

# WELCOME!

## Public Information Centre #1

### Tamarack Estates Subdivision Class Environmental Assessment

Please take the time to sign and fill out the project comment sheet.

Staff from the Town and Consultant Team are available to discuss the project and any questions or concerns you may have.

Thank you.





# PURPOSE OF THIS PUBLIC INFORMATION CENTRE

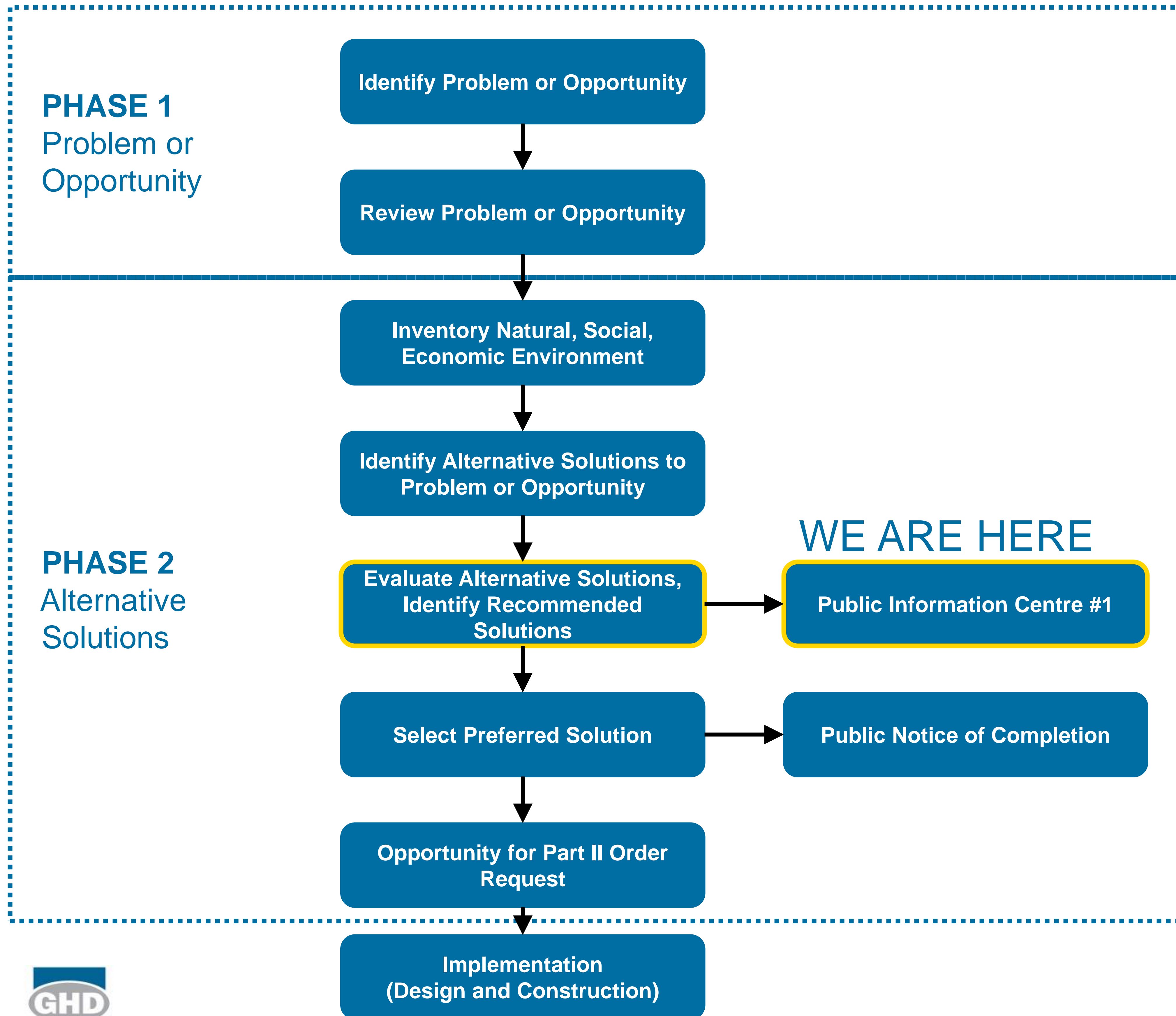
The Town of Caledon is holding a Public Information Centre in order to present the Tamarack Estates Subdivision Drainage Issues Study to the public, and to solicit feedback and comments to assist in developing sound recommendations.

Objectives of this Public Information Centre:

- Provide members of the community with information regarding the objectives and scope of the Study.
- Solicit input regarding existing concerns individuals may have with the current drainage issues within the Tamarack Estates Subdivision.
- Present potential drainage mitigation alternatives for review by the public.
- Identify outcomes desired by members of the community for the Study Area.

Input received from stakeholders will be documented and considered during completion of the Class Environmental Assessment process.

