



# Clair-Maltby

**Transform. Connect. Community.**

June 24, 2021 Open House  
Environment and Stormwater Management  
Session  
3:00 pm



# Land Acknowledgement

As we gather, we are reminded that Guelph is situated on treaty land that is steeped in rich indigenous history and home to many First Nations, Inuit and Métis people today.

As a City we have a responsibility for the stewardship of the land on which we live and work.

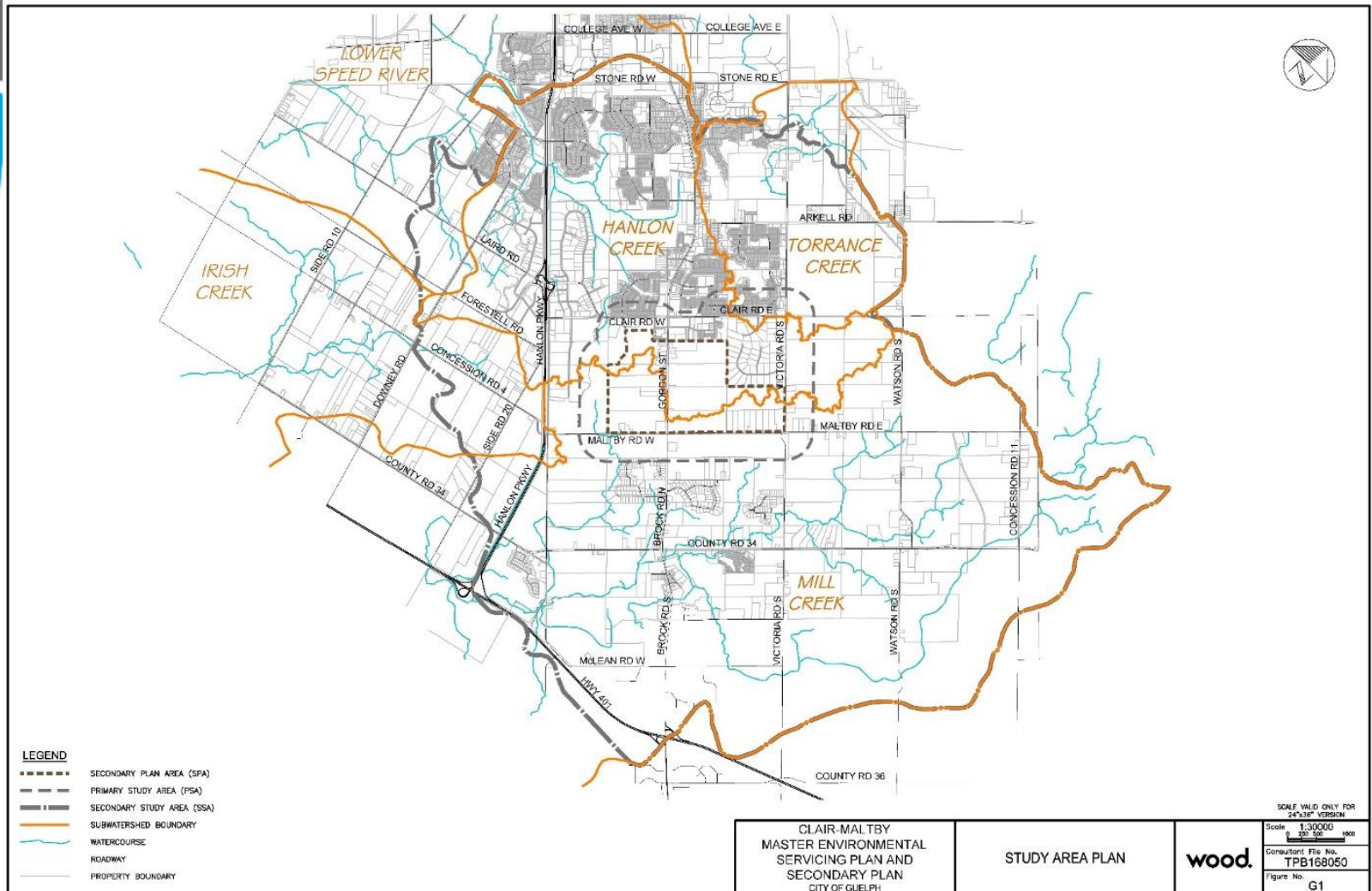
Today we acknowledge the Mississaugas of the Credit First Nation of the Anishinaabek Peoples on whose traditional territory we are meeting.



# Overview Agenda

- Introduction and Overview
- Comprehensive Environmental Impact Study (CEIS) and Master Environmental Servicing Study (MESPP)
  - Natural Heritage
  - Groundwater
  - Surface Water
  - Conclusions

# Introduction and Overview

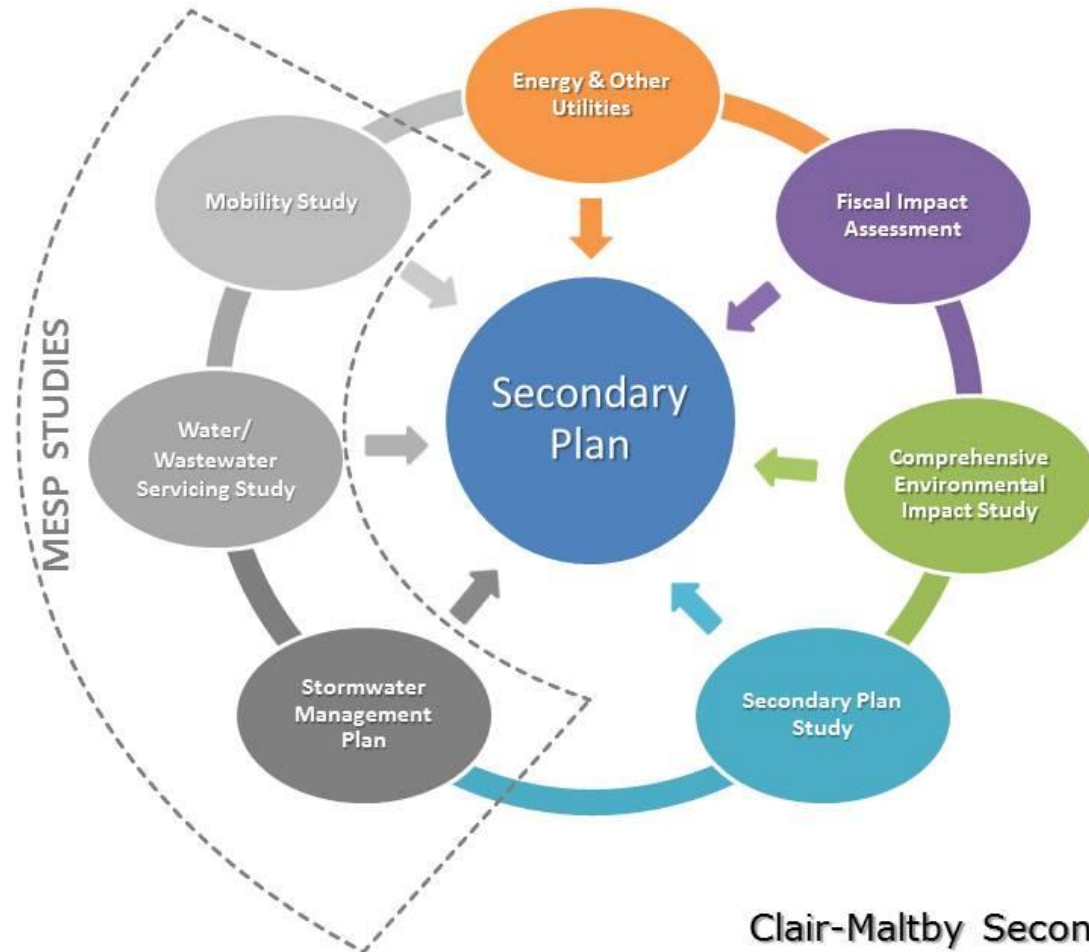




# Introduction and Overview

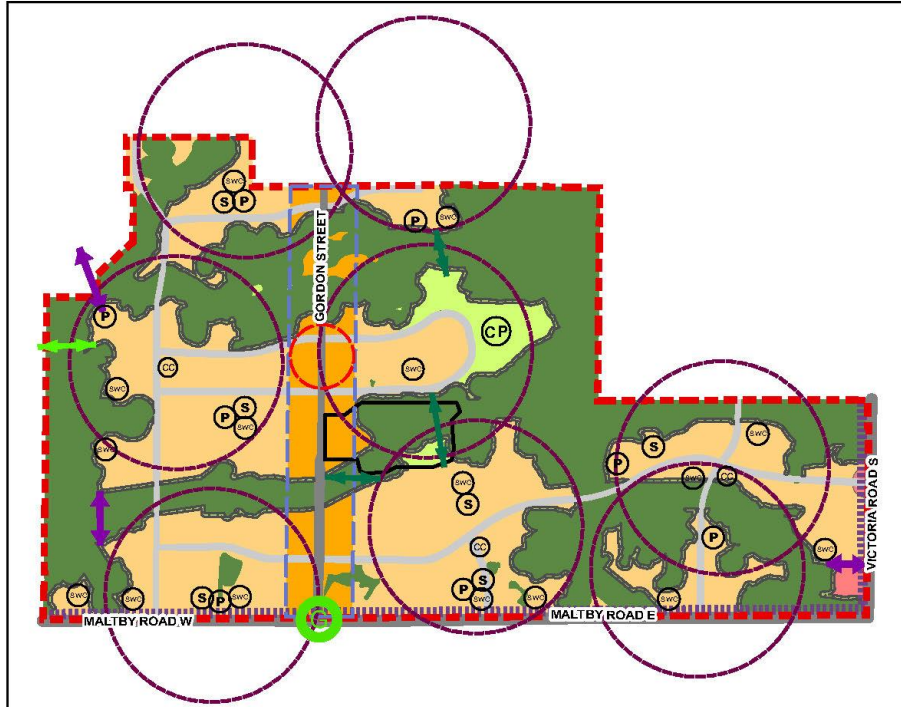
- Comprehensive Environmental Impact Study (CEIS)
  - Informed land use process
  - Technical basis for groundwater, surface water and natural heritage assessment
  - Technical basis for integrated impact management plan(s) and implementation and monitoring plan(s)

# Introduction and Overview



Clair-Maltby Secondary Plan  
Process Diagram

# Introduction and Overview



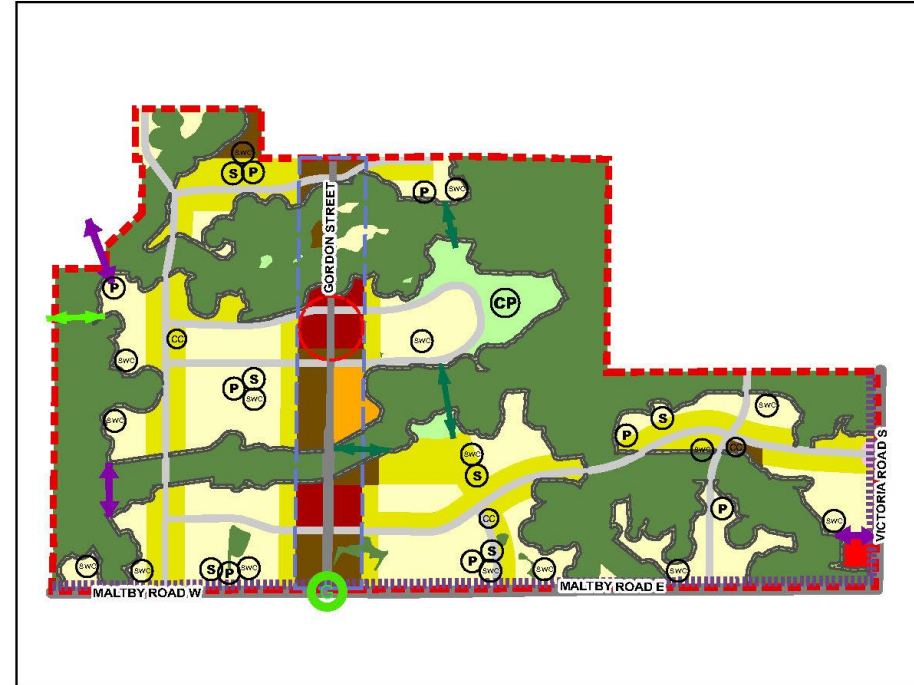
- Legend**
- Clair-Maltby Secondary Plan Boundary
  - Gordon Street Corridor
  - Urban-Rural Transition Zone
  - Residential Neighbourhood (400m radius)
  - Urban Village Core
  - Designated Cultural Heritage Landscape
  - Green Gateway
  - Natural Heritage System
  - Moraine Ribbon
  - Residential
  - Mixed-use
  - Commercial
  - Open Space
- Infrastructure Framework**
- Arterial Road
  - Collector Road
  - Community Park
  - Neighbourhood Park
  - Stormwater Capture Area (SWC)
  - Potential Elementary School
  - Convenience Commercial Area
  - Essential Active Transportation Link
  - Potential Active Transportation Link
  - Potential Trail Connection

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February, 2021

**CITY OF GUELPH  
OFFICIAL PLAN  
SCHEDULE A:  
CLAIR-MALTBY  
SECONDARY PLAN  
COMMUNITY STRUCTURE**

Draft June, 2021



- Legend**
- Clair-Maltby Secondary Plan Boundary
  - Gordon Street Corridor
  - Urban Village Core
  - Green Gateway
  - Natural Heritage System
  - Moraine Ribbon
  - Open Space and Park
  - Urban-Rural Transition Zone
  - Low Density Greenfield Residential
  - Medium Density Residential
  - Clair-Maltby High Density Residential
  - Mixed-use
  - Neighbourhood Commercial Centre
  - Clair-Maltby Mixed Office/Commercial
  - Service Commercial
  - Arterial Road
  - Collector Road
  - Community Park
  - Neighbourhood Park
  - Stormwater Capture Area (SWC)
  - Potential Elementary School
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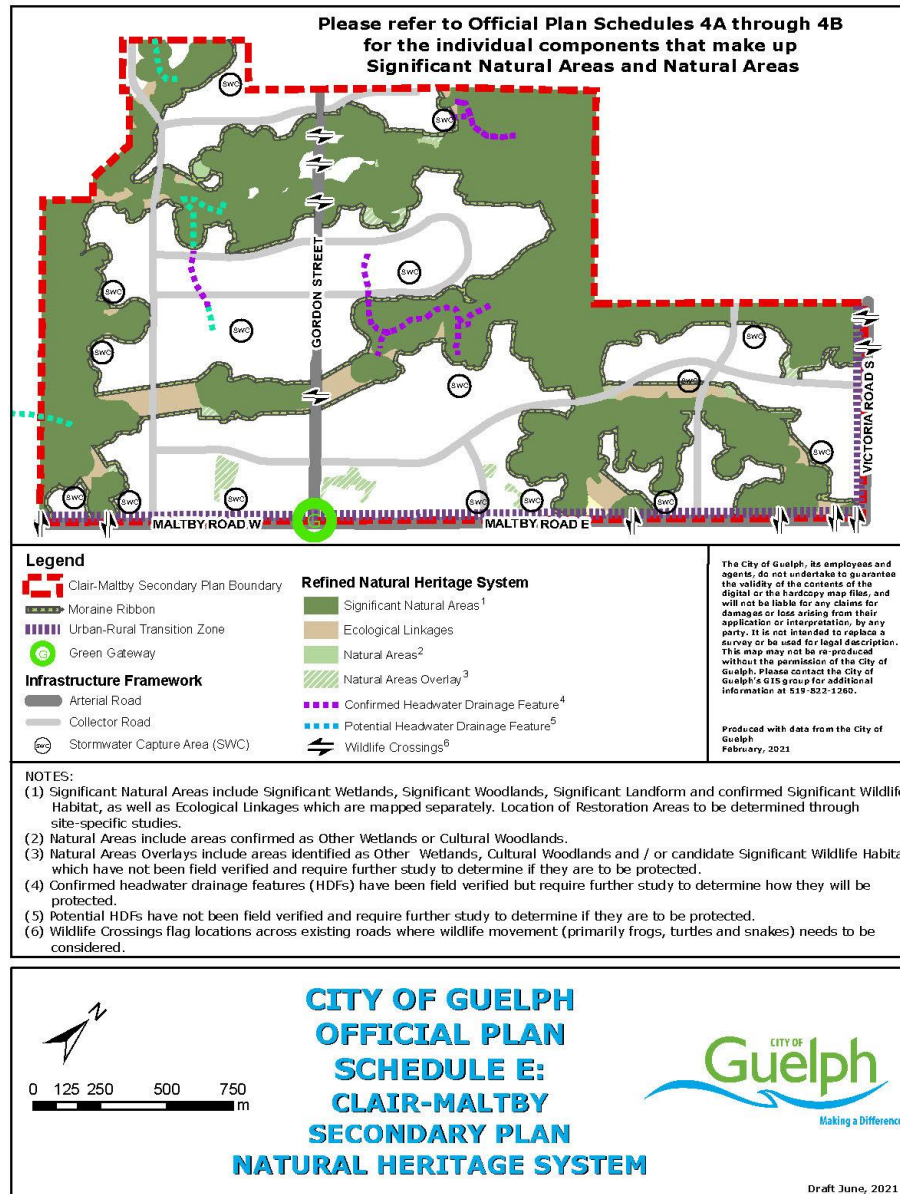
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**CITY OF GUELPH  
OFFICIAL PLAN  
SCHEDULE B:  
CLAIR-MALTBY  
SECONDARY PLAN  
LAND USE**

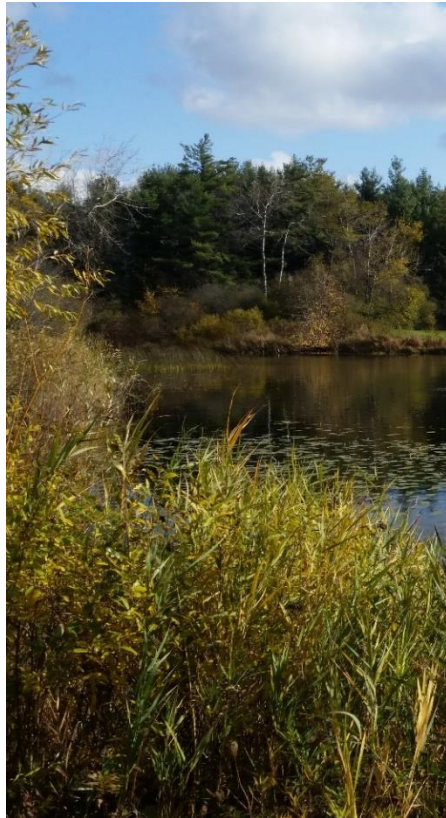
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# Introduction and Overview



