

Survey-Client Collaboration Ripples in a Pond

Abigail Burt – abigail.burt@ontario.ca

Ontario Geological Survey

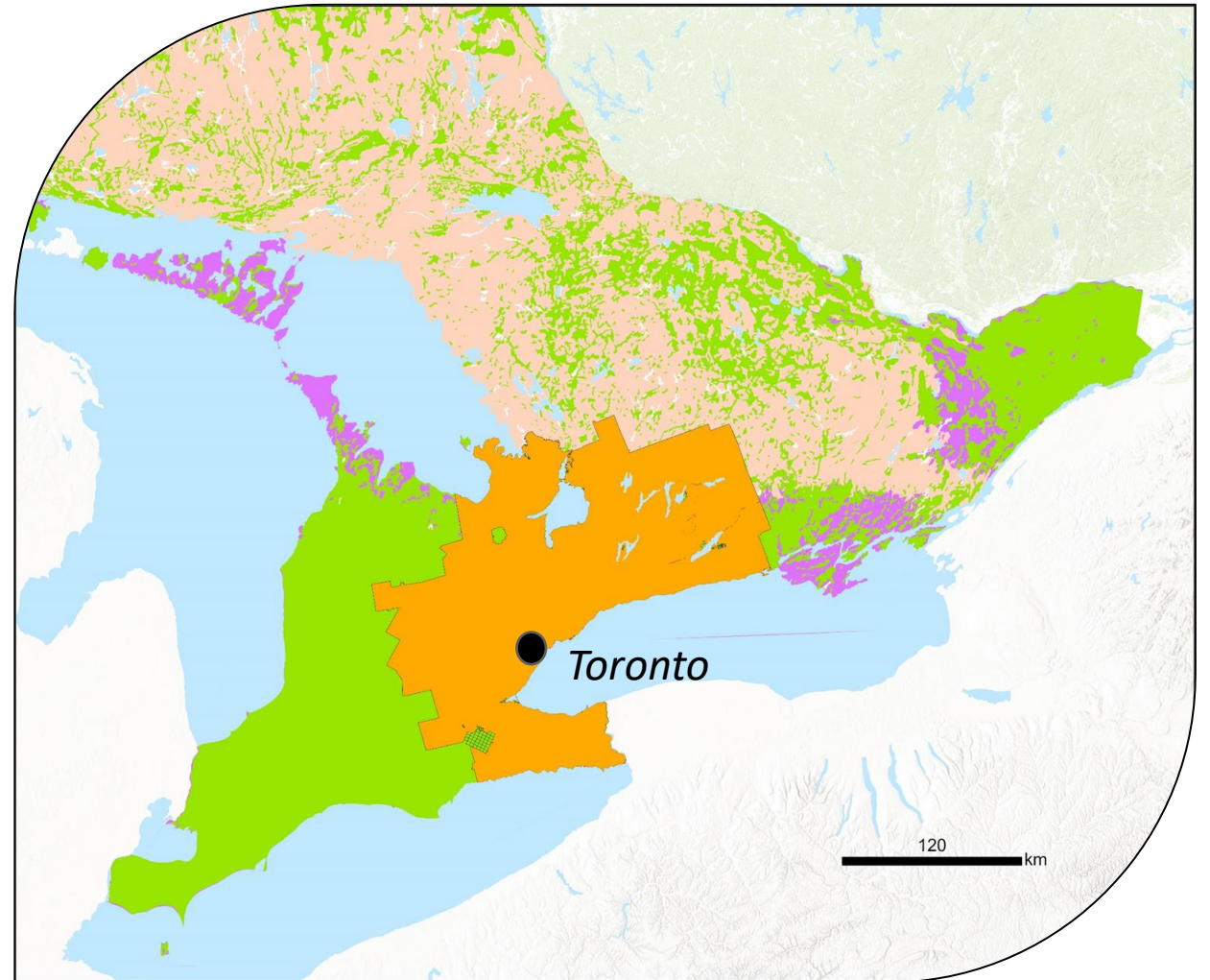
Ministry of Energy and Mines

An aerial photograph showing a city in the background, a winding river in the middle ground, and large agricultural fields in the foreground. The trees are in autumn colors, and the text is overlaid in the center.