# CLASS ENVIRONMENTAL ASSESSMENT PROCESS



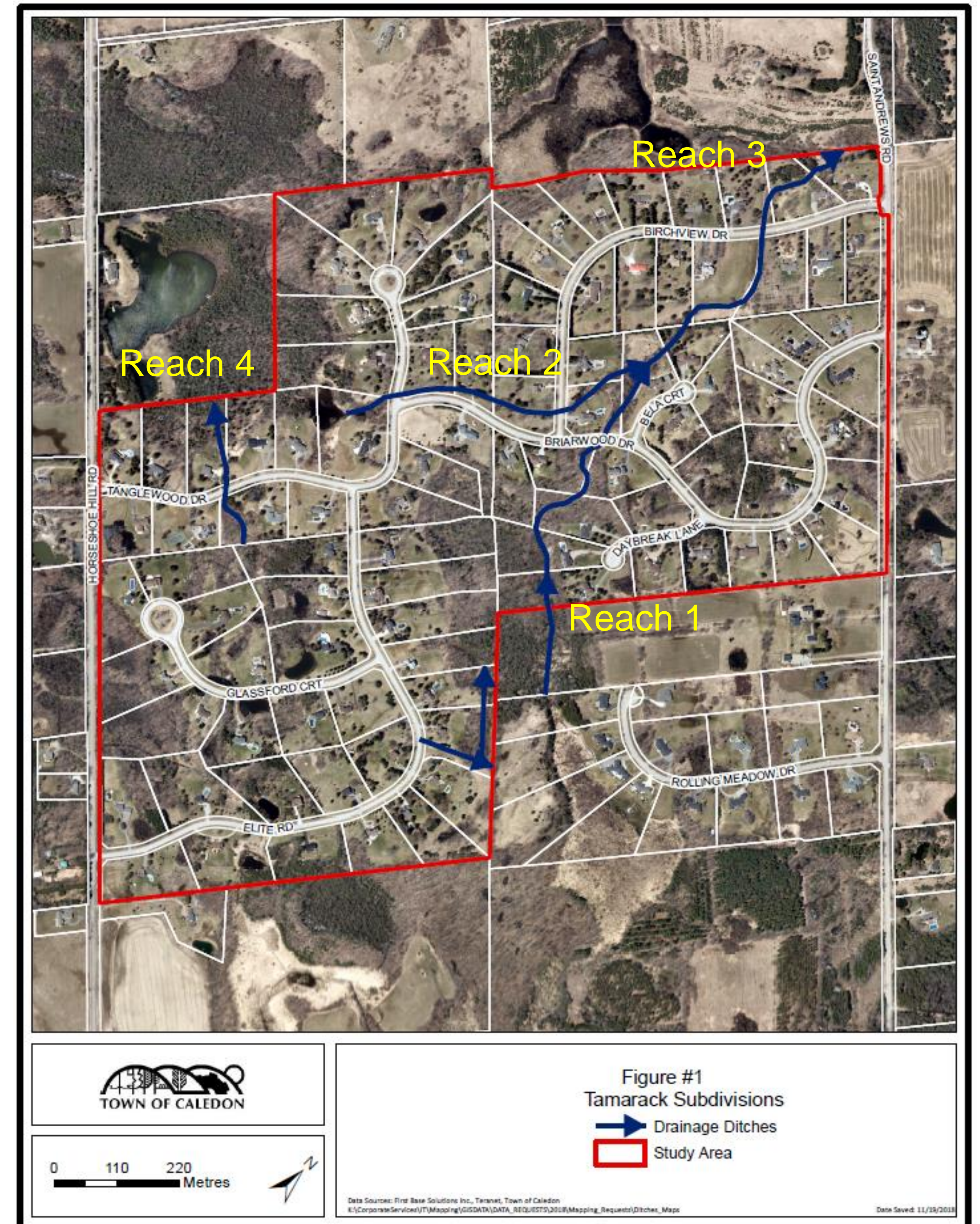
The Study will be conducted in accordance with the planning and design process for 'Schedule B' projects, as outlined in the Municipal Class Environmental Assessment document, (October 2000, as amended in 2015), which is approved under the Ontario Environmental Assessment Act. 'Schedule B' projects involve Phase 1 and Phase 2 of the Municipal Class Environmental Assessment process, as illustrated to the left.

The Class Environmental Assessment process includes public/external agency consultation, an evaluation of alternative solutions and alternative design concepts, an assessment of potential impacts associated with the proposed improvements and the development of measures to mitigate identified impacts.



# STUDY AREA

- The Tamarack Estates Subdivision is located at the headwaters of the Main Humber River watershed, within the jurisdictional boundary of the Toronto and Region Conservation Authority.
- The Study Area includes four Study Reaches labeled Reach 1 to Reach 4 on this map. The main channel exits the Study Area through two culverts at Saint Andrews Road.
- Stormwater is conveyed through a network of drainage swales to the natural drainage system. This is more inline with rural subdivisions as opposed to urban subdivisions which include storm sewers and stormwater management facilities.
- The subdivision was developed in a wetland area.
- The residents rely on groundwater wells as their drinking water source.





# EXISTING CONDITIONS

- Channel originates in Non-Evaluated Wetland south of Tanglewood Drive and is conveyed under Tanglewood Drive through a 600 mm culvert
- This channel is conveyed northwest and flows along the northwest border of the Study Area
- Channel converges with the main channel upstream of Saint Andrews Road