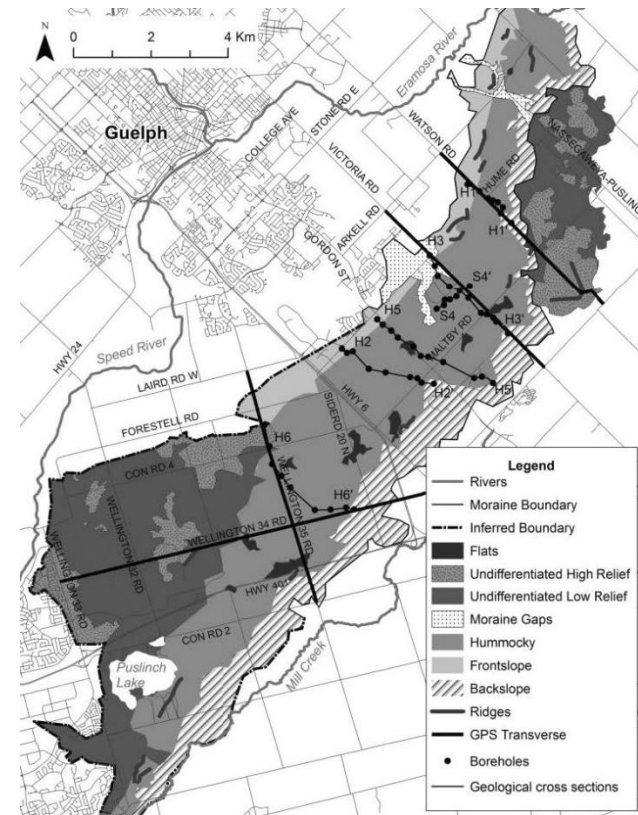
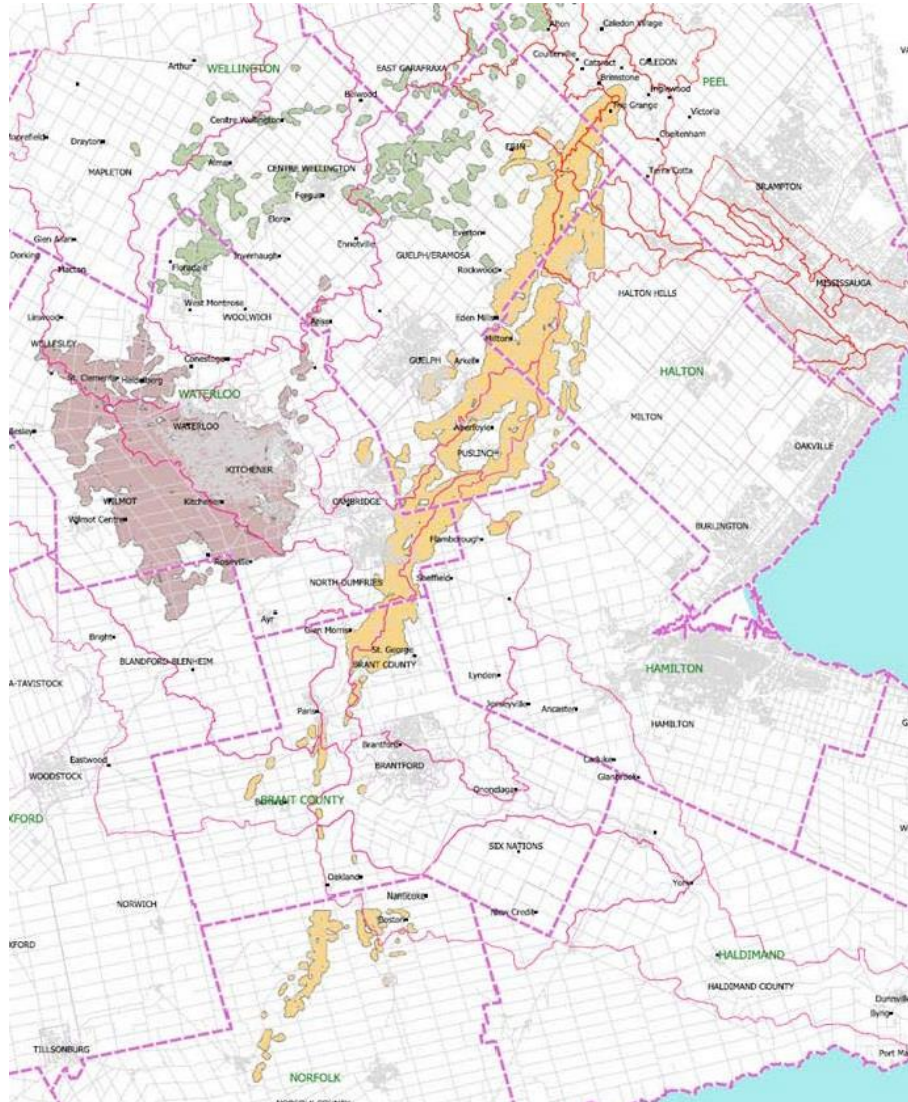


# Natural Heritage



# Where are we?

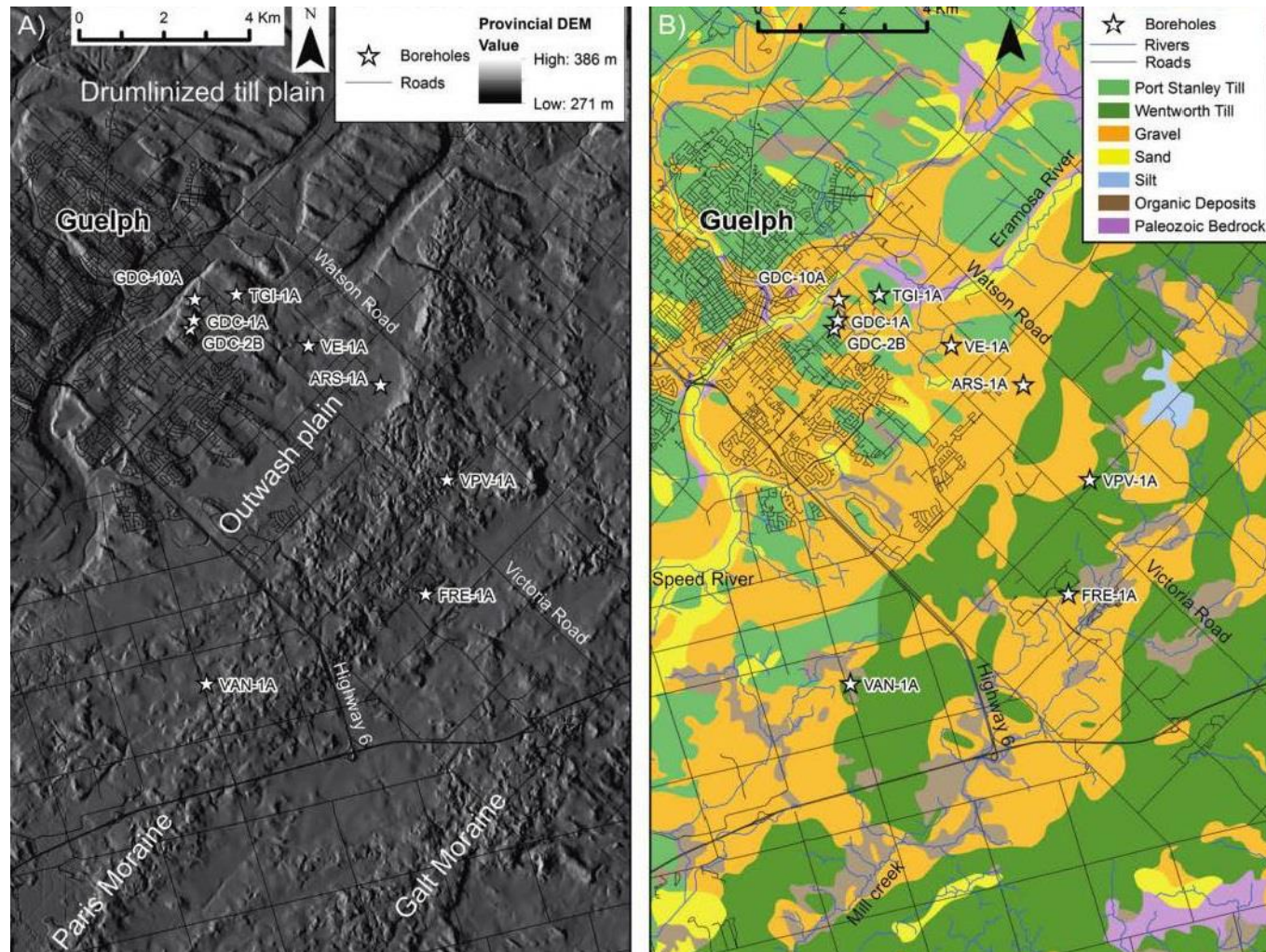
## Biophysical Context: Landform



Credit: *Subsurface heterogeneity in the geological and hydraulic properties of the hummocky Paris Moraine, Guelph, Ontario* (Arnaud et al., 2017)

# Where are we?

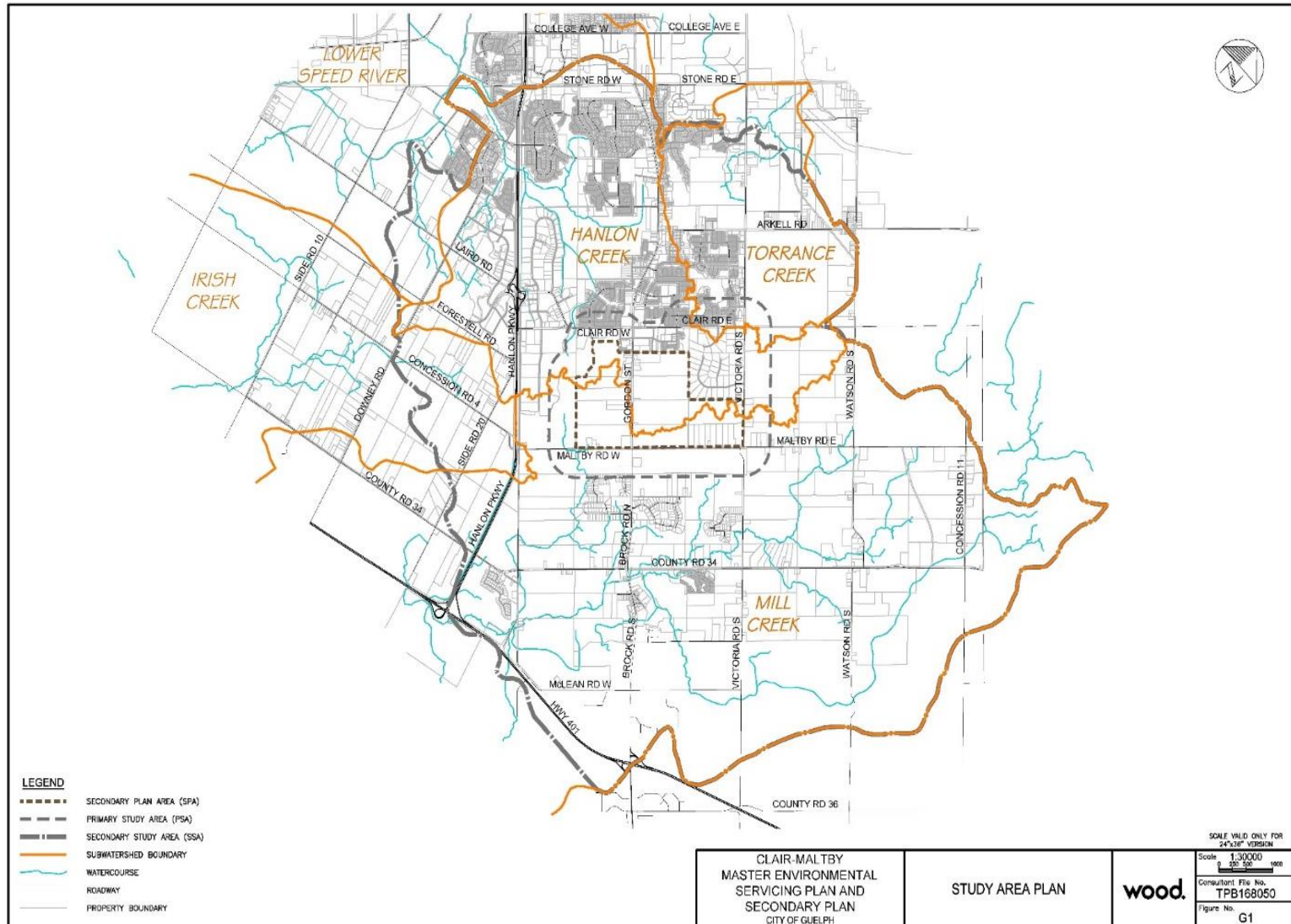
## Biophysical Context: Geology



Credit: *Subsurface heterogeneity in the geological and hydraulic properties of the hummocky Paris Moraine, Guelph, Ontario* (Arnaud et al., 2017 )

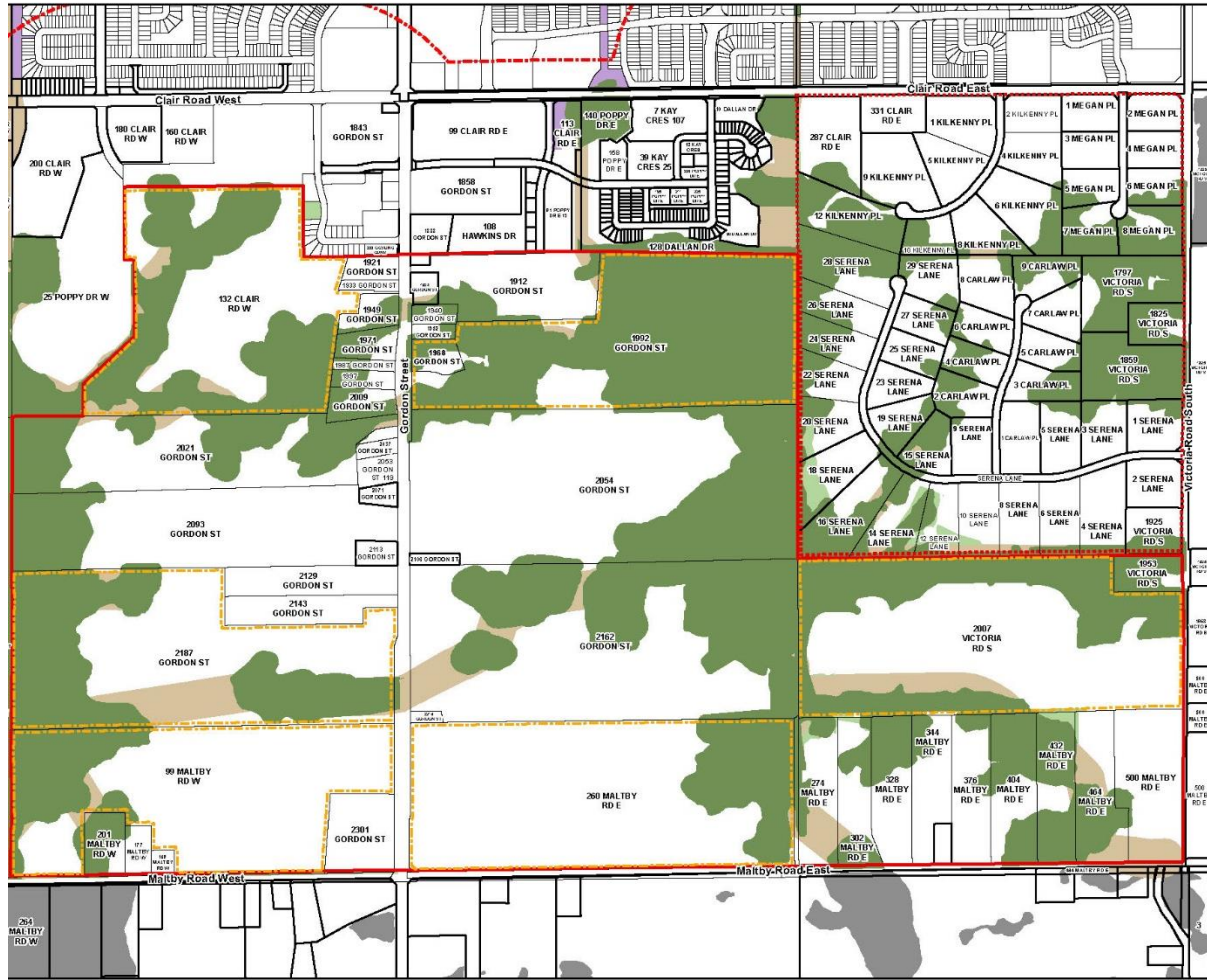
# Where are we?

## Biophysical Context: Watersheds



# Where are we?

## Local Natural Heritage Context



**OPA 42  
Approved Natural Heritage System  
(NHS)**

**Map NH-1**

Clair-Maltby Secondary Plan  
Comprehensive Environmental  
Impact Study (CEIS)

**Legend**

- Primary Study Area (PSA)
- Secondary Plan Area (SPA)
- Rolling Hills Community<sup>1</sup>
- Parcel Fabric
- Properties with Appeals Settled under OPA 42
- City of Guelph Natural Heritage System (2014)**
- Significant Natural Areas
- Natural Areas
- Ecological Linkages
- Restoration Areas
- County of Wellington Greenlands System

**Notes**

1. NHS refinements in the Rolling Hills area (outside of the revised Secondary Plan Area boundary) will be incorporated part of a future Official Plan update rather than through the Clair-Maltby Secondary Plan process.

