

**Summary of Community Liaison Group Feedback
on the
Centre Wellington Scoped Tier 3 Water Budget and
Local Area Risk Assessment
Physical Characterization Draft Report**

**Prepared by Grand River Conservation Authority,
Ministry of the Environment and Climate Change,
Township of Centre Wellington,
Wellington Source Water,
Matrix Solutions Inc., and
Lura Consulting**

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**Centre
Wellington**



**LAKE ERIE
SOURCE
PROTECTION
REGION**

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1 Introduction

Background

The Grand River Conservation Authority (GRCA), with funding from the Ministry of the Environment and Climate Change (MOECC), is managing a Scoped Tier 3 Water Budget Study and Local Area Risk Assessment for the Centre Wellington municipal drinking water system on behalf of the Township of Centre Wellington.

The goal of the Centre Wellington Scoped Tier 3 Water Budget and Local Area Risk Assessment (Tier 3 Study) is to provide a quantitative assessment of current and future risks to Centre Wellington's municipal drinking water sources. The ability of the municipal wells to meet demand will be evaluated under a variety of future scenarios.

Given the growth projections introduced under the *Places to Grow Act* (2005) in the Growth Plan for the Greater Golden Horseshoe (2005, 2017) and the expected increase in water use in the Township, a Scoped Tier 3 Study was initiated in the fall of 2016. The project is being carried out as a "scoped" study as a number of the Risk Assessment scenarios evaluated in other Tier 3 Studies may not be able to be evaluated. Similar to other Tier 3 Studies, this Scoped Tier 3 Study will develop and apply water budget tools that will be applied to support the Township in safe-guarding the quantity of their long term municipal water supply aquifers. Scenarios will be designed and run to identify the potential change in water levels in municipal wells due to: a) new additional (hypothetical) future water supply wells (to be determined with input from the Water Supply Master Plan); b) climatic variability and climate change; and c) reductions in groundwater recharge resulting from future changes in land use development.

The following are the key components of the Centre Wellington Scoped Tier 3 Study:

- Data Collection and Review
- Physical Characterization / Conceptualization of the Hydrogeologic Flow System
- Numerical Groundwater Flow Modelling, and
- Risk Assessment

This study, like all Tier 3 Water Budget studies, is being peer reviewed on behalf of the Province by a team of highly qualified third party technical experts. The Provincial Peer Review Team has met with the Project Team once and will meet with the project team and consultants at least twice more throughout the project. The role of the Peer Review Team is to ensure the project is scientifically defensible, ensure any subjectivity in the project will not result in significantly varying outcomes, and to provide guidance and feedback to the project team at critical milestones throughout the project.

Stakeholder and community consultation is an important component of the Centre Wellington Scoped Tier 3 Study. A [Community Liaison Group](#) (CLG) was formed at the outset of the project and the group is comprised of 15 local stakeholders and residents. The purpose of the CLG is to provide feedback and

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advice to the Tier 3 Project Team at key milestones in the study, and support efforts to keep the broader community informed about the project and its progress.

A draft [Physical Characterization Report](#) was prepared by the project consultant and reviewed by the Provincial Peer Review team in the summer of 2017, representing a key milestone in the project process. The report was updated with feedback from the Peer Review Team and an updated draft report was subsequently circulated and presented to CLG members in the fall of 2017, which generated interest in the form of comments and questions.

Report Contents

This document provides a high level summary or synthesis of the comments and questions submitted by CLG members on the draft Physical Characterization Report. Section 2 provides project team responses to questions received by the CLG and is followed by a brief description of next steps in Section 3.

2 Summary of Community Liaison Group Feedback

The draft Physical Characterization Report was provided to CLG members in the summer of 2017 and time was provided to the CLG to review and comment on the contents of the report before the document was finalized. Six email submissions, containing over 80 broad and detailed questions and comments were received by members of the CLG; the table presented below provides a synthesis of the themes regarding the key questions/issues received and the Project Team responses to those questions.

What We Heard

A few submissions conveyed appreciation for community involvement and the opportunity to provide input to the Tier 3 Study process, and a few others commended the quality of the CLG presentation and the quality of the technical information presented in the Physical Characterization Report. Recurring comments, concerns, questions and input on the draft report, which expand on the questions raised at the second CLG Meeting, have been organized according to the themes below:

- Study Purpose and Process
- Physical Setting and the Study Area
- Water Supply Systems and Estimated Demand
- Municipal Water Quality
- Suggestions to Improve Report Formatting
- Data Requests

Project Team Responses

Key questions/issues raised by CLG members are listed below along with the corresponding response from the Tier 3 Project Team.