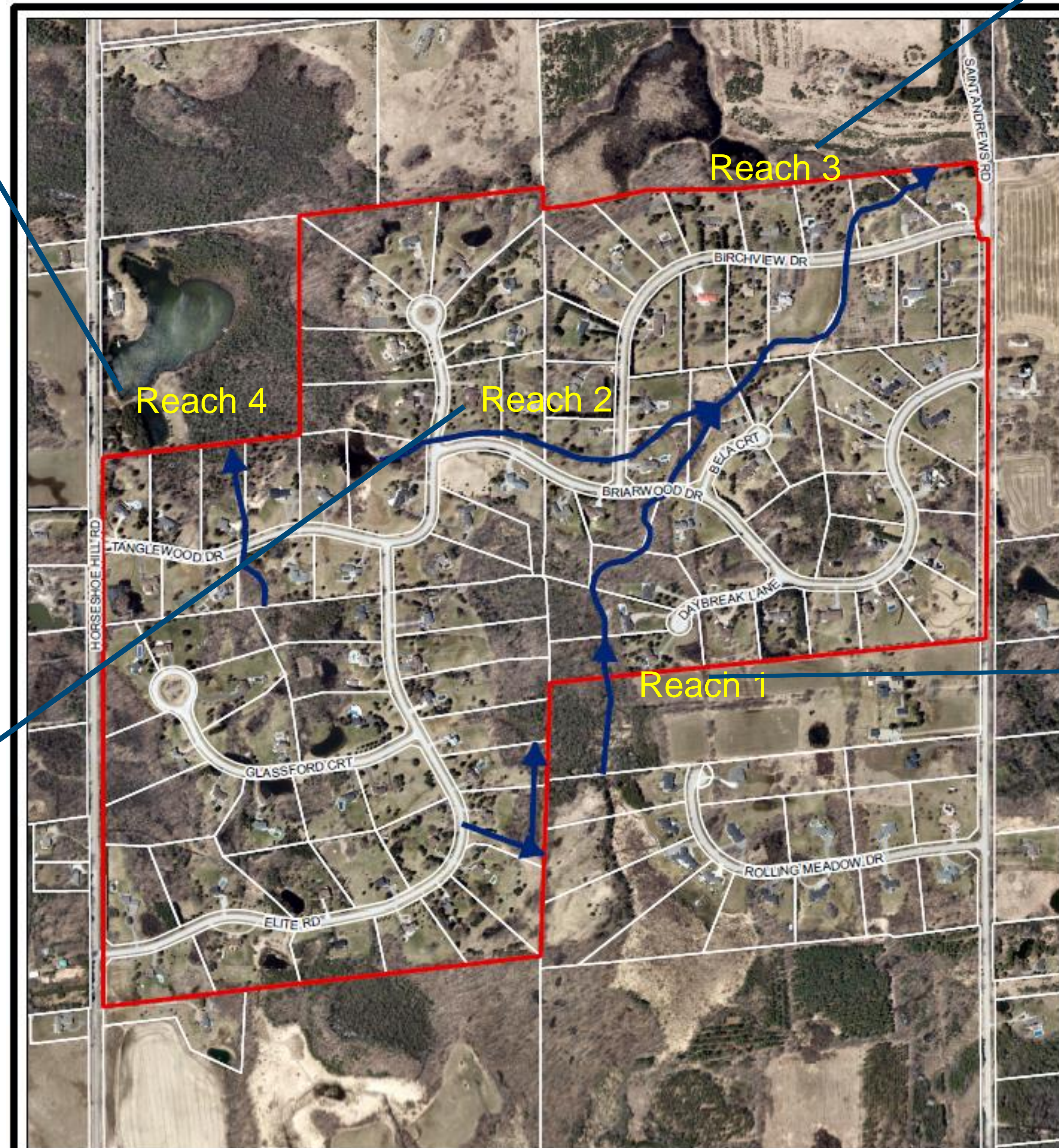


Reach 4 Looking Downstream at Tanglewood Drive

- Main channel is conveyed through a 1700 mm x 1150 mm culvert at Birchview Drive
- Channel exits the Study Area through a 1800 mm culvert and a 900 mm culvert at Saint Andrews Road
- Groundwater seeps were observed in the floodplain downstream of the Birchview Drive crossing



Culvert Inlets on Reach 3 at Saint Andrews Road



- Southwest branch of the main channel originates in a Non-Evaluated Wetland
- Channel is conveyed under Tanglewood Drive through a 900 mm culvert
- Channel is conveyed under Birchview Drive through a 1200 mm culvert
- Channel converges with the southeast branch of the main channel west of Bela Court
- Set of deformed culverts convey stormwater under Briarwood Drive between Tanglewood Drive and Birchview Drive
- Southeast branch of the main channel originates in a Provincially Significant Wetland
- Channel is conveyed under Briarwood Drive through a 1150 mm x 700 mm culvert
- Culvert inlet is deformed causing upstream ponding
- Channel converges with the southwest branch of the main channel west of Bela Court



Deformed Culvert Inlet on Reach 1 at Briarwood Drive

- Southwest branch of the main channel originates in a Non-Evaluated Wetland
- Channel is conveyed under Tanglewood Drive through a 900 mm culvert
- Channel is conveyed under Birchview Drive through a 1200 mm culvert
- Channel converges with the southeast branch of the main channel west of Bela Court
- Set of deformed culverts convey stormwater under Briarwood Drive between Tanglewood Drive and Birchview Drive