Relationships
Flexibility
Persistence

Managing priorities

- Critical minerals
- Land-in-demand



Municipalities

Water and
wastewater

**Conservation
Authorities**

Manage water
resources

Consultants

Site characterization
and numerical
models

**Ontario Geological
Survey**

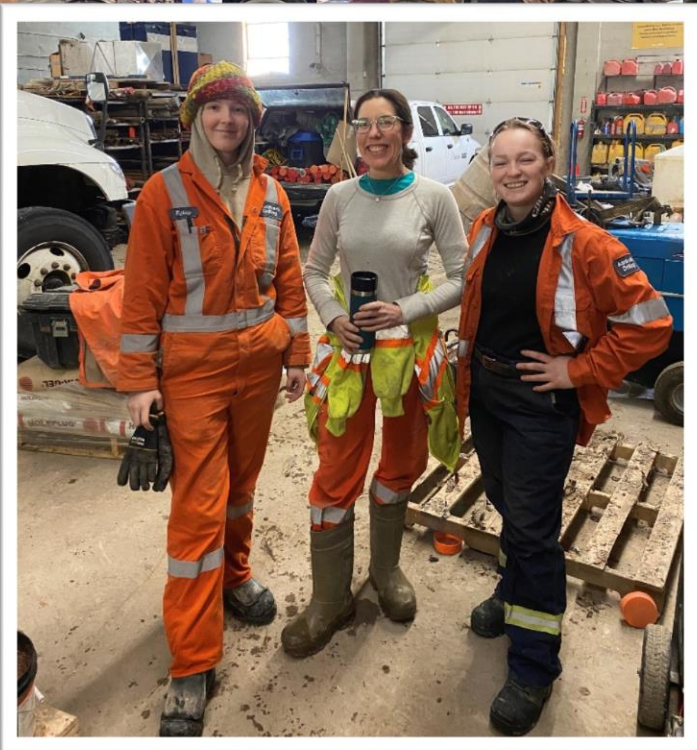
Map and characterize

Academia

Training and research

Drilling Companies

Provide services



Identifying needs

City of Guelph

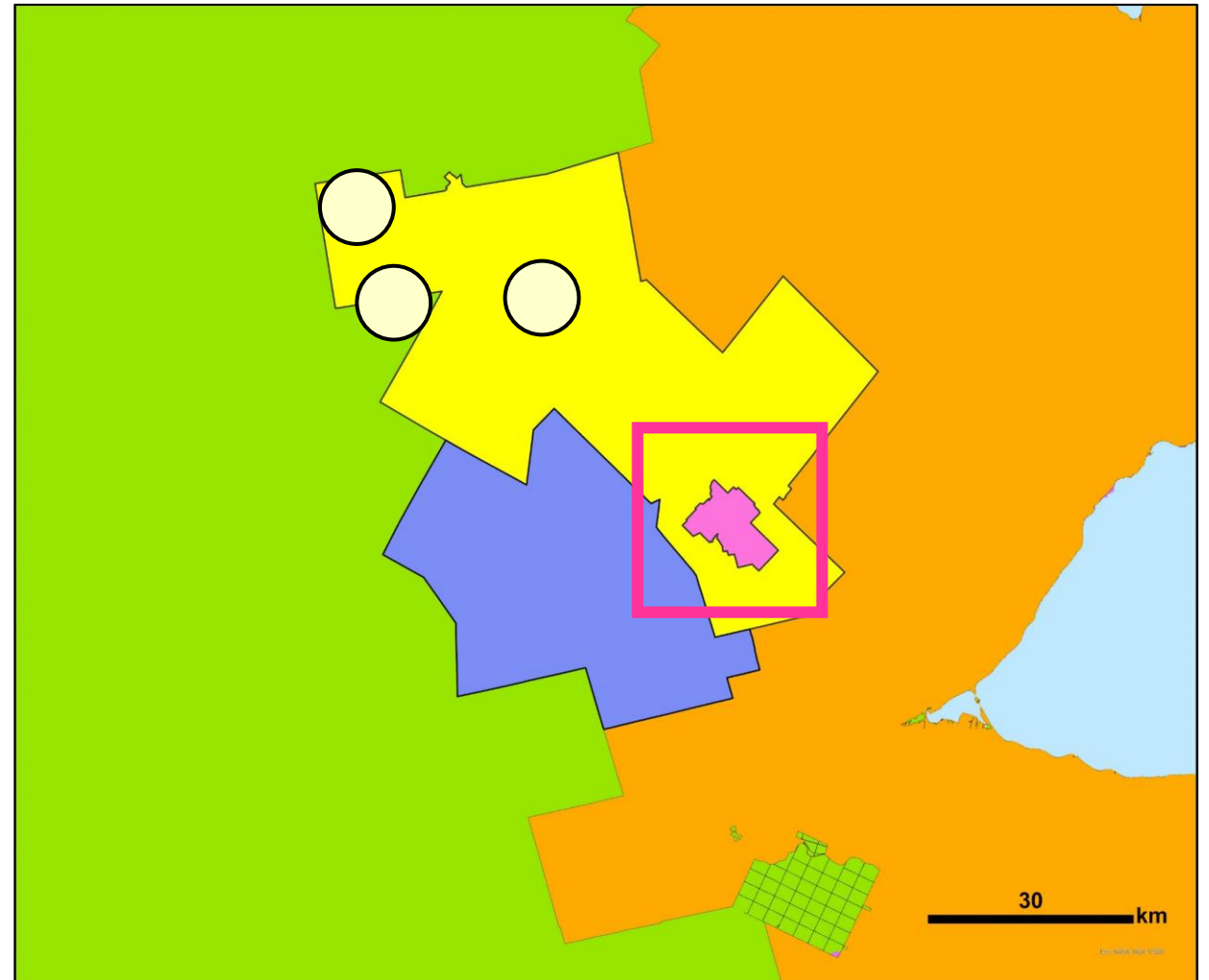
- Update numerical flow model
- Expand wellfields
- Improved mapping