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Questions / Issues	Response
Study Purpose and Process	
<p>What is the purpose of the study?</p>	<p>The purpose of the Scoped Tier 3 Study is to evaluate the sustainability of Centre Wellington’s municipal water supply system as it currently operates, and under various changes, such as land development as the population increases, drought, and increased municipal water takings that may occur into the future to the year 2041.</p> <p>The overall scope of the project has not changed, although the budget for the 2017/2018 fiscal year was revised to reflect unforeseen, yet necessary, technical revisions. This included the development of a new groundwater flow model, and the inclusion of the most current (yet-to-be-published) geological data from the Ontario Geological Survey. The project team is dedicated to the development of a groundwater flow model based on all best available current information, and this has taken more time than originally anticipated.</p>
<p>Can additional information on the project scope and Water Supply Master Plan be provided?</p>	<p>The schedule and timelines for this study have varied from those established at the onset of the project. When the project started in September 2016, the Township was not planning to begin their Water Supply Master Plan (WSMP) until after 2019. This has now changed with Township Council approving funding for the WSMP in its 2017 and 2018 Capital Budgets. The Request for Proposals for the WSMP was issued by the Township on December 14, 2017 and closed on January 15, 2018. Until the timelines for its completion are confirmed, the Tier 3 project timelines for the latter parts of the study are in flux.</p> <p>The Tier 3 groundwater flow model will be presented to the CLG in the spring of 2018. Following the completion of the model, a number of scenarios evaluating different stresses on the groundwater flow system will be assessed and the results will be analyzed; this process is referred to as the Risk Assessment. The Risk Assessment portion of the Tier 3 Study will use the groundwater flow model to evaluate stresses to the groundwater system, such as increased municipal pumping, changes in land cover resulting from land use development, drought, and the effects of other large water takers on the water levels at the municipal supply wells. The intent of this study is to follow the prescribed risk assessment scenarios outlined in the Ministry’s Technical Rules as closely as possible. However, some of scenarios cannot be completed if the Water Supply Master Plan is incomplete. The Project Team will work closely with its municipal partners to ensure relevant scenarios are developed to assess the potential effects of growth and development on the Centre Wellington municipal groundwater system. The Project Team is working towards the common goal of increased understanding of the Township’s municipal water supplies now and into the future, and to better understand what stresses affect the supply and how those stresses can be effectively managed. To begin this process, meaningful scenarios will be developed in consultation with the Township, Province, and consulting teams for the Tier 3 and the WSMP.</p>

<p>To better ensure that the public is made aware of upcoming meetings, it was requested that at least two weeks advance notice of meetings be provided using various forms of communication.</p>	<p>For the first CLG meeting, notice was provided in the Wellington Advertiser and through a Centre Wellington Council meeting. The second CLG meeting was posted on GRCA’s Facebook page and released through GRCA’s Twitter account. The Township re-tweeted the meeting notice twice prior to the meeting. We acknowledge that updates via social media may not be the way to reach everyone.</p> <p>We will increase efforts to extend the reach of our communications to the general public prior to the next meeting. Members of the CLG are also encouraged to let others in their organization, or other interested individuals in the community know about the meeting on their respective organization’s websites as well.</p>
<p>Physical Setting and the Study Area</p>	
<p>How does rainfall make its way to the municipal wells?</p>	<p>Some of the rain or snow that falls to the ground surface seeps into the ground. The portion that flows downwards through the unsaturated (dry) zone and reaches the water table is called groundwater recharge. This water is always moving underground; it moves more quickly through “aquifers” (rocks or soils that transmit water easily) and moves much more slowly through aquitards (rocks or soil that do not transmit water very easily). The rate or velocity that groundwater moves is dependent on the location and characteristics of the aquifer and aquitard layers, but groundwater is always moving. Groundwater continues to move until it enters (discharges) into a surface water feature like a river, stream or lake, or until it is withdrawn from the ground by pumping at a well.</p> <p>The arrows on Figure 1 illustrate the direction that groundwater is flowing from the shallow water table aquifer to deeper groundwater aquifers, including areas where the confining unit (aquitard) is absent, vertically fractured or discontinuous. The source of water for deep bedrock units such as the Gasport Formation deep below the ground in Centre Wellington includes water that flows as part of the regional bedrock flow system (e.g. water originating near the Niagara Escarpment), but there are also contributions of water from the overlying overburden and bedrock aquifers in the area.</p>

