GUELPH-GUELPH/ERAMOSA TIER 3 STUDY AND WATER QUANTITY POLICY DEVELOPMENT PROCESS

Community Liaison Group Workshop

May 23, 2018

COMMUNITY LIAISON GROUP

Meeting Purpose

- Provide context and information about the technical studies that help guide the development of source protection water quantity policies
    a. Review the results of the Tier 3 Technical Study
    b. Provide an update of the Risk Management Measures Evaluation Process (RMMEP)
- Provide an update on the current state of the policy development process

COMMUNITY LIAISON GROUP

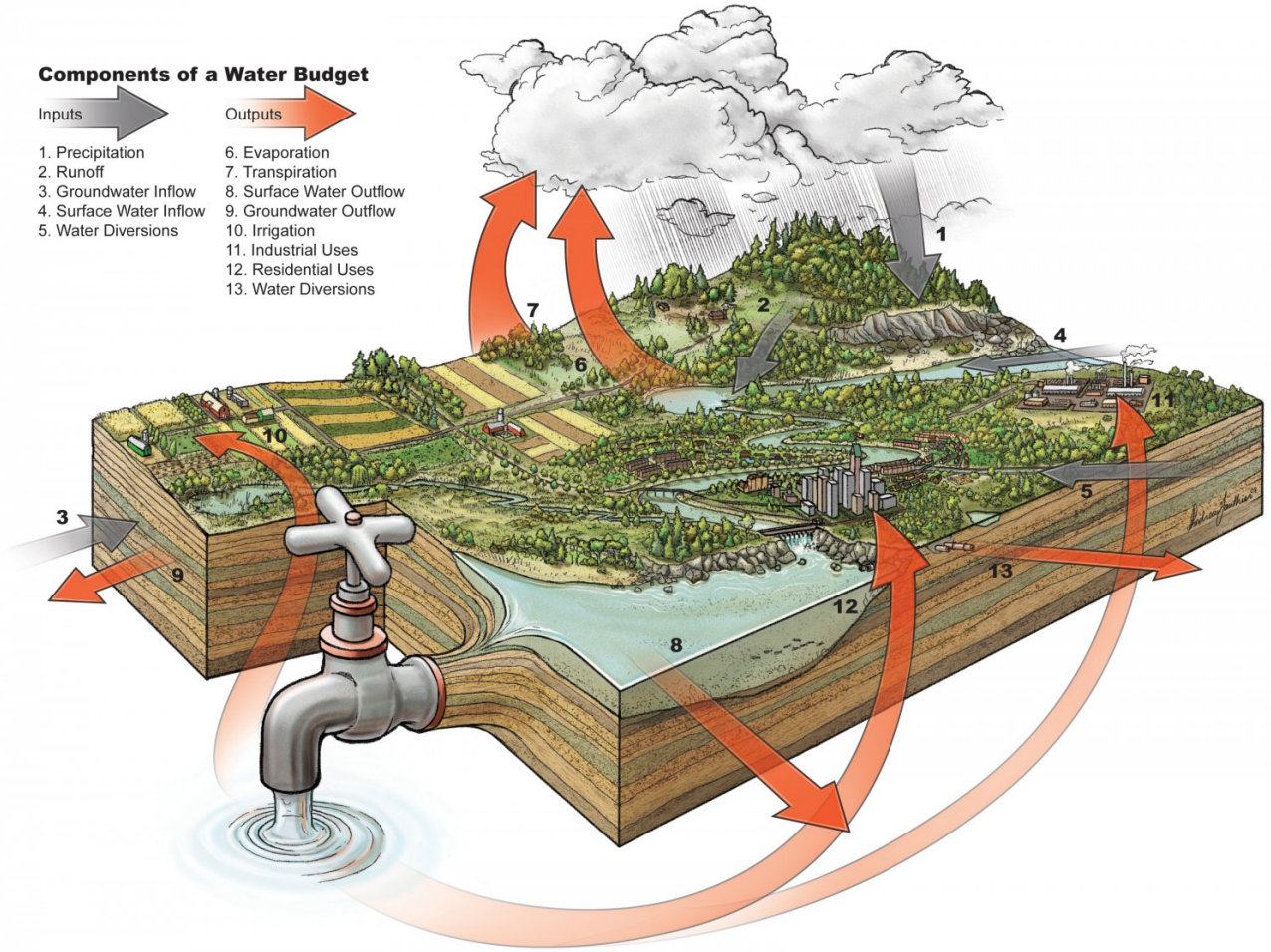
Agenda

7:00 p.m.	Welcome, Agenda Review and Introductions
7:10 p.m.	Review of Previous Meeting Outcomes
7:20 p.m.	Overview of the Technical Studies • Questions of clarification
8:20 p.m.	Update on the Current State of the Policy Development Process • Questions of clarification
8:55 p.m.	Next Steps and Closing Remarks
9:00 p.m.	Adjourn

COMMUNITY LIAISON GROUP

WATER BUDGET

What is a water budget?



- Technical study
- Quantifies the volume of water entering, moving through and leaving the area to help determine sustainable water use

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WATER BUDGET

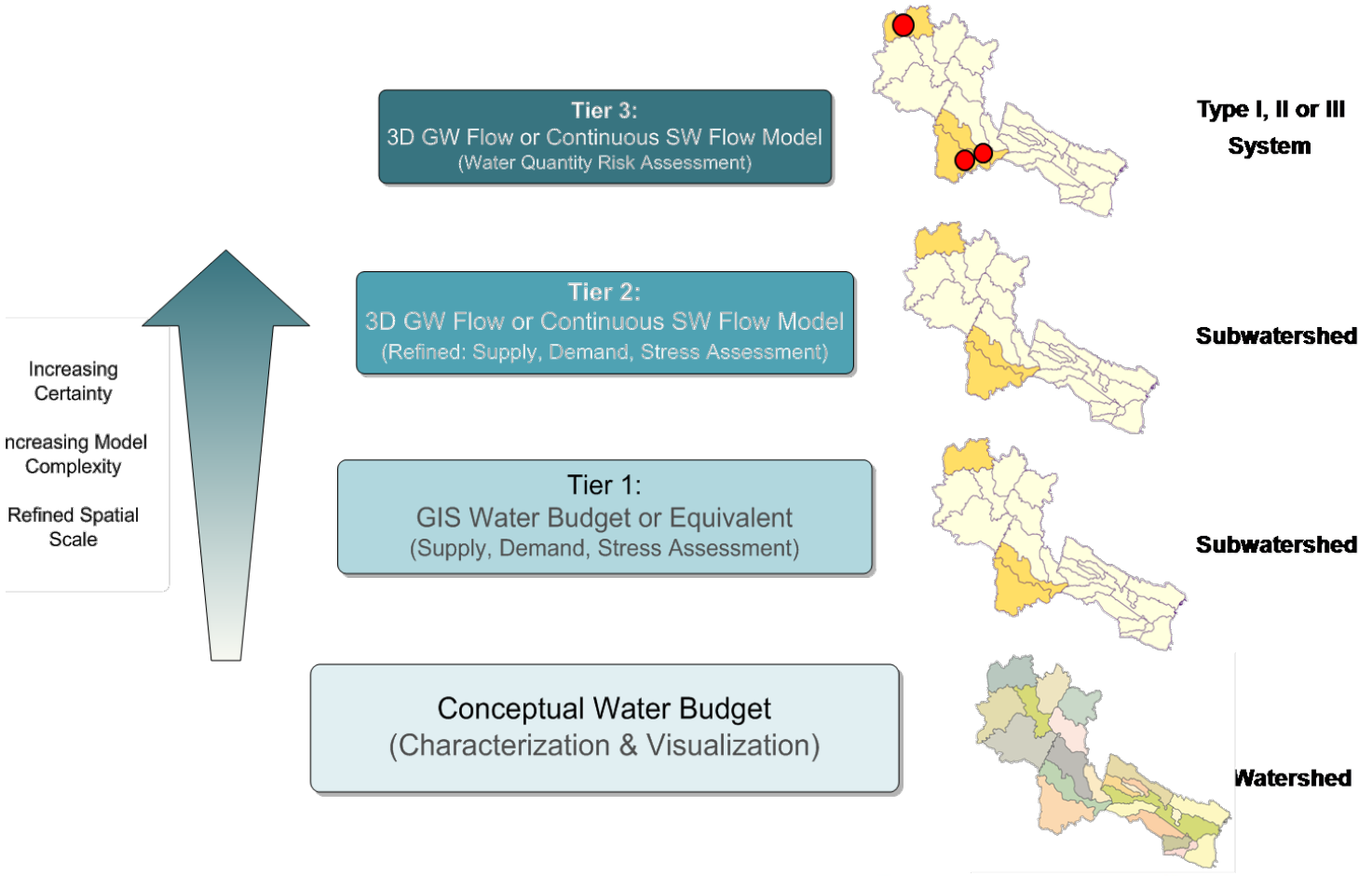
How does a water budget fit in the Source Protection Program?