Wellington County

- Update wellhead protection zones

Region of Waterloo

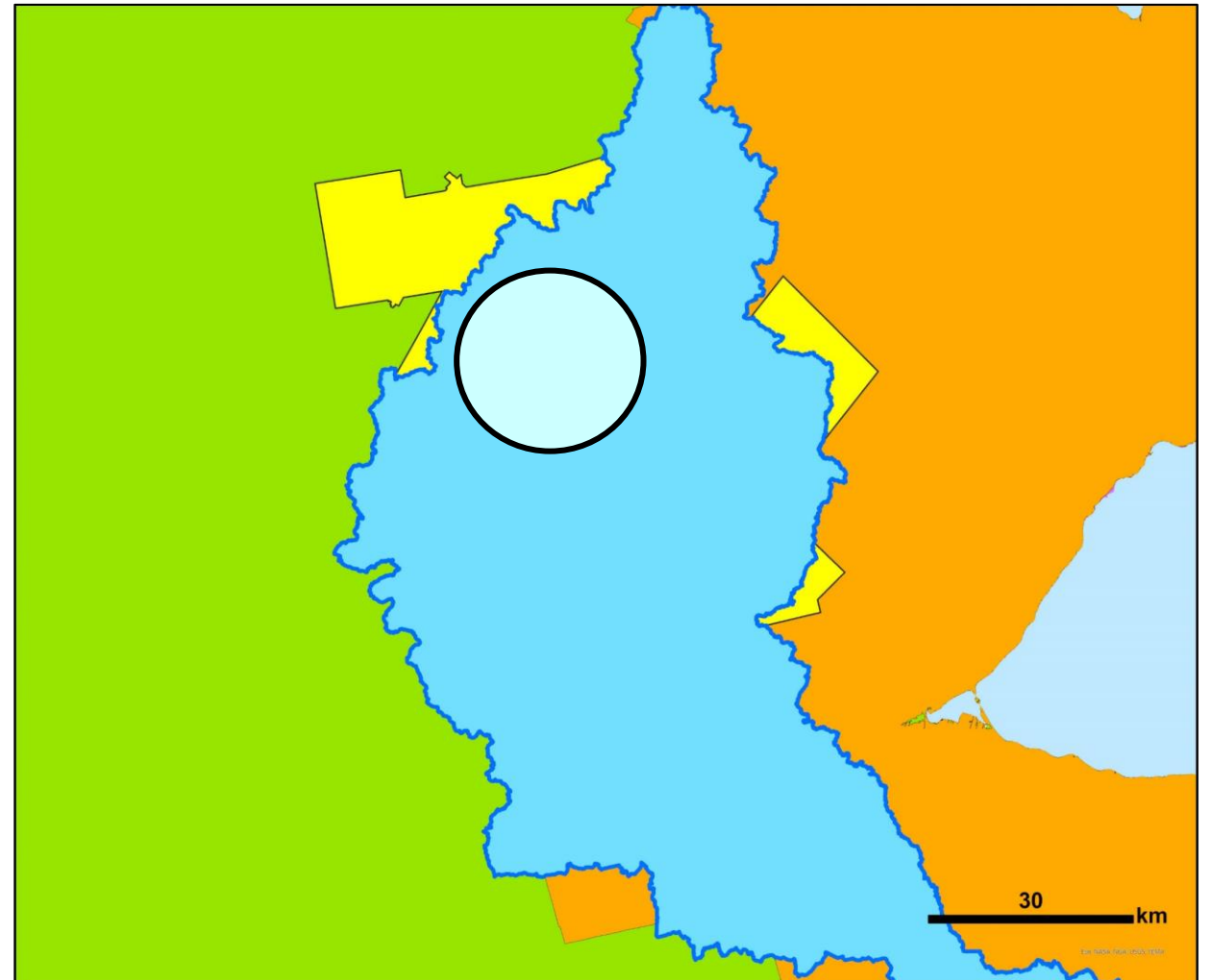
- Targeted growth



Identifying needs

Grand River Conservation Authority

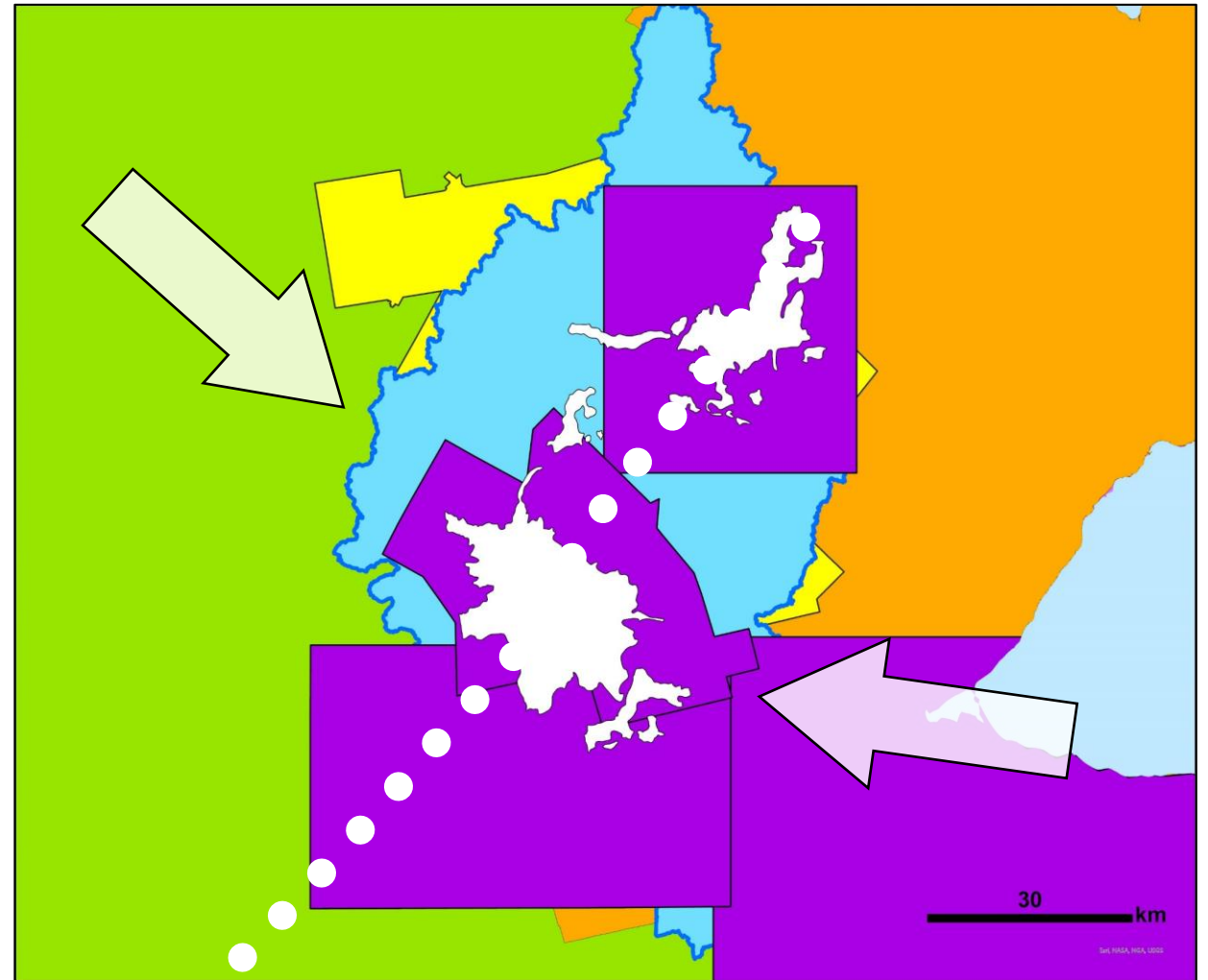
- Water budgets
 - Track water entering, moving through and leaving the watershed
 - How much remains for sustainable water use
- Expand monitoring well network