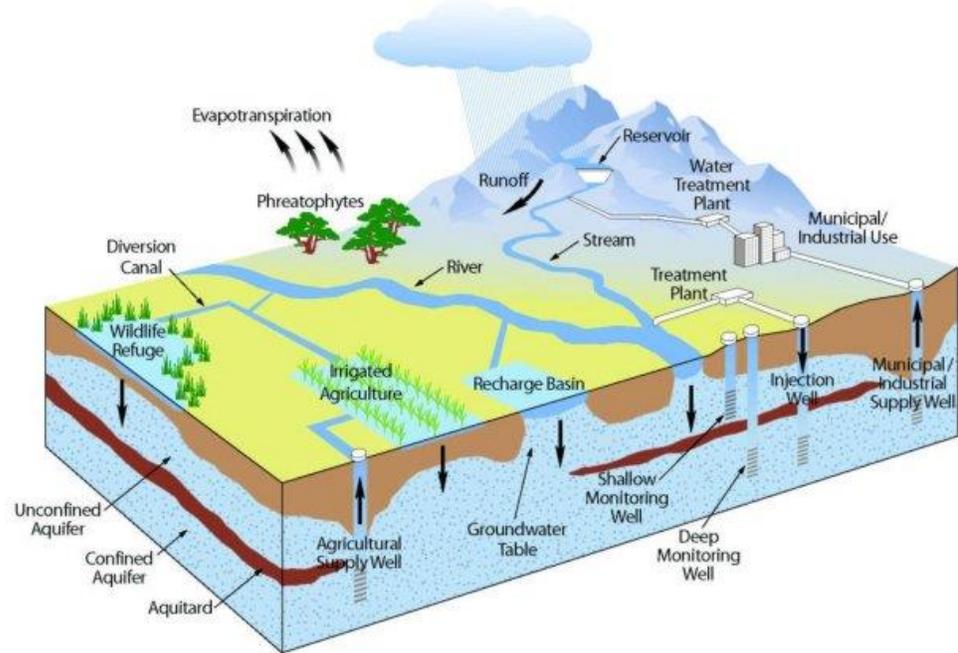


Figure 1: Water Cycle (from, California Department of Water Resources)

Computer models are often developed to help evaluate the sustainability of shallow and deep bedrock aquifers. Groundwater flow models are simplifications of the complex subsurface environment yet they provide insight and information on how the groundwater flow system may respond to different stresses without the risk of long term testing in the real world. For example, a groundwater flow model can be used to evaluate; a) the change in the groundwater flow system if pumping from municipal wells is increased to their estimated future pumping rates, b) the effects of long-term drought, or c) the impact of reductions of groundwater recharge in the urban areas due to land use development. Groundwater modelling provides insight on the potential individual or cumulative effects associated with different environmental stresses. It is important to note that the modelling results are not facts; rather, they provide insight into the long term sustainability of the municipal aquifer(s) under various future potential conditions.