- Program developed under the Province's *Clean Water Act, 2006* (CWA) to protect the quality and quantity of existing and proposed municipal drinking water systems
- To date, only water quality components of the Grand River Source Protection Plan have been approved and are in place
- Tier 3 water budget a major component of the water quantity work

WATER BUDGET

How does a water budget fit in the Source Protection Program?

- Tiered water budget studies assess water quantity following Province's Technical Rules:
  - Conceptual/Tier 1 (for Grand River watershed had sufficient data to move directly to Tier 2)
  - Tier 2 (complete)
  - Tier 3 (complete)



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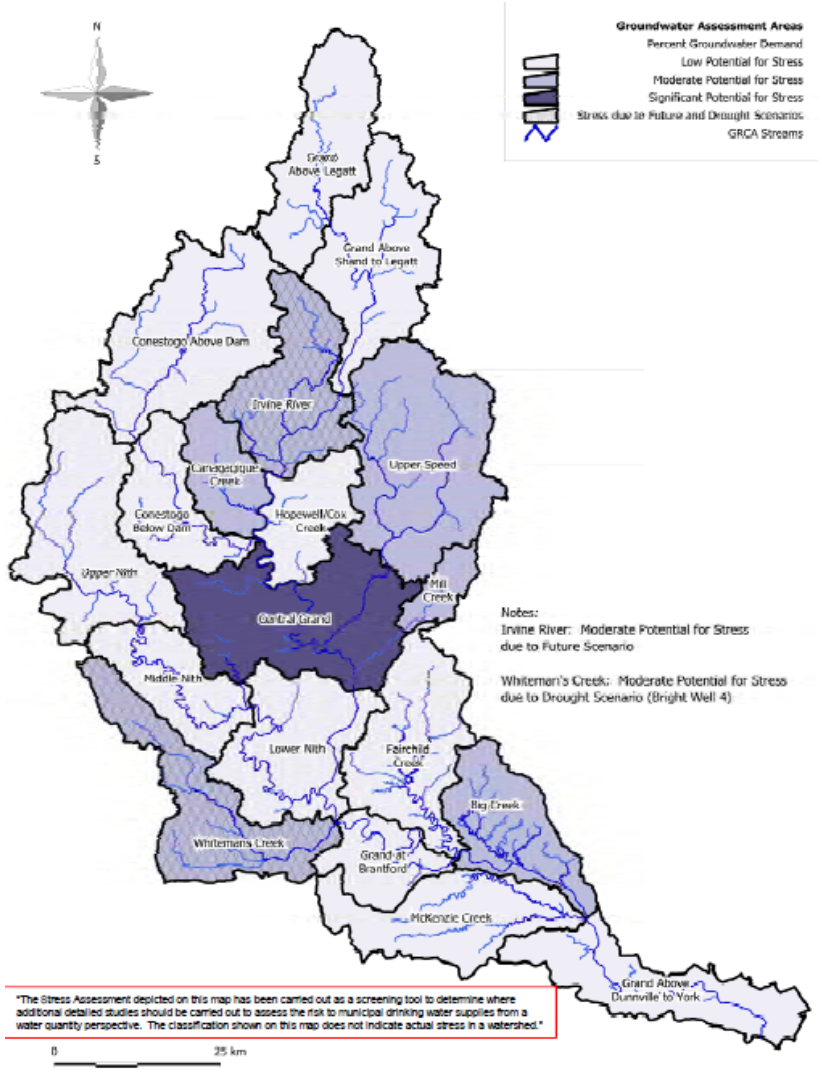
WATER BUDGET

Tier 2 Study

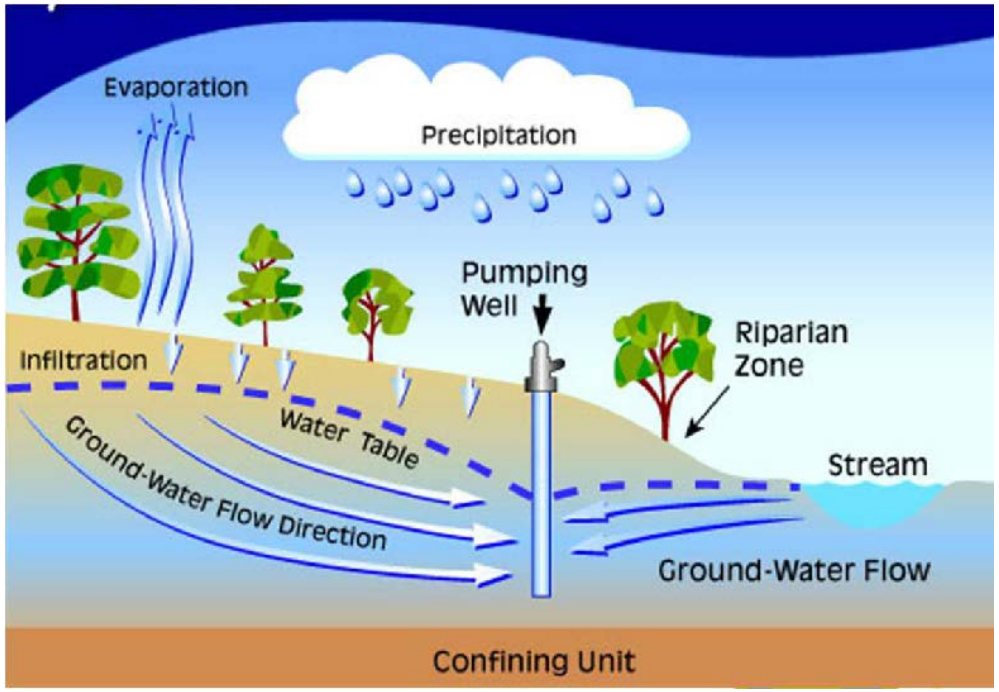


Aim: identify municipal drinking water systems that rely on groundwater or surface water with a potential for stress

- Tier 2 study completed for the Grand River watershed
  - Identified Upper Speed Assessment Area as having moderate potential for groundwater stress
- Results led to comprehensive evaluation of City of Guelph (City) and Guelph/Eramosa Township (GET) municipal drinking water systems (Tier 3)

