REPORT TO COUNCIL

City of Kelowna

Date: March 5, 2012

File: 0710-70

To: City Manager

From: Utilities Planning Manager - Infrastructure Planning

Subject: Okanagan Basin Water Board Conservation and Quality Improvement Grant

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Recommendation:

THAT Council receives, for information, the report from the Utilities Planning Manager dated March 5, 2012, with respect to the Okanagan Basin Water Board Conservation and Quality Improvement Grant.

AND THAT Council endorses the University of British Columbia Okanagan (UBCO) application to the Okanagan Basin Water Board (OBWB) Water Conservation and Quality Improvement Grant for the Contaminant Intrusion in Water Distribution Systems research project.

Purpose:
To seek Council's support of an application by UBCO to the Okanagan Basin Water Board for a grant of $20,000.00 in addition to 5 applications approved by Council on February 13th, 2012.

Background:
The purpose of the Okanagan Basin Water Board's Water Conservation and Quality Improvement Grant Initiative is to assist local government in addressing issues that enhance the valley-wide sustainable use of water. As part of the application process, all applications must be accompanied by a Board or Council resolution from the respective Regional District Board and/or Municipal Council. This includes applications from local governments and all non-profit/community groups or improvement districts.

UBCO approached city staff in January 2012 for a letter of support for the OBWB funding application for the "Contaminant Intrusion in Water Distribution Systems project." A letter was provided to UBCO however a Council resolution was also required. OBWB received the grant application by the February 24th, 2012 deadline and will accept a late submission of supporting Council resolution.

Grant funding for this project would be used to study the vulnerability of a water distribution system from both hydraulic and water quality points of views through a numerical modeling process. Kelowna's water distribution system would be used as a test case. This proposed modeling strategy fits very well within the City and the Provincial objectives for developing

source to tap solutions for water protection. The City would use this research to augment its existing cross connection control program and would expect to enhance management of public safety and risk by matching the location of high risk users to the areas of the water system that are most vulnerable to contaminant intrusion. The proposed research will not only assist with the City's existing cross connection program but will also help other water authorities with their systems design and operation.

This is an innovative approach to cross connection control.

This grant application would be #6 in priority ranking of the following submissions previously approved by Council bringing our total request to the Okanagan Basin Water Board to $110,000.00 from $90,000.00.

1. City of Kelowna, Civic Operations - Drought Tolerant Sod Replacement Program - $30,000.00;
2. City of Kelowna, Parks Services - Reducing Water used for Irrigation by Active Management - $20,000.00;
3. Okanagan Regional Goose Mgt. Committee - Investigation of the Resident Canada Goose Population - $5,000.00;
4. Mission Creek Restoration Initiative - Website Development for Education and Outreach - $5,000.00;
5. Mission Creek Restoration Initiative - Ecological Goods & Services Assessment - $30,000.00;
6. UBCO - Contaminant Intrusion in Water Distribution Systems project - $20,000.00.

Internal Circulation:
Director, Civic Operations
Grants Manager

Existing Policy:
Water Subdivision Regulation Bylaw No. 10480
Development and Servicing Bylaw No. 7900

Financial/Budgetary Considerations:
UBCO are not requesting any funding from the City of Kelowna in support of this application.

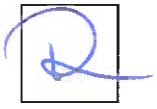
Considerations not applicable to this report:
Legal/Statutory Authority:
Legal/Statutory Procedural Requirements:

Personnel Implications:
External Agency/Public Comments:
Communications Comments:
Alternate Recommendation:

Submitted by:

Andrea Reeder

A. Reeder, Utilities Planning Manager

Approved for inclusion:  R. Cleveland, Director, Infrastructure Planning

Attach 1: OBWB UBCO Grant Application Letter
Attach 2: Water Conservation and Quality Improvement Grant Program 2012 Application Form

cc: Director, Civic Operations
Director, Strategic Initiatives

Attachment 1: OBWB UBCO Grant Application Letter

City of Kelowna

January 17, 2012
File: 0710-70

C/O Bahman Naser, Ph.D
Assistant Professor, School of Engineering
3333 University Way
Kelowna, B.C.,
V1V-1V7

Subject: OBWB UBCO Grant Application

To Whom It May Concern:

This is to inform you that we have carefully read Dr. Gholamreza (Bahman) Naser's research proposal entitled *"Contaminant Intrusion in Water Distribution Systems"*. We understand that he is applying for an Okanagan Basin Water Board Grant in order to study vulnerability of a water distribution system from both hydraulics and water quality points of views through a numerical modeling process. Further, I understand that he would like to study the Kelowna's water distribution system as a test case. This is to express the City of Kelowna's support for his proposed research and grant application.

The proposed modeling strategy fits very well within the City and the Provincial objectives for developing source to tap solutions for water protection. Our intent would be to use Dr. Naser's research to augment our existing cross connection control program. We would expect that we could enhance our management of public safety and risk by matching the location of high risk users to the areas of our water system that are most vulnerable to risk of contaminant intrusion. We believe that the proposed research will not only assist us with our existing cross connection program but also help other water authorities with their systems design/operation. Further, this is an innovative approach to cross connection control and first project of its type in B.C. that I am aware of.

While Dr. Naser has not requested any financial support from the City of Kelowna for his research proposal, we are happy to offer him any technical information that may assist him with his research. This includes G.I.S. data, water modeling, and existing studies. Further, we will assist Dr. Naser's team with scheduling, sampling and locations for field measurements. However, laboratory tests/measurements will be carried out in the Water-Lab at the University of British Columbia.

Should you desire any further information, please do not hesitate to contact myself at (250) 469-8876.