Water Supply Systems and Estimated Demand																
How are non-municipal water users incorporated into the study?	<p>Recognizing the value of the water demand estimates for this project, water use estimates across the Study Area were estimated using various data sources (Table 1).</p> <p>Table 1: Water Demand Data Sources</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Type</th> <th style="text-align: left;">Example</th> <th style="text-align: left;">Source for Estimated Water Demand</th> </tr> </thead> <tbody> <tr> <td>Municipal - Permitted</td> <td>Centre Wellington municipal wells</td> <td>Metered rates from Townships</td> </tr> <tr> <td>Non-municipal - Permitted</td> <td>Aquaculture, golf course irrigation</td> <td>Water Taking Reporting System</td> </tr> <tr> <td>Non-municipal - Permit Exempt - Agriculture</td> <td>Large-scale poultry operation</td> <td>Reported and estimated values from the agricultural water users (with focus on farms located near municipal wells)</td> </tr> <tr> <td>Non-municipal Domestic (rates below permit requirements)</td> <td>Domestic water takings</td> <td>Environment and Climate Change Canada. 2017. Residential Water Use in Canada report.</td> </tr> </tbody> </table> <p>The future water demand for all water takers, with the exception of the Centre Wellington municipal wells, is assumed to be the same as current water demands. Future municipal pumping rates for Centre Wellington will be estimated in consultation with Township staff. A summary of the water takers within the Study Area was provided in Appendix C of the Physical Characterization Report.</p> <p>Additional work has been done to estimate demands from non-permitted agricultural water takers located in close proximity to the municipal wells. These water takers were incorporated into the groundwater flow model and those pumping rates will be documented in the forthcoming groundwater flow modelling report.</p> <p>Water demand associated with potential new developments such as research facilities were not included in this project as those developments have not applied for, or do not hold active permits to take water.</p>	Type	Example	Source for Estimated Water Demand	Municipal - Permitted	Centre Wellington municipal wells	Metered rates from Townships	Non-municipal - Permitted	Aquaculture, golf course irrigation	Water Taking Reporting System	Non-municipal - Permit Exempt - Agriculture	Large-scale poultry operation	Reported and estimated values from the agricultural water users (with focus on farms located near municipal wells)	Non-municipal Domestic (rates below permit requirements)	Domestic water takings	Environment and Climate Change Canada. 2017. Residential Water Use in Canada report.
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Why is municipal Well F2 included in the study since it's been off-line since 2003?	<p>The Township of Centre Wellington has a Permit to Take Water issued by the MOECC for ongoing water taking from Well F2, even though the well is currently offline. The well was included in the Scoped Tier 3 Assessment because it is a potential municipal water supply well that could be used in the future if treatment were put in place. There are practical reasons why the well is currently not being used; however, the Water Supply Master Plan will assess all wells, including Well F2, in developing long term potential water supply solutions for the Township, and the results of that study may, or may not, recommend that the well be brought back online as a water supply well. The Township wishes to include all potential wells within the Study Area as options, and not close any doors.</p>															

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<p>How does a PTTW applicant to demonstrate their water taking is sustainable?</p>	<p>The MOECC’s Permit to Take Water Manual (2005) sets out what the Ministry considers when evaluating a Permit to Take Water application. Those seeking a permit use the guide to complete their applications and submit any additional required supporting technical documentation. The Manual also sets out the Province’s water management policy “to ensure the fair sharing, conservation and sustainable use of the waters...”. MOECC ensures this approach is achieved by requiring (as outlined in the Manual) that proposed permit holders must consider the following six principles:</p> <ol style="list-style-type: none"> 1) the reasonable water needs for natural ecosystem function; 2) prevention of unacceptable interference with existing uses of water; 3) employment of adaptive management to better respond to changing environmental conditions; 4) the cumulative impacts of water takings; 5) the incorporation of risk management principles whereby the level of scientific evaluation required is commensurate with the potential for environmental effects and inference with other users. 6) the promotion public and local agency involvement – municipalities and conservation are notified about long-term, non-agricultural water takings PTTW and provided the opportunity to comment and notices about these applications are posted on the Environmental Registry for the public to review and provide comments.
<p>Does source protection differentiate between takings that returned to the watershed and those that are not?</p>	<p>The purpose of the Source Protection Tier 3 Study is to assess the long-term sustainability of the municipal water sources. From a source protection perspective, consideration is given to the consumptive use of the water taking. Water that is pumped from an aquifer and not returned to the same aquifer is considered consumptive. Consequently, Source Protection studies do not differentiate between takings that withdraw from a groundwater source and return to a surface water source and those that withdraw from a groundwater source and return to a surface water source outside the watershed.</p>
<p>How will the Middlebrook Well be assessed as a part of this study?</p>	<p>The focus of a Tier 3 Study is to evaluate the long-term sustainability of municipal drinking water sources. Future municipal wells evaluated as part of the municipal planning process are included in Tier 3 Studies; however, future water needs of commercial and industrial takers are traditionally not evaluated. As this is a Scoped Tier 3 Study the potential effects of a new non-municipal water taking coming on-line will be evaluated.</p> <p>The proposed taking from the Middlebrook Well has been selected as an example water taking as hydraulic testing data is available from that well, so the results and interpretations can be incorporated into the groundwater flow model. For the Tier 3 Study, the Middlebrook Well will be assessed in a scenario using a rate of 1,637 m³/day. This rate coincides with the pumped rate during the long-term (30-day) pumping test conducted in 2004 (Gartner Lee 2005). The impact of pumping at this</p>