WATER BUDGET

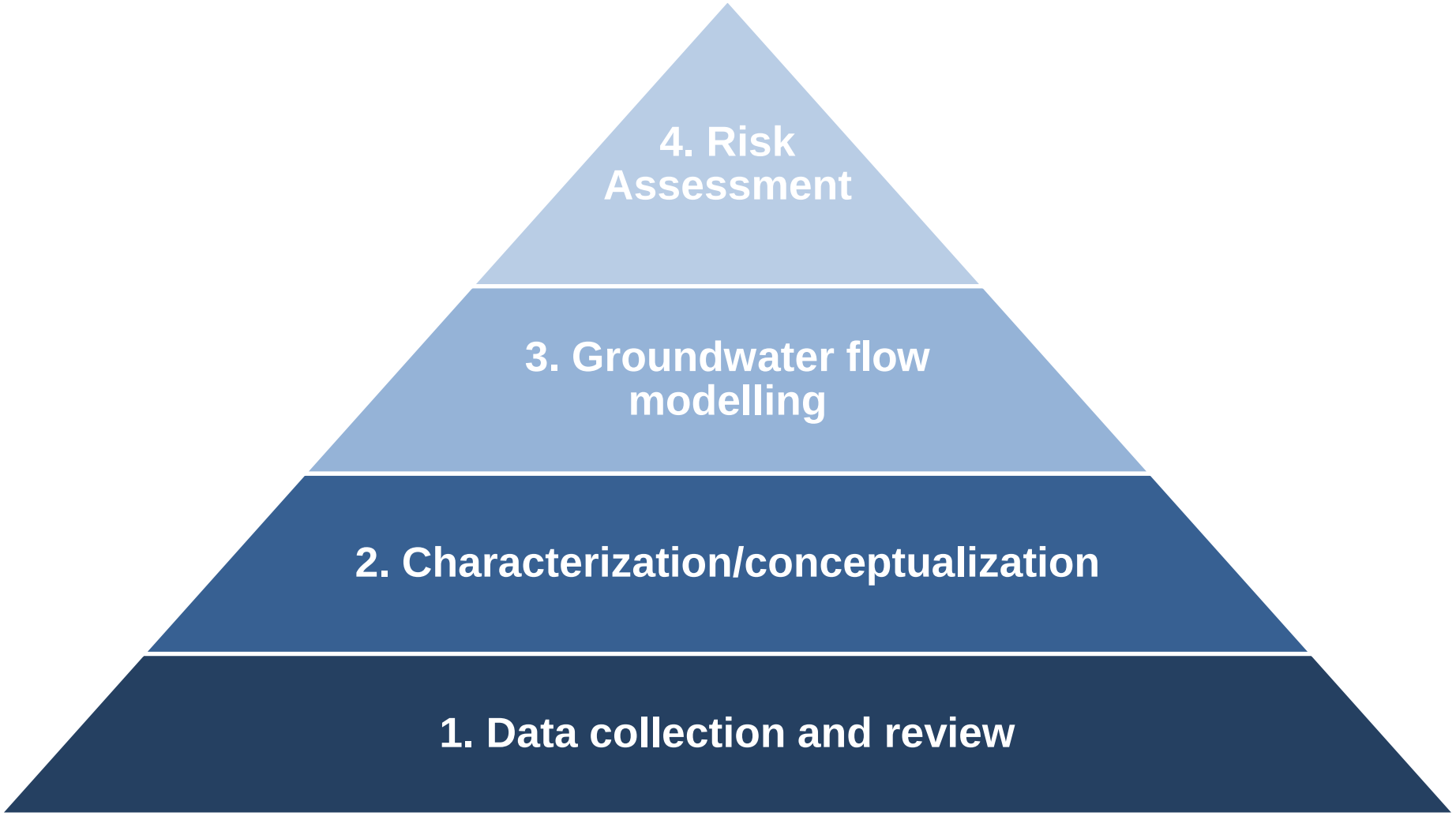
Guelph-Guelph/Eramosa (GGET) Tier 3 Study Objective



- Detailed study to identify if the City's and GET's water supply can meet current and future needs resulting from population growth
- Uses computer model to test variety of scenarios, such as:
  - Increased municipal water needs due to growth
  - prolonged drought
- Uses all available data to understand groundwater flow system and quantify amount of water flowing through the area

WATER BUDGET

GGET Tier 3 Study Components



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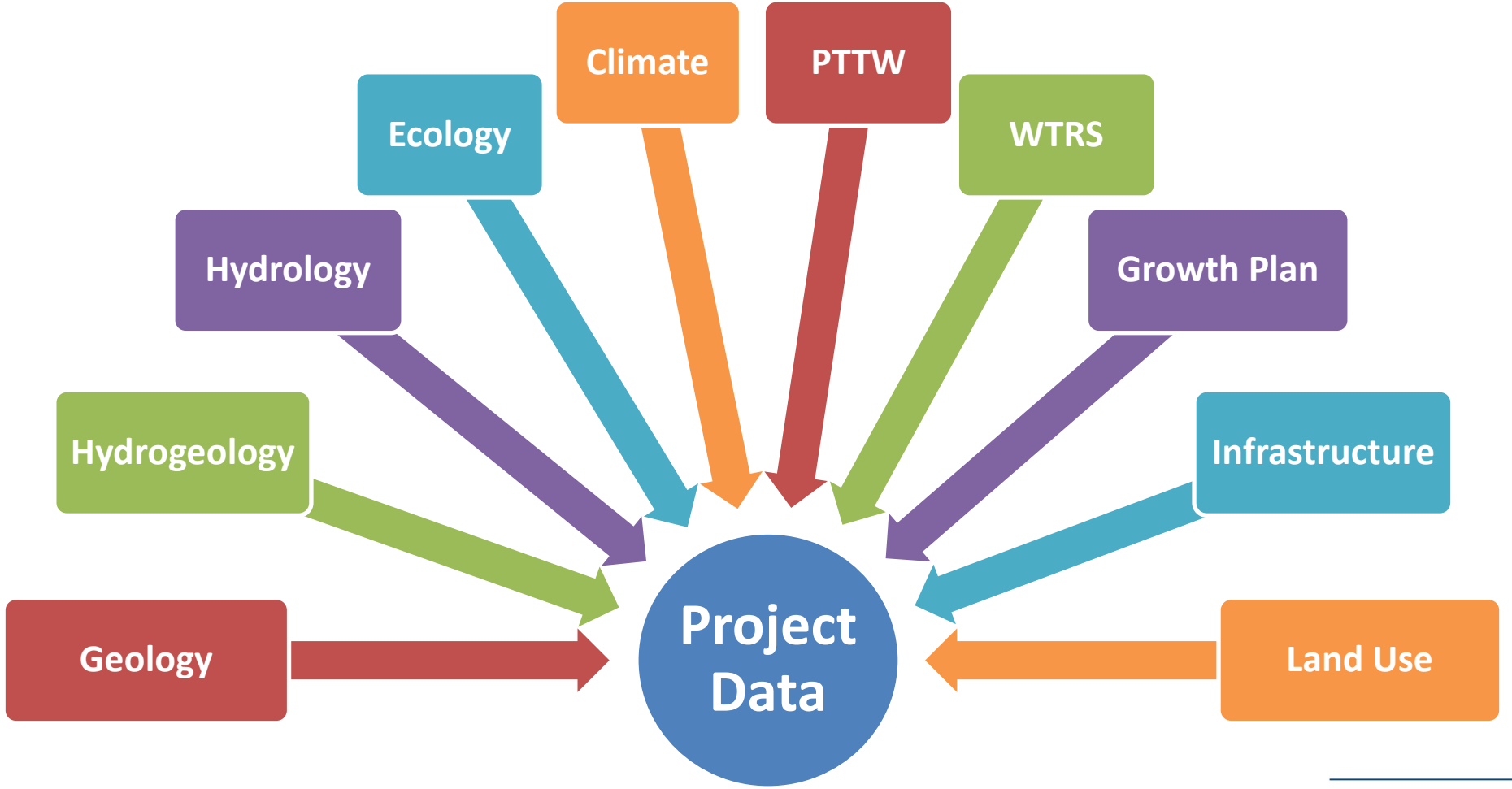
DATA COLLECTION