Identifying needs

Geological Survey

- 3D sediment models
 - Regional scale
 - Hydrostratigraphic units (age and material)
 - Surfaces and volumes
- Gap in coverage
- Develop glacial history and stratigraphy northwest of late glacial interlobate zone



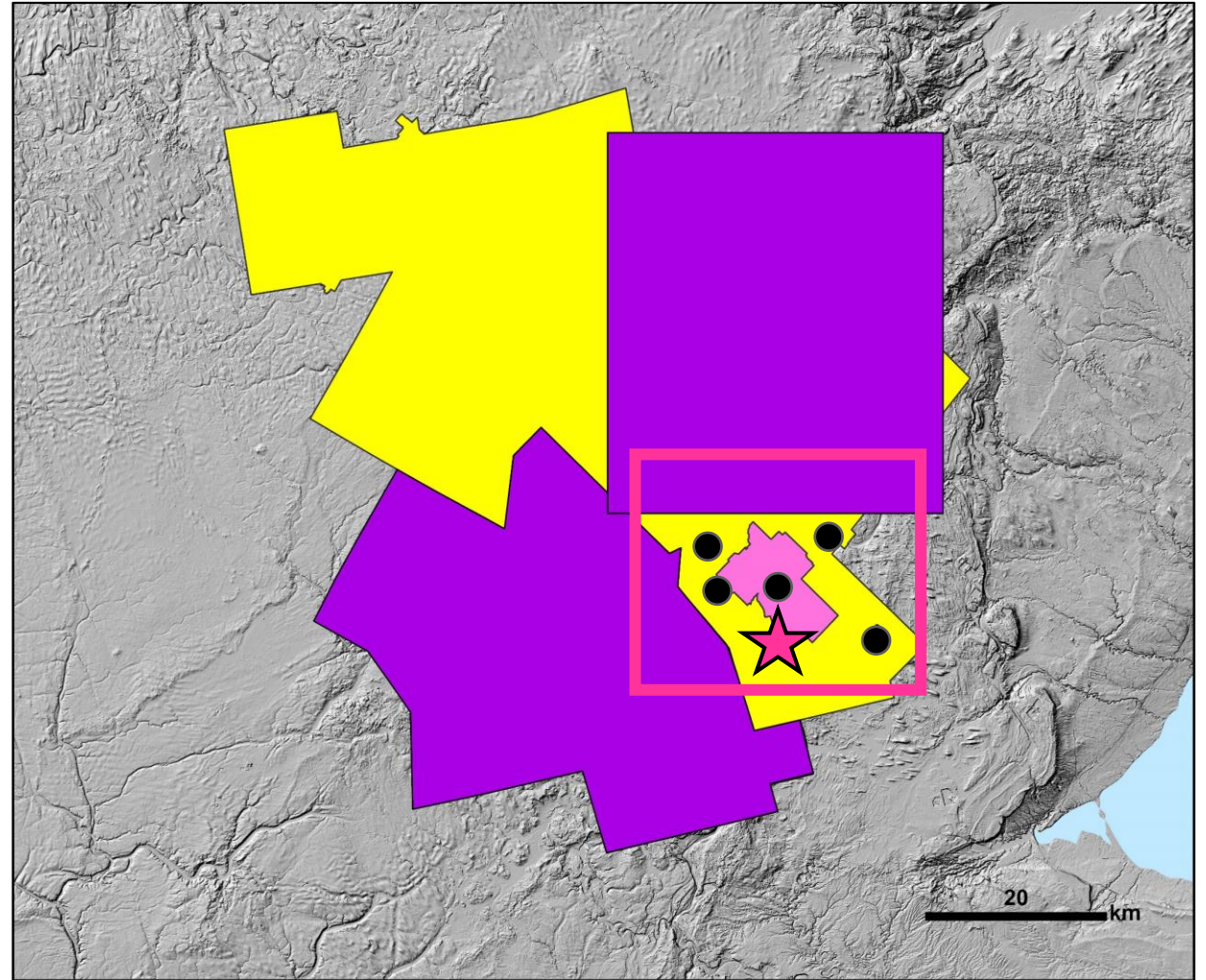
Meeting needs

Numerical groundwater flow model

- University-consultant partnership
