

**Minutes - Standing Committee on Fiscal Issues - October 12, 2004**

**REPORTS**

**Minute No. 47      Water Treatment Program Financial Status Report No. 2  
File WS-7**

**STANDING COMMITTEE DECISION:**

The Standing Committee on Fiscal Issues concurred in the administrative recommendation and received the report as information.

**Minutes - Standing Committee on Fiscal Issues - October 12, 2004**

DECISION MAKING HISTORY:

Moved by Councillor Thomas,

That the administrative recommendation be concurred in.

Carried

**RE: Water Treatment Program Financial Status Report No. 2**

**FOR SUBMISSION TO: STANDING COMMITTEE ON FISCAL ISSUES**

**ORIGINAL REPORT SIGNED BY:** B. D. MacBride, P. Eng., Director, Water & Waste

**REPORT DATE:** October 5, 2004

**RECOMMENDATION(S):** That this report be received as information.

**REPORT SUMMARY**

**KEY ISSUES:**

- Information report required pursuant to Council Direction.
- The project is projected to be within budget although market forces may result in cost escalation.
- The project completion date appears achievable but will require an aggressive schedule.

**IMPLICATIONS OF THE RECOMMENDATION(S):**

**General Implications**

- |                                     |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | None  |
| <input type="checkbox"/>            | For the organization overall and/or for other departments               |
| <input type="checkbox"/>            | For the community and/or organizations external to the City of Winnipeg |
| <input type="checkbox"/>            | Involves a multi-year contract  |

Comment(s):

**Policy Implications**

- |                                     |                   |
|-------------------------------------|-------------------|
| <input checked="" type="checkbox"/> | No                |
| <input type="checkbox"/>            | Yes – Comment(s): |

**Environmental Implications**

- |                                     |                   |
|-------------------------------------|-------------------|
| <input checked="" type="checkbox"/> | None              |
| <input type="checkbox"/>            | Yes – Comment(s): |

**Human Resources Implications**

- |                                     |   |
|-------------------------------------|---|
| <input type="checkbox"/>            | No  |
| <input checked="" type="checkbox"/> | Yes – Comment(s): Additional staff will be required to maintain and operate the new facility. |

**Financial Implications**

- |                                     |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Within approved current and/or capital budget     |
| <input type="checkbox"/>            | Current and/or capital budget adjustment required |

## REPORT

### REASON FOR THE REPORT:

At its meeting held on December 16, 1999, City Council adopted a policy whereby all Capital projects with a total estimated cost of \$10 million or more be submitted by the associated Civic Department to the Standing Policy Committee on Fiscal Issues for review and recommendation prior to any bid solicitation being issued.

### HISTORY:

1993 Council approved the creation of the Water Treatment Reserve Fund to cash finance a portion of the cost of a water treatment plant.

2000 On November 22, Council adopted the following recommendations:

1. *The City proceed with treatment of the water supply as described herein.*
2. *Design and construction activities be undertaken so that the water treatment plant be operational in the year 2006.*
3. *That the water treatment process as identified through the pilot testing and described herein be adopted as the baseline process for comparison to alternatives and new technologies.*
4. *The Administration:*
  - a) *Investigate and report on emerging technologies such as ultraviolet disinfection and membranes;*
  - b) *Investigate and report on alternative project delivery strategies;*
  - c) *Prepare documents in support of any application by Council for Federal and Provincial funding.*

2002 On July 17, Council adopted the following recommendations:

1. *That the baseline water treatment process approved by Council be amended to include ultra violet (UV) light disinfection.*
2. *That the schedule for implementation of water treatment approved by Council be amended to facilitate staged implementation, with construction of a UV disinfection facility to be operational in 2004, construction of a chloramination facility to be operational in 2005, and construction of the balance of the water treatment plant to be operational in 2007.*
3. *That membrane filtration not be considered for water treatment in Winnipeg, due to the high cost of the technology.*

2003 On June 25, Council adopted the following recommendation:

*It is recommended that the "construction management" project delivery strategy be utilized for design and construction of the water treatment plant, and that City forces operate the facility.*

2004 On May 4, the Standing Committee on Fiscal Issues received "Water Treatment Program Financial Status Report No. 1" as information.