GGET Tier 3



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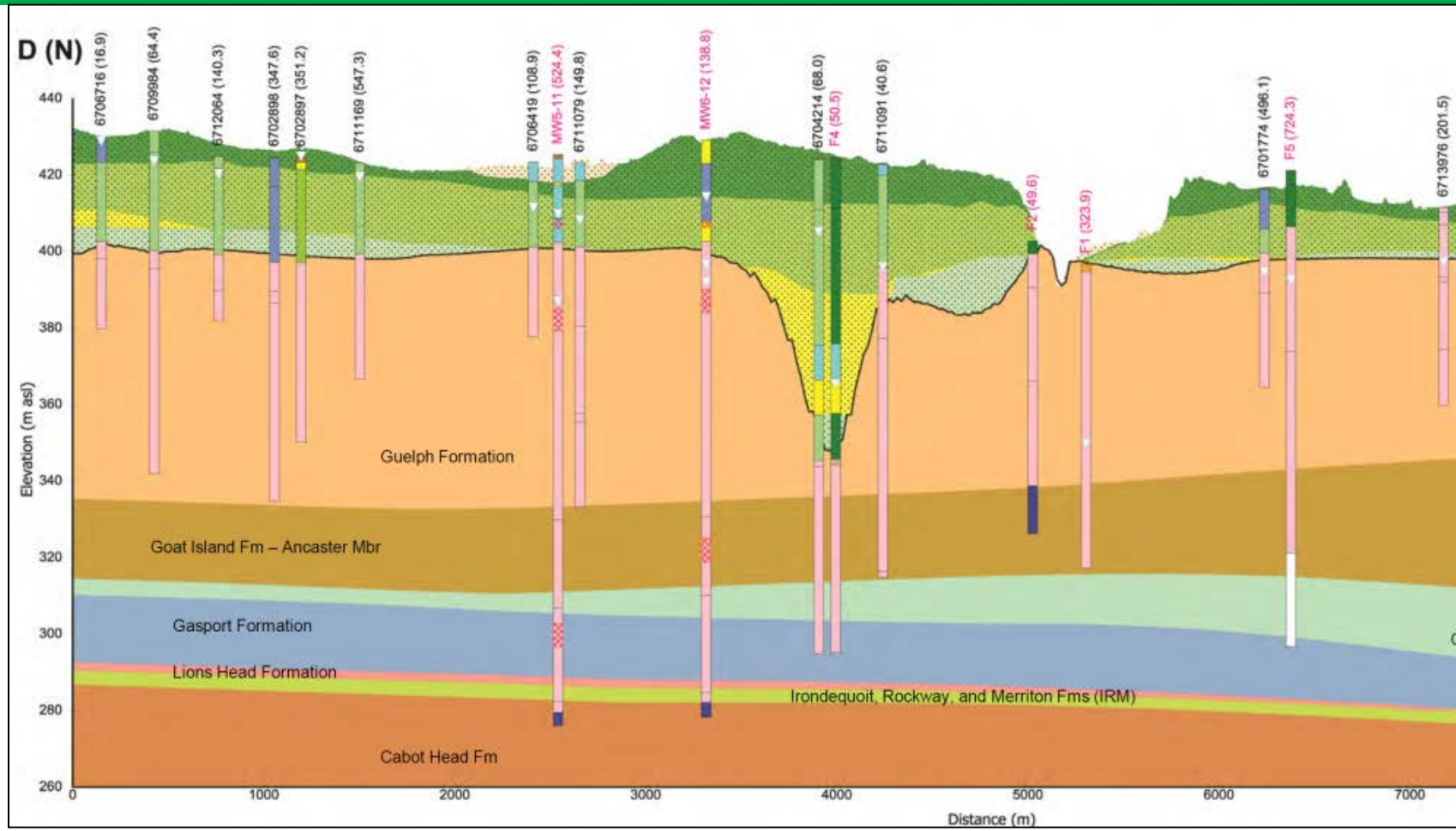
PHYSICAL CHARACTERIZATION

GGET Tier 3

- Geology
- Climate data
- Stream flow measurements
- Groundwater level measurements
- Reported water takings



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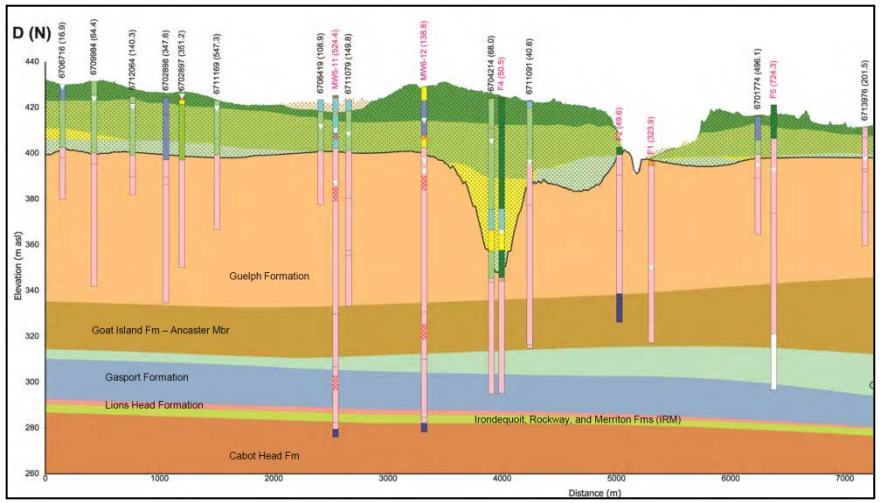
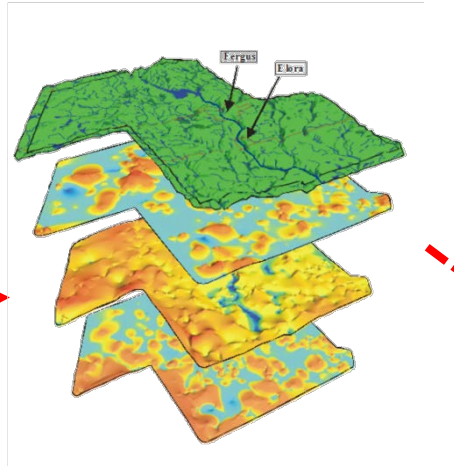
CHARACTERIZATION → MODEL