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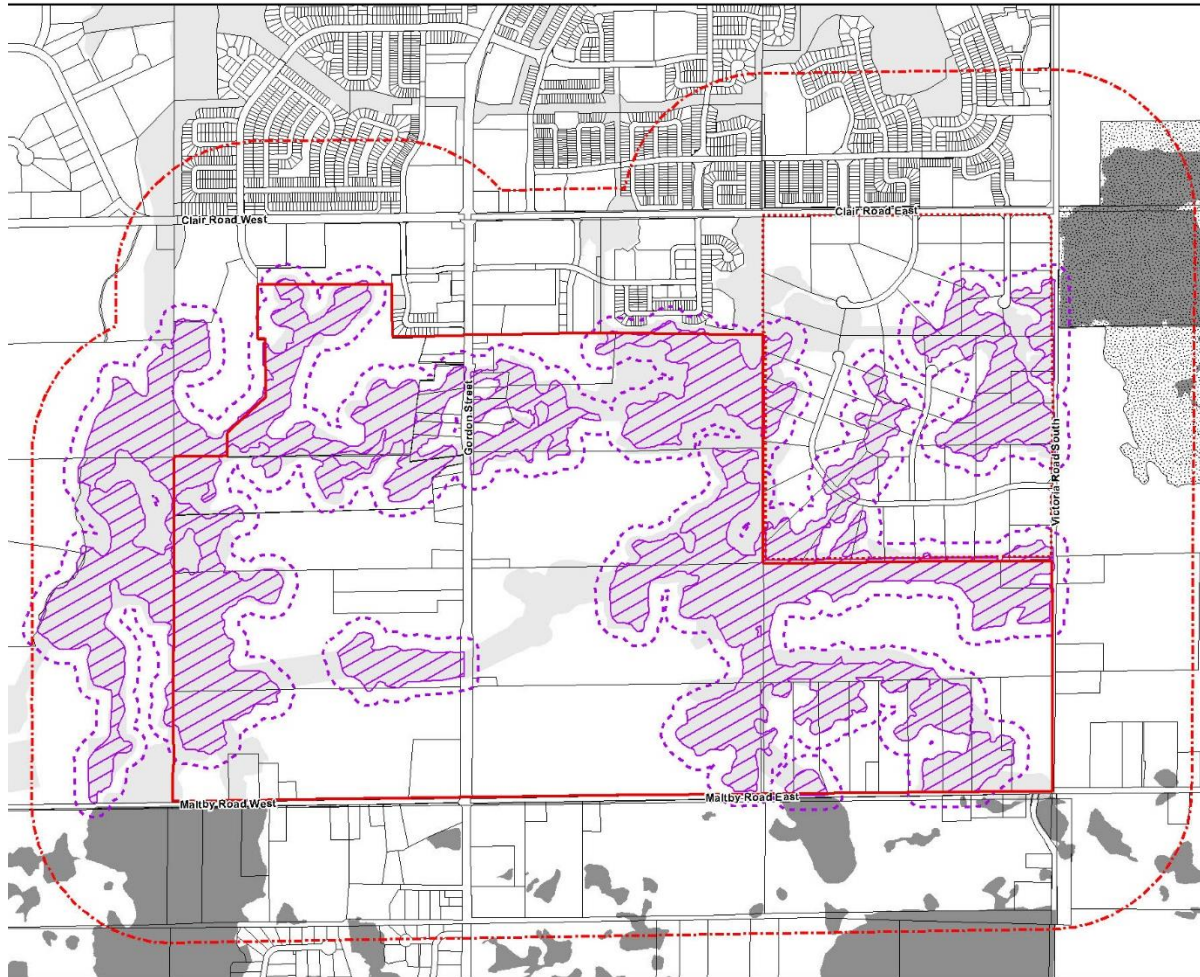
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**BEACON**  
ENVIRONMENTAL

Project 216002  
January, 2021

# Where are we?

## Significant Landform (2014)



### Significant Landform

#### Map NH-13

Clair-Maltby Secondary Plan  
Comprehensive Environmental  
Impact Study (CEIS)

#### Legend

- Primary Study Area (PSA)
- Secondary Plan Area (SPA)
- Rolling Hills Community<sup>1</sup>
- Significant Landform (City of Guelph 2014)
- Significant Landform (2014) 50 m Adjacent Lands
- Setback
- Paris Moraine Earth Science ANSI (MNRF)
- City of Guelph Natural Heritage System (2014)
- County of Wellington Greenlands System

#### Notes

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ENVIRONMENTAL

Project 216002  
January, 2021



# What did we do?

## Overview of Environmental Work

### **Phase 1 and 2 (April 2016 - October 2019)**

- Verification / refinement / assessment of environmental features and functions
- Integrated assessment of the role of groundwater/surface water to support natural systems
- Constraints and opportunities identification
  - 4 years of surface and groundwater monitoring
  - 3 years of scoped ecological monitoring

### **Phase 3 (July 2018 - 2022)**

- Assessment of impacts associated with different community structure options
- Establishment of integrated management strategies, including monitoring framework



# What did we look at?

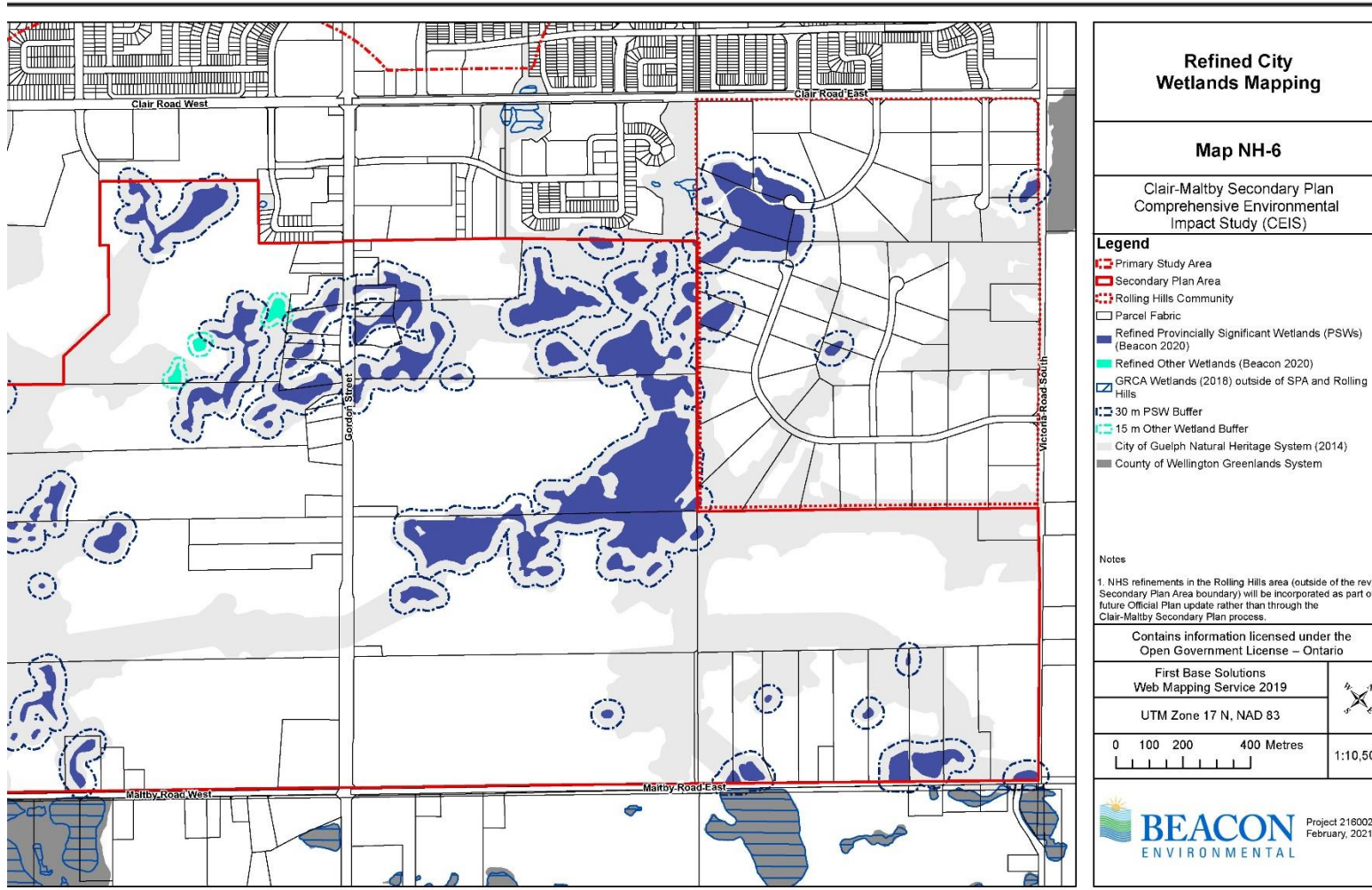
## Natural Heritage System Components

- Surface Water Features & Fish Habitat
- Significant Wetlands & Other Wetlands
- Significant Woodlands & Cultural Woodlands
- Significant Wildlife Habitat (SWH)
- Significant Landform
- Habitat for Provincially & Locally Significant Species
- Ecological Linkages



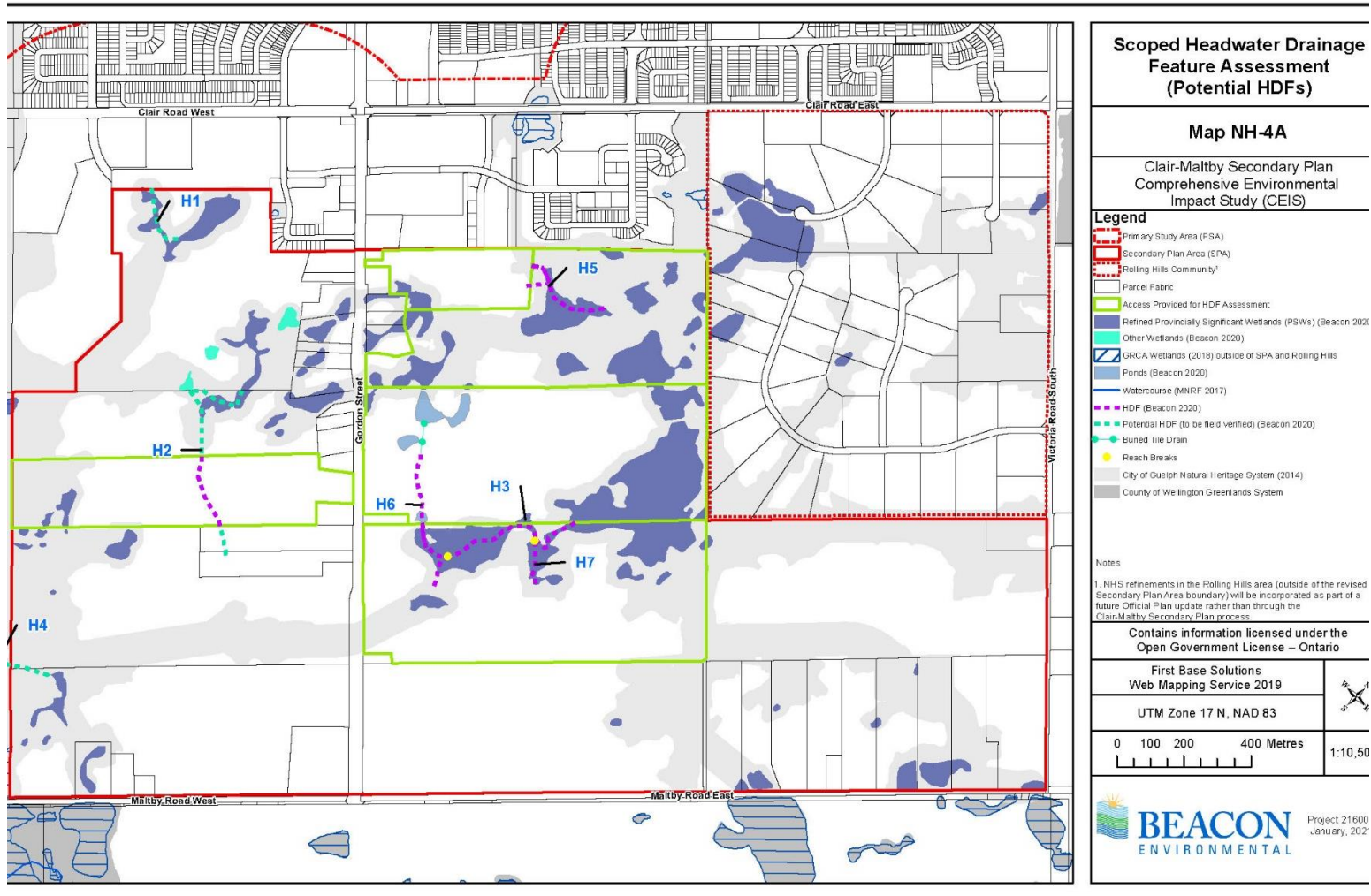
# What did we find?

## Significant & Other Wetlands



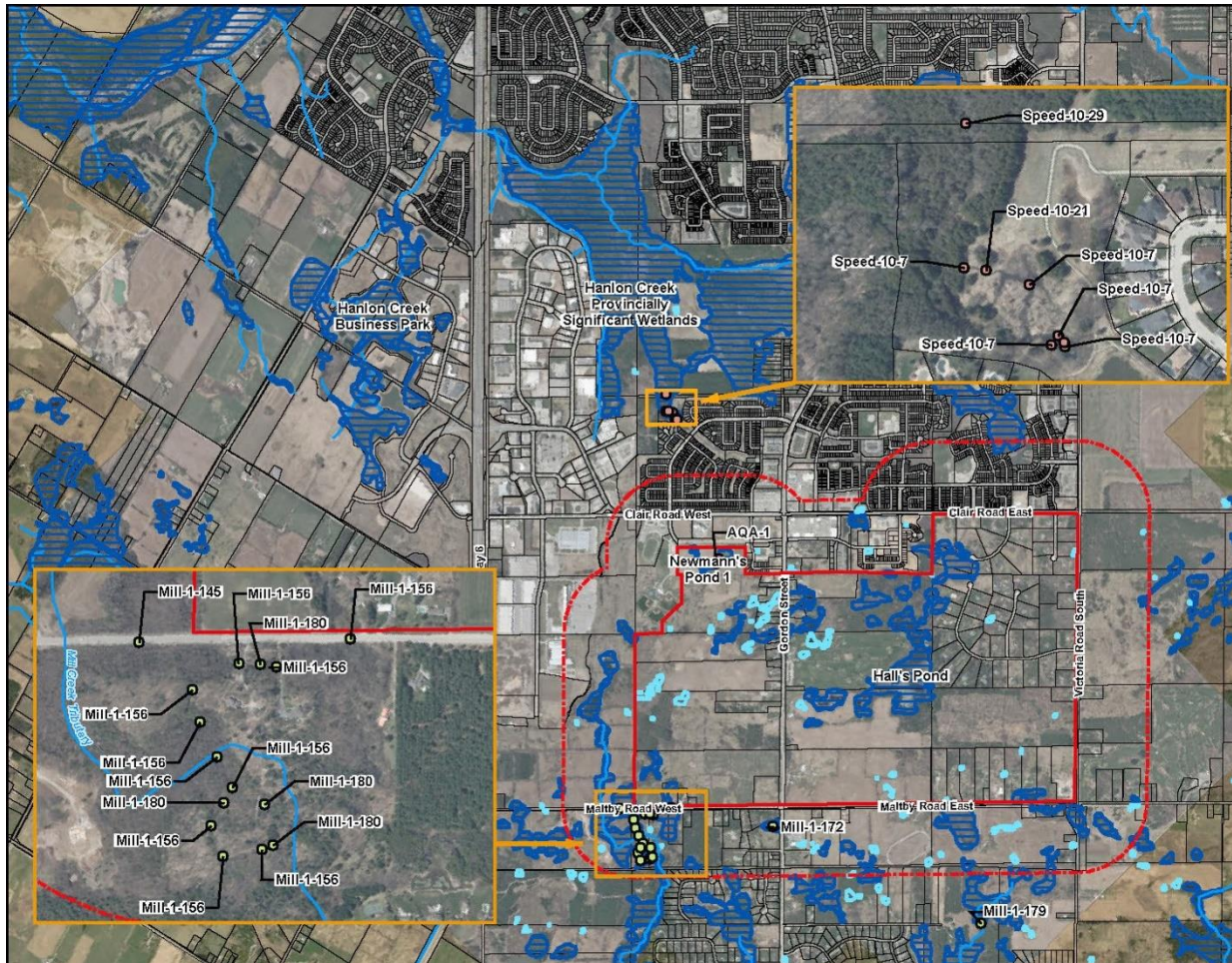
# What did we find?

## Headwater Drainage Features



# What did we find?

## Fish Habitat



### Scoped Fisheries Assessment

#### Map NH-3

#### Clair-Maltby Secondary Plan Phase 1 and 2 Characterization Report

#### Legend

- Primary Study Area
- Secondary Plan Area
- Watercourse (MNRF 2017)
- Hanlon Creek (MNRF 1999)
- Mill Creek (MNRF 2010-2012)
- Aquafor Beech Limited Data (2012)
- Wetlands**
- ▨ Provincially Significant Wetlands (MNRF 2017)
- ▨ Unevaluated Wetlands (MNRF 2017)

Beacon Environmental: Watercourse, Primary Study Area Boundary, 2016;  
City of Guelph: Secondary Plan Area Boundary, Parcel Fabric, 2016;  
Ministry of Natural Resources and Forestry: Hanlon Creek, Mill Creek,  
Aquafor Beech Limited: Sample Data, 2011

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First Base Solutions  
Web Mapping Service 2017