Reach 2 Looking Downstream at Birchview Drive

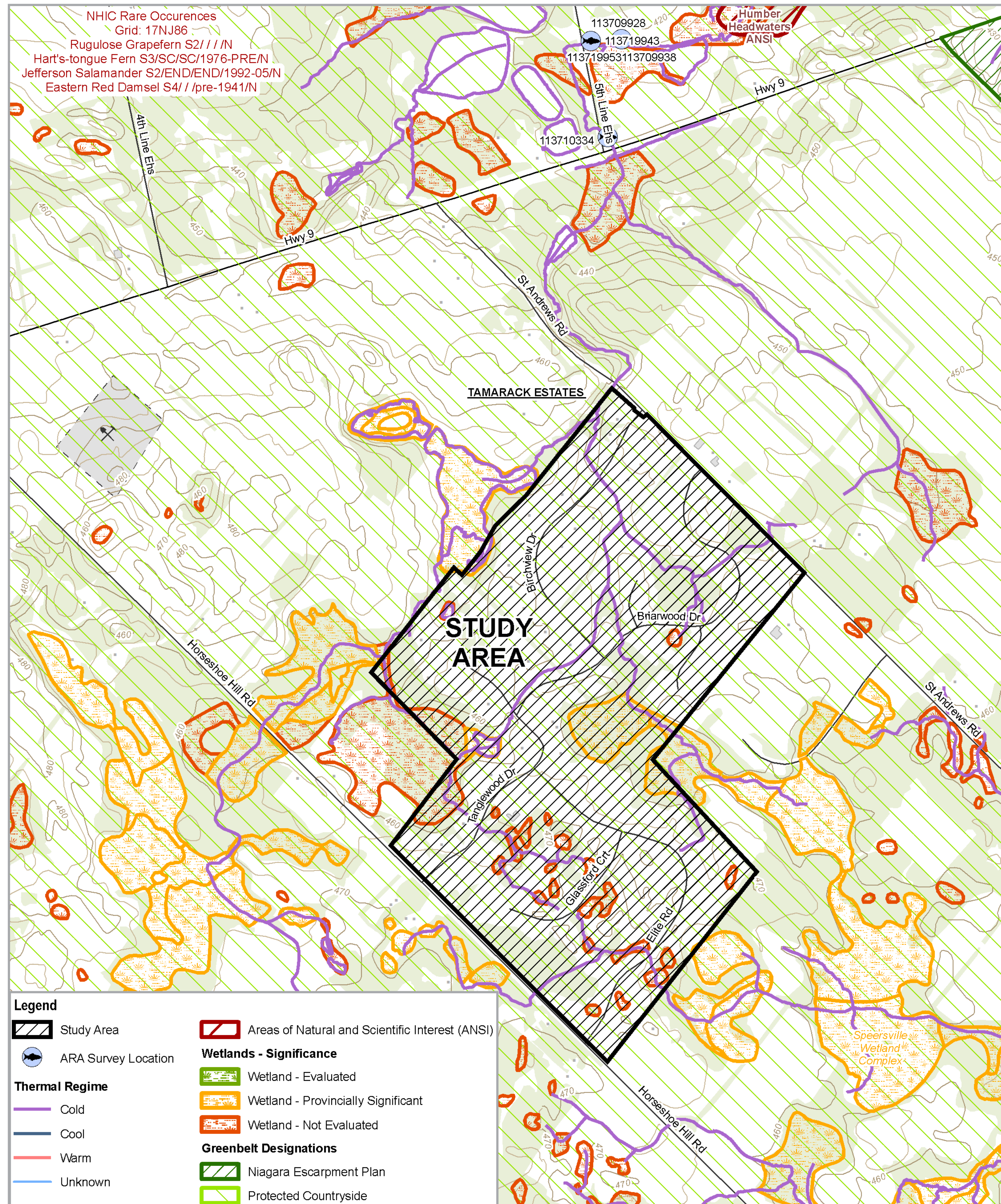




# DATA COLLECTION

Various field data collection efforts have been completed or are currently underway, encompassing ecological, hydrologic, and spatial fields of study. The current status of the field data collection efforts are summarized below:

Task	Status
Fish community and aquatic habitat assessments	<b>Complete</b> - July 9, 2019
Vegetation community classification and botanical surveys	<b>Complete</b> – July 9, 2019
Calling amphibian surveys	<b>Complete</b> - April 12, 2019, May 24, 2019 & June 27, 2019
Topographic survey of study area	<b>Complete</b> – August 20, 2019
Drainage assessment	<b>Complete</b> – December 5, 2018 & June 25, 2019
Stage 1 Archaeological Study	<b>Under Review</b>



Paper Size ANSI A  
 0 200 400 600  
 Meters  
 Map Projection: Transverse Mercator  
 Horizontal Datum: North American 1983  
 Grid: NAD 1983 UTM Zone 17N

**TOWN OF CALEDON  
 TAMARACK ESTATES SUBDIVISION  
 WASTEWATER AND STORMWATER  
 COLLECTION SYSTEM  
 ENVIRONMENTAL ASSESSMENT  
 KNOWN ENVIRONMENTAL FEATURES**

Project No. 11192224  
 Revision No. -  
 Date Sep 19, 2019

**FIGURE 1**

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Source: MNRF NRVIS, 2018. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2019.



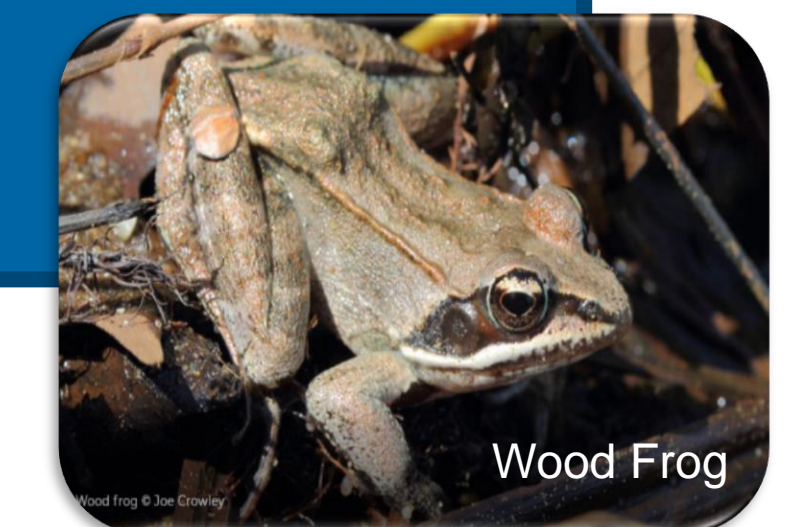
# NATURAL ENVIRONMENT

## WETLANDS

- Vegetation community classifications for the larger natural areas are provided on this figure and are based on field confirmation or air photo interpretation and background data where field access was not permitted.
- A large proportion of the vegetation communities in the Study Area consist of wetlands. Wetlands that are considered Provincially Significant wetlands are shown in orange (Speersville Wetland Complex), while numerous currently unevaluated wetlands are shown in red or included in the ecological land classification layer (marshes, swamps, open water communities).
- Wetlands and watercourses are regulated by the Toronto and Region Conservation Authority and permits are required for construction activities in or adjacent to these areas, as well as extensive studies to ensure flood limits are not impacted.