GGET Tier 3



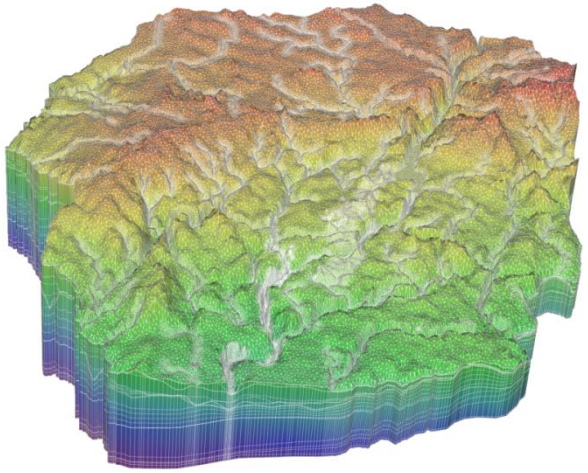
Layer interpretations



Layer Property Interpretations

Water Demand Water Level Data

Groundwater Flow Model



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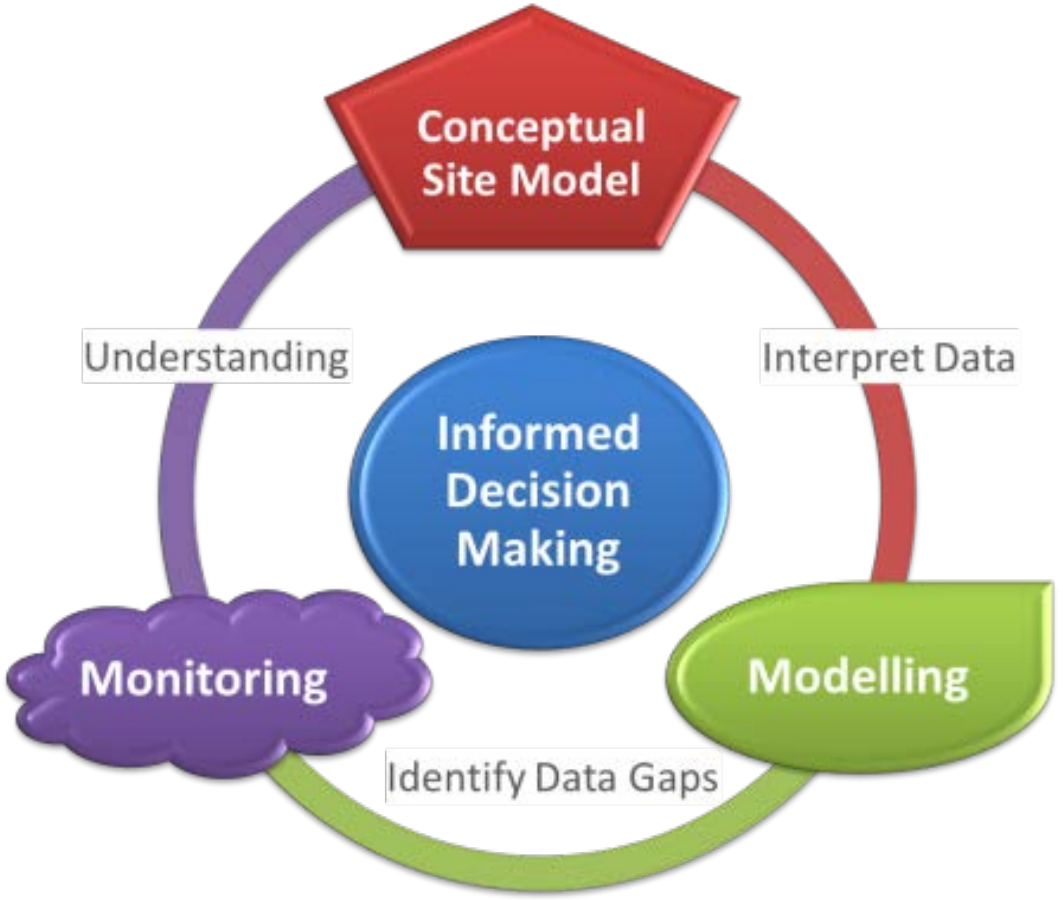
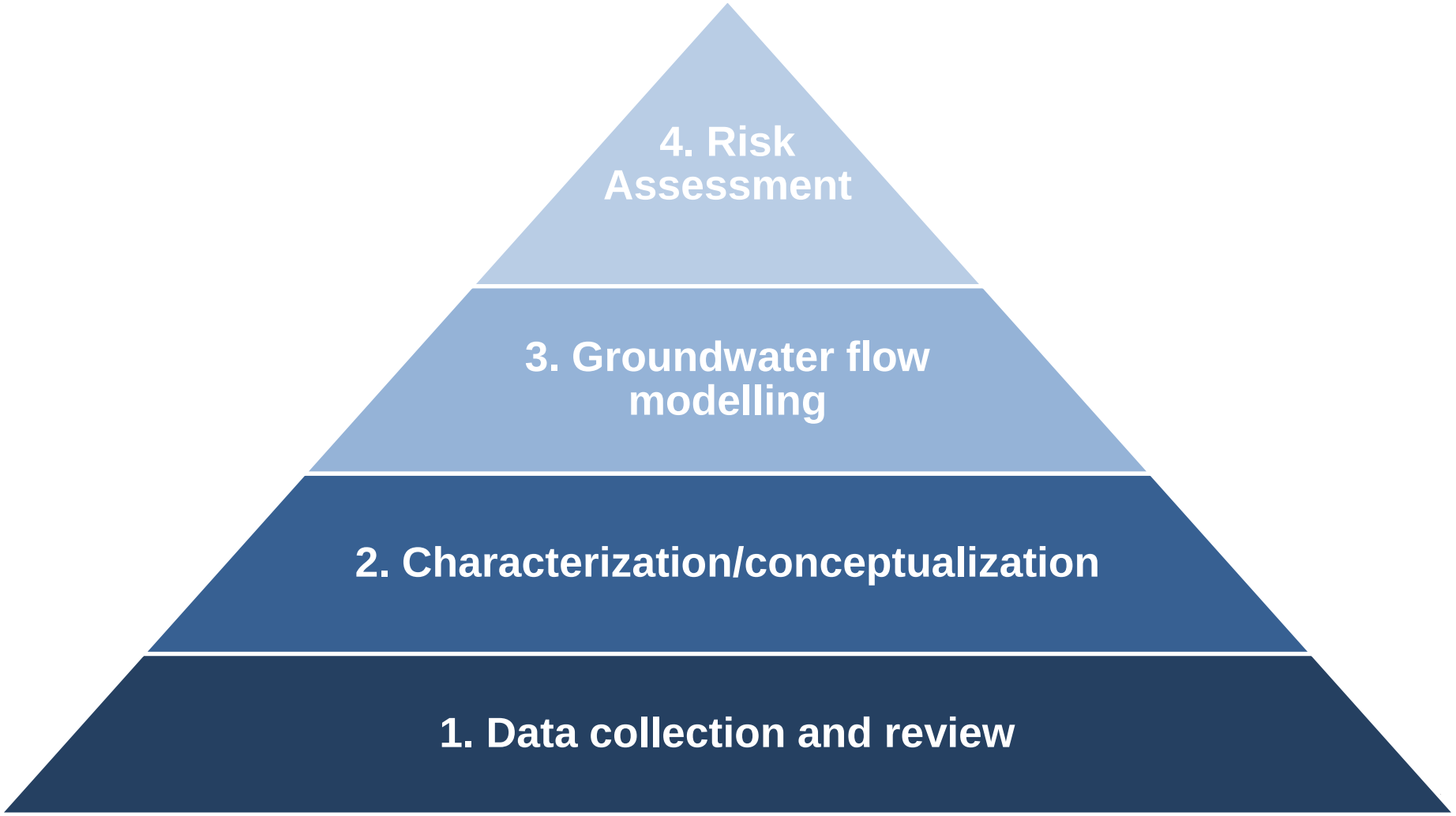
CONTINUOUS IMPROVEMENT