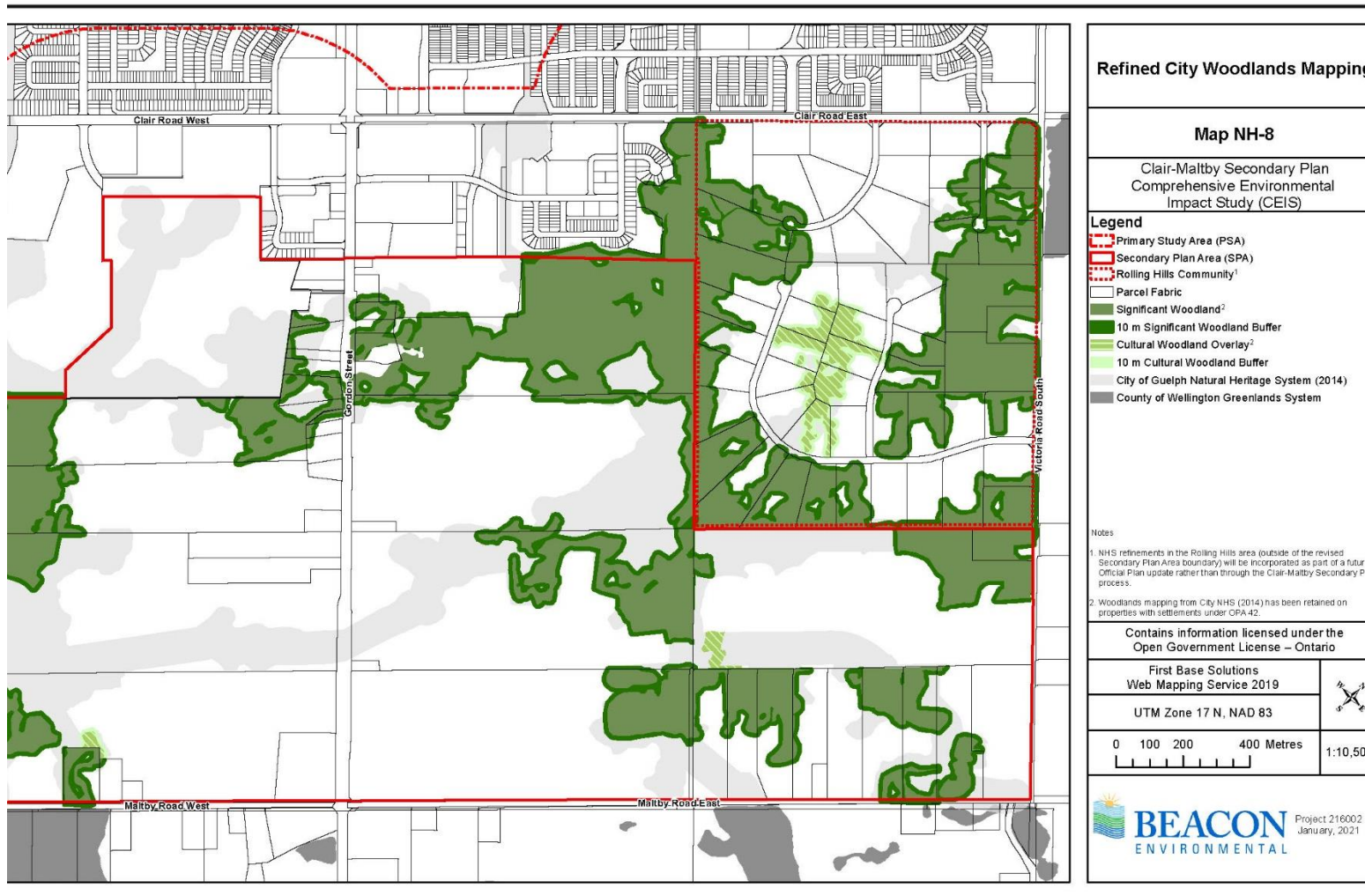
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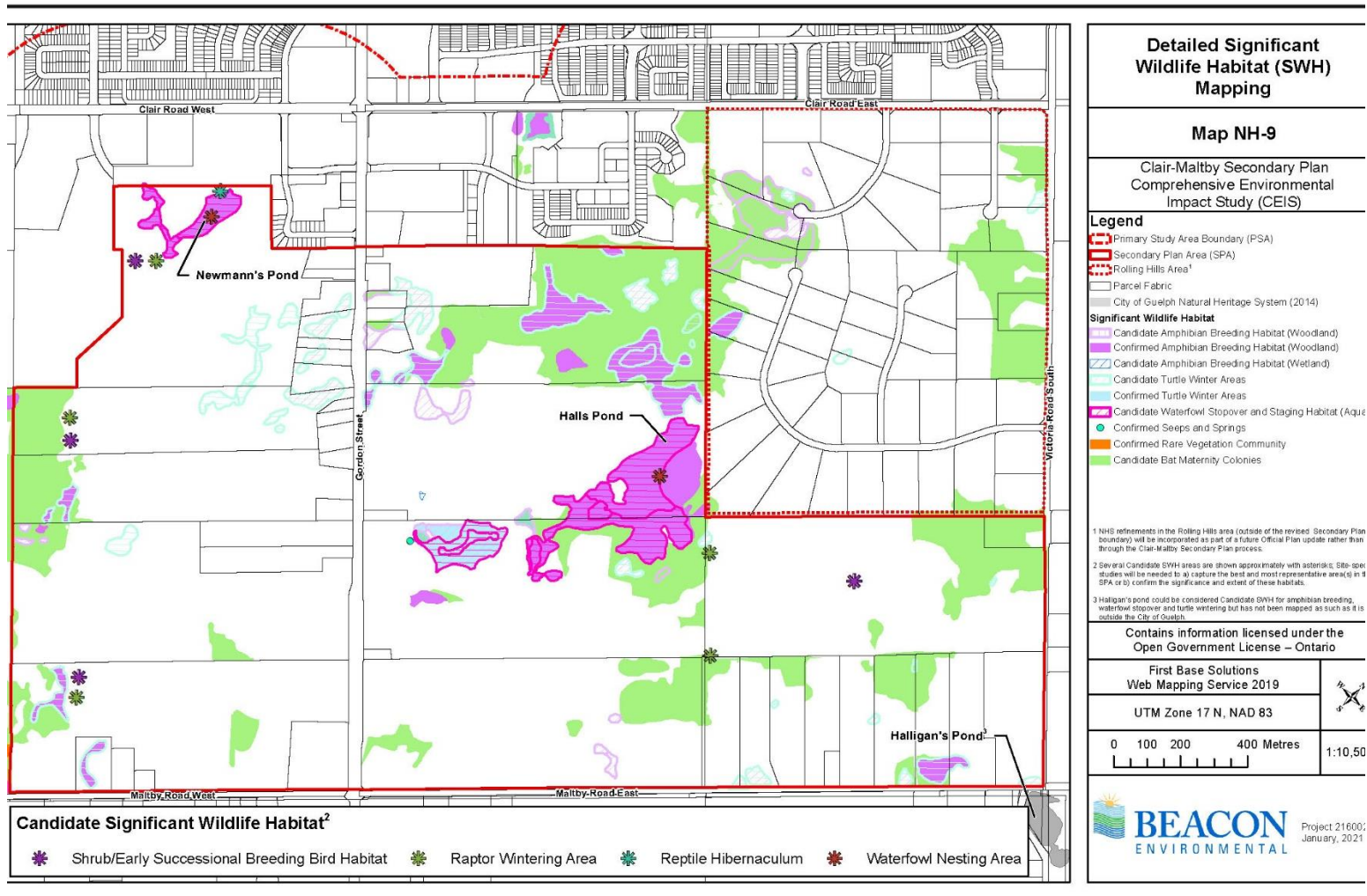
# What did we find?

## Significant & Cultural Woodlands



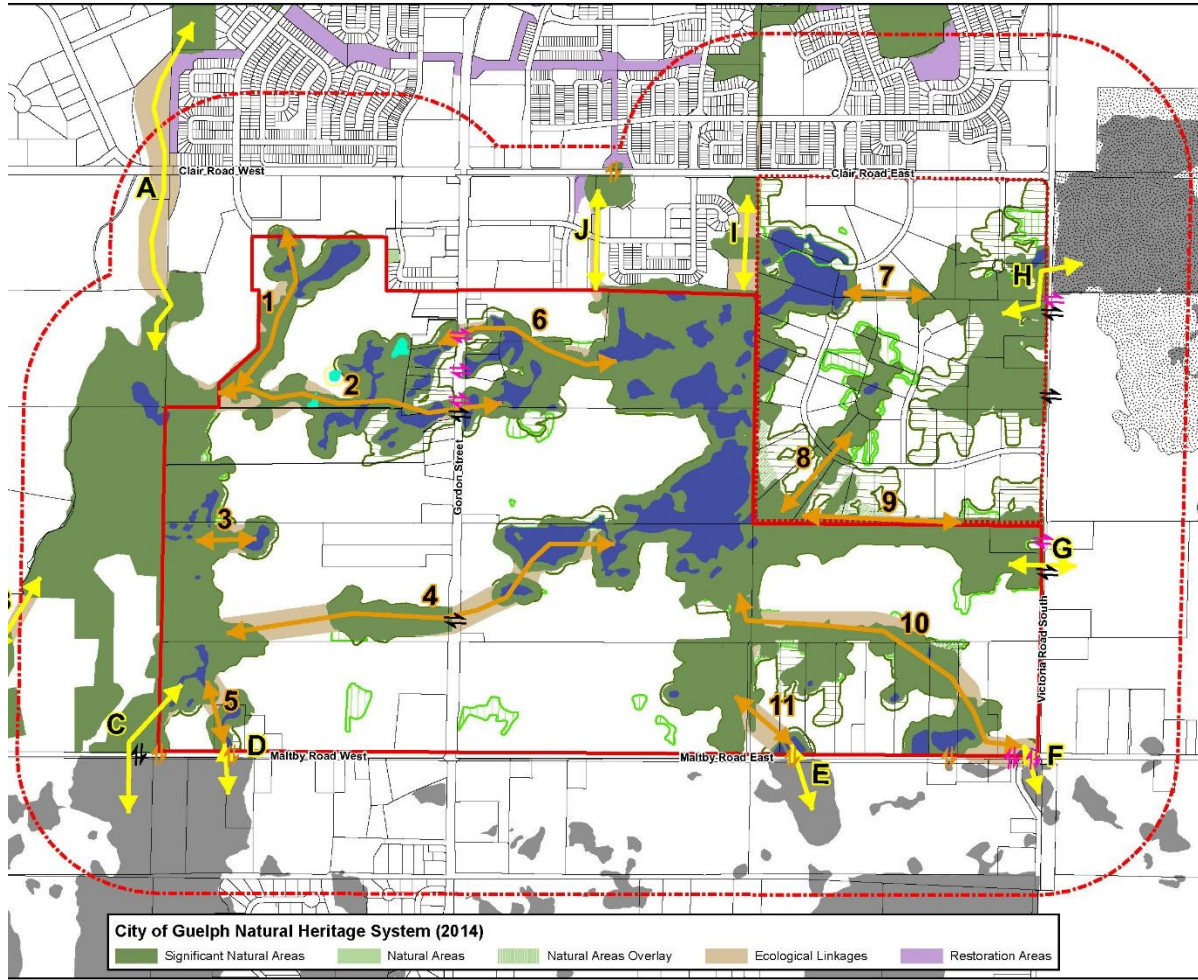
# What did we find?

## Significant Wildlife Habitat (SWH)



# What did we find?

## Ecological Linkages



### Ecological Linkages Assessment

#### Map NH-11

Clair-Maltby Secondary Plan  
Comprehensive Environmental  
Impact Study (CEIS)

#### Legend

- Primary Study Area (PSA)
- Secondary Plan Area (SPA)
- 'Rolling Hills Community'
- Ecological Linkages within the PSA
- Ecological Linkages within the SPA
- Refined PSWs (Beacon 2020)
- Refined Other Wetlands (Beacon 2020)
- Paris Moraine Earth Science ANSI (MNRF 2016)

#### Refined Natural Heritage System

- Significant Natural Areas
- Natural Areas
- Natural Areas Overlay

#### Wildlife Crossings

- ↔ Amphibian and Reptile Crossings
- ↔ Potential Deer Crossings
- ↔ New Amphibian and Reptile Crossings

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Web Mapping Service 2019

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Project 216002  
February, 2021

# What did we find?

## Natural Heritage



PLANTS: 467 species

- 1 Provincially Endangered (Butternut) and 20 locally significant species (i.e., in the County)

BIRDS: 112 species

- 6 Species at Risk and 46 species locally significant and/or rare

AMPHIBIANS: 10 species

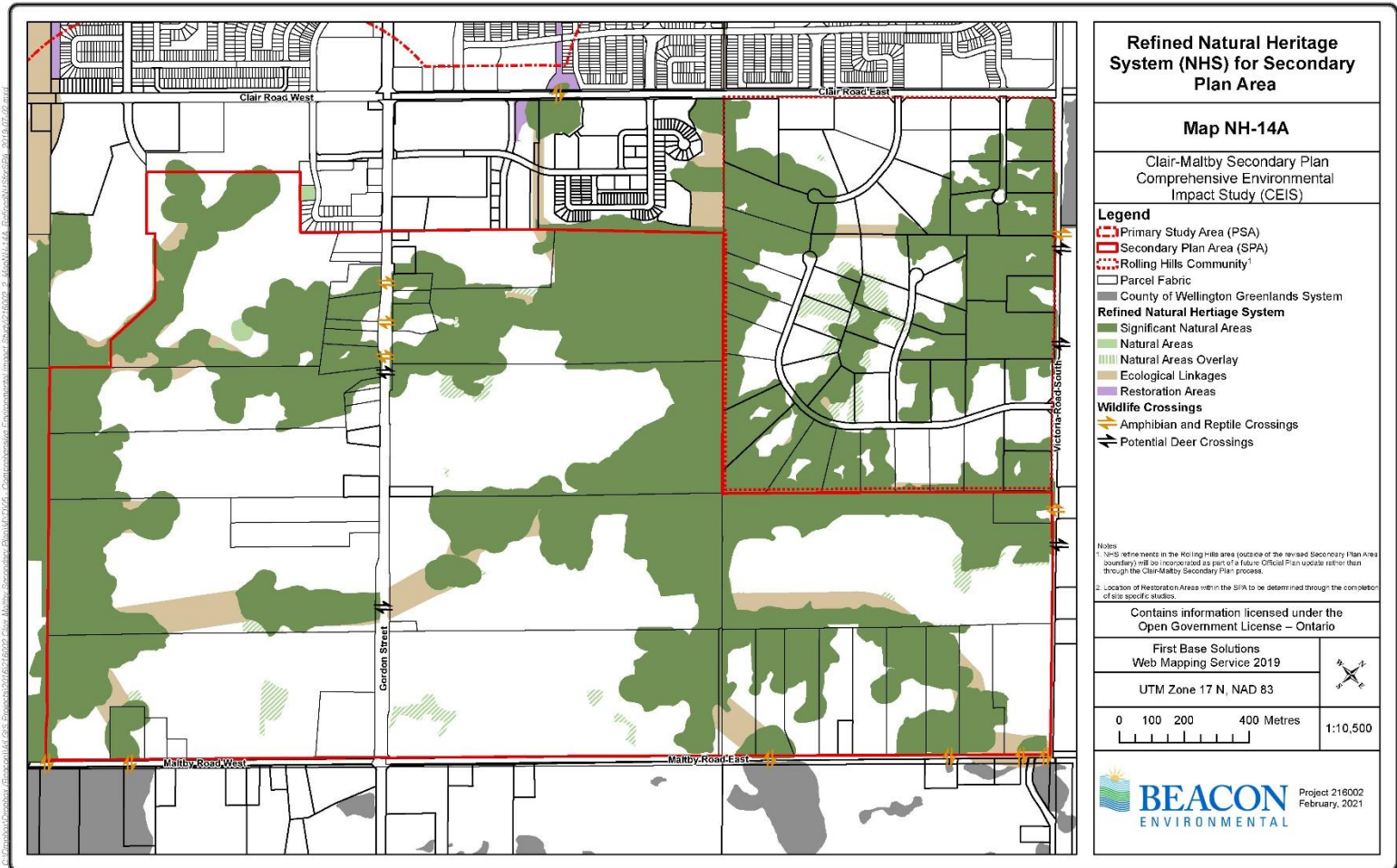
- 1 Federally Threatened from, 2 species of frogs, 2 locally significant frog and 1 locally significant salamander species

REPTILES: 3 spp. of turtle, 4 spp. of snake

- 7 frog, 1 salamander and 3 snake species all locally significant

# What did we find?

## Refined Natural Heritage System





# What did we find?

## Refined Natural Heritage System

Clair-Maltby Secondary Plan Area	2014 (hectares)	2021 (hectares)
Significant Natural Areas	160.22	170.23
Natural Areas	0.00	0.39
Natural Areas Overlay	0.76	4.09
Ecological Linkages	14.01	11.90
<b>TOTALS</b>	<b>174.99</b>	<b>186.25</b> (11.26 net gain)
	42% of CMSPA	45% of CMSPA

Note: Restoration Areas within and/or adjacent to the Refined Natural Heritage System are to be identified through the site-specific planning process



# What did we recommend?

## Avoiding & Minimizing Impacts

### AS PART OF THE CLAIR-MALTBY PROCESS

- Mapping all known components of the NHS as exclusive land use designations, including applicable buffers
- Keeping arterial roads from crossing Significant Wetlands and Significant Woodlands and generally limiting road crossings of the NHS
- Building on the wildlife crossing infrastructure already incorporated by confirming existing and identifying new locations for wildlife crossing infrastructure (and / or other mitigative measures)
- The Moraine Ribbon - keeping major trails largely outside / on the periphery of the NHS
- Placement of storm water capture areas (SWCAs) / parks / schools adjacent to the NHS where possible to provide supplemental “buffering” of the NHS from more intensive land uses



# What did we recommend?

## Managing Unavoidable Impacts

Some key examples include...

### GOOD PLANNING

- Protect features and functions as per approved Official Plan policies with supporting guidelines (e.g., with buffers, linkages)

### ECOLOGICALLY SENSITIVE SITE DESIGN

- Significant Landform: Minimize grading in adjacent lands, restore disturbed topography, allow gradual transitions to developed lands where possible

### LOCALLY APPROPRIATE WATER MANAGEMENT

- Implement distributed infiltration and stormwater management measures to maintain surface and groundwater inputs to wetlands

### MAINTAINING & ENHANCING CONNECTIVITY

- Naturalizing linkages, installing amphibian and reptile tunnels under roads, bridge crossing over Gordon (for pedestrians and wildlife)

### ONGOING MANAGEMENT & TARGETED MONITORING

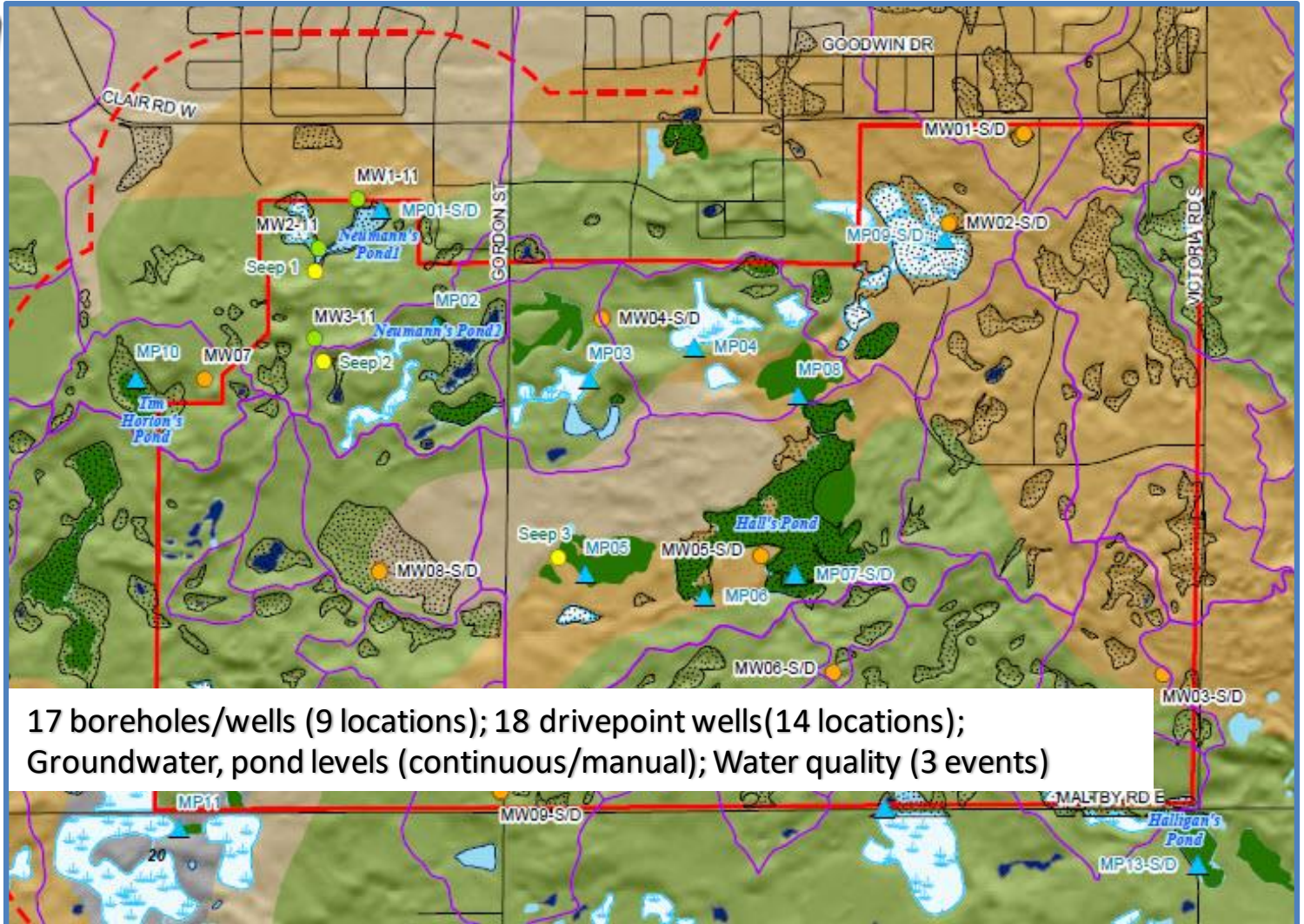
- Fencing between public protected natural areas and other land uses
- Tracking changes in vegetation and tree cover, wildlife movement

