Agenda – Executive Policy Committee – June 8, 2011

Report – Standing Policy Committee on Infrastructure Renewal and Public Works – May 31, 2011

Item No. 6 Grant to University of Manitoba in 2011 and 2012 to research sustainable wastewater treatment and nutrient recovery

STANDING COMMITTEE RECOMMENDATION:

On May 31, 2011, the Standing Policy Committee on Infrastructure Renewal and Public Works concurred in the recommendation of the Winnipeg Public Service and submits the following to Council:

1. That a grant be approved to the University of Manitoba in the amount of $120,000 in 2011 and $30,000 in 2012 plus applicable taxes for applied research on Sustainable Wastewater Treatment and Nutrient Recovery.

2. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

Agenda – Executive Policy Committee – June 8, 2011

Report – Standing Policy Committee on Infrastructure Renewal and Public Works – May 31, 2011

DECISION MAKING HISTORY:

STANDING COMMITTEE RECOMMENDATION:

On May 31, 2011, the Standing Policy Committee on Infrastructure Renewal and Public Works concurred in the recommendation of the Winnipeg Public Service and submitted the matter to the Executive Policy Committee and Council.

ADMINISTRATIVE REPORT

Title: **GRANT TO UNIVERSITY OF MANITOBA IN 2011 AND 2012 TO RESEARCH SUSTAINABLE WASTEWATER TREATMENT AND NUTRIENT RECOVERY**

Critical Path: **Standing Policy Committee of Infrastructure Renewal and Public Works – Executive Policy Committee – Council**

AUTHORIZATION

Author	Department Head	CFO	CAO
M. A. Shkolny, P. Eng. Manager of Engineering	B. D. MacBride, P. Eng Director of Water and Waste	M Geer A/CFO	M Ruta A/CAO

RECOMMENDATIONS

That a grant be approved to the University of Manitoba in the amount of $120,000.00 in 2011 and $30,000.00 in 2012 plus applicable taxes for applied research on Sustainable Wastewater Treatment and Nutrient Recovery.

REASON FOR THE REPORT

Grants to outside organizations require Council approval.

IMPLICATIONS OF THE RECOMMENDATIONS

Funds in the amount of $992,714.00 are included in the 2004 to 2011 Capital Budget for the Environmental Impact Statement/Public Hearings which are directly related to the upgrading of the wastewater treatment plants to comply with regulatory Licence requirements. Capital account number: 444 181000 200752 20340003YY GRANTS.

Water and Waste Department is engaged as partner with Natural Sciences and Engineering Research Council (NSERC), with Environment Canada (EC) and Lake Winnipeg Stewardship Board (LWSB) in extensive collaborative research at the University of Manitoba on nitrogen and phosphorus removal and recovery. The objectives of this research are to:

- Successfully conclude ongoing research at the North End Water Pollution Control Centre (NEWPCC) related to effluent ammonia reduction via bioaugmentation and plant-wide

adjustment of unit operations and processes. Determine, in smaller scale, if it would be possible to continue with bioaugmentation when ammonia is oxidized only to nitrites;
- Successfully conclude ongoing research on the optimization of unit operations and processes associated with the NEWPCC centrate treatment sequencing batch reactors (SBR) to realize cost savings related to the reduction of chemicals and electricity while maintaining the present level of nitrogen removal; and
- Through research and testing, determine innovative modifications to the existing and proposed treatment upgrades to the NEWPCC and South End Water Pollution Control Centre (SEWPCC) to remove and recover phosphorus in an economical and sustainable manner.

Ongoing research efforts in concert with operational adjustments to the NEWPCC biological treatment processes have shown that it is possible to meet the effluent ammonia limit required. Finalization of the research on bioaugmentation (seeding of biomass from the new centrate treatment SBR into the main plant to increase and sustain ammonia-nitrogen removal in the main plant) is required to ensure the stable and long-term effectiveness of the ammonia removal process. In addition, the applied research has the potential to reduce the cost of the upgrades required at the NEWPCC to comply with nitrogen limits. Bioaugmentation has the potential to reduce the tank volume required by more than 10% associated with the full plant upgrade to meet nitrogen limits.

The potential optimization of the SBR through applied research and testing has the potential to save significant operating costs. This is research has been sponsored initially by Manitoba Conservation's Sustainable Development Innovation Fund (SDIF) in collaboration with the City, and is part of a collaborative effort between NSERC, City of Winnipeg - Water & Waste Department, and University of Manitoba. Modifications to the SBR processes could reduce the annual chemical and electrical costs by one-third. Finalization of this research is required to test alternative processes and modes of operation in a safe and reliable manner to minimize chemical and electrical demands.

Compliance with the phosphorus limits contained in the Licenses for all three of Winnipeg's wastewater treatment plants would reduce the annual phosphorus load to Lake Winnipeg by about 300 tonnes per year. Phosphorus is an essential element required for plant growth and important for to all life. Scientific studies suggest that readily available phosphorous used in fertilizers is being depleted on global scale and will begin to negatively impact future food crop production and food supplies in as little as 30 years. As such, its recovery through sustainable wastewater treatment will become increasingly important resource. The outcome of the research will assist in the selection or integration of treatment technologies related to phosphorus reduction and recovery for upgrades to the NEWPCC and SEWPCC to comply with Licence requirements. This research is fully consistent with Manitoba Conservations approach to sustainable management of phosphorus in wastewater treatment plants discharging within Lake Winnipeg watershed, and aims at finding a solution for Winnipeg plants that would be unique and the first in Canada.