2004 On July 21, Council adopted the following recommendations:

1. *That the water treatment plant (WTP) design capacity be set to provide a treated water capacity of 400 million litres/day (ML/d).*
2. *That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.*

## **DISCUSSION:**

### **Current Status:**

Conceptual design for the water treatment program and pilot testing of key process elements has been completed. Value engineering (VE) of the concept design was undertaken with a view to reducing the cost and/or increasing value for money expended. The VE process identified several opportunities to reduce cost of the project without impacting value and these will be more fully explored during functional and detailed design of the facility. One recommendation was that the water treatment plant (WTP) capacity be revisited in light of reduced water demands experienced in Winnipeg in recent years. A recommendation to reduce the design capacity of the WTP from 515 ML/d to 400 ML/d was adopted by Council on July 21, 2004.

The Water Treatment Program comprises all works related to the treatment process approved by Council. In July, 2002 Council approved a staged approach to implementation, as follows:

- Construction of an Ultraviolet light (UV) disinfection facility to be operational in 2004
- Construction of a Chloramination facility to be operational in 2005
- Construction of the balance of the WTP to be operational in 2007

Design of the UV disinfection facility (which is being installed in the existing Deacon Booster Pumping Station) has been completed. Four separate supply contracts have been awarded for process equipment. An installation contract has been tendered and awarded to Empire Iron Works. The budget for the UV disinfection project is \$9 million. Overall, the UV project is about \$2 million below budget at the present time. Construction of the facility is underway and it is anticipated that it will be completed on schedule, late in 2004.

Council has approved a “construction management” project delivery strategy for design and construction of the WTP. The facility will be owned by the City of Winnipeg and operated by City forces. During August, 2004 the department engaged consultants for three key areas of service relating to delivery of the project; Operations Consultant, Design Consultant and Construction Manager. A partnering session between the consultants and the department has been held, a management structure and project plan for the project have been developed and work relating to preliminary design is now underway.

An environmental effects assessment study is also required concerning the Water Treatment Program, so that information relating to environmental effects is available as soon as possible for discussion with regulators and stakeholders. This work is being undertaken by a separate consultant and it is anticipated that this study will be completed late in 2004.

Concurrent with the foregoing, a review of the risks and benefits relating to the schedule for implementation of the Chloramination facility has been undertaken. Based upon this review, it has been recommended in a separate report that the implementation schedule for water treatment approved by Council be amended so that the Chloramination Facility (originally scheduled for operation in 2005) is deferred and becomes operational concurrent with the balance of the Water Treatment Plant, in 2007.

The overall completion of the Water Treatment Program is scheduled such that the WTP will be operational in 2007, pursuant to the Council approved plan. A very aggressive design and construction schedule will be required in order to meet this completion date. The feasibility, risks, benefits and costs associated with an aggressive schedule will be examined more fully after the Construction Manager has had an opportunity to develop a detailed work program.

### **Risks and Risk Mitigation:**

The following measures are being undertaken to mitigate risk and ensure proper oversight of the Water Treatment Program.

- An experienced Project Director has been dedicated to the project along with a dedicated project team from the Department.
- The Project Director will review the financial status of the Water Treatment Program with the Departmental Controller on a monthly basis.
- The department has engaged highly qualified consultants to undertake design, construction management, environmental effects assessment and provide an operational review to the facility design and assistance in operator training and start-up. Prior to engaging these entities the firms’ qualifications were carefully reviewed, and reference checks and a review of each firm’s financial capacity to undertake the assignment were undertaken.
- A comprehensive risk management process will be implemented, beginning with a risk management seminar once the project team has been assembled. This seminar will identify potential risks and mitigative strategies.

- A design seminar will be undertaken to identify the principal factors that drive cost and impact schedule once the project team has been assembled.
- VE will be undertaken at appropriate stages of the project to ensure cost effectiveness.
- A Steering Committee comprised of senior administrators has been established as recommended by the Main/Norwood Bridges Project Review. The Project Director will report to the Steering Committee every four months regarding progress, risk issues and budget.
- The department will provide a report to the Standing Committee on Fiscal Issues every four months regarding progress, risk issues and budget.