# Groundwater



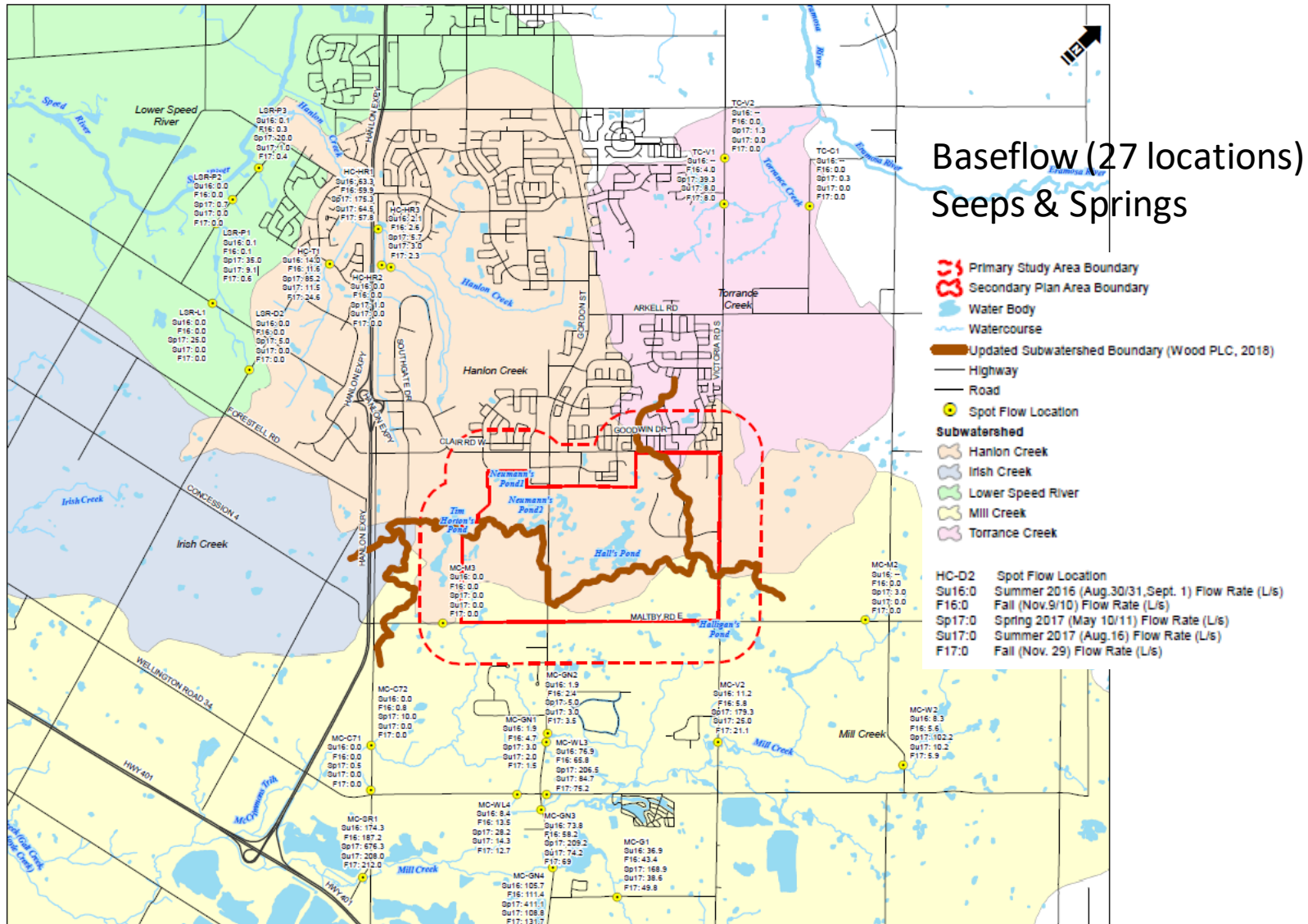
# Hydrogeologic Characterization

## Groundwater & Pond Level Monitoring Locations



# Hydrogeologic Characterization

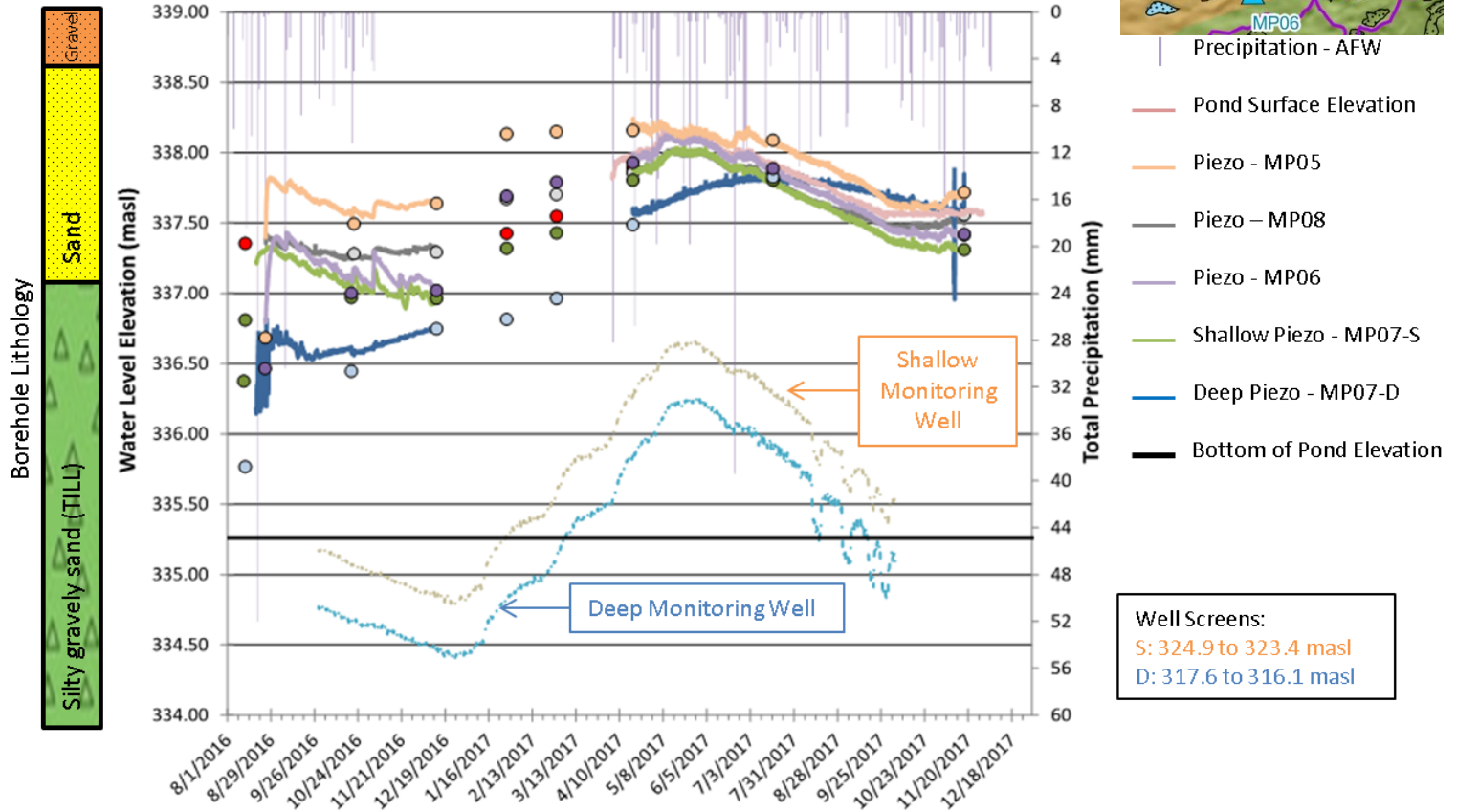
## Baseflow Monitoring Locations



# Hydrogeologic Characterization

## Seasonal Variation in Groundwater & Pond Levels

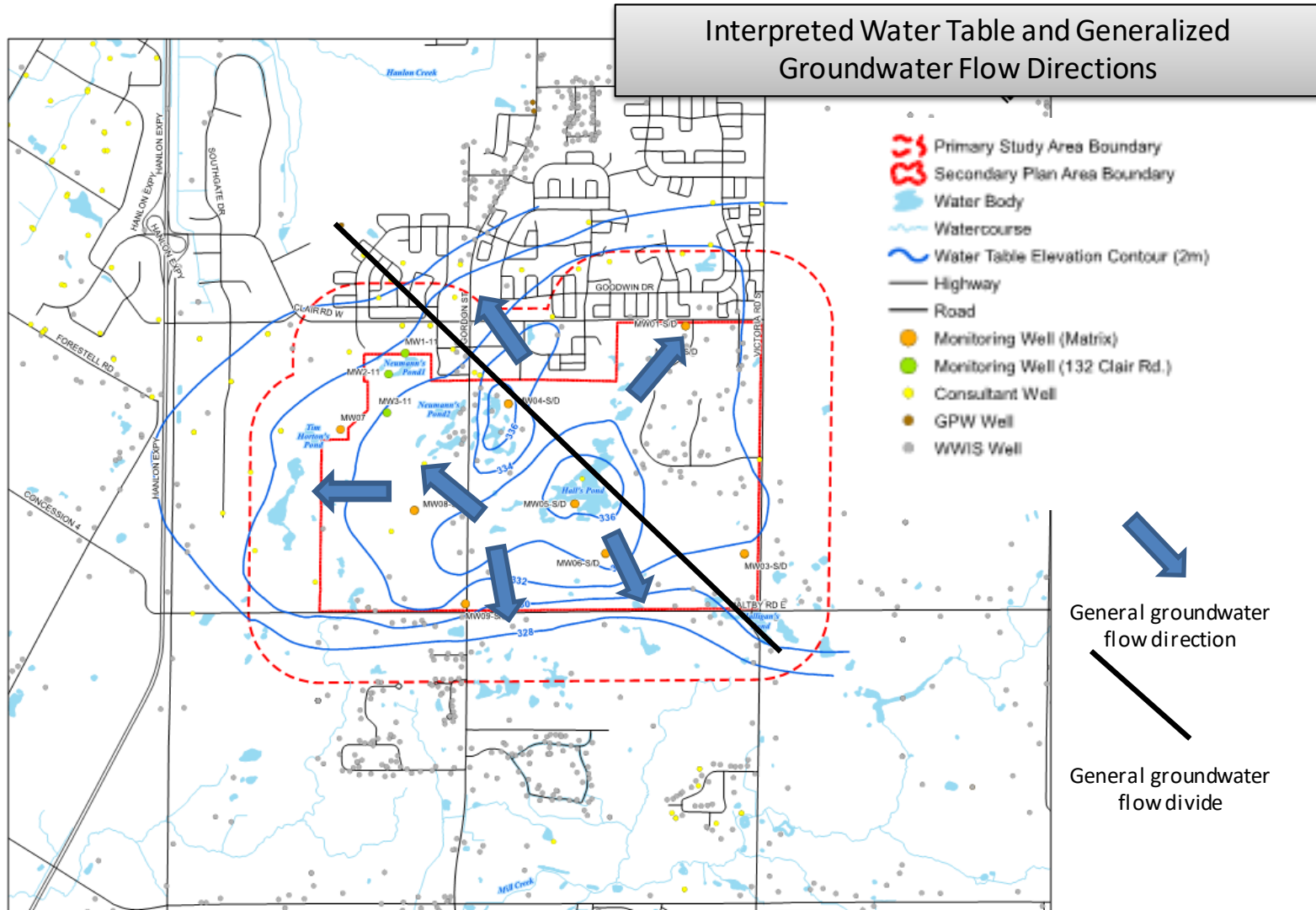
Clair-Maltby Secondary Plan  
Long Term Groundwater Level Monitoring  
Hall's Pond



Precipitation - AFW: Data set from rain gauge installed by AMEC Foster-Wheeler at 500 Maltby Rd. E.

