manitoba Conservation for a plan to be submitted for approval by November 15, 2009.

Environment Act Licence No. 2589 was issued on February 4, 2003 for the City's mechanical wastewater treatment plant. It included a clause requiring the City to prepare and submit an Environment Act Proposal (EAP) for upgrading of the plant from a primary to a secondary level of treatment, along with the addition of effluent disinfection. An engineering study was undertaken in 2005 to review the upgrading requirements and establish supporting information for the EAP, and the deadline for the EAP was extended to April 30, 2005. The EAP was never submitted and a subsequent extension was never requested, resulting in the City of Thompson being out of compliance under the Act.

The November 15, 2009 submission is to address the noncompliance and outline a five year plan to bring the mechanical plant up to current standards.

City of Thompson has been proactive in developing long-range plans for its entire water and wastewater services and will be responding positively to the request. The City has completed a water utility study that has investigated not only the wastewater treatment upgrading requirements, but the entire water and wastewater capital program. The City has made the decision to proceed with a departmental water utility model to provide a source of revenue for the utility to be self-supporting and both environmentally and financially sustainable over the long term.

The plan for the wastewater program calls for an orderly approach to the problem by dealing with the upstream issues as the first priority. Improvements made through reductions in water consumption and inflow and infiltration mitigation will reduce water wastage and reduce sewer discharges to the environment, while generating stable wastewater generation rates suitable for the successful design and operation of a new modern wastewater treatment plant capable of meeting the latest environmental regulations.

The new wastewater treatment plant will require an investment in the order of \$25,000,000 when inflation to the time of construction is considered. It is anticipated the new facility will be placed into service by the end of 2015.

The ability to fund the facility and implement it on schedule depends on the access to grant funding from senior levels of government. A grant by April 1, 2010 is required to proceed with the water metering project, which is critical to the wastewater treatment upgrading program, as it will provide the City's main source of revenue.

# 1. Introduction

## 1.1. Background

In a letter to the City of Thompson dated October 9, 2009, the Director of Environmental Assessment and Licencing for the Manitoba Conservation Department (Province) instructed the City to file a five year plan outlining the steps and timing for bringing the wastewater treatment plant up to current standards. In support for this request, the City authorized CH2M HILL to assemble the plan and supporting documentation.

Manitoba Conservation is responsible for licencing wastewater treatment plants in the province, and issues licences that set discharge limits on treatment plant effluents. As part of the regulatory process, an agreed upon date of April 30, 2005 was set for receipt of an Environment Act Proposal (EAP) dealing with the wastewater treatment plant upgrading. In attempting to meet the requirements, the City, in conjunction with Manitoba Water Services Board, authorized an engineering study dealing with upgrading options. While the study was undertaken as planned, the EAP was not completed and by oversight the compliance date passed without the requirements being met or an extension being authorized. In the meantime, the City has proceeded in accordance with the intent of the program by pursuing water metering as a method of reducing water consumption and wastewater generation, and providing a source of funding for their portion of the required upgrades.

The City of Thompson has been proactively working on a long-range plan for its entire water and wastewater services, which includes transitioning to a departmental water utility as the cornerstone of the plan. CH2M HILL completed a Water Utility Study (Study) for the City that took a comprehensive view of the entire water utility and recommended establishment of a departmental utility. The study included development of a capital improvement plan (CIP) for both water and wastewater services, as well as a water rate study with assumed funding sources and timing of capital projects. The wastewater treatment plant upgrade was included in the CIP.

City Council approved the study recommendations and are now proceeding with departmental water utility implementation. CH2M HILL has been assigned to assist in implementation of the water utility. The next phase will include updating the estimates developed in the study to more structured plans. The wastewater treatment plant upgrade is included in these considerations, and will be structured into the City's long-term plans, as required by the Province.

## 1.2. Purpose

This report has been prepared to identify the background, issues and plans for the wastewater treatment plant upgrading. The plan is to be submitted to the Province by November 15, 2009. The plan will also provide input for further refinement of the City's water rate study, which will be required by the Public Utilities Board in establishment of the departmental water utility project.