- Extend OGS sediment models
- Combine with OGS-GSC bedrock model
- Identified targets

Expanded wellfield

- Deep multilevel monitoring well
- Updated model predictions
- City-Township relationship



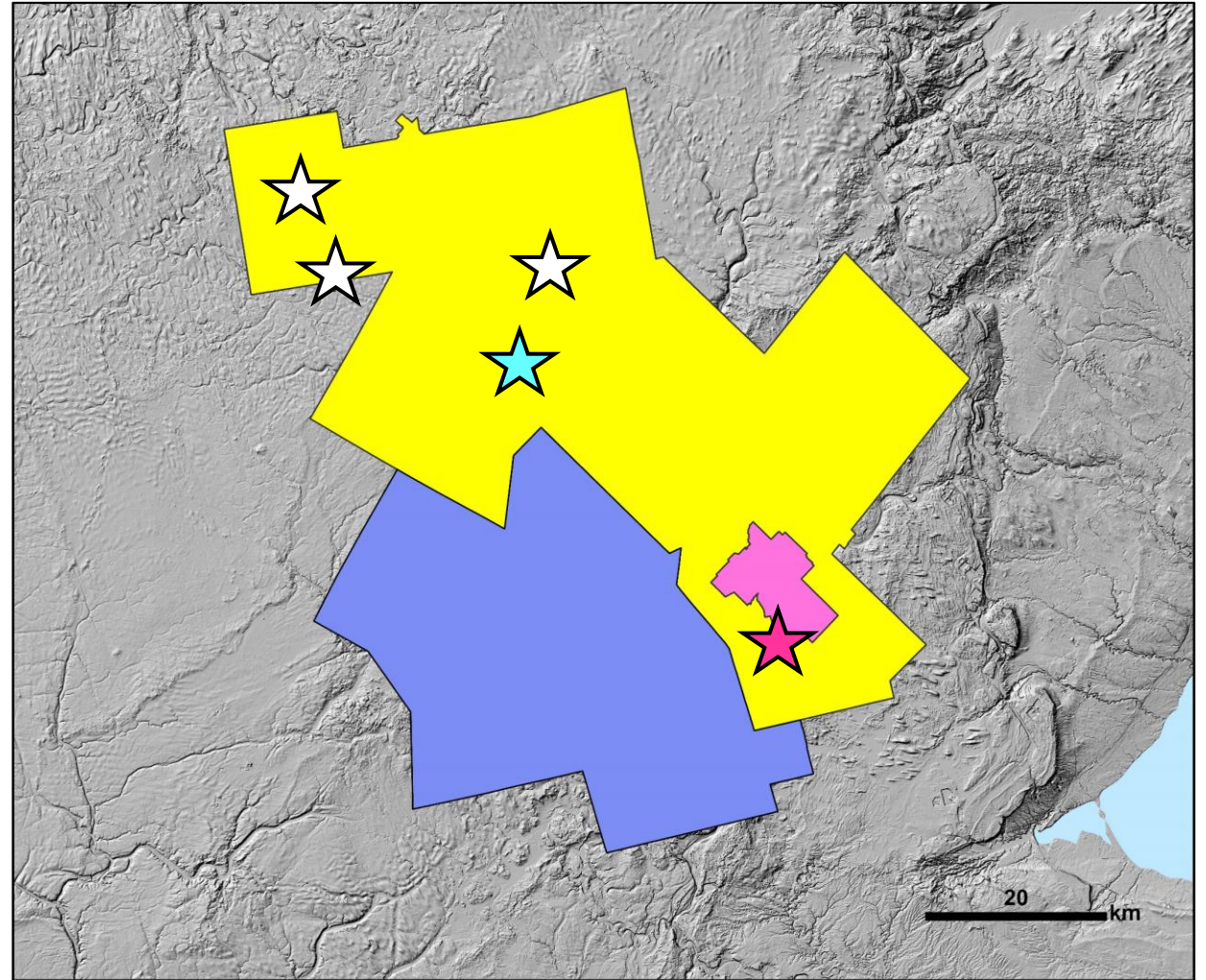
Meeting needs

Well head protection zones

- Targets identified by County and consultants
- Streamlined permitting
- Follow up with deeper bedrock wells