WATER BUDGET

GGET Tier 3 Study Components



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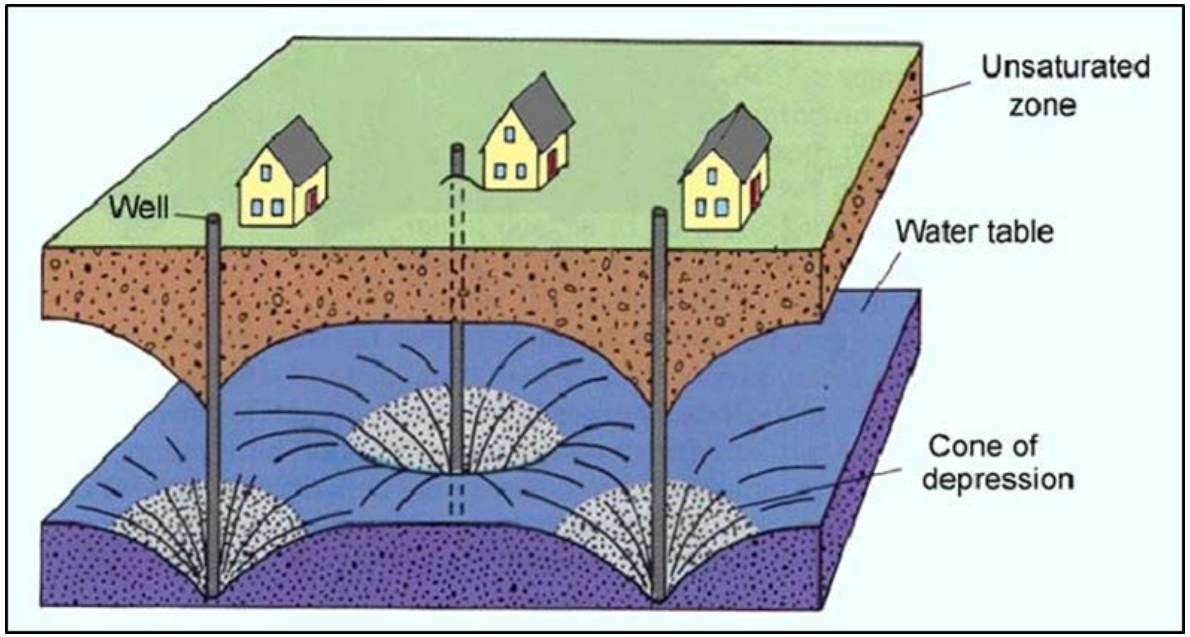
RISK ASSESSMENT

WHPA-Q delineation

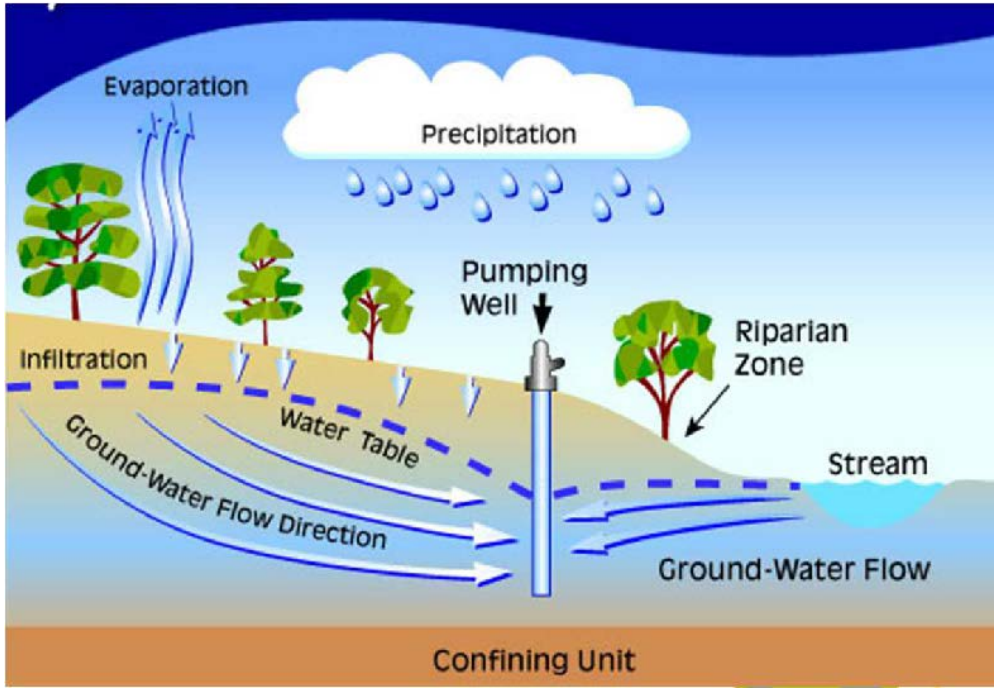
- Determined using current municipal pumping rates
- Delineation of groundwater (WHPA-Q) and surface water (IPZ-Q) vulnerable areas
- Combines the area where municipal wells lower the aquifer (cone of influence) AND the cones of influence or other permitted water takings that intersect.



RISK ASSESSMENT

Risk Levels

- Assess the ability to meet future water quantity needs under scenarios:
  - Increased demand from growth
  - Future land development
  - Drought conditions
- Assign risk level to vulnerable areas (significant, moderate, low)
- Risk is assessed based on
  - water level in municipal wells and whether water can still be pumped
  - Impacts to surface water features (coldwater streams, wetlands)



RISK ASSESSMENT

Water quantity threats

- Identify moderate and significant drinking water quantity threats
- For a WHPA-Q with a Significant Risk Level, the following activities are identified as being a significant risk:
  - All water takings (includes municipal and non-municipal takings)
  - Future land development that could reduce groundwater recharge

PERMITS TO TAKE WATER

- Purpose is to ensure a water taking is sustainable and does not negatively impact other users and the natural and built environments
- Permits include terms and conditions to manage the taking
- Aspects of the taking that are typically managed include:
  - Volume (i.e., maximum daily volume of water taking)
  - Duration (i.e., length of taking, number of days of taking per calendar year, hours per day)
  - Rate (e.g., can be controlled separately for sensitive surface water systems)
  - Monitoring requirements (i.e., physical measurements to ensure that local groundwater levels are responding to the water taking as anticipated in the technical study)