	rate on water levels in the municipal wells will be evaluated, and the results will be used by the Province and the municipality to guide water management decisions.
Municipal Water Quality	
<p>Will the water budget model be considering water quality in addition to water quantity?</p>	<p>An in depth analysis of water quality parameters is beyond the scope of this Tier 3 Study. How water moves in the subsurface and how water composition changes as it moves are very complex problems to evaluate simultaneously using computer models. Current groundwater modelling practices typically look at water quality and water quantity separately, especially when applied beyond a property level scale. For example, water quantity is assessed through development of a water budget which quantifies the components of the water cycle. In contrast, water quality is evaluated by assessing the geochemical evolution of groundwater along its flow path as it interacts with soil and rock.</p> <p>Developing a groundwater model that integrates water quality and quantity is outside the scope of this project, and the Source Protection program is directed at evaluating water quality and quantity threats separately. However, water quality parameters can provide insight into groundwater movement, and as such are helpful in developing the conceptual understanding of groundwater flow through the subsurface. For example, water quality changes over time within a well can indicate the influence of activities at ground surface and may identify the presence of younger water in areas where older water is expected. The presence of certain water quality parameters can also indicate shorter than expected groundwater travel times. Similarly, information about potentially shortened travel times may provide information about the connectivity of bedrock fractures in that area.</p> <p>Water quality parameters that suggest anthropogenic impacts on groundwater (i.e., chemical contaminants from industrial activity, nitrogen and pathogens from septic systems) or those that are naturally occurring indicators of surface water (i.e., pathogens, atmospheric levels of dissolved oxygen) can indicate connections between surficial sources of contamination and underlying aquifers. For this study, where information about these parameters was available, it was examined as part of the development of the conceptual model and this is why water quality studies are referenced in the Physical Characterization Report.</p> <p>The Township has completed separate water quality related studies to evaluate their municipal water quality and these are summarized and available for review in Section 7.3 of the GRCA’s Assessment Report (https://www.sourcewater.ca/en/source-protection-areas/Grand-River-Assessment-Report.aspx).</p>
<p>How is water quality for municipal wells protected?</p>	<p>Ontario’s drinking water is protected by a comprehensive safety net that includes the protection of drinking water sources, the establishment and implementation of appropriate treatment and implementation of a comprehensive testing program to verify the effectiveness of treatment.</p> <p>The first step in the safety net approach is protecting the surface or groundwater resources that supply the municipal drinking water systems. This is called Source Protection. The Grand River Source Protection Plan (2015) includes policies to</p>