Expanded monitoring well network

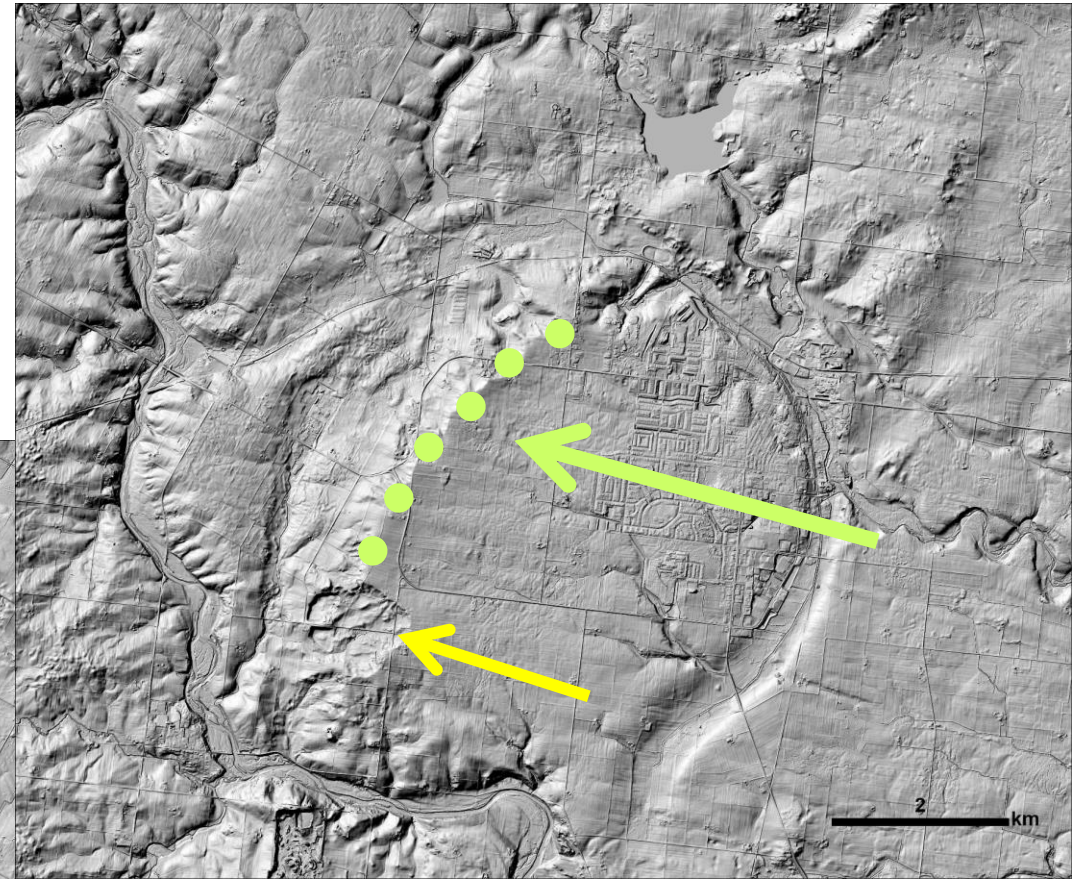
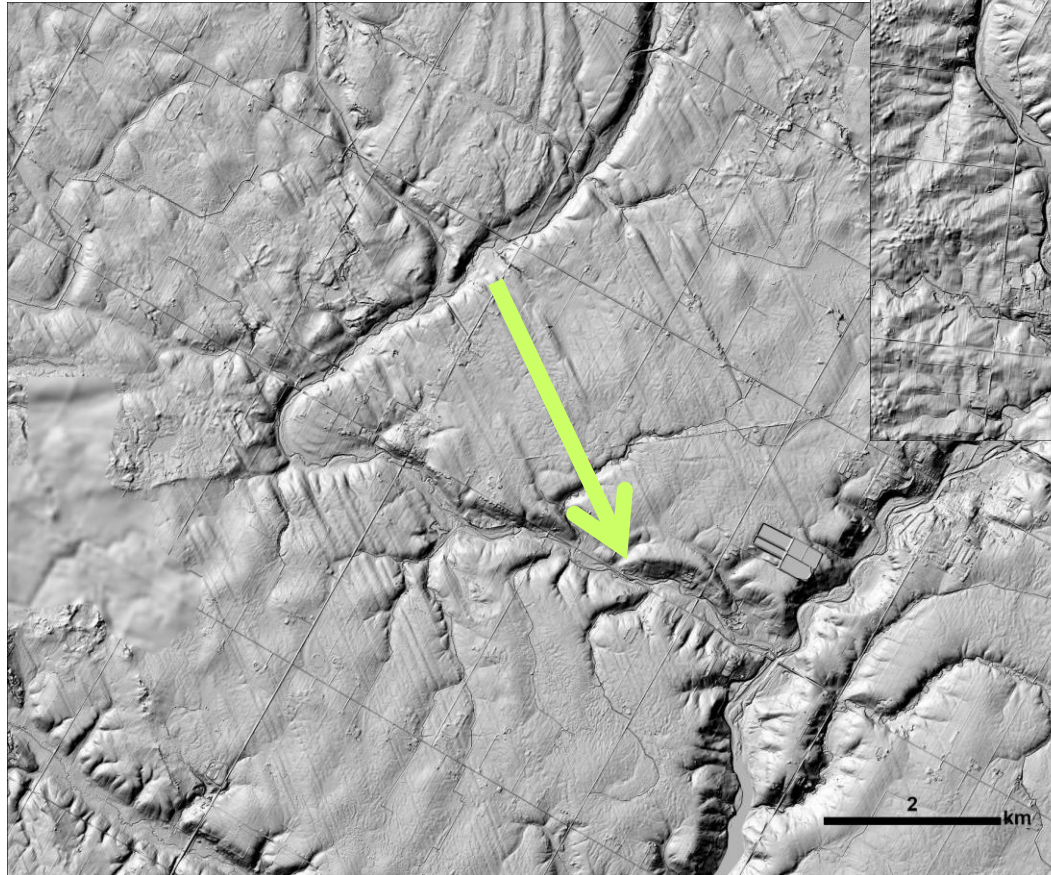
- Group decision!