# Hydrogeologic Characterization

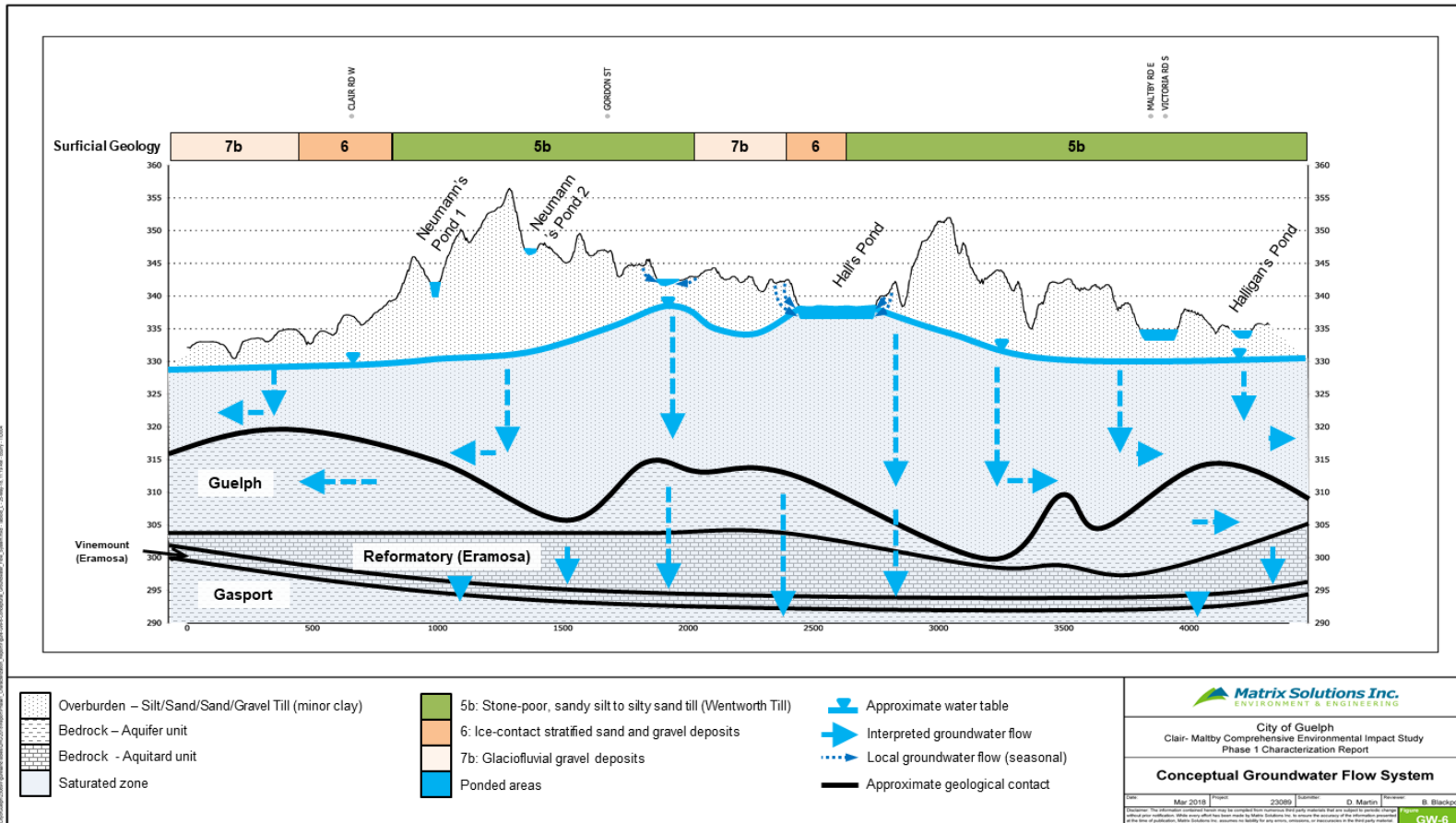
## Groundwater Flow and Function





# Hydrogeologic Characterization Groundwater Flow and Function

Conceptual Model of Recharge and Groundwater Flow Systems



# Integrated Surface Water – Groundwater Simulation

## Groundwater Flow and Function

Integrated Surface Water-Groundwater Model Domain

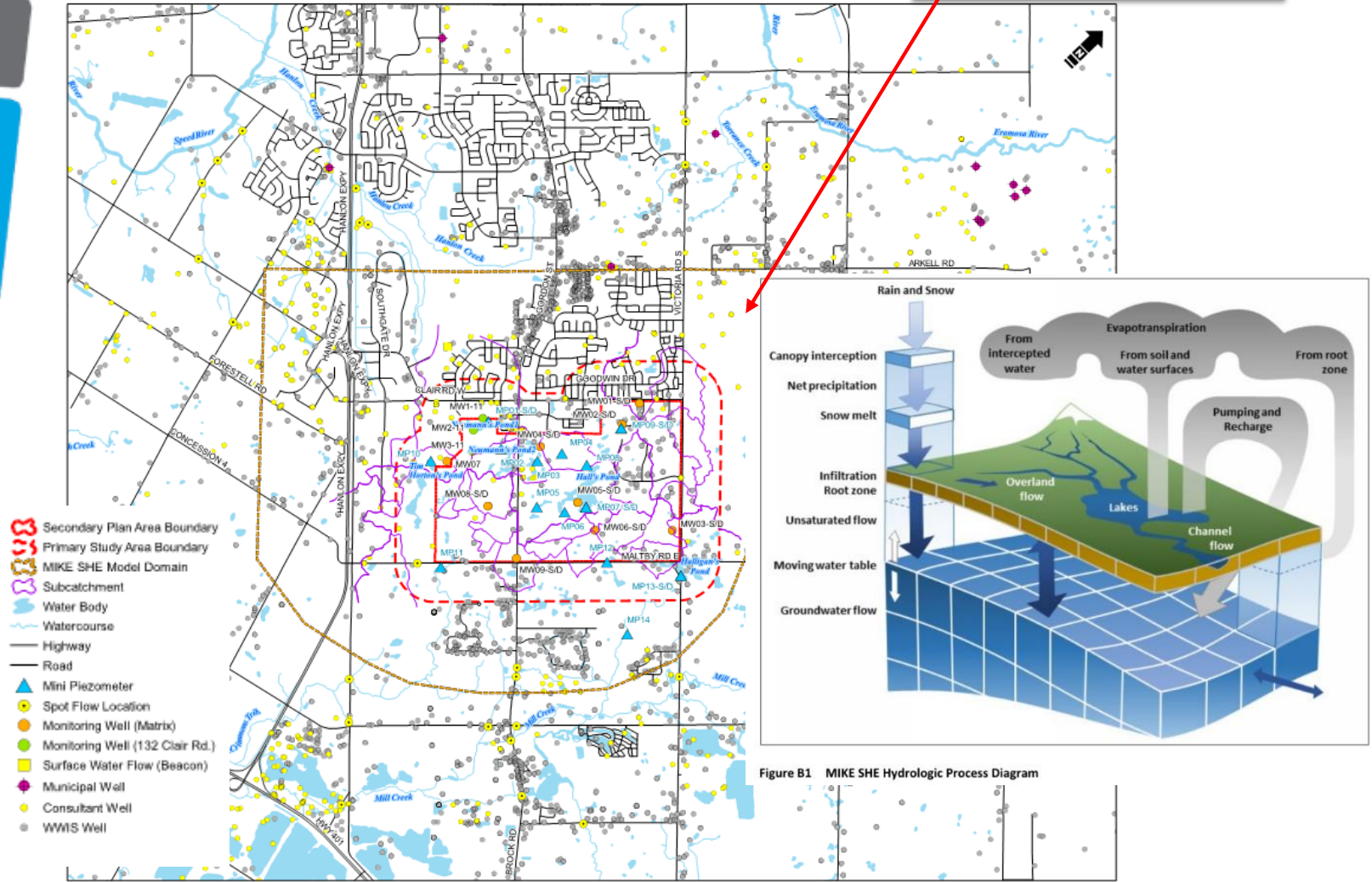
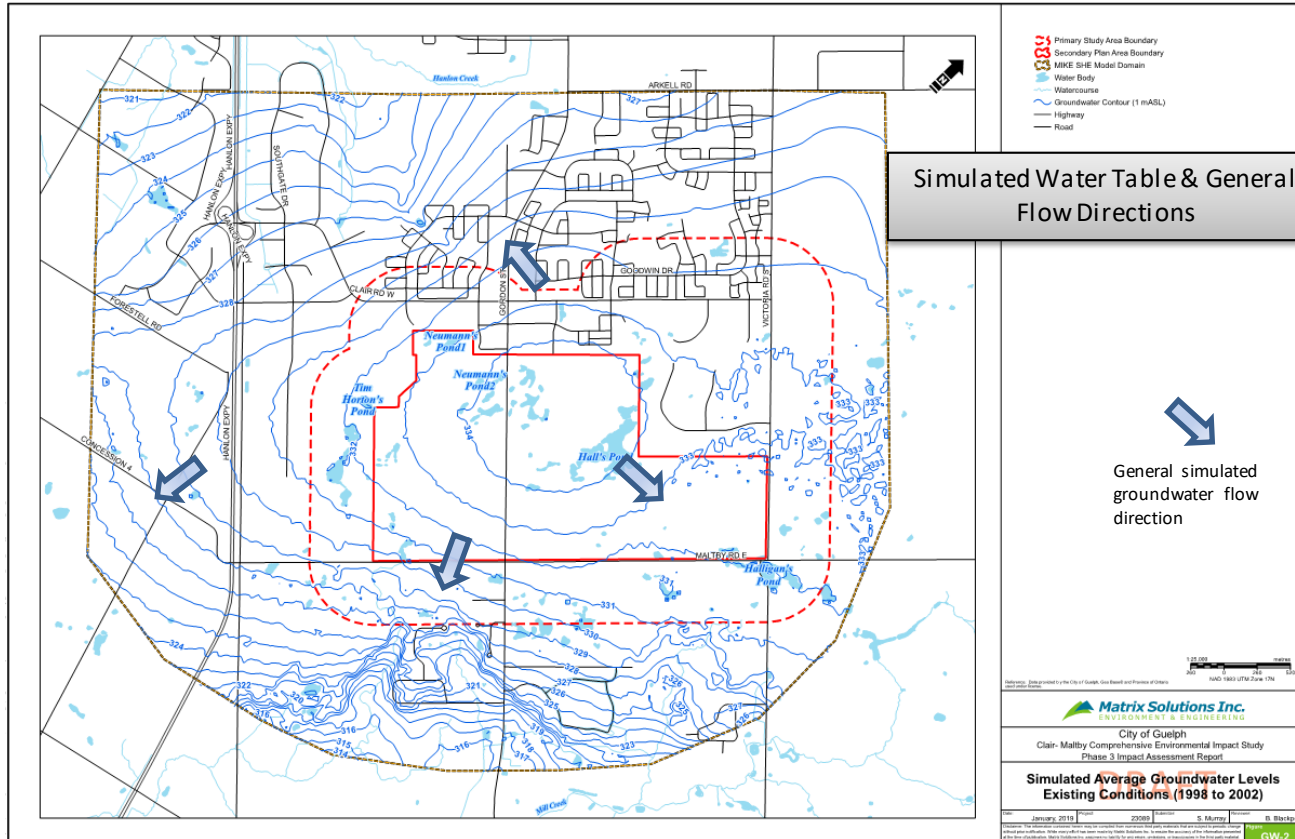
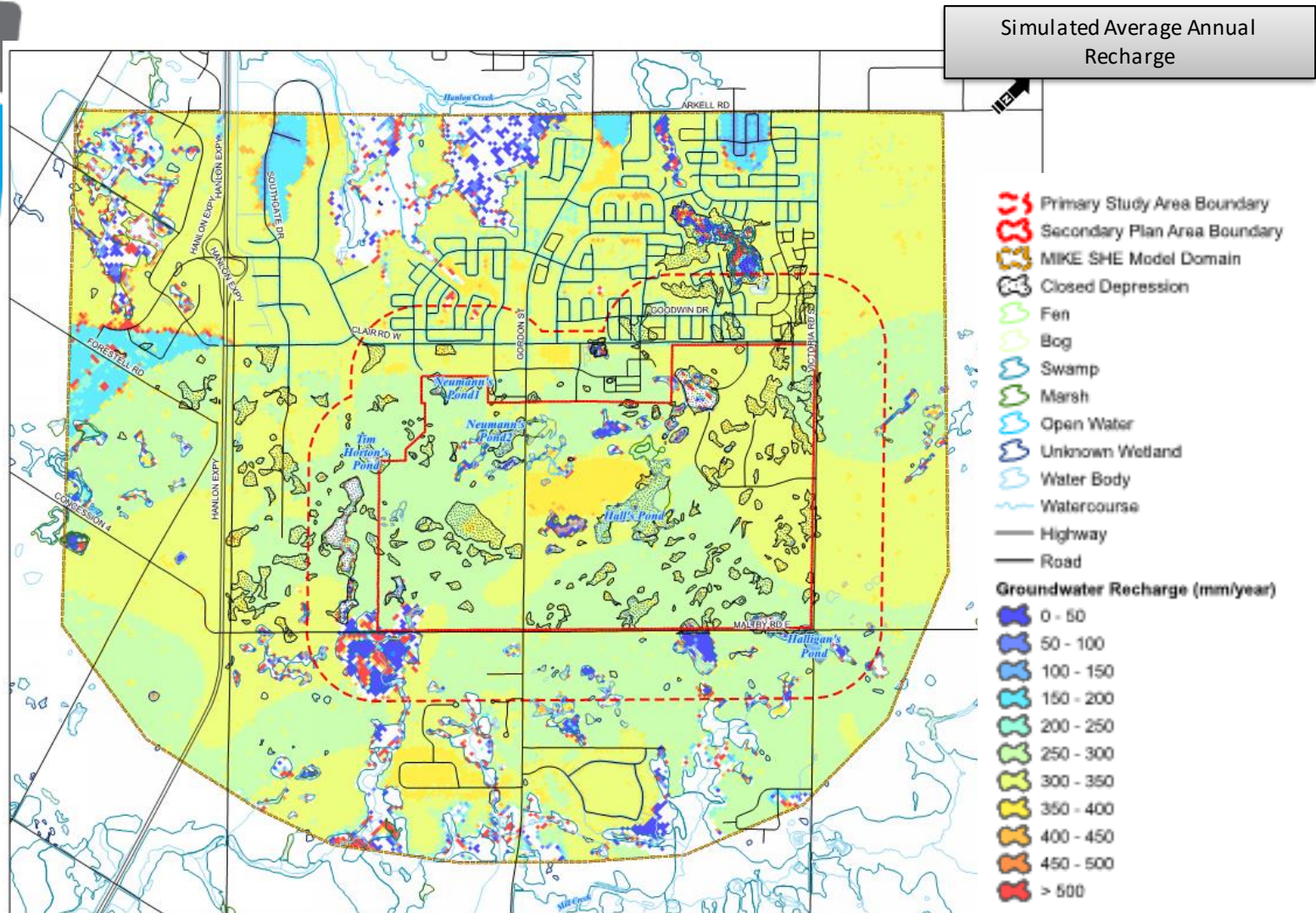


Figure B1 MIKE SHE Hydrologic Process Diagram

# Integrated Surface Water – Groundwater Simulation Groundwater Flow and Function

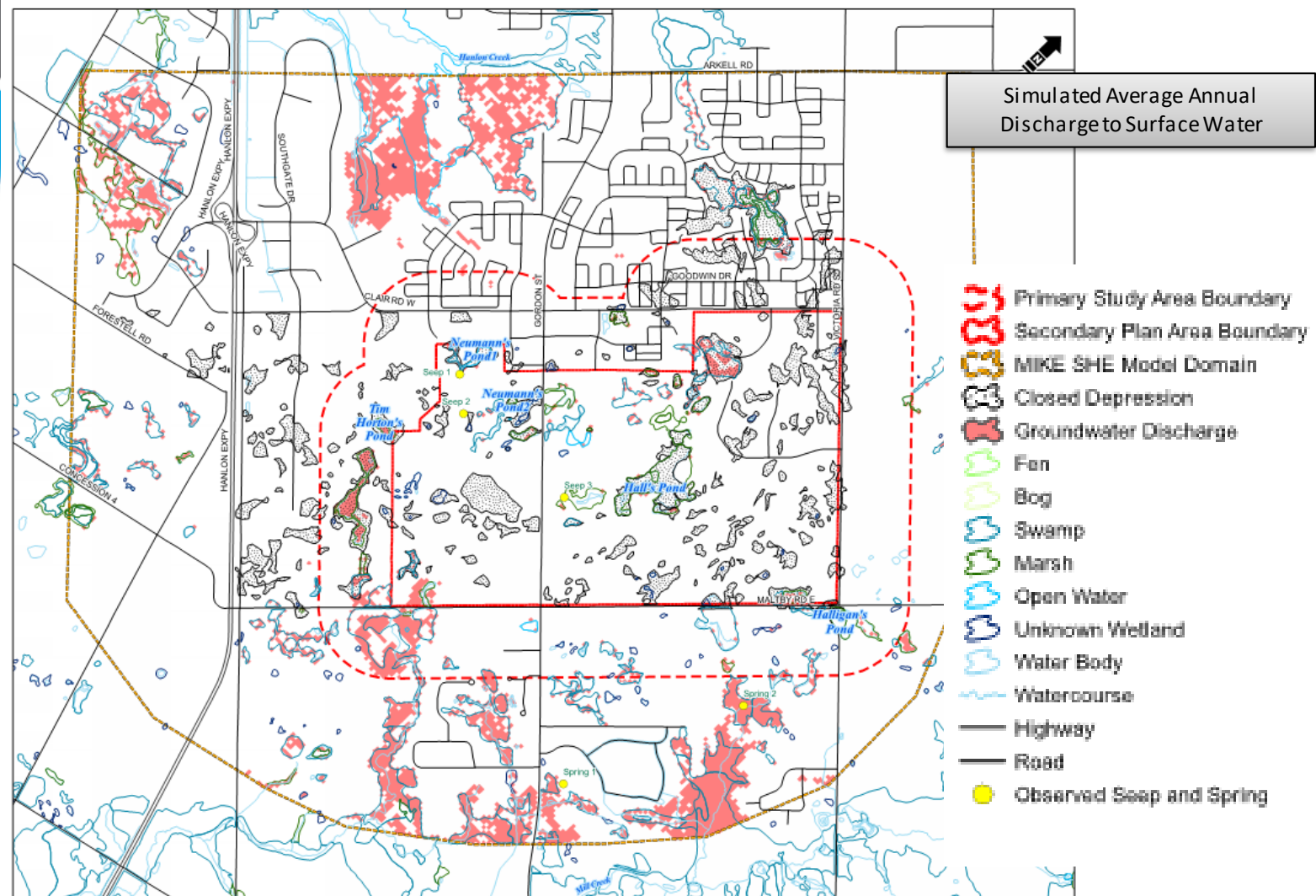


# Integrated Surface Water – Groundwater Simulation Current Conditions Recharge



# Integrated Surface Water – Groundwater Simulation

## Current Conditions Groundwater Discharge



# Impact Assessment Hydrogeology

- Integrated Surface Water – Groundwater Model used to simulated change in land use and represent proposed stormwater management;
    - Low Impact Development BMPs (source infiltration)
    - Storm Water Capture Areas for Large Events
1. Initial Preferred Community Structure (May 2018)
  2. Updated Preferred Community Structure (May 2019)

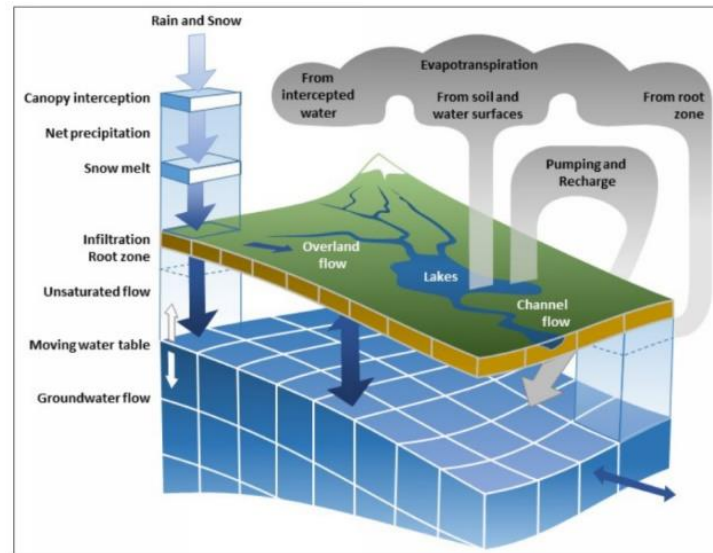


Figure B1 MIKE SHE Hydrologic Process Diagram



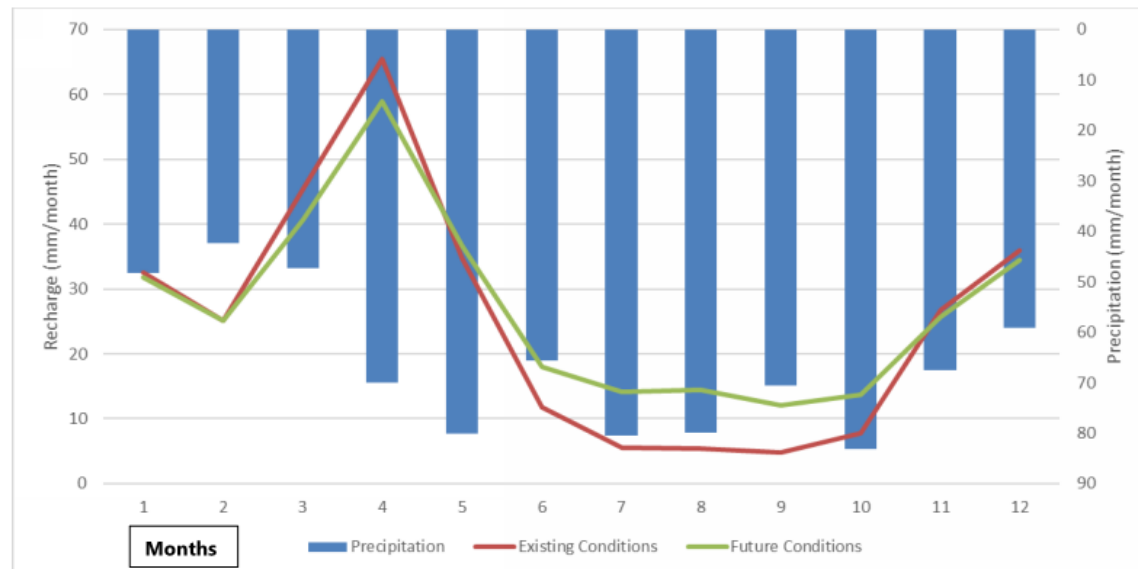
# Impact Assessment Hydrogeology

- Impacts assessed
  - Water budgets in the SPA, PSA and key NHS features in, and adjacent to, the SPA,
  - Groundwater flow directions and depth to water table,
  - Recharge to the water table, shallow and deep bedrock aquifers,
  - Groundwater discharge to streams and wetlands,
  - Average annual ponded water elevation in wetlands.


# Impact Assessment Iterations 1 & 2 Results

- Water budgets for SPA, PSA Halls, Neumann and Halligans Ponds maintained
- Groundwater flow and discharge locations maintained
- Recharge to water table and bedrock aquifers maintained

**Figure 6.1. Mean Monthly Groundwater Recharge – Existing vs. Future Conditions (Updated PCS) (2003-2017)**







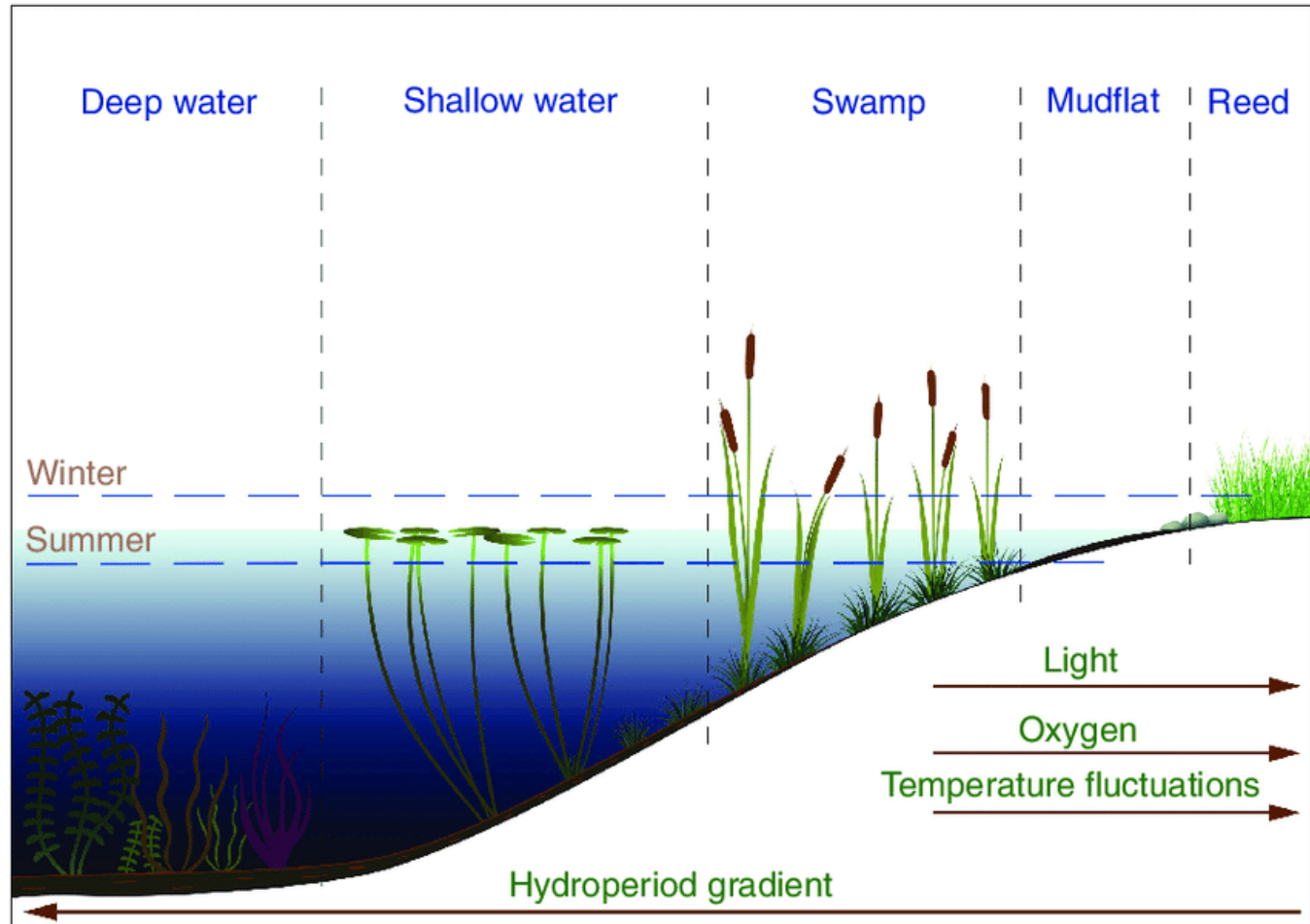
# Impact Assessment Iterations 1 & 2

## Results

- Increase in ponded water levels at Halls and Neumanns Ponds
- Does the small increase in average annual ponded water levels represent a significant impact to wetland hydroperiod and vegetation communities?
- Can impact be mitigated by refinement of Land Use and SWM?