Certain risk factors and mitigative strategies have already been identified. These are outlined in the discussion that follows.

***Project Delivery Issues:***

To minimize potential cost increases, VE was undertaken during the conceptual design phase of the WTP. VE will be repeated at completion of preliminary design of the works and as appropriate during detailed design, to ensure an economical and constructible facility.

The WTP project is so large that very few general contractors in Winnipeg would be able to secure bonding for a bid submission. Lack of competition on a large project can significantly impact bid prices. Further, it is anticipated that a significant number of large construction projects will begin in Winnipeg during the period when the WTP is scheduled for construction. As large construction firms reach capacity during this period, profit margins and prices will very likely increase. This will place an upward pressure on the budget for the Water Treatment Program and may create significant challenges in delivering the project within the original budget. The "construction management" service delivery strategy adopted by Council for delivery of this project will help to mitigate both of these risks.

A Construction Manager has been engaged on a fee-for-service basis to manage construction of the WTP. The Construction Manager will tender the work and coordinate construction of the work. Construction management will increase competition during the tender phase. In a competitive environment it may be possible to break the work packages down into smaller components or otherwise segment work to increase competition.

This exposes the City to additional risks during the construction phase, because the responsibility for overall project cost and schedule have been shifted from a General Contractor to the City's agent. The capital cost of the project will not be determined until the project is completed. Accordingly, the City is exposed to risk relating to the capital budget until this point. This will be mitigated by controlling scope creep, undertaking VE and performing rigorous cost estimates during the design process.

Implementing alternative designs during the construction phase can mitigate risks associated with cost increases. Similarly, alternative construction strategies can be considered if necessary to advance schedule. Decisions with respect to these measures are under the City's control.

There is a greater potential for cost savings from innovation using this delivery option than with a General Contractor, because the Construction Manager can deal directly with the major subcontractors concerning potential changes. Further, the General Contractor markup is avoided on changes to the work. The savings resulting from this service delivery option reflect the premium that is paid to the General Contractor to assume the construction risk under the "conventional" service delivery strategy.

The City will engage an insurance consortium that will provide coverage to all parties involved in delivery of the Water Treatment Program. This will assure consistent, comprehensive coverage and eliminate the potential for cross liability in the event of a loss.

### ***Operating Issues:***

The City does not currently operate a WTP and has no certified WTP operators on staff. The City must invest in personnel and training in order to develop the necessary capacity to operate the WTP. This is quite achievable but will involve nominal startup costs and an investment in staff. Risk will be mitigated by hiring an experienced, certified professional (the plant superintendent) during design phase of the WTP, to become familiar with plant design, construction and operation. The superintendent will be responsible for developing classification requirements, recruiting and training plant operating personnel in the years leading up to completion of the facility. An Operations Consultant with experience in the operation of large treatment facilities has been retained to support the superintendent during the design phase and the first year of plant operations. The Operations Consultant will also provide input concerning plant design, maintenance issues and staffing requirements.

The main areas where savings in operating costs appear feasible are energy, chemicals and consumables, and residuals management. The department will focus the Operations Consultant upon ensuring that the WTP is designed and staffed to maximize savings in these areas, while ensuring high-quality finished water. Savings relating to chemicals and consumables may be achieved through partnerships and strategic purchasing arrangements. Residuals management is currently contracted out for our wastewater treatment facilities and a similar strategy could be employed for the WTP if savings appear likely.

### **Finances:**

The budget for the Water Treatment Program including engineering, contingencies, financing administration and inflation through to the 2007 completion date is \$214 million. Committed expenditures to date are slightly (\$1.6 million) below budget. The project estimate was developed in 1999 and updated in 2002. It includes an allowance of \$11 million for inflation and \$14.9 million for contingencies. Based upon the current construction environment, both of these figures may be low. Accordingly, we have directed that the Construction Manager develop an updated estimate which reflects the present economic climate, as well as the outcome of the Value Engineering undertaken at the end of Concept Design. Information on this estimate will be included in our next report.