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	<p>address identified water quality threats in Centre Wellington’s water quality-related Wellhead Protection Areas (WHPAs) and potential threats and issues identified within the WHPAs are documented in the Grand River Assessment Report (https://www.sourcewater.ca/en/source-protection-areas/Grand-River-Assessment-Report.aspx). A common misconception is that Source Water Protection involves protection of the ultimate recharge area, or “source” of the water within the municipal aquifers. As groundwater flows so slowly, Source Protection studies focus on the 25-year time of travel to reach the well, or the area within which water travels to the well in 25-years or less. This approach ensures municipalities have sufficient time to implement plans to protect the quality and quantity of their surface water or groundwater sources.</p> <p>The Township has established a Risk Management Office in conjunction with the other municipalities within Wellington County. Wellington Source Water Protection’s mandate is to implement the <i>Clean Water Act</i> for the Wellington County municipalities. Part of this role includes staff who are designated as Risk Management Officials and Inspectors for the Township. Risk Management Officials and Inspectors are responsible for ensuring activities that pose a significant risk to municipal water quality are identified, managed and inspected to reduce or remove the risk. Further information can be found at www.wellingtonwater.ca.</p> <p>Quality WHPAs will be re-evaluated using the groundwater flow model that is being developed as part of this study, and potential threats, such as septic systems and landfills, and issues, such as chloride or TCE, within the new WHPAs will be re-assessed. This work will begin after the groundwater flow model has been developed, calibrated and reviewed by the Provincial Peer Review Team. To learn more about quality-WHPAs and how municipal water quality is protected under the <i>Clean Water Act</i>, 2006 please visit: http://www.sourcewater.ca or http://www.wellingtonwater.ca</p> <p>Beyond the <i>Clean Water Act</i>, Ontario regulates the quality of drinking water by establishing strict health-based standards for microbiological organisms and chemical and radiological substances, as prescribed under the <i>Safe Drinking Water Act</i>. The Ontario Drinking Water Quality Standards are listed in <i>Ontario Regulation 169/03 (O. Reg.169/03)</i>.</p> <p>To ensure safe drinking water, the Township's drinking water system operates under a framework referred to as a <u>Quality Management System</u> that was established by the Ontario Ministry of the Environment and Climate Change and legislated under the <u><i>Safe Drinking Water Act, 2002</i></u>. Treated water samples are collected from the Elora and Fergus water systems on a weekly basis and tested to confirm water quality standards are met. Some parameters, such as chlorine, are monitored continuously. Water quality is summarized in the Township’s <u>Annual Water Report</u>. Further information can be found at www.centrewellington.ca.</p>
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<p>How do municipalities balance water quality with quantity?</p>	<p>When looking for a new groundwater supply well, municipalities consider the quantity of water available, the quality of the water, and the proximity of the location to existing infrastructure. The ideal municipal water source provides sufficient volumes of good quality water that requires minimal treatment and is located near residents. When such a supply is not available, municipalities must increasingly prioritize water quantity and balance treatment and distribution cost; these are some of the many considerations when a municipality evaluates a new potential groundwater supply well or surface water intake.</p>
<p>Will the Tier 3 Study evaluate private well water quality?</p>	<p>Groundwater is normally clean and safe for consumption. Soils that often overlie groundwater aquifers can act as a natural filter that can slow, or remove certain contaminants. Proper installation and maintenance of private wells should address most water quality concerns; however, treatment is often desired and may even be required. In Ontario, the responsibility for water quality testing and treatment of private wells lies with the private well owners.</p> <p>Through legislation and guidance, the Province aims to protect water quality and its use. The law sets out the minimum rules for:</p> <ul style="list-style-type: none"> ● Choosing a location for a new well (i.e., setback distances from potential contamination sources such as septic systems, chemicals, etc.); ● Licensing individuals and companies who construct a well; ● Constructing and maintaining a well; ● Abandoning a well (plugging and sealing it); ● Reporting well activities (e.g., completing and submitting well records); and, ● Responsibilities of the well owners. <p>A good reference guide for private well owners was developed by the Grey-Bruce Health Unit: Private Drinking Water.</p> <p>In Wellington County, private well owners that have concerns about their water quality should contact the Wellington-Dufferin-Guelph Public Health Unit. To help ensure water is safe, Public Health Ontario offers free water-quality testing for bacteria. The Health Unit recommends well water is tested for bacteria at least three times a year, with the most important time to test in the spring.</p> <p>Public Health have staff that can help interpret homeowners test results and provide information on disinfection and filtration systems, well upgrades and ongoing well maintenance. Further information can be found at www.wdgpUBLICHEALTH.ca.</p>

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<p>Suggestions to Improve Report Formatting or Readability</p>	<p>Members of the CLG provided several comments regarding the presentation of information in text, figures and maps within the report to help clarify the material presented. These comments were taken into consideration and in many cases the text and figures were updated to help strengthen the document. In some cases, the questions or comments raised will be more fully addressed in subsequent reporting phases of the project (i.e., Groundwater Flow Model Development Report, or the Risk Assessment Report).</p>
<p>Requests for Project Data</p>	<p>Several requests were received for project data related to the Tier 3 Study for independent review and analysis. The purpose of the CLG is to communicate the project to the community as it progresses, and receive local advice and input from the group. The report received by CLG members has been extensively reviewed through a Provincial Peer Review Team consisting of academia and experts in the field of hydrogeology and water resources. It is therefore not the objective of the CLG to provide additional data review.</p> <p>The project database compiled for this study contains data that has been obtained from third party organizations through a data license agreement. As stipulated in that license, the data is for use by the GRCA only for the Tier 3 Study. The GRCA is not permitted to otherwise transfer, sublicense, sell, loan, or disclose the data.</p> <p>Terms and conditions like these are relatively standard when non-open source data is licensed for specific projects between the GRCA and others. The GRCA cannot legally distribute data outside of our data license agreements.</p>

3 Next Steps

The Physical Characterization Report is now final and the groundwater flow model is under development. The model and preliminary results will be assessed by the Provincial Peer Review Team, and presented to CLG members, tentatively in spring 2018. CLG members will be given the opportunity to review and comment on the modelling report and results.