## AMPHIBIANS

- Species heard during frog call surveys include: Wood Frogs, Green Frogs, Spring Peepers, Gray Tree Frogs, Northern Leopard Frog, and American Toad.
- Significant levels of calling were identified within some of the larger swamp and marsh wetlands within the Study Area.

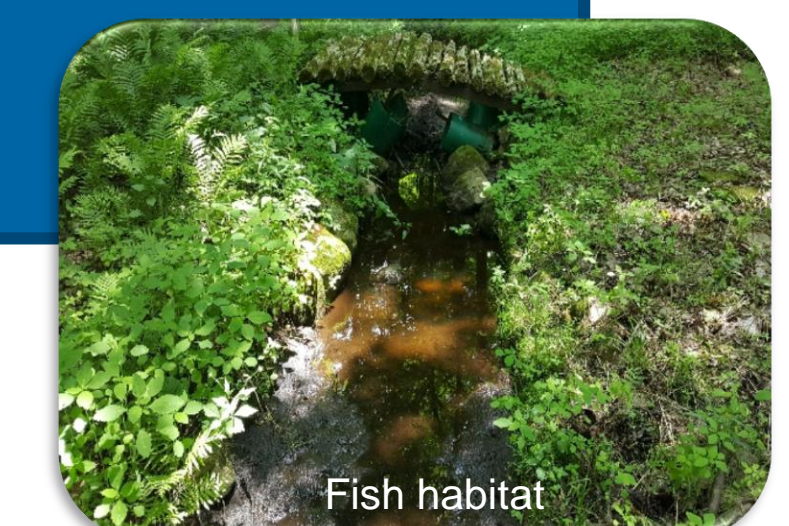
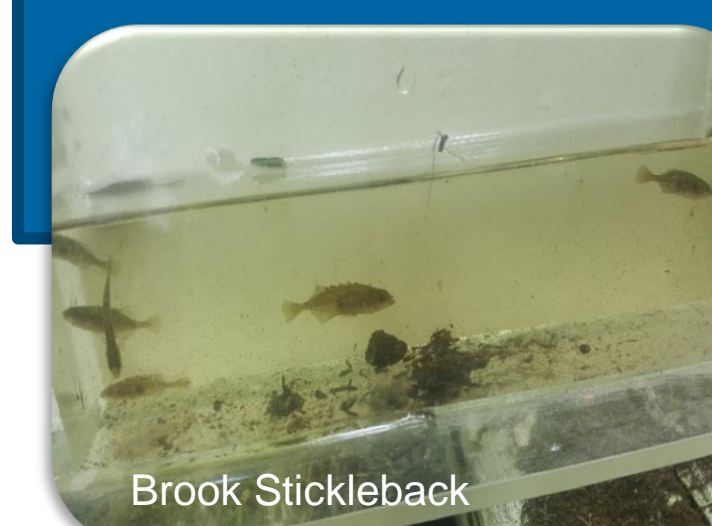
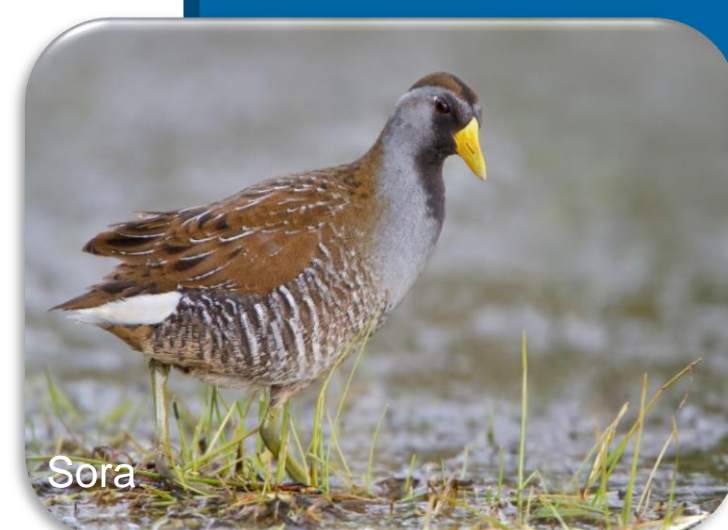


## WILDLIFE

- Wildlife observed during surveys include sora, killdeer, eastern wood-pewee (species at risk), American crow, red-winged blackbird, grouse, mourning dove, house wren and house sparrow.
- Many ponded areas throughout the Study Area would be expected to provide suitable habitat for a variety of turtles.
- Woodland pools may provide habitat for salamanders.
- A variety of other wildlife dependent on wetlands and treed habitats are expected to occur throughout the Study Area (e.g., wetland foraging insectivores such as bats).

## AQUATIC HABITAT

- A total of one fish species was identified by GHD ecologists within the Study Area, namely Brook Stickleback.
- This coolwater species prefers small, boggy headwater streams/backwaters of creeks and is usually associated with aquatic vegetation.
- Brook Stickleback are native baitfish and common in abundance. They have intermediate tolerance to environmental disturbances and pollution.



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TOWN OF CALEDON  
TAMARACK ESTATES SUBDIVISION  
WASTEWATER AND STORMWATER  
COLLECTION SYSTEM  
ENVIRONMENTAL ASSESSMENT  
ENVIRONMENTAL FEATURES

Project No. 11192224  
Revision No. -  
Date Sep 19, 2019

FIGURE 2













# DRAINAGE IMPROVEMENT ALTERNATIVES

In compliance with the Class Environmental Assessment process several alternatives have been considered to improve drainage issues within the Study Area.

## Alternative 1: Do Nothing

- Maintain existing conditions.

## Alternative 2: Implement Low Impact Development (LID) Measures

- LID measures promote infiltration at source to reduce runoff volumes, and enhance groundwater recharge.
- Benefit of LIDs is dependent on local soil conditions, groundwater levels, and the local water supply system.