## 1.3. Scope

The City has authorized CH2M HILL to proceed with this work as a Task Order under a Master Services Agreement. The scope of work includes:

- Review and confirm the status and expectations for regulatory licencing.
- Review the previously completed mechanical plant upgrading report, prepared by Wardrop Engineering, to confirm the assumptions and recommendations conform to the utility plans and comply with the intended licencing requirements.
- Update the WWTP costs for use in water rate estimation and program budgeting by the City.
- Identify and account for potential government grants for use in the water rate estimates.
- Develop an implementation plan and schedule in a format suitable for submission to the Province.

## 2. Regulatory Background

The City of Thompson operates a mechanical wastewater treatment plant, which was constructed in 1958, as well as a sewage lagoon. They are located in different parts of the city and function independent of each other. The mechanical plant receives about two-thirds of the city's wastewater.

The 2003 to 2005 regulatory correspondence, the completed engineering analysis and the recent October 9, 2009 letter from the Province, refer to regulatory upgrades to the mechanical plant only. Maintenance upgrades to the lagoons are required, and have been included in the City's utility planning study, but there is no requirement for process upgrading.

The regulatory history of Thompson's wastewater facilities is summarized in Exhibit 1.

*Exhibit 1: Regulatory History for the City of Thompson's Wastewater Facilities*

Date	Licence	Correspondence
June 1, 1970	CEC Act Ordinary Licence	Approval for a multi-cell aerated lagoon, 1) Remove 80% of BOD 2) Chlorinate, residual of 0.5 mg/L
November 3, 1986	CEC Order No. 1107 WWTP	
January 15, 2003		City Request for Alteration of Lift Stations and WWTP
February 4, 2003		Request for modifications approved, and Licence 2589 issued. <b>Proposal required within one-year to upgrade to Secondary with Effluent Disinfection</b>
February 4, 2003	Environment Act Licence No. 2589 WWTP	BOD5 and TSS < 80 mg/L – three month average BOD5 and TSS < 125 mg/L – single sample Licence No. 1107 rescinded
	Extension	WWTP Upgrade Proposal submission extension to December 31, 2004 granted.
January 11, 2005	Extension	WWTP Upgrade Proposal submission extension to April 30, 2005 granted.
October 9, 2009	<b>Out of Compliance</b> EAP Pending	Letter from Manitoba Conservation, 5-year plan required by November 15, 2009

A new licence for the mechanical plant (Licence No. 2589) was issued February 4, 2003, rescinding previous Licence No. 1107. There has been no similar update to the lagoon licence. The lagoon will continue to operate under the Clean Environment Commission Licence dated June 1, 1970.

Clause 16 of Licence No. 2589 requires that the City file a proposal to upgrade the wastewater plant. Two extensions to the compliance date have been approved, with the most recent deadline being April 30, 2005. The City is currently out of compliance because the date has expired without request for further extension or submission of the required proposal (EAP). The steps required to return the City into compliance are defined in the October 9, 2009 letter.

The EAP is to include upgrading the existing mechanical plant from primary to secondary treatment along with the addition of effluent disinfection, consistent with Manitoba Surface Water Quality Standards, Objectives and Guidelines.

The plant discharge limits, which are needed to establish the facility requirements, will not be known for certain until an environmental licence is issued by Manitoba Conservation. There has been a trend to increasingly more stringent requirements. Ammonia control is likely to be required by either or both the provincial and federal levels, as well as the potential for nutrient removal.

Preparation and submission of the Environment Act Proposal is outstanding and is required to establish the discharge limits, and set the targets for treatment plant design.

### 3. Water Utility Planning

The water utility study included a review of the current situation for all of Thompson's water and wastewater services and developed a long-range plan for the utility. The plan includes transition to a self supporting departmental water utility, that will generate a continuous source of revenue based on water consumption once implemented. The utility will be regulated under the Public Utilities Board.

A Capital Improvement Plan (CIP) covering the entire water and wastewater infrastructure upgrading needs was prepared as part of the study. The CIP includes the upgrading projects of interest to Manitoba Conservation and the Manitoba Water Services Board.