# Impact Assessment Iteration 3

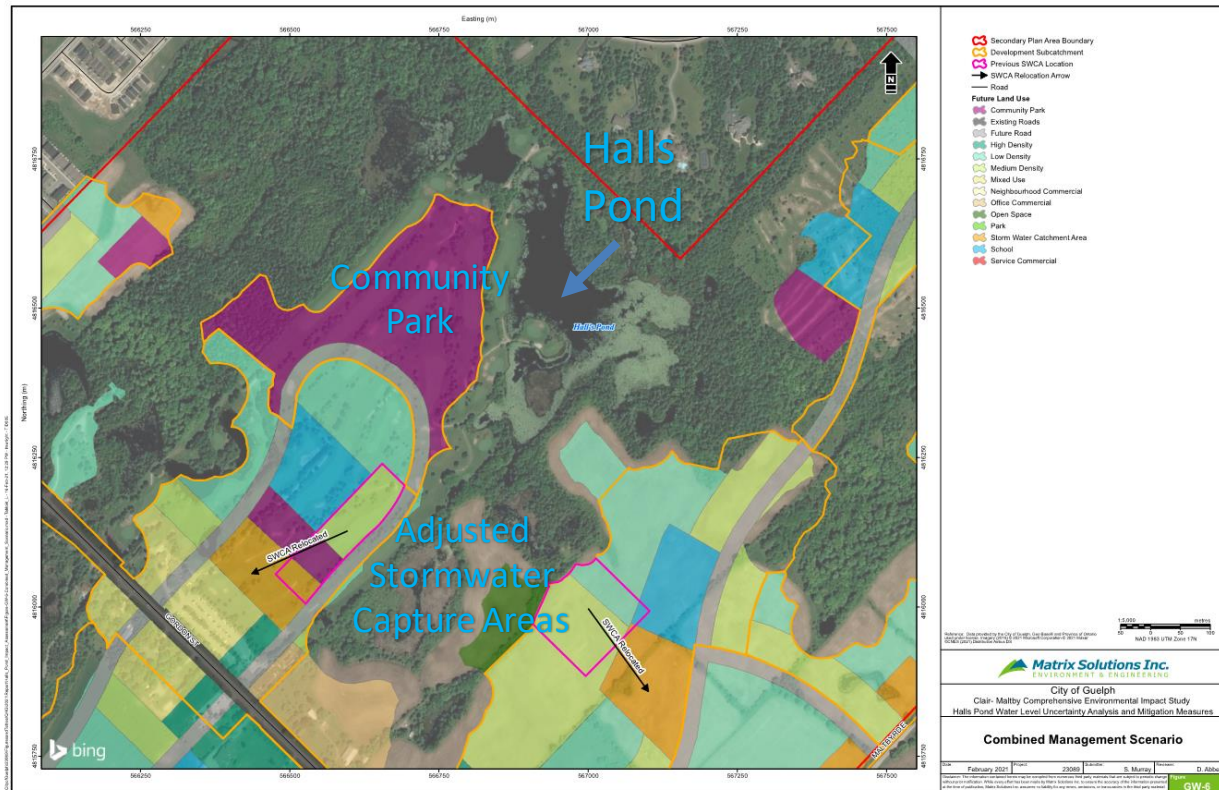
## Hydroperiod and Halls Pond



Wetland hydroperiod – the length of time and portion of the year the wetland holds ponded water

# Impact Assessment Iteration 3 Results

Additional simulation to account for finalized community park location and refined representation of Halls Pond to assess potential impacts to hydroperiod (Final PCS ,2021)



# Impact Assessment Iteration 3

## Hydroperiod and Halls Pond

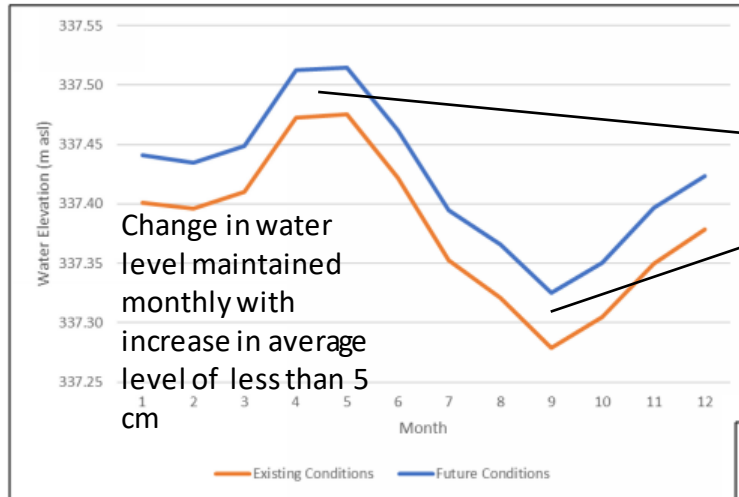
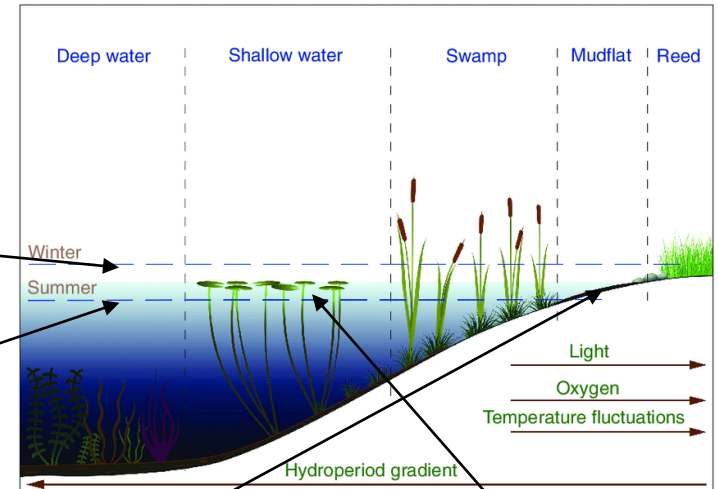


FIGURE A Mean Monthly Water Levels at Halls Pond (2003-2017)



Hydroperiod – Pond and Buffer Area, Frequency of Ponding Maintained

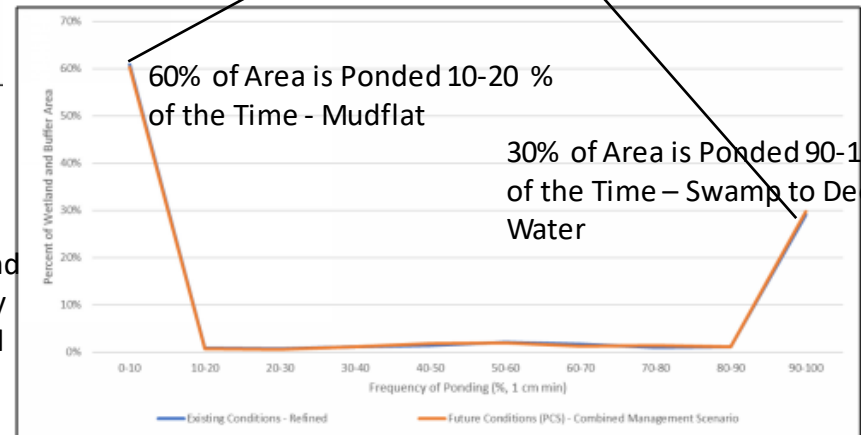


FIGURE B Halls Pond and Buffer Area Ponding Frequency >1 cm (2003-2017)

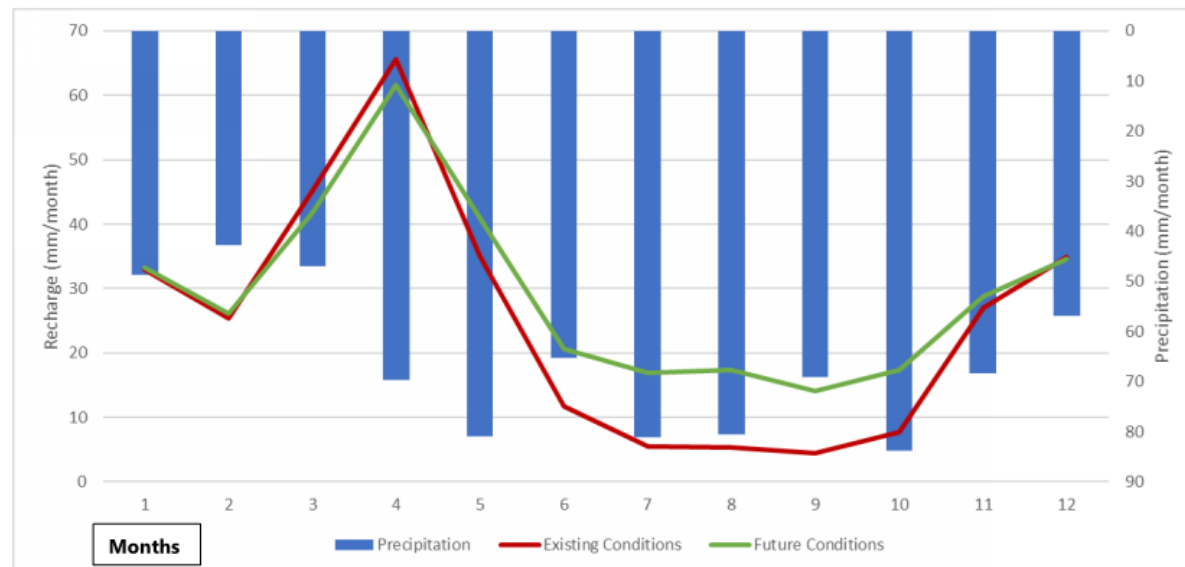
- Hydroperiod maintained despite less than 5 cm change in average annual water level

# Impact Assessment Iteration 3

## Groundwater Recharge and Discharge

- Water budgets for SPA, PSA Halls, Neumann and Halligans Ponds maintained
- Groundwater flow and discharge locations maintained
- Recharge to water table and bedrock aquifers maintained

Figure 6.3. Mean Monthly Groundwater Recharge – Existing (revised) vs. Future Conditions (Final PCS) (2003-2017)



# Surface Water



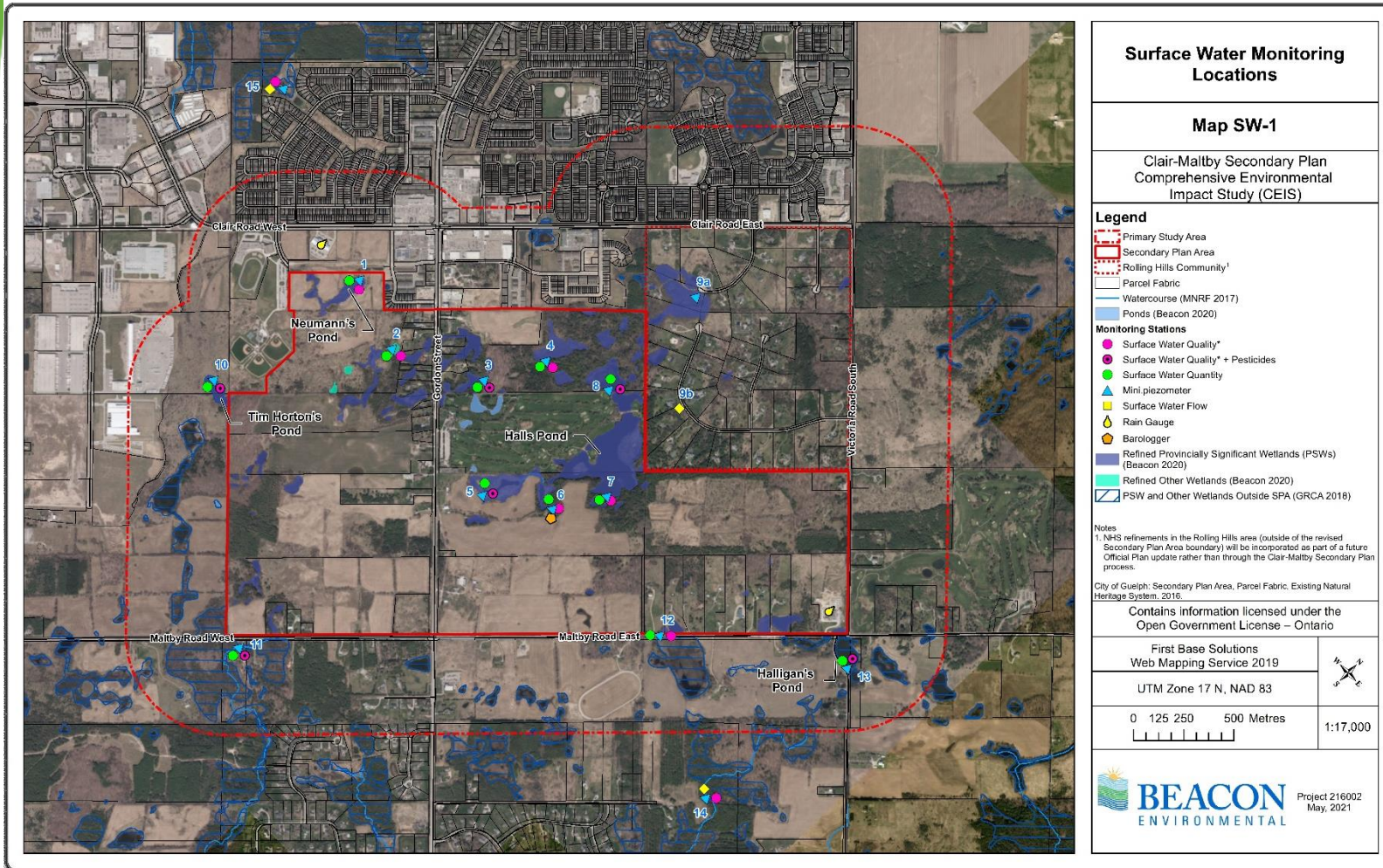


# Surface Water

## **Objective / Purpose**

- Need to define runoff characteristics (peak and volume) in the study area (Headwaters of Mill, Hanlon and Torrance Creeks)
- Assist in the definition of the role of water in supporting natural systems functionality
- Fundamental component of Stormwater Management Plan development

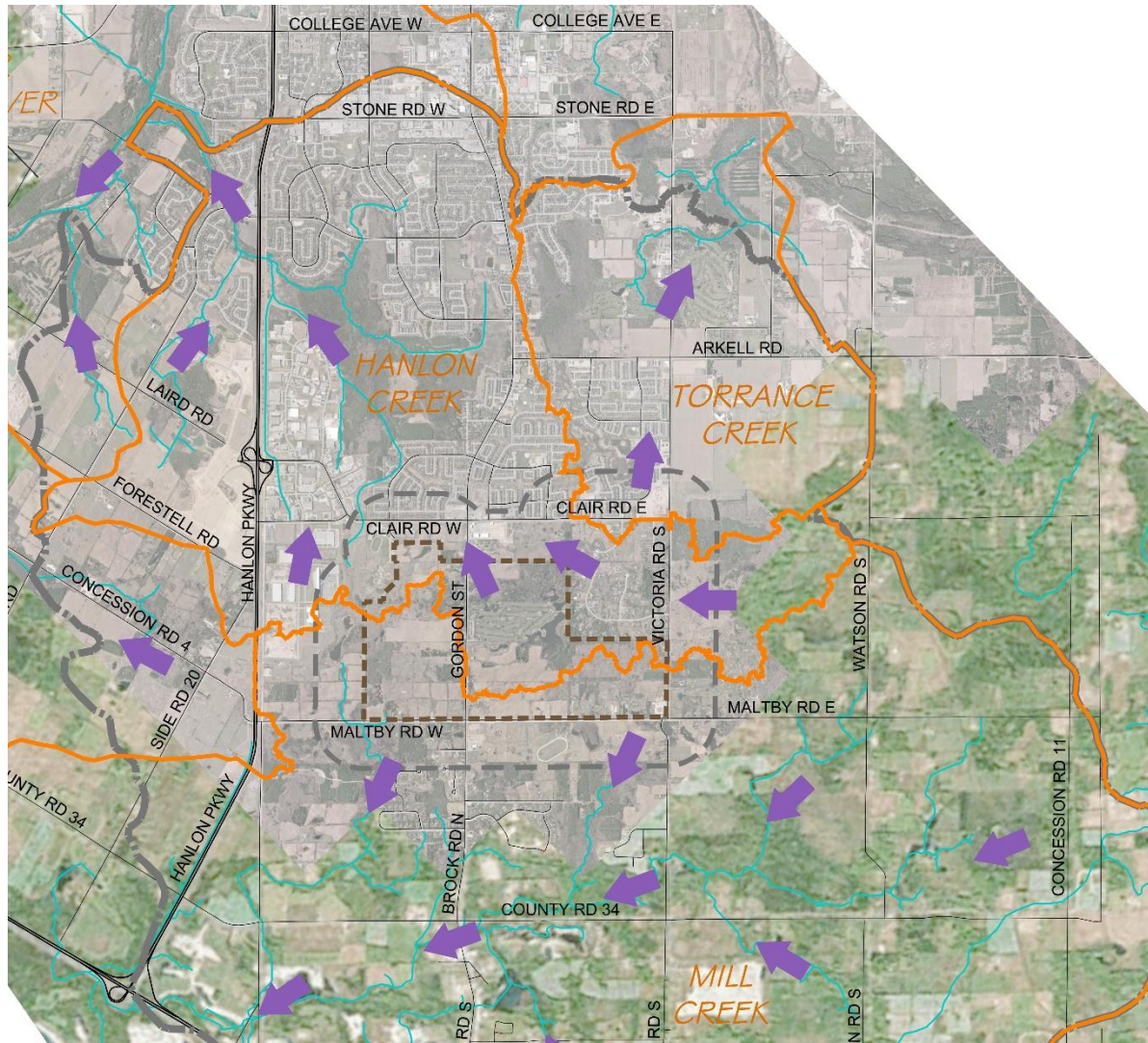
# Surface Water



- Monitoring surface water quantity and quality (2016-2019)