## Alternative 3: Install Conveyance and Stormwater Management (SWM) Measures

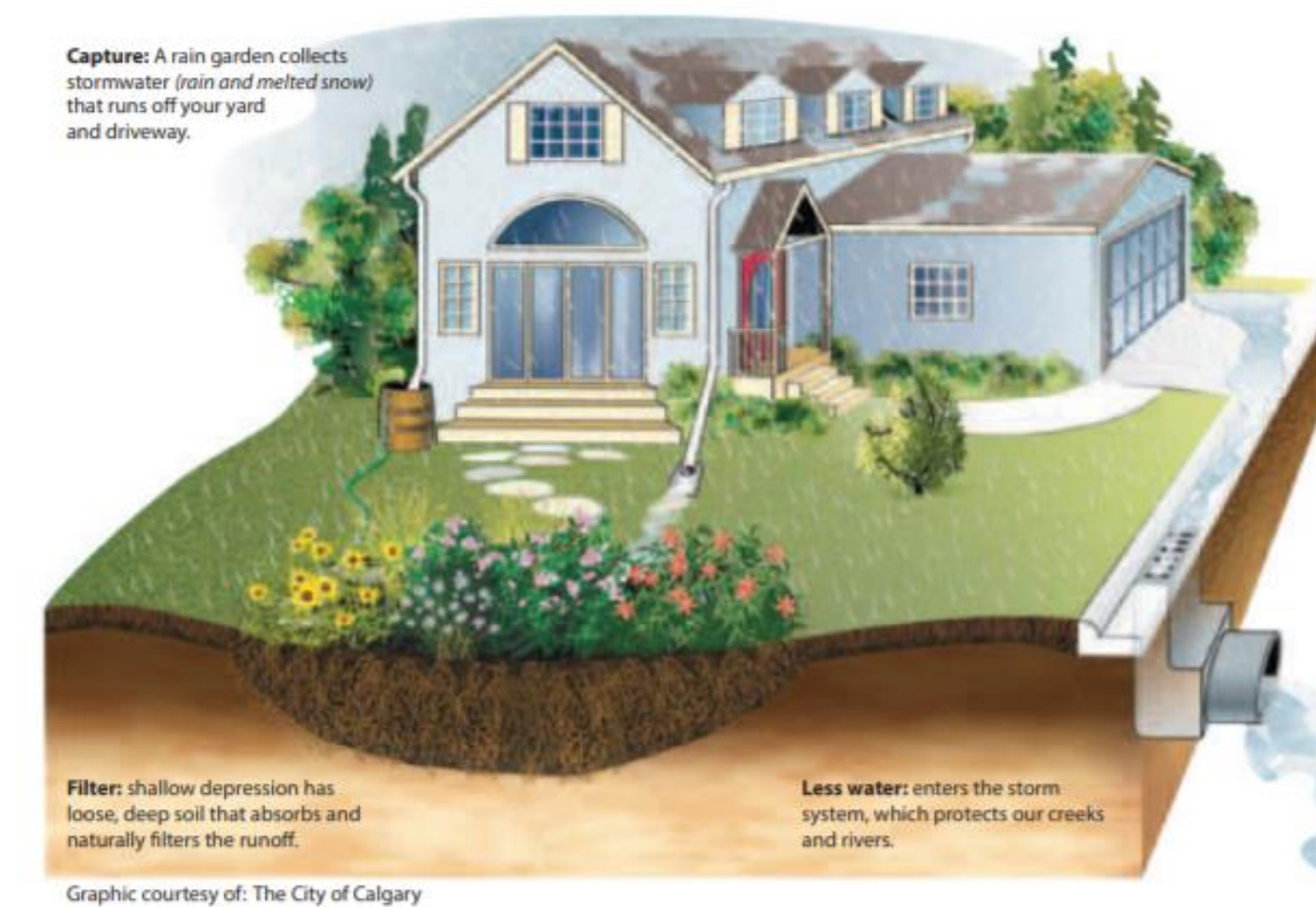
- Minor conveyance system (i.e., a storm sewer system) to convey road drainage.
- Stormwater management facilities (i.e., SWM ponds, engineered wetlands) to provide water quantity control and water quality treatment of stormwater runoff.

## Alternative 4: Improvements to Existing Drainage Infrastructure

- Replacement of existing culverts to increase the conveyance capacity under roads and minimize road overtopping.

## Alternative 5: Maintenance of the Existing Drainage and Flood Conveyance System

- Regular, scheduled maintenance within the Town's drainage easements including removal of obstructions in channels and culverts such as sediment, large wooded debris.
- Cleanout operations must take into consideration protection and preservation of the existing aquatic and terrestrial habitat.



Typical Rain Garden. A common LID measure in residential areas. Figure obtained from Rain Gardens (Toronto and Region Conservation Authority, n.d.) <https://trca.ca/app/uploads/2016/10/2138-StrEW-Rain-Gardens.pdf>



Typical Stormwater Management Pond. Photo obtained from Stormwater Management Ponds (Sustainable Technologies Evaluation Program, 2019) <https://sustainabletechnologies.ca/home/urban-runoff-green-infrastructure/conventional-stormwater-management/stormwater-management-ponds/>



Large wooded debris in culvert (left). Bottom of culvert is rusted and may soon require replacement (right).