Meeting needs

Geology!

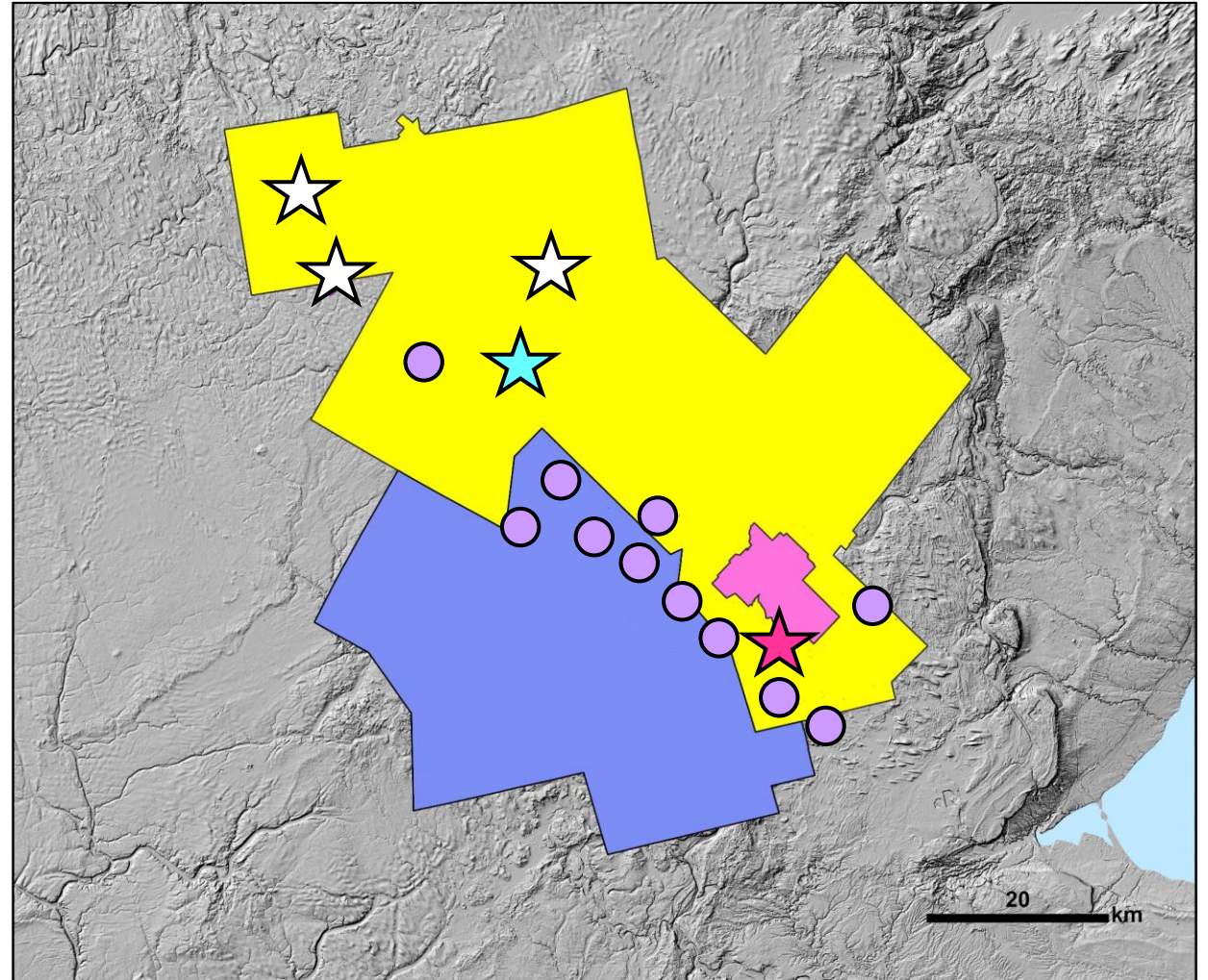
- Stratigraphy
- Processes
- Landforms....



Meeting needs

Geology!

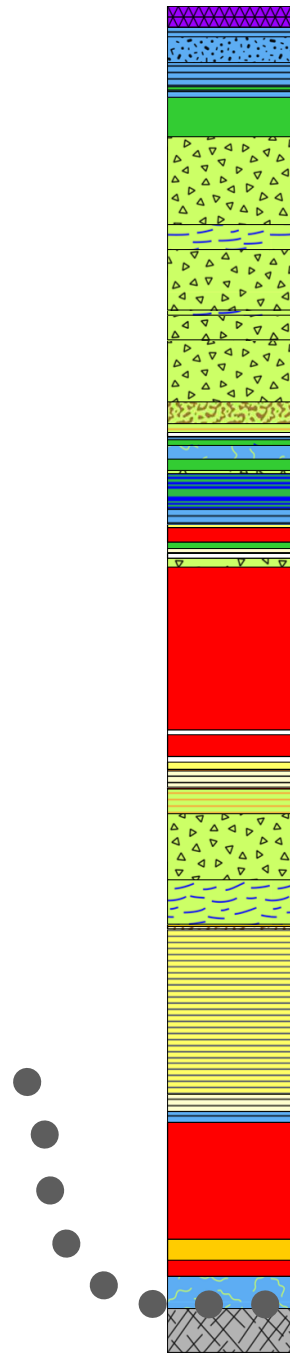
- Stratigraphy
- Processes
- Landforms...
- Beyond known limits of stratified moraines
- Flat spot
- Ease of permitting