As of August 31, 2004 funds committed to the Water Treatment Program stood at approximately \$32.6 million, and funds expended were about \$8.4 million. The majority of funds expended to date have been for engineering studies, pilot testing and design and construction of the UV disinfection facility.

In 1993, Council approved the creation of the Water Treatment Reserve Fund to cash finance approximately 50% of the cost of a WTP. As a result of this initiative, \$112 million of the \$214 million budget for the Water Treatment Program will be funded from the reserve. All expenditures to date have been funded from the reserve.

Capital requirements for the Water Treatment Program are summarized in the table below.

**Water Treatment Program Capital Requirements (in \$000s)**

<b>Year</b>	<b>Authorized Capital</b>	<b>Actual + Projected Cashflows</b>	<b>Cumulative Capital Budget Remaining</b>
Up to 2003	\$ 20,000	\$ 4,100	\$ 15,900
2004	26,000	14,300	27,600
2005	84,000	60,000	51,600
2006	84,000	73,700	61,900
2007	-	60,000	1,900
<b>Total</b>	<b>\$ 214,000</b>	<b>\$ 212,100</b>	<b>\$ 1,900</b>

A summary of project cost categories, budgets, and actual and forecast expenditures for the program is included in Appendix 1.

**FINANCIAL IMPACT:**

As this report is submitted for informational purposes only, there is no financial impact associated with this recommendation.

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Moira L. Geer C.A.  
 Manager of Finance & Administration

**IN PREPARING THIS REPORT THERE WAS CONSULTATION WITH AND CONCURRENCE BY:**

Not applicable

**THIS REPORT SUBMITTED BY:**

Department: Water and Waste Department  
Division: Engineering Services Division  
Prepared by: Tom Pearson  
File No.: 020-18-29-05-00

**Appendix 1**  
**Water Treatment Plant – Financial Status**  
**Summary**

**WATER TREATMENT PROGRAM  
WATER AND WASTE DEPARTMENT - ENGINEERING DIVISION  
APPENDIX 1  
As at August 31, 2004**

Components	COSTS				PROJECTED COSTS TO COMPLETE					TOTAL	VARIANCE	NOTE
	Total Budgeted Costs	Approved Budget To Date	Costs Incurred up to last report	Costs submitted this report	Total Costs Incurred to Date (per G/L 31-Aug-04)	2004 (Remainder)	2005	2006	2007	Total Costs Remaining to Complete	Total Project Cost	Variance from Budget ( Unfavourable )
A) CONCEPTUAL ENGINEERING	3,700,000	3,737,028	-	3,737,028	3,737,028	-	-	-	-	-	3,737,028	(37,028)
B) UV DISINFECTION	9,000,000	9,000,000	-	4,655,791	4,655,791	2,350,000	-	-	-	2,350,000	7,005,791	1,994,209
C) CHLORAMINATION	3,000,000	3,000,000	-	-	-	-	3,000,000	-	-	3,000,000	3,000,000	0
D) PROGRAM'S PROJECT MANAGEMENT OFFICE	100,000	100,000	-	17,231	17,231	82,769	-	-	-	82,769	100,000	0
E) WATER TREATMENT PLANT ENGINEERING	22,700,000	23,000,000	-	11,309	11,309	2,500,000	13,500,000	4,000,000	3,000,000	23,000,000	23,011,309	(311,309)
F) WATER TREATMENT PLANT CONSTRUCTION	175,500,000	7,204,972	-	-	-	5,000,000	44,000,000	69,500,000	57,000,000	175,500,000	175,500,000	0
<b>Total</b>	<b>214,000,000</b>	<b>46,042,000</b>	<b>0</b>	<b>8,421,359</b>	<b>8,421,359</b>	<b>9,932,769</b>	<b>60,500,000</b>	<b>73,500,000</b>	<b>60,000,000</b>	<b>203,932,769</b>	<b>212,354,128</b>	<b>1,645,872</b>
<b>Percentage Complete</b>					4%							