# PRELIMINARY EVALUATION OF ALTERNATIVES

Evaluation Criteria	Alternative #2 - LID Measures	Alternative #3 – Conveyance and SWM Measures	Alternative #4 – Drainage Infrastructure Improvements	Alternative #5 – Drainage Infrastructure Maintenance
<b>Construction and Maintenance Costs</b>	<ul style="list-style-type: none"> <li>Construction costs of LID measures such as rain gardens, enhanced swales, infiltration trenches, etc. are low compared to other types of stormwater management measures. However, this alternative requires installation of many LID structures across the Study Area.</li> <li>Relatively low maintenance requirements and costs.</li> </ul>	<ul style="list-style-type: none"> <li>Construction costs for installation of storm sewers and stormwater management facilities are high.</li> <li>Stormwater management facility cleanouts are required regularly, resulting in high maintenance costs.</li> </ul>	<ul style="list-style-type: none"> <li>Overall costs are low compared to Alternatives 2 and 3 because only 1-2 structures are recommended for replacement.</li> <li>Construction and maintenance costs are very low compared to Alternative 3.</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance costs are relatively low.</li> </ul>
<b>Impact/Benefit to Natural Environment</b>	<ul style="list-style-type: none"> <li>Positive impact to the groundwater system by promoting infiltration in highly impervious development areas.</li> <li>However, the Study Area is mostly pervious meaning the existing infiltration potential is high; therefore, the benefit to the natural environment in this Study Area is not significant.</li> </ul>	<ul style="list-style-type: none"> <li>Storm sewer systems do not enhance the natural environment.</li> <li>Stormwater management facilities can enhance stormwater quality; however, due to the high proportion of relatively clean, pervious land cover in the Study Area, water quality enhancement measures are not recommended.</li> </ul>	<ul style="list-style-type: none"> <li>Culverts can be improved to facilitate fish passage and support aquatic habitat identified in the Study Area.</li> </ul>	<ul style="list-style-type: none"> <li>Promote fish passage in the natural drainage channel and culvert crossings, and improve fish habitat.</li> </ul>
<b>Impact/Benefit to Social Environment</b>	<ul style="list-style-type: none"> <li>Typically an aesthetic stormwater management measure.</li> <li>Negative impact to residents that rely on local groundwater as their drinking water supply.</li> </ul>	<ul style="list-style-type: none"> <li>Installation of storm sewers and stormwater management facilities would be very disruptive to residents.</li> <li>Stormwater management facilities require a large footprint of land to be constructed.</li> </ul>	<ul style="list-style-type: none"> <li>Larger culverts reduce the magnitude and occurrence of road overtopping, and upstream ponding during high flow events in the natural drainage channel.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce localized flooding on private properties, and at road crossings.</li> </ul>
<b>Technical Effectiveness</b>	<ul style="list-style-type: none"> <li>Technical effectiveness depends on the natural soil and groundwater conditions of the Study Area.</li> <li>Groundwater levels in the Study Area are too high for LID measures to be effective. The high water table is evident by the number/size of wetlands in the Study Area, and groundwater seeps observed in the floodplain of the natural drainage channel.</li> </ul>	<ul style="list-style-type: none"> <li>Storm sewers are typically installed in urban environments to convey stormwater runoff and prevent flooding/ponding of stormwater where the available space and land use does not permit the installation of a grassed swale system.</li> <li>Stormwater management facilities effectively provide control of runoff, and treatment of water quality. However, they would provide little-no benefit to this Study Area.</li> </ul>	<ul style="list-style-type: none"> <li>Effectively reduce flooding at road crossings, and improve fish habitat in the Study Area.</li> </ul>	<ul style="list-style-type: none"> <li>Effectively reduce localized flooding due to stormwater runoff, and improve fish habitat in the Study Area.</li> </ul>