#### 3.1. Capital Improvement Plan (2008)

The Water Utility Study completed in 2008 reviewed the City's current situation and estimated capital upgrading projects based on available information, engineering experience and judgment. The resulting CIP provides a basis for the City to set priorities and establish its annual capital budgets. The 2008 CIP is reproduced in Exhibit 2.

*Exhibit: 2 Capital Improvement Plan proposed in the 2008 Water Utility Study*

Program	1	2	3	4	5	6	7	8	9	10	11	12	
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Yearly Capital Expenditure, \$ thousands</b>													
<b>Water Supply</b>													
Water Treatment		\$5											
<b>Water Distribution</b>													
Condition Assessment		\$100	\$150	\$150				\$100					\$100
Water Network Model		\$40											
Pressure Upgrading Evaluation			\$25	\$200									
Water Meter Installation	\$15	\$1,750	\$1,500										
<b>Watermain Renewal</b>													
Metallic				\$1,300	\$1,300	\$1,300	\$1,300	\$1,300	\$1,300	\$1,300	\$1,300	\$1,300	\$1,300
Non-metallic								\$10	\$10	\$10	\$10	\$10	\$10
<b>Wastewater Collection</b>													
Inflow and Infiltration Study		\$250	\$250										
Sewer Condition Assessment			\$100	\$100					\$100				
<b>Sewer Renewals</b>													
Clay Tile with Watermain				\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200
Separate Trench & Metallic				\$25	\$25	\$25	\$25	\$25	\$25	\$25	\$25	\$25	\$25
Lift Station/Forcemain Upgrading		\$25	\$25	\$25	\$100	\$100	\$100	\$100	\$100	\$100	\$100	\$100	\$100
<b>Wastewater Treatment</b>													
WWTP Upgrade		\$5	\$300	\$15,000									
Lagoon					\$1,000								
<b>Asset Management</b>													
Asset Management		\$20	\$50	\$500									
<b>TOTAL</b>	\$15	\$2,490	\$17,100	\$3,500	\$1,625	\$1,625	\$1,625	\$1,735	\$1,735	\$1,635	\$1,635	\$1,635	\$1,735

These are 2008 estimates and are to be Updated

The CIP is a planning document, capturing the best estimates at the time. It is intended to be updated and modified as decisions are made and information becomes available. For the initial assessment, the major linear infrastructure was assumed to be rehabilitated and replaced on the basis of continuous annual programs. The wastewater treatment plant

upgrade project is by far the largest single project in the CIP. Its value and timing are further considered in this document based on additional considerations.

The major items in the CIP are discussed as follows:

### 3.1.1. Water Distribution

The water distribution function includes water main repairs, system pressure upgrades and the water meter installation program needed to support the departmental water utility implementation project. The city has been experiencing a rapid increase in the number of water main breaks and has had to hire additional maintenance and repair staff to keep pace with the required repairs. The water main renewal program is a non-discretionary activity and is a priority for the City.

The water meter installation program involves installation of water meters for every water service in the city. It will provide the source of revenue for the planned water utility.

### 3.1.2. Wastewater Collection

The previous works on the wastewater treatment plant and review of the collection system under the water utility study identified the need to carry out an inflow and infiltration study. It is planned to commence in 2010 and continue through 2011. Results of the study will be used to identify priority upgrades, such as water main leaks, or elimination of cross connections.

The CIP also anticipates that continual long term annual sewer and lift station upgrading programs will be carried out.

### 3.1.3. Wastewater Treatment

The wastewater treatment plant capital plan included allowances for both the mechanical treatment plant upgrade and lagoon rehabilitation. The initial plan in the utility study contemplated construction of the new mechanical plant in 2010.

This estimate has since been revised based on additional consideration of the upstream conditions and funding limitations, as discussed subsequently in this report. It is now anticipated that the facility will cost in the order of \$25,000,000 with start of construction in 2014.

Lagoon upgrades are required because of its age and condition, with allowances included in the CIP.