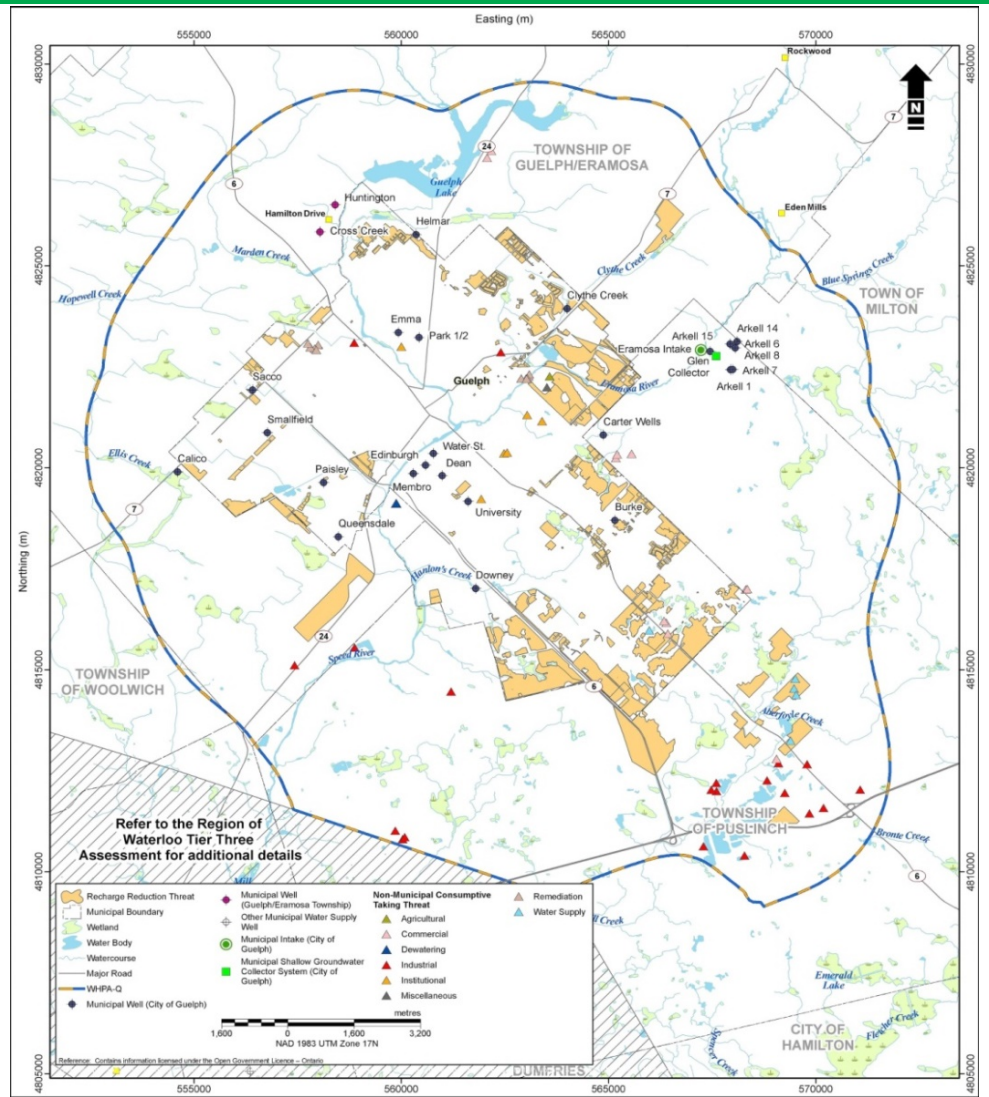
RISK ASSESSMENT

Results

- The City's and GET's wells can meet current needs
- The City's Queensdale municipal well is predicted to not be able to meet future needs under normal climate conditions and during prolonged drought
- The City's other wells and GET's wells expected to meet future needs under all scenarios.
  - However, there is a high level of uncertainty for the results of the City's Arkell Well 1, which would also trigger a significant risk level
- Water Quantity Wellhead Protection Area (WHPA-Q) and Water Quantity Intake Protection Zone (IPZ-Q) are assigned a **significant risk level**

RISK ASSESSMENT

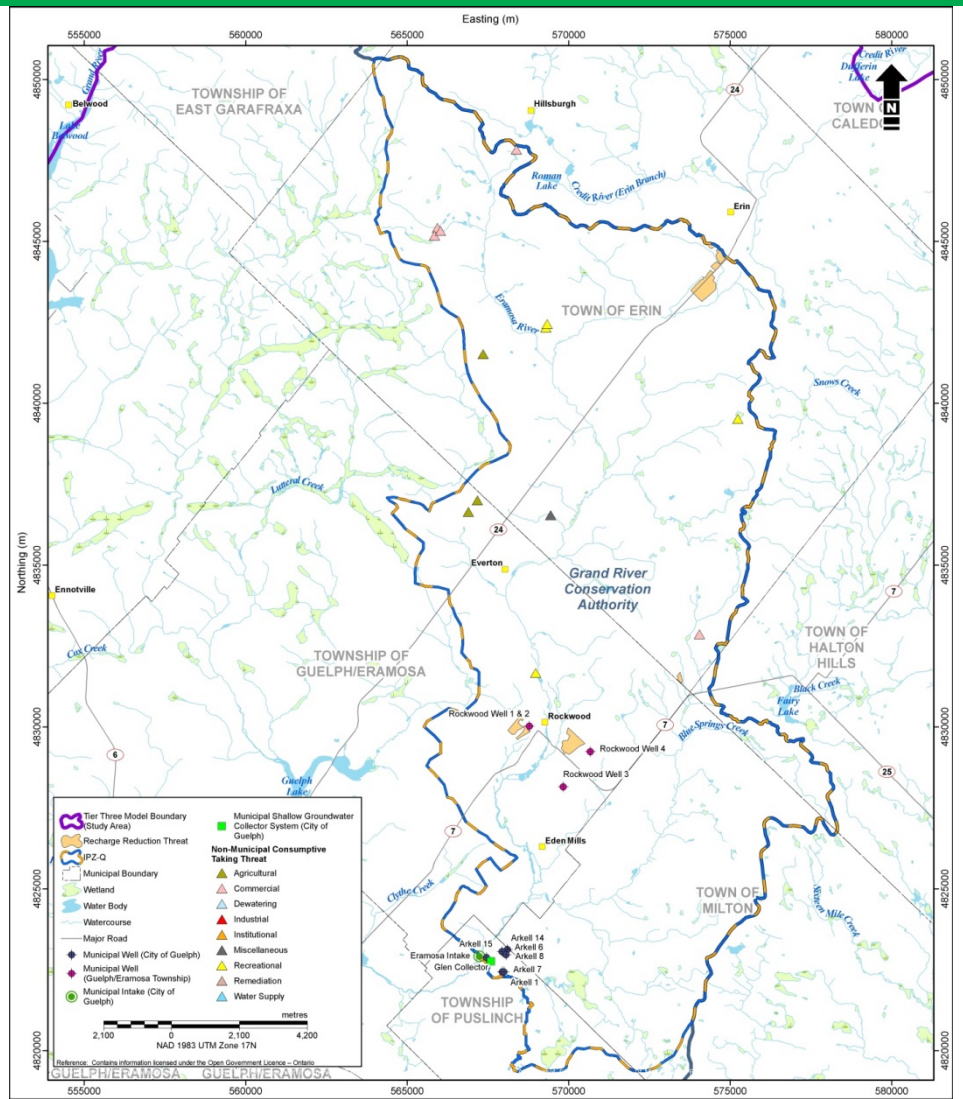
WHPA-Q – City and GET Hamilton Drive



- Assigned **significant** risk level
- Water takings identified include water supply, agricultural, commercial, dewatering, industrial, institutional, miscellaneous
- Areas identified as sensitive to recharge reduction include areas for future development as per Official Plan

RISK ASSESSMENT

IPZ-Q – GET



- Assigned **significant** risk level
- Area upstream of the surface water intake on the Eramosa River
- Risk level adopted from WHPA-Q because of interconnection through Arkell System

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PEER REVIEW

- Tier 3 study was peer reviewed on behalf of the province by a team of highly qualified third party technical experts working in both academia and private consulting
- Local municipalities participated as municipal peer reviewers and provided comments
- Provincial peer reviewers deemed model “fit for purpose” and MOECC accepted Tier 3 study results
- Complete Guelph-Guelph/Eramosa Tier 3 study was presented and accepted by Lake Erie Region Source Protection Committee on April 6, 2017

RISK MANAGEMENT MEASURES EVALUATION PROCESS (RMMEP)

RISK MANAGEMENT

What is the RMMEP?