# FLOOD IMPROVEMENT ALTERNATIVES SELECTED FOR FURTHER ANALYSIS

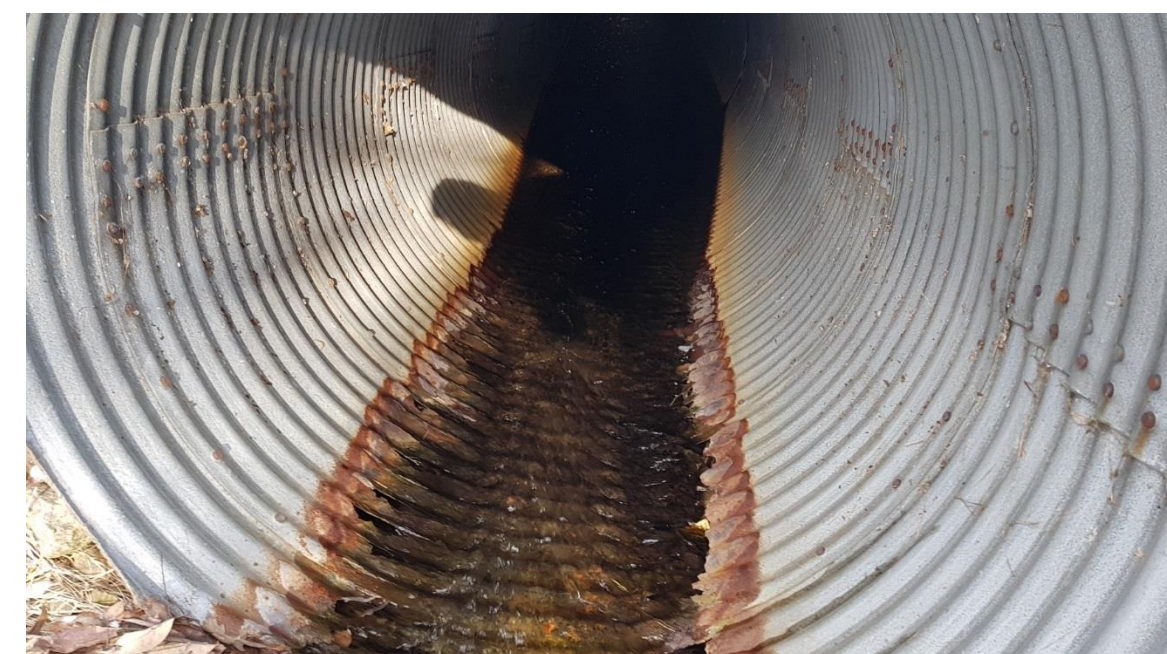
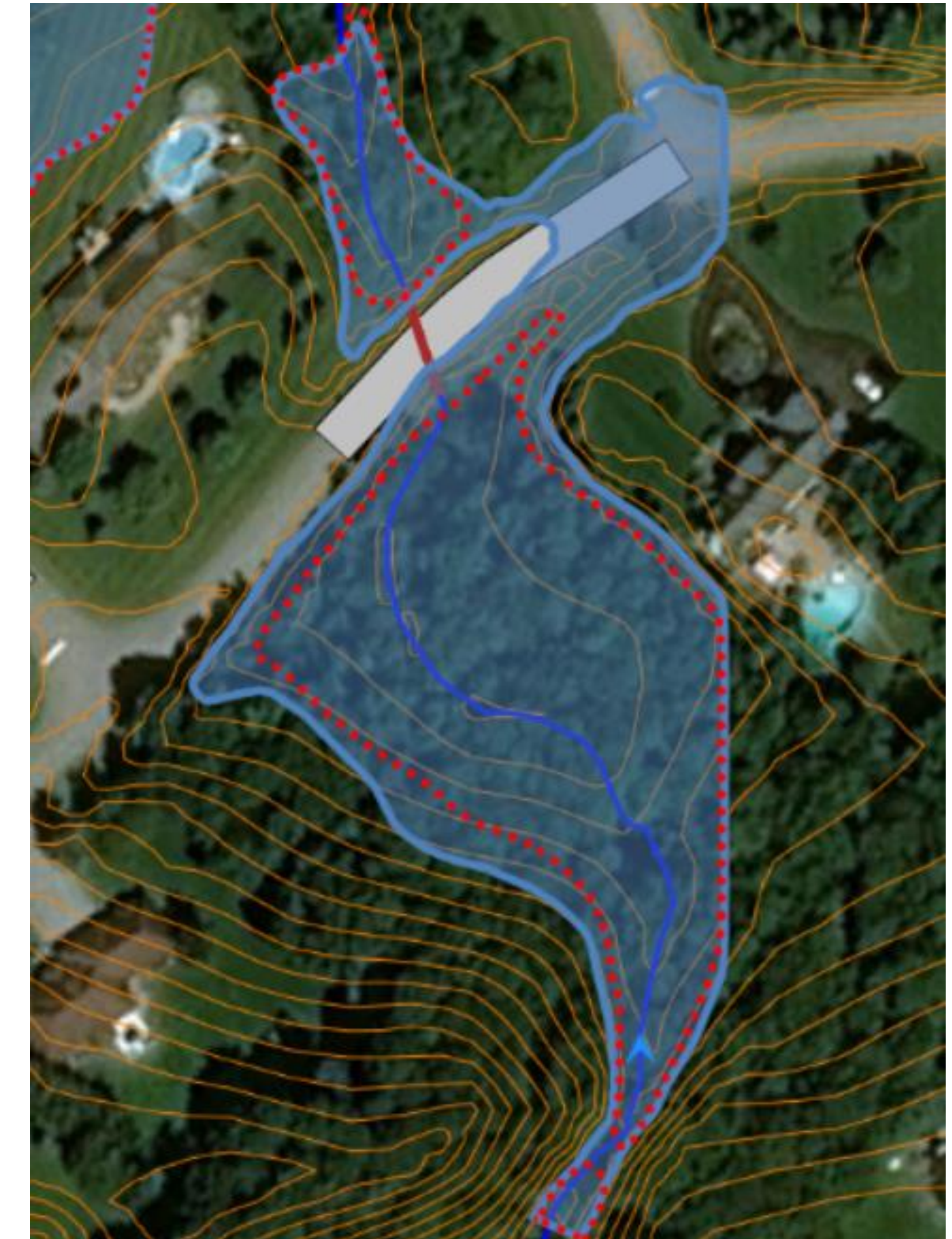
- Alternative 4 and Alternative 5 were selected for further assessment to improve drainage and conveyance within the Tamarack Estates Subdivision.
- These alternatives call for action of the Town to replace, improve, and maintain existing drainage infrastructure such as culverts, swales, and the natural drainage channel on Town-owned property and easements.

## Alternative 4 – Improvement to Existing Drainage Infrastructure

- Inlet of the culvert on Reach 1 at Briarwood Drive is deformed causing overtopping of the road during the 25-year storm as shown by the hydraulic modelling results.
- Fish habitat has been identified upstream of this culvert.
- It is recommended to replace this culvert with a 2400 mm x 1200 mm concrete box culvert with a natural channel bottom to safely convey the 25-year design flow rate. The culvert will be designed with substrate and a low flow channel to facilitate fish passage.
- Bottom of 1200 mm culvert on Reach 2 at Birchview Drive is deteriorating.
- It is recommended to monitor the physical condition of this culvert over the next several years.

## Alternative 5 – Maintenance of Existing Drainage Infrastructure and Conveyance System

- Regular inspection and maintenance of culverts is recommended to ensure culvert barrels are unobstructed, and are able to convey the design flow rate to prevent localized flooding and road overtopping.
- An obstruction to fish passage was identified on Reach 3 upstream of the Birchview Drive crossing. The obstruction is caused by sediment build-up in the channel. Not only can an unmaintained channel cause localized flooding, but it can adversely impact fish habitat.
- Regular inspection and maintenance of the natural drainage channel is recommended.





# LOT-LEVEL MITIGATION MEASURES & STRATEGIES FOR LIVING NEAR WETLANDS