## 4. WWTP Upgrade Program

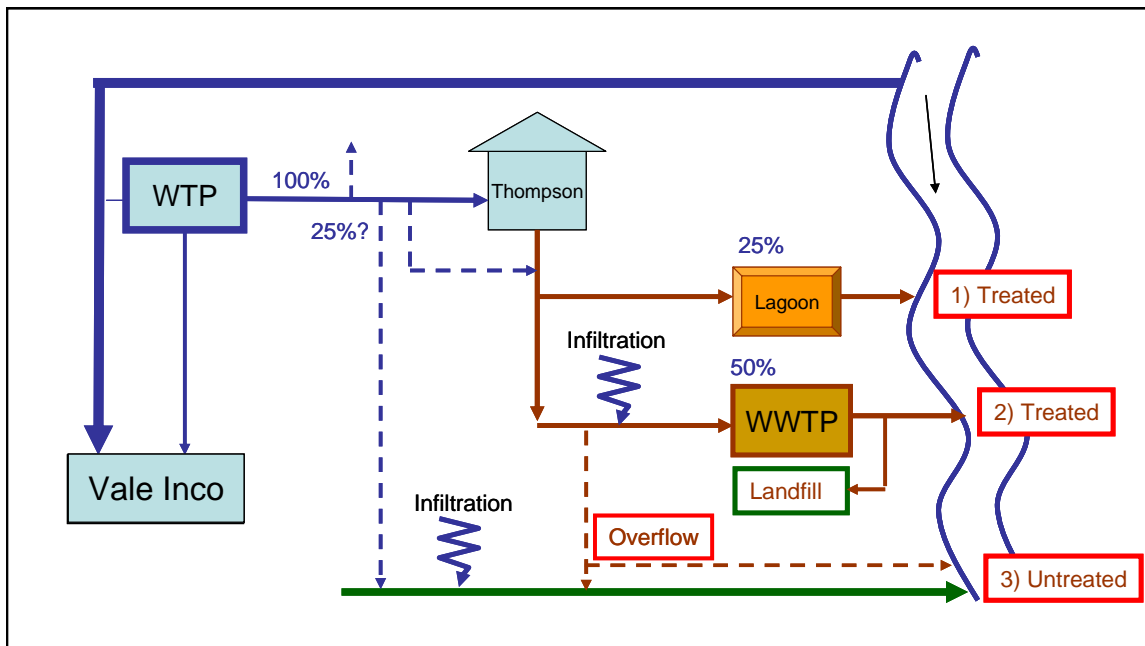
The 2008 CIP was developed based on first transitioning the water and waste services to a department utility model, and then undertaking long-term capital upgrading in an orderly, financially responsible and sustainable manner.

As part of this report we have reconsidered the activities related to the wastewater treatment plant upgrade, and its regulatory requirements, and developed a short-term plan to address the needs. Our review has identified priority programs that we consider to have value in completing prior to commencement of the WWTP design.

### 4.1. Priority Pre-design Programs

The background and rationale for the priority programs is presented with the aid of system illustrations shown in Exhibit 3.

*Exhibit: 3: City of Thompson Water and Wastewater System Illustration*



#### 4.1.1. Water Balance

Raw water is drawn from the Burntwood River by Vale Inco and pumped to the mine site in two large diameter water mains. A water treatment plant (WTP) owned and operated by Vale Inco is located between the river pump house and the mine site, where water is drawn from either of the two water mains and treated to potable water suitable for domestic use. The potable water is pumped to both Vale Inco's mine site for their use, and into the City of Thompson's water distribution system for use by the entire City of Thompson.

The amount of treated water supplied to the City by Vale Inco, as reported in the 2005 Wardrop report, on average is 705 litres per capita per day (L/c/d). The average water consumption for similar sized cities in other locations with water metering, and presumably water conservation programs, is about 350 L/c/d. The water utility study anticipated that with implementation of a water metering program the water consumption would drop from 705 to 465 in the short term, which is approximately a 35% drop. Over the long term it was anticipated that it will drop to 350 L/c/d.

The volume of water that leaves the city as sewage on a per capita basis, combined for both sewage treatment facilities, is 521 L/c/d. The resulting average daily volume received at the mechanical treatment plant, considering the flow split with the lagoons, has been recorded at 4,600 cubic meters per day. If the short term water use reduction of 35% to 465 L/c/d is assumed, the daily average wastewater volume would drop to 4,100 cubic meters per day, and even further over the longer term with increased water conservation.