- A collaborative technical project amongst municipal partners and the Lake Erie Region
- Typically undertaken when WHPA-Q/IPZ-Q assigned significant risk level
- Risk Management Measures Evaluation Process (RMMEP):
  - Evaluate and determine water takings and recharge reduction activities with greatest impact on municipal supplies
  - Evaluating effective risk management measures using Tier 3 groundwater model (e.g., optimised pumping, water loss management, water conservation)

RISK MEASURES

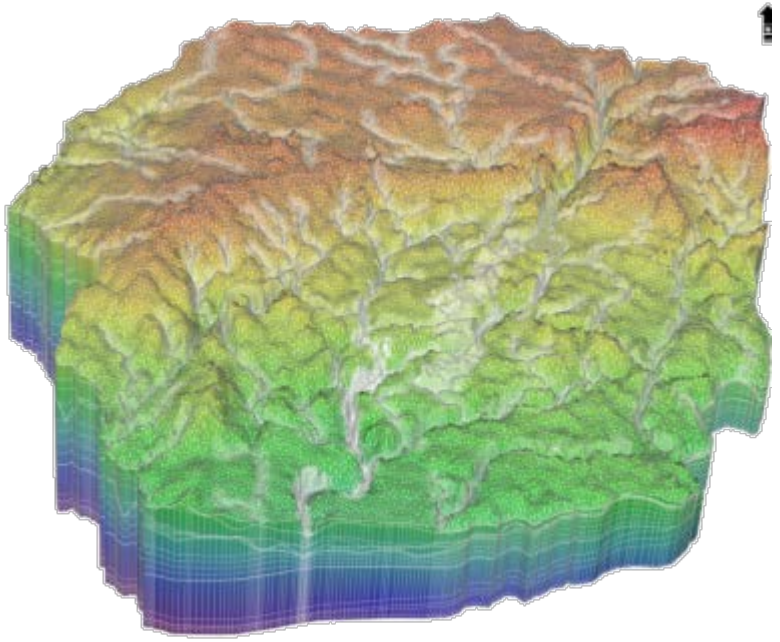
What is the RMMEP?

- Activities evaluated include:
  - All water takings (municipal wells, permitted and non-permitted takers)
  - Future land development areas that have potential to reduce recharge

MODEL APPLICATION

How can we use the model?

- Evaluate:
  - Change in water levels due to new water wells
  - Change in water levels due to land development
  - Change in groundwater flow into rivers and streams due to increase/ decrease in pumping rates
  - Others…
- What do we change in the model when we apply it?
  - Pumping rates (increase/ decrease)
  - Add or remove pumping wells
  - Change groundwater recharge rates to simulate impact of land development
  - Change groundwater recharge rates to simulate drought/ changing climate



RMMEP COMPONENTS

Greatest impact

- Impact of water quantity threats on water level in municipal wells and whether they can still be pumped
- Evaluated using Tier 3 model

Threats ranking

- Water quantity threats are ranked based on impact

Best measures

- Threats ranking guides the selection of preliminary Risk Management Measures (RMMs)
- RMMs evaluated and recommended through scenarios using Tier 3 model

RISK MANAGEMENT MEASURES

- Examples include:
  - Increase of supply (i.e., addition of new wells)
  - Protection of significant groundwater recharge areas (SGRAs)
  - Upgrades to municipal infrastructure (i.e., increasing connections throughout system) and system optimization
  - Residential – leakage reduction program/repair
  - Additional water storage facilities
  - Acquiring land to protect future supplies

THREATS MANAGEMENT STRATEGY

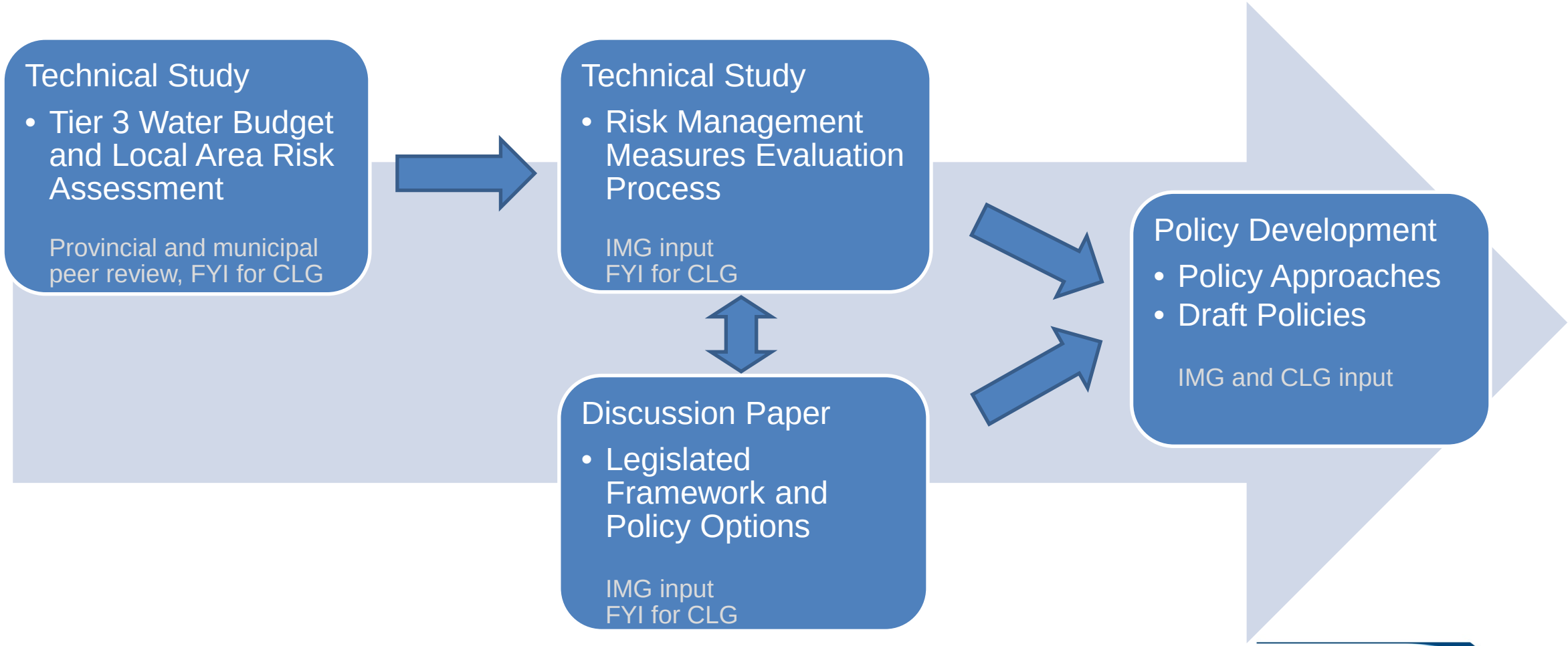
Purpose

- Results of the RMMEP included in a Threats Management Strategy (TMS)
- TMS purpose: summarizes RMMEP and discusses recommended measures based on what was learned from the scenarios
- Key elements:
  - Identification of moderate and/or significant threats
  - Identification of measures that are predicted to be most effective at meeting future municipal demands
  - Specific recommendations on how the measures could be implemented and tested further
- TMS forms the technical foundation for policy development

GUELPH-GUELPH/ERAMOSA WATER QUANTITY POLICY DEVELOPMENT STUDY

POLICY DEVELOPMENT

Guelph-Guelph/Eramosa Water Quantity Policy Development Study



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DISCUSSION PAPER

What is a discussion paper?

- Part of the process to update the Grand River plan to address water quantity threats in the vulnerable areas
- Aids policy makers by providing background information on:
  - Technical studies
  - Drinking water quantity threats
  - Existing legislation, policies and programs
  - Review of policy tools and approaches available

GGET DISCUSSION PAPER

Components

1. Introduction
2. GGET Tier 3 Water Budget and Local Area Risk Assessment Summary
3. Description of the Drinking Water Quantity Threats
4. Existing Legislation, Policies and Other Programs
5. Policy Toolbox
6. Policy Options
7. Policy Tool Review
8. Promising Policy Tools
9. Next Steps

NEXT STEPS

- Discussion paper and TMS will be brought to the June 21, 2018 SPC meeting for public release
- CLG will receive TMS and discussion paper at June 26, 2018 meeting
- Policy approaches to be drafted by the GGET project team with input from the Implementing Municipalities Group (IMG) and the CLG
- Drafting water quantity policy text expected to begin in the early fall 2018
- Development of policy approaches and text to be guided by the TMS and discussion paper