Regards,

Andrew Reeder, P.Eng.,
Manager of Utilities Planning

Infrastructure Planning
1435 Water Street
Kelowna, BC V1Y 1J4
TEL 250 469-8876
FAX 250 862-3363
kelowna.ca

Attachment 2: Water Conservation and Quality Improvement Grant Program 2012 Application Form

Okanagan Basin WATER BOARD

1450 K.L.O. Road
Kelowna, B.C.
V1W 3Z4
250-469-6270
www.obwb.ca
grants@obwb.ca

Water Conservation and Quality Improvement Grant Program 2012 Application Form

Please carefully complete and review this form before submitting. If you are unclear on any of the sections, please consult the guide to the application, or contact the office and grants administrator at 250-469-6270 or grants@obwb.ca.

A. PROJECT SUMMARY

Name of Organization University of British Columbia-Okanagan

Project Title Contaminant Intrusion in Water Distribution Systems

Regional District ○ RDNO ◉ RDCO ○ RDOS

Supporting Local Gov't The City of Kelowna

Project Budget $20,000.00 Grant Requested $20,000.00

B. PROJECT CONTACT

Name Gholamreza Naser

Title Assistant Professor

Phone 2,508,078,464 Fax 2,508,079,850

Email bahman.naser@ubc.ca

C. PROJECT GOALS

What is the aim of the project?

Contaminant intrusion is one of the most important mechanisms for water quality failure in a water distribution system (WDS). Three prerequisite conditions of contaminant intrusion are contaminant sources, driving forces (low/negative pressure), and pathways. Focusing on the pathway element, the main objective of this research is to develop an ingress model to determine the volume inflow rate of contaminant to a WDS.

D. PROJECT DELIVERABLES/MEASURABLE OUTCOMES

What are the expected deliverables of the project? How will the project's success be measured?

The outcome of this research will help water authorities to have a more realistic estimate of the contaminant intrusion to a WDS. When coupled with a WDS modeling tool (e.g., EPANET), this research can be used to assess the risk associated with the intrusion and contaminant propagation along a WDS.

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E. PROJECT METHODOLOGY

Briefly describe how your organization will achieve its goal.

The research will be accomplished in four steps. 1) Subsurface Module: This module will develop a two-dimensional finite element model to determine the flow conditions in a saturated porous media around a pipe by employing the Forchheimer-extended Darcy's law. 2) Design of Experiment Module: The intrusion rate depends on many factors. This module will investigate the effective factors, the degree of their significance, and the possible combination of them that may have impacts on the volume rate of the intruded contaminant. This module will also determine a set of dimensionless parameters among the effective parameters. However, the functionality will be determined by performing a set of numerical simulations each for a specific value of a dimensionless parameter. 3) Optimization Module: Using the generated numerical data-set and applying an optimization process, the functionality discussed in step 3 above will be determined. 4) Case Module: This module will perform a case study on the water distribution system of the City of Kelowna to find the system's vulnerability and risk contours.

F. PROJECT TIMELINE

Project Start Date (dd/mm/yy)

Completion Date (dd/mm/yy)

Activity (describe components of project below)	Category (select)	Date (mm/yy)
Subsurface Module	Other	05/12
Design of Experiment Module	Other	08/12
Optimization Module	Other	09/12
Case Module	Data Collection	10/12

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G. PROJECT PARTNERS

How does this project illustrate collaboration with other agencies? With other jurisdictions?

The proposed research will facilitate and promote informed decision-making process for a water distribution system management/operation. Mr. Andrew Reeder who works for the City of Kelowna as the Manager of Utilities Planning will be closely involved in this research. The City will provide all the necessary technical help to conduct this study. A weekly meeting will be arranged with Mr. Reeder to discuss the research progress.

H. PROJECT VALLEY-WIDE BENEFIT

Recognizing that the Okanagan is one valley with one water, how does this project benefit the valley as a whole? Describe how the outcomes of the project can benefit others in the Okanagan.

Contaminant intrusion may happen anywhere in the valley at anytime if prerequisite conditions exist. Cross connection is a common problem in Okanagan valley. The proposed model will provide realistic estimates of the rate/volume of the intruded contaminant. When coupled with a robust hydraulic model (e.g., EPANET), it will determine the intrusion risk and the vulnerability of a system. All municipalities responsible for providing safe and reliable drinking water will directly benefit from the research outcomes.

I. PROJECT INNOVATION

What is innovative about this project? Will this project present a new and/or innovative approach or address a previously unidentified issue?

Ignoring the significant impacts of the soil properties (hydraulic conductivity, porosity, and particle size) on the intrusion rate, the orifice equation is often suggested for estimating the intrusion rate into a WDS, while it is not accurate enough. This research, for the first time, will consider the impacts of the soil properties on the intrusion rate.

J. GRANT TRACK RECORD

If your organization has recieved OBWB grants for previous projects, please comment on the success of the projects and the significance of the grants to your organization.

Not applicable.

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K. PROJECT FUNDING

Total Project Funding $

Source	Type	Confirmed

L. PROJECT EXPENSES

Total Project Budget $

Project Management	
Equipment	$ 2,030.00
Supplies/Consumables	$ 570.00
Printing/Media	$ 500.00
Consultant/Contractor	$ 2,000.00
Travel	$ 300.00
Wages	$14,600.00
Other	

SUBMITTING THIS APPLICATION

Please ensure you have reviewed the terms of reference and the guide to the application. Once your application is complete, please submit a copy, along with the **required supporting resolution** from local government and any other supporting documents, to:

The Okanagan Basin Water Board
re: 2012 WCQI
1450 K.L.O. Road
Kelowna, B.C.
V1W 3Z4

Applications must be recieved by **4:00 p.m., February, 24, 2012.** Late or incomplete applications will not be accepted. Please save and print a copy of the application for your records.