Inflow and infiltration is also normally a major detrimental factor for wastewater treatment plants. Inflows at locations such as joints or cracks in sewers, manhole infiltration and cross connections commonly adds significantly to flow rates, particularly during wet weather events. The amount of inflow and infiltration in Thompson's situation is unknown because there have not been any evaluation studies ever undertaken. Based on our knowledge of the systems, it is anticipated that the inflow and infiltration would be significant, with their being opportunities for low cost upgrades resulting in significant improvements.

By comparing the water and wastewater values, it is noted that only 75% of the water is captured as sewage, and therefore 25% of the water supply is unaccounted for. Water loss from a distribution system is not uncommon or unexpected, as there are uses such as lawn watering and loss through water main breaks that are not expected to return it to the wastewater sewers. However, the water loss is typically offset by an increase in wastewater sewer flow from inflow and infiltration, such that the two values are closer to the range of being 10 percent different.

One of the possible explanations for lost water is because of excessive leakage to the sewer system. The water distribution system is pressurized and as a result will only flow from the water mains to the sewers. Previous construction practices used in Thompson included common trench construction for sewer and water mains, which provides the potential for water main leaks to take place completely underground without the water ever migrating to the surface. It is not known if this situation is actually happening, but conversely there is not enough information currently available to rule it out.

With the rate of water consumption being 25 percent greater than the rate of sewage collection, it is apparent the excess water is not all being collected by wastewater sewers and must have another escape route. The logical possibility is through discharge in the storm sewers. Storm sewers drain only runoff from rainfalls, or groundwater from infiltration or building weeping tiles. Storm sewers are generally intermittently used gravity sewers requiring low maintenance. Unanticipated flows in storm sewers could easily occur without being noticed because of their infrequent need for attention, and since most of the discharge points are inaccessible and flows would not be noticed.

#### 4.1.2. Mass Balance

A mass balance was undertaken to define the relationship between solids produced in the City in comparison to solids received at the treatment facilities. Two parameters commonly used in the wastewater treatment industry were used for the wastewater loading estimate. BOD<sub>5</sub> is a measure of the amount of oxygen consuming material in the sewage, and TSS is the total amount of suspended solids. In an average community, 77 grams of BOD<sub>5</sub> is produced and 90 grams of solid material per person. When these materials are mixed with water they are reported in terms of milligrams per litre.

The solids loading calculations based on water consumption at 706 L/c/d, and 521 L/c/d are presented in Exhibit 4. The theoretical value at 706 L/c/d represents the concentration that would be seen if the solids matter were completely mixed with all incoming water, while the theoretical value at 521 L/c/d represents the concentrations that would be seen if the water loss occurred prior to the water being mixed with the solids.

*Exhibit: 4 Mass Balance of Wastewater for City of Thompson*

	Theoretical @ 706 L/c/d (mg/L)	Theoretical @ 521 L/c/d (mg/L)	Recorded 2000-4 (mg/L)	Recorded 2004-5 mg/L
BOD <sub>5</sub>	109	148	66	85
TSS	127	173	86	177

By comparing the theoretical loadings to the recorded values it can be concluded that there is an imbalance in the system. To be in balance the amount generated in the system (Theoretical at 521) should equal the recorded values, but the recorded values are less. The TSS for instance recorded from 2000 to 2004 only averaged 86 mg/L in comparison to an expected value of 173 mg/L. In attempting to resolve the discrepancy in 2005, the City undertook additional monitoring, reported in the table as being recorded in 2004/5. The more recent data correlates quite well in terms of TSS, but is still very low in terms of BOD<sub>5</sub>.

Aside from the imprecise assumptions, the possible explanations could be inaccurate monitoring results and a loss of sewage to the storm sewer system.

In the worst case scenario, the system could have water leaking from the water mains to both the wastewater and storm sewers. Increased flow in the wastewater sewers could be subsequently migrating to the storm sewers, accounting for the lower than expected wastewater flows and solids loss from the system.