Drone image
by Jim Baxter

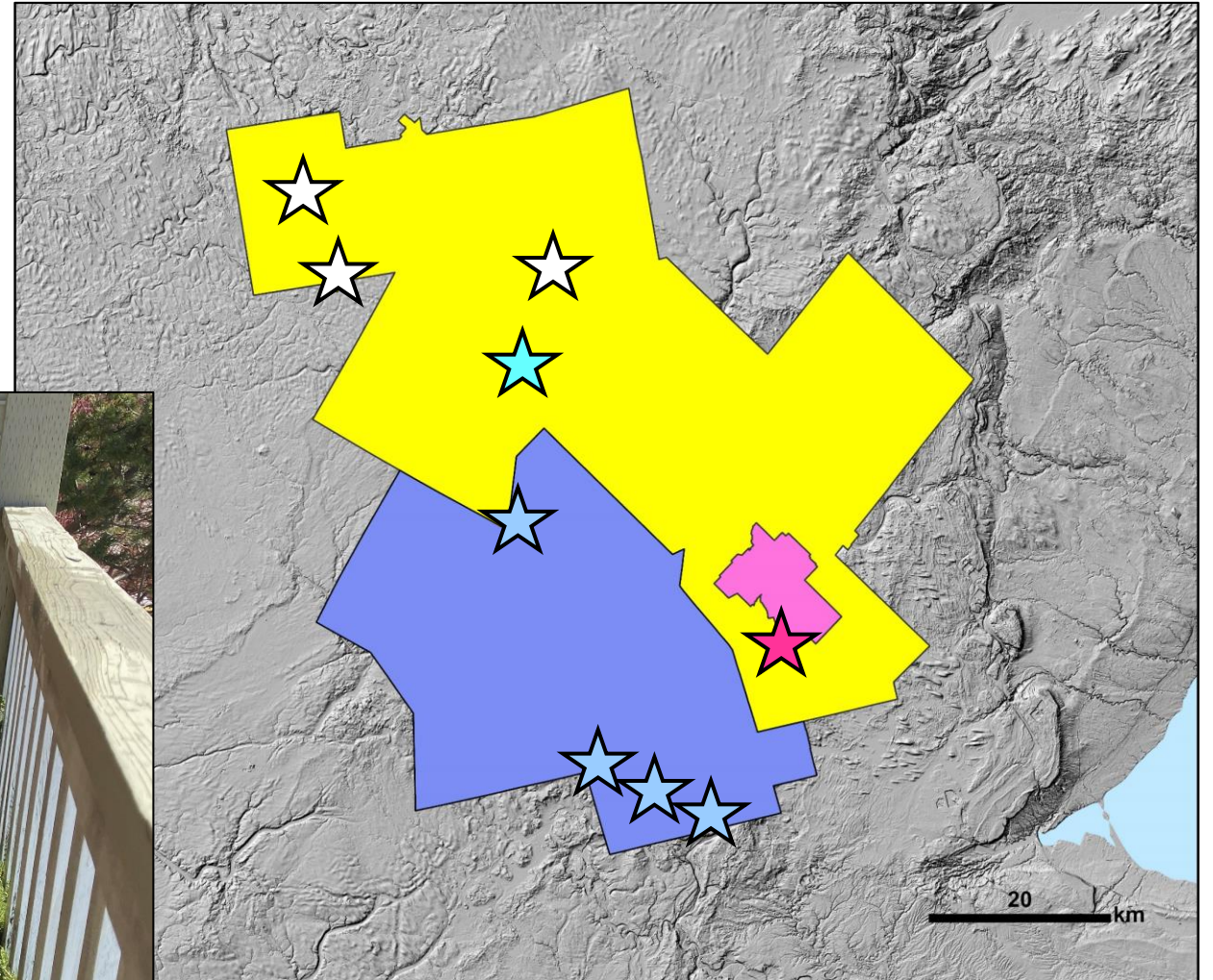




Surprise core

Region of Waterloo

- Monitoring wells and geophysics





Surprise gamma logger

Heather Crow
Geological Survey of Canada



Getting creative

OGS

- Two drilling contracts (\$242 000)
- Stored well supplies (\$16 000)
- Divert divert divert.... (\$25 000)

Collaborators

- Overburden/interface monitoring wells (\$25 000)
- Deep multilevel well (\$100 000)
- Core! (\$100 000)
- Gamma logger (\$100 000)



What we got

OGS

- 17 cored boreholes (3 projects)
- Geophysical logs (wells)
- Ambient groundwater geochemistry program
- Gamma logger

Collaborators

- Detailed logs
- Preliminary stratigraphic interpretations
- 'Free' holes



What about Ashok?

Training
Research



Final thoughts

Relationships

- 2 geological surveys
- 1 conservation authority
- 8 municipalities
- 2 universities
- 6 consulting companies
- 2 drilling companies

Flexibility

- Surprise program
- Surprise targets
- Surprise well
- Surprise equipment
- Surprise core

Persistence?



***Cored borehole logs are
better than nothing!***

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