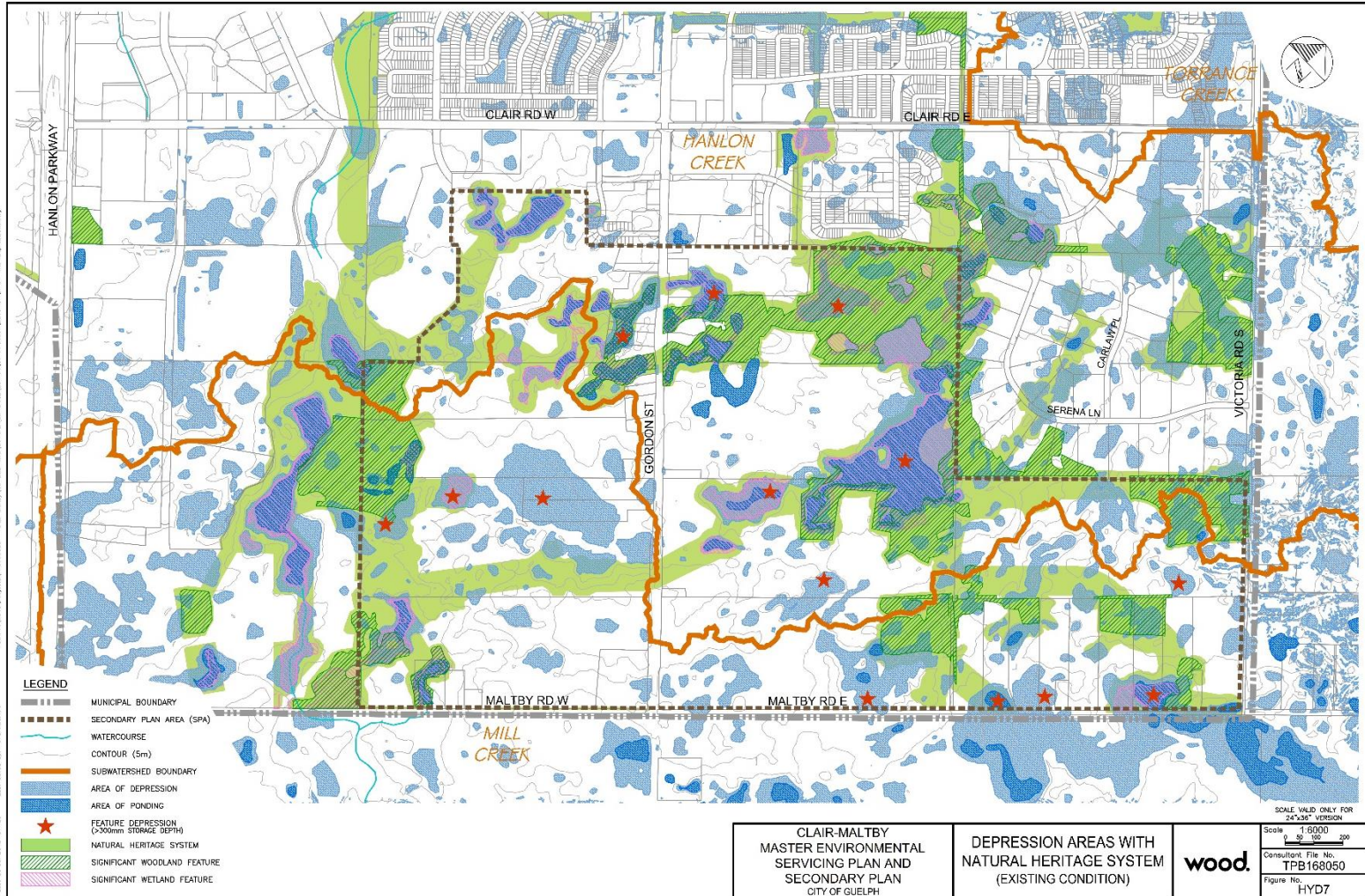


# Surface Water



- Drainage Directions

# Surface Water



- Depressional features and NHS



# Surface Water

## **Analytical Approach**

- Hydrologic computer model (PCSWMM) used to determine runoff response (flows, runoff volumes) to both synthetic design storm events and observed historical rainfall.
- Model uses soil conditions, topography and land use to determine runoff response.

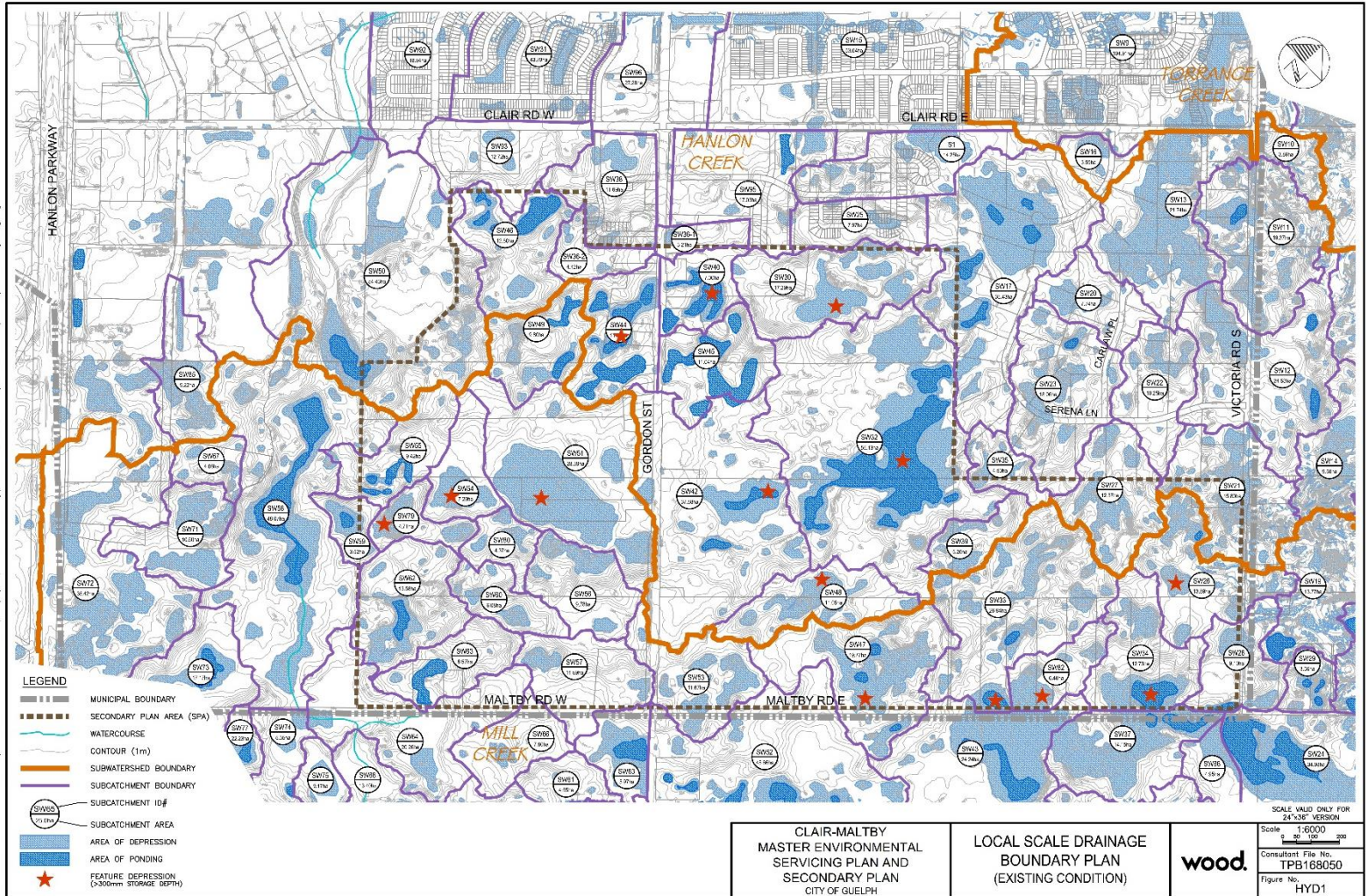


# Surface Water

## **Analytical Approach**

- Hydrologic modelling used to determine runoff response for both existing and future land uses (Preferred Community Structure) and assess stormwater management strategies and alternatives.

# Surface Water



- Existing drainage conditions



# Surface Water

## **Stormwater Management**

- Stormwater management needed to address drainage impacts from the proposed land use conditions.
- Stormwater management strategy to meet surface water and groundwater targets set in the Comprehensive Environmental Impact Study (CEIS).



# Surface Water

## **Stormwater Management**

- Stormwater management alternatives have been assessed as part of the MESP, in accordance with the MEA Class EA Process (Schedule B).



# Surface Water

## **Stormwater Management**

- MESP Alternative Assessment Evaluation Criteria consider:
  - Impacts or opportunities that an alternative may have related to the natural environment and to the people and their relationship to the study area.
  - Costing of alternatives.
  - Ability of alternatives to address impacts (i.e. effectiveness).





# Surface Water

## **Stormwater Management**

- Alternative Assessment included:
  - Traditional (end of pipe)
  - Innovative (low impact development best management practices)
  - Consideration for climate change



# Surface Water

## **Stormwater Management**

- Community structure alternatives assessed to determine impacts to:
  - Quantity (peaks)
  - Quality (contaminants)
  - Water Budget (volumes)



# Surface Water

## **Stormwater Management**

- SWM Plan includes:
  - Distributed low impact development (LID) best management measures (BMPs) to capture 20 mm runoff within both public and private lands.
  - Stormwater capture areas, sized to capture the Regional Storm (Hurricane Hazel), with overflow to existing depression areas.

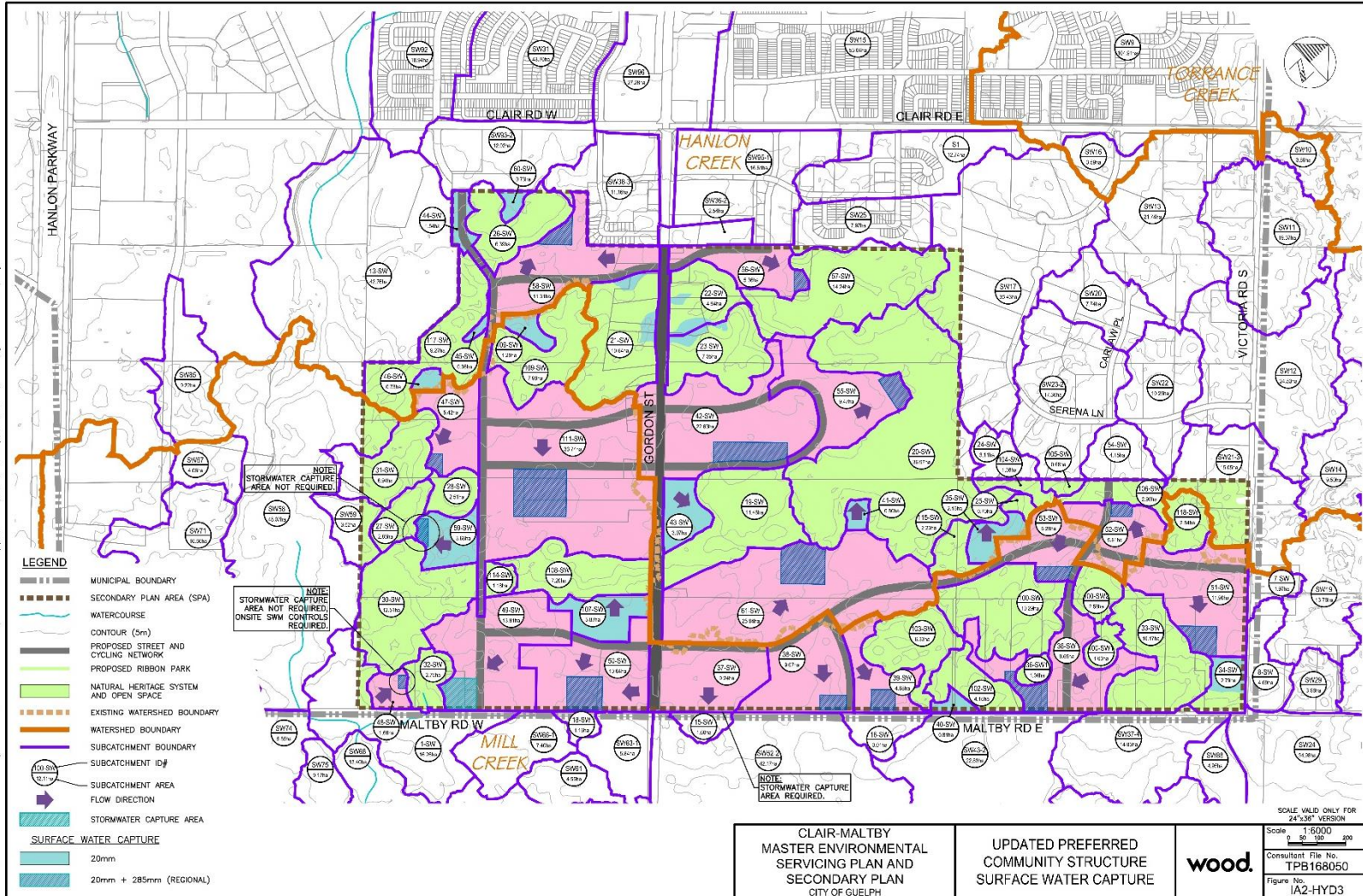


# Surface Water

## **Stormwater Management**

- Infiltrative LID BMPs that receive runoff from paved surfaces will require pretreatment to prevent groundwater contamination.
- A treatment train approach will be used to protect the stormwater capture areas' infiltration function and groundwater quality.

# Surface Water Drainage Capture



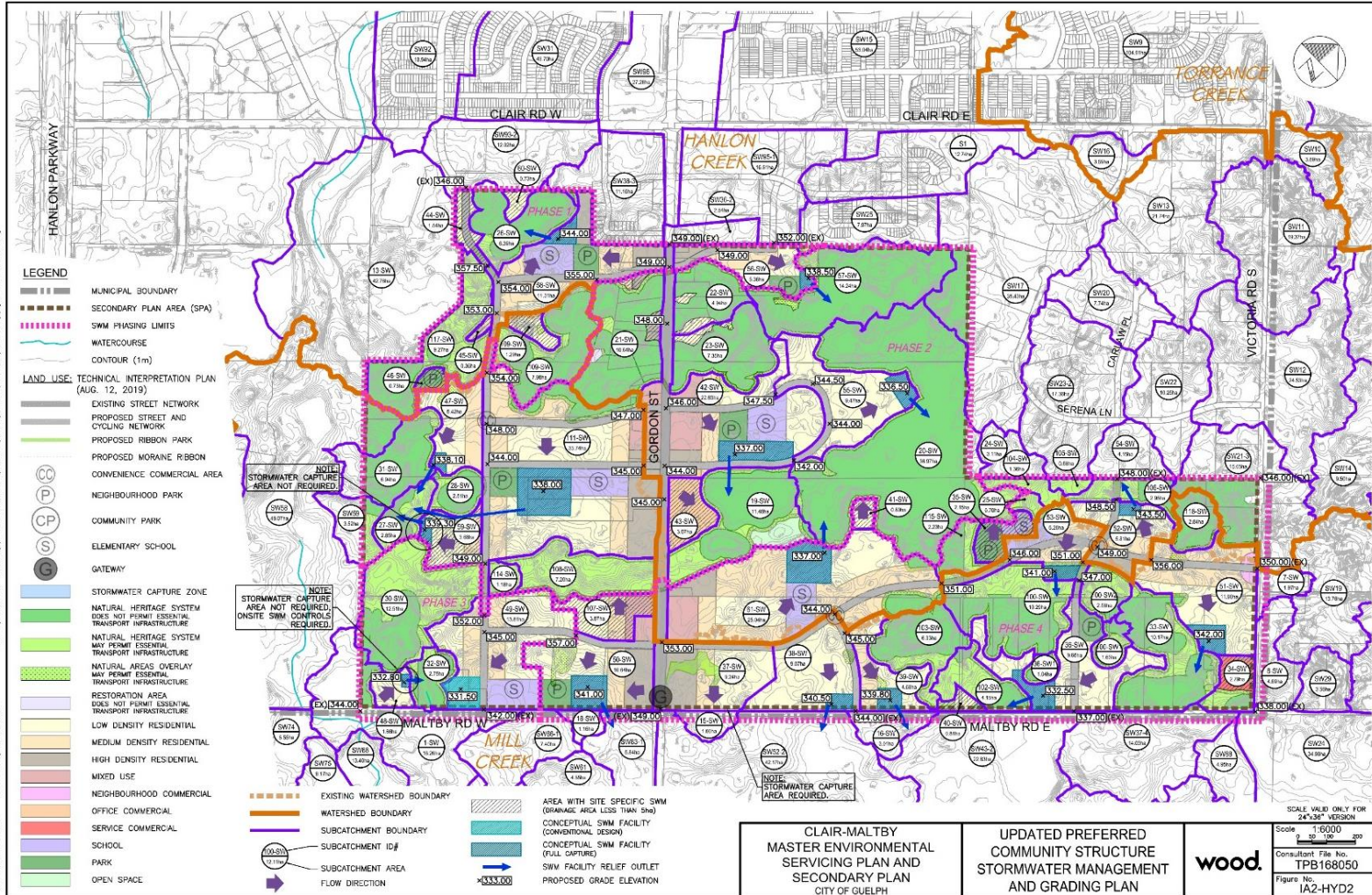
CLAIR-MALTBY  
MASTER ENVIRONMENTAL  
SERVICING PLAN AND  
SECONDARY PLAN  
CITY OF GUELPH

UPDATED PREFERRED  
COMMUNITY STRUCTURE  
SURFACE WATER CAPTURE

**wood.**

Scale: 1:6000  
Consultant File No. TPB168050  
Figure No. IA2-HYD3

# Surface Water Future Drainage Plan





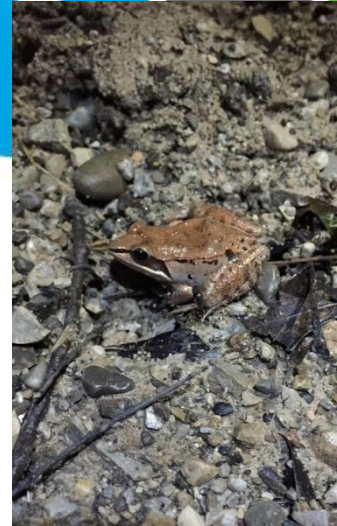
# Surface Water

## Results

- Flow targets met at Hanlon Creek and Mill Creek (external to the Clair-Maltby )
- Surface water budget met (validated by both surface water and groundwater modelling)
- Stormwater management to be phased

# THANK YOU

## Questions?



[haveyoursay.guelph.ca/Clair-Maltby](https://haveyoursay.guelph.ca/Clair-Maltby)

- Provide your thoughts and ideas on the 'Idea Boards' until August 8, 2021
- Ask Questions
- Attend our virtual office hours
- email us at [clair-maltby@guelph.ca](mailto:clair-maltby@guelph.ca)