The exact nature and mechanics of the potable water loss and inflow and infiltration is unknown and the foregoing assessment was developed by conjecture. It does draw attention for the need to develop a better understanding of the existing situation. Under the worst case, 25% of the sewage could be lost through cross connections and overflows, and since this discharge is untreated (3 Untreated on exhibit 4), its environmental effects could exceed that of the treated discharges (1 Treated and 2 Treated on exhibit 4).

The short term plan relating to the WWTP upgrade priority programs therefore includes:

- Implementation of water meters to encourage water conservation
- Water consumption measurements to be used to track and eliminate water loss
- Inflow and Infiltration program be implemented to locate sewer problems
- Sewer problem areas be fixed to reduce inflows and outflows from wastewater sewers
- Water consumption data with water meters in place, and wastewater flows and concentrations under upgraded conditions be collected and used for design of the upgraded WWTP

### 4.1.3. Wastewater Treatment Plant Upgrade Impacts

The water supply and sewage collection issues should be resolved prior to making substantial investments in a new wastewater treatment facility. The water metering initiative and wastewater collection upgrades will not only provide a significant environmental benefit, but they will also facilitate collection of appropriate design and sizing information for the new WWTP, and avoid interim operational periods where the dilute sewage impedes a stable and manageable plant operation.

Program planning for the new WWTP is recommended to start after the collection system has been rehabilitated to a satisfactory state and sufficient monitoring data has been collected to provide an understanding of the flow and loading characteristics.

## 4.2. Wastewater Treatment Plant Upgrade

Wardrop Engineering completed a study in 2005 on the wastewater treatment plant upgrade requirements. The study provided a review of alternative treatment process technologies, and produced cost estimates for a plant capable of meeting the more stringent requirements, including ammonia, nitrogen and phosphorus removal, in addition to secondary treatment and effluent disinfection.

The report identified costs for the WWTP upgrade of \$12,100,000 for the case where water meters were implemented and \$13,300,000 without water meters, in terms of 2005 dollar values. The report anticipated the construction would take place in 2008, and projected the costs to \$13,600,000 and \$15,000,000 with and without water metering in terms of 2008 values.

The projections from 2005 to 2008 values were based on a four percent per year rate of construction escalation. While in 2005 the projection would have been reasonable, construction costs escalated at a much higher rate over the time period due to a western Canadian building boom. Exhibit 5 provides a comparison of costs at higher escalation rates for the option, which includes water metering.

*Exhibit 5: Construction Cost Escalation for the Wastewater Treatment Plant - Water Metering Option*

Escalation 2005 to 2008	Escalation 2008 to 2014	2005	2008	2010	2014
4.0%	4.0%	\$12.1	\$13.6	\$14.7	\$17.2
15.0%	4.0%	\$12.1	\$18.4	\$19.9	\$23.3
20.0%	4.0%	\$12.1	\$20.9	\$22.6	\$26.5

Construction cost escalation in the Thompson market was closer to the 15 to 20 percent range for the 2005 to 2008 period, as compared to the assumed four percent rate. The construction cost increases have tapered off since that time, which means the probable construction cost of the WWTP would be in the range of \$20 million today. If a reasonable rate of escalation continues, it is expected the cost at the time of construction will be about \$25,000,000, including engineering and contingencies, but not taxes.

Manitoba Water Services Board (MWSB) requested that the two options be included in the engineering study, one with water meters and one without. The evaluation assumed a 35% reduction in water usage through the implementation of water meters.

There was an assumption in the water utility study that provincial funding grants for the WWTP will be contingent on water meters being installed. There has also been an expectation that a similar requirement will be imposed for an inflow and infiltration program. No official documentation was found to confirm these contingent programs are a requirement of the funding grants, or the details of the potential programs.

Regardless of the benefit tied to the funding grants, the programs will produce a significant savings just through their implementation. Water conservation from the water meters alone would result in a \$1,400,000 just on the WWTP capital cost savings.

## 5. Water Utility Program Update

The water utility implementation is the corner stone of the City's future water and wastewater programs, and is critical to revenue generation for program operation, maintenance, refurbishment, replacements and expansions to the services. The plans and status of the program are discussed in the following section:

### 5.1. Public Utilities Board Application

The new Thompson water utility will be regulated by the Public Utilities Board (PUB). The schedule is yet to be defined, but it is anticipated PUB will require a comprehensive submission to support the City's application. This requirement is likely to be more onerous because of it being the City of Thompson's inaugural submission.