The funds requested are for student scholarship, analytical technician's time, equipment, and logistics of collaborative research that takes place at the SEWPCC and in the University of Manitoba Environmental Engineering laboratories. There have been delays in the project and discontinuity to full scale experiments due to a digester upset at the plant and the current flood situation. The bench scale experiments are continuing.

Funds for this project are available in the Environmental Impact Statement/Public Hearings Project.

The financial status of the Environmental Impact Statement/Public Hearings Project.:

Authorized Capital		$992,714.00
Amount of Previous Awards or Expenditures	$752,890.00	
Amount of this Recommendation	$150,000.00	
Estimated Amount of MRST	$ 3,500.00	
Total Estimated Cost	$906,390.00	$906,390.00
Estimated Residual for Remaining Projects		$ 86,324.00

HISTORY

On February 18, 2003, the Province of Manitoba announced the Lake Winnipeg Action Plan to help protect Lake Winnipeg. The plan also established the creation of a Lake Winnipeg Stewardship Board.

In August 2003, the 2003 Clean Environment Commission (CEC) hearings resulted in a report to the Minister that contained the following recommendation under Nutrient Management Strategy:

> *"The City of Winnipeg should be directed to plan for the removal of nitrogen and phosphorus from its municipal wastewaters and to take immediate steps in support of the nutrient reduction targets established for Lake Winnipeg.*

In December 2006, The Lake Winnipeg Stewardship Board submitted a report to the Minister of Water Stewardship "Reducing Nutrient Loading to Lake Winnipeg and its Watershed - Our Collective Responsibility and Commitment to Action" that contained the following recommendations:

> *"11.1 The Province of Manitoba should continue to require that nutrient reductions be implemented as quickly as possible at the large municipal and industrial wastewater treatment facilities in the cities of Winnipeg, Portage la Prairie, and Brandon"*

In September 2008, The Minister of Conservation requested the Clean Environment Commission to investigate the nutrient reduction and ammonia treatment at the City of Winnipeg's wastewater treatment facilities.

In March 2009, the Clean Environment Commission's review of the need to remove nitrogen, ammonia, and phosphorus resulted in a report to the Minister of Conservation that contained the following recommendations:

> *"8.1) In order to protect the environment, City of Winnipeg wastewater treatment facilities must be regulated and operated in a manner that ensures the following:*

a) *Phosphorus discharges from City of Winnipeg wastewater facilities should be as low as possible and should not exceed 1.0 milligram per litre, as determined by the 30-day rolling average. A desirable operating goal would be 0.5 milligrams of phosphorus per litre.*
b) *Nitrogen discharges must not exceed 15 milligrams per litre, as determined by the 30-day rolling average."*

On June 24, 2009 Council concurred with the recommendation of the Standing Policy Committee on Infrastructure Renewal and Public Works to Grant to University of Manitoba a total amount of $180,000 to support applied research on Plant-Wide Nitrogen Removal Optimization at North End Water Pollution Control Centre for the years 2009 and 2010.

In February 2010, the Clean Environment Commission held additional hearings on the need to remove nitrogen and ammonia where new plant performance information arising from the applied research in conjunction with modified treatment process operations was presented.

FINANCIAL IMPACT

Financial Impact Statement

Date: April 27, 2011

Project Name: **First Year of Program** **2011**

GRANT TO UNIVERSITY OF MANITOBA IN 2011 AND 2012 TO RESEARCH SUSTAINABLE WASTEWATER TREATMENT AND NUTRIENT RECOVERY

	2011	2012	2013	2014	2015
Capital					
Capital Expenditures Required	$ 122,800	$ 30,700	$ -	$ -	$ -
Less: Existing Budgeted Costs	122,800	30,700	-	-	-
Additional Capital Budget Required	$ -	$ -	$ -	$ -	$ -
Funding Sources:					
Debt - Internal	$ -	$ -	$ -	$ -	$ -
Debt - External	-	-	-	-	-
Grants (Enter Description Here)	-	-	-	-	-
Reserves, Equity, Surplus	-	-	-	-	-
Other - Enter Description Here	-	-	-	-	-
Total Funding	$ -	$ -	$ -	$ -	$ -
Total Additional Capital Budget Required	$ -				
Total Additional Debt Required	$ -				
Current Expenditures/Revenues					
Direct Costs	$ -	$ -	$ -	$ -	$ -
Less: Incremental Revenue/Recovery	-	-	-	-	-
Net Cost/(Benefit)	$ -	$ -	$ -	$ -	$ -
Less: Existing Budget Amounts	-	-	-	-	-
Net Budget Adjustment Required	$ -	$ -	$ -	$ -	$ -

Additional Comments: Funding for this project is included in the approved Capital Budget and is financed by the Environmental Projects Reserve.

"Original signed by Lucy Szkwarek, C.G.A."
Lucy Szkwarek, C.G.A.
Acting Manager of Finance and Administration

sc
27-Apr-11

CONSULTATION

In preparing this report there was consultation with:

N/A

SUBMITTED BY

Water and Waste Department
Engineering Division
Prepared by: Nick Szoke, P.Eng.
Date: May 11, 2011
File No.: 020-01-02-00-00

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