Upon receipt and review of the application, the PUB will decide if public hearings are required. The City of Thompson has already initiated a public program, which will be considered favorably by the PUB, and they may, under favourable consideration waive the requirement for hearings.

### 5.2. Water Meters

Water meters will be required for all water customers to support the new water utility's billing system. The water meters will be owned and operated by the water utility, and will require routine reading, maintenance and replacement. Functional planning is underway for the water meters. The purchase and implementation will require the preparation of specifications, tendering and award for the supply and installation services.

The current plan is for a go-live date of January 1, 2011 for the entire water meter system.

## 6. Program Schedule

The wastewater treatment plant upgrade plan should be considered with consideration for the other related and integrated works. The utility implementation, water meter installation and inflow and infiltration programs are all critical to its success. An integrated schedule for the short term plan has been developed with these considerations, and is included as Exhibit 6.



The water utility implementation project is currently underway, with go-live being planned for January 1, 2011. The water utility implementation is critical as it will provide the City's source of revenue for the WWTP upgrading project. It will also result in water conservation, having a significant impact on the WWTP physical sizing and cost.

The inflow and infiltration program has a level of significance similar to water conservation, in that removing flows from the collections system will result in WWTP savings. It is also considered a priority from an environmental perspective, because of its potential to identify and mitigate overflow and dry weather discharges. A two year program is anticipated.

Planning for the WWTP project will commence in 2012, with one year of records and experience with the new water metering system, and both years of the inflow and infiltration program completed. Data will be collected throughout these programs relevant to and consistent with the WWTP design needs.

Detailed design of the WWTP will commence in 2013, leading to start of construction in 2014. It is expected the \$25,000,000 will be completely constructed, commissioned and started up by December 31, 2015.

## 7. Water Utility Program Financing

It has been anticipated that funding grants from the senior levels of government will be available to assist the City of Thompson in implementation of these important but very costly programs. The grant assumptions were based on those available from the MWSB, which offer a base grant of 50% for first and second tier projects. Communities north of the 53<sup>rd</sup> parallel are eligible for an additional 10%, resulting in grant funding of 60% for these types of projects.

This study was not updated to include any new or changed grant funding programs since the study phase.

### 7.1. Water Meter Grant

The water meter program, including water meter purchase, installation and water billing system to support transformation to a utility-based approach was estimated to cost \$3,265,000. Based on the current plan for a go-live of January 1, 2011, grant funding must be in place as soon as possible, but no later than by April 1, 2010 to avoid compromising the limited summer construction period.

It is assumed a 60% grant will be provided, equaling \$1,959,000.

### 7.2. Wastewater Treatment Plant Grant

The original water utility study incorporated the Wardrop study cost estimate of \$15,000,000 with implementation in 2010. Subsequent review in this report indicates a more realistic installation date of 2014, at a cost of \$25,000,000. It is assumed that the 60% grant funding will still be provided on the escalated value. At 60% the expected grant value is \$15,000,000.

Based on construction commencing in 2014, large capital funding support will not be required until 2013.

Priority programs and design services are of lesser value and have a lesser significance and urgency.

### 7.3. Water Revenue

The water rate study was developed on the basis of both receiving grants and not receiving grants. Water rates were estimated on a total cost recovery basis for the water utility. Water rates were estimated at \$803 per year per residential customer without grant funding. Consideration for the higher WWTP cost resulting from construction cost escalation would result in even a higher rate.

The model assumed debt financing would be used to fund the City's share of the wastewater treatment plant. Assumed interest rates were used, the City's current debt load, credit rating

or ability to pay were not taken into account. The absence of grant funding could potentially impact these factors, and even the City's financial ability to undertake the projects.

The water rate study accounted for the fact that water supply and treatment is provided to the City at no cost by Vale Inco, and will continue indefinitely.

Confirmation of the grants are required for use in updating the Water Rate Model for inclusion in the application to the Public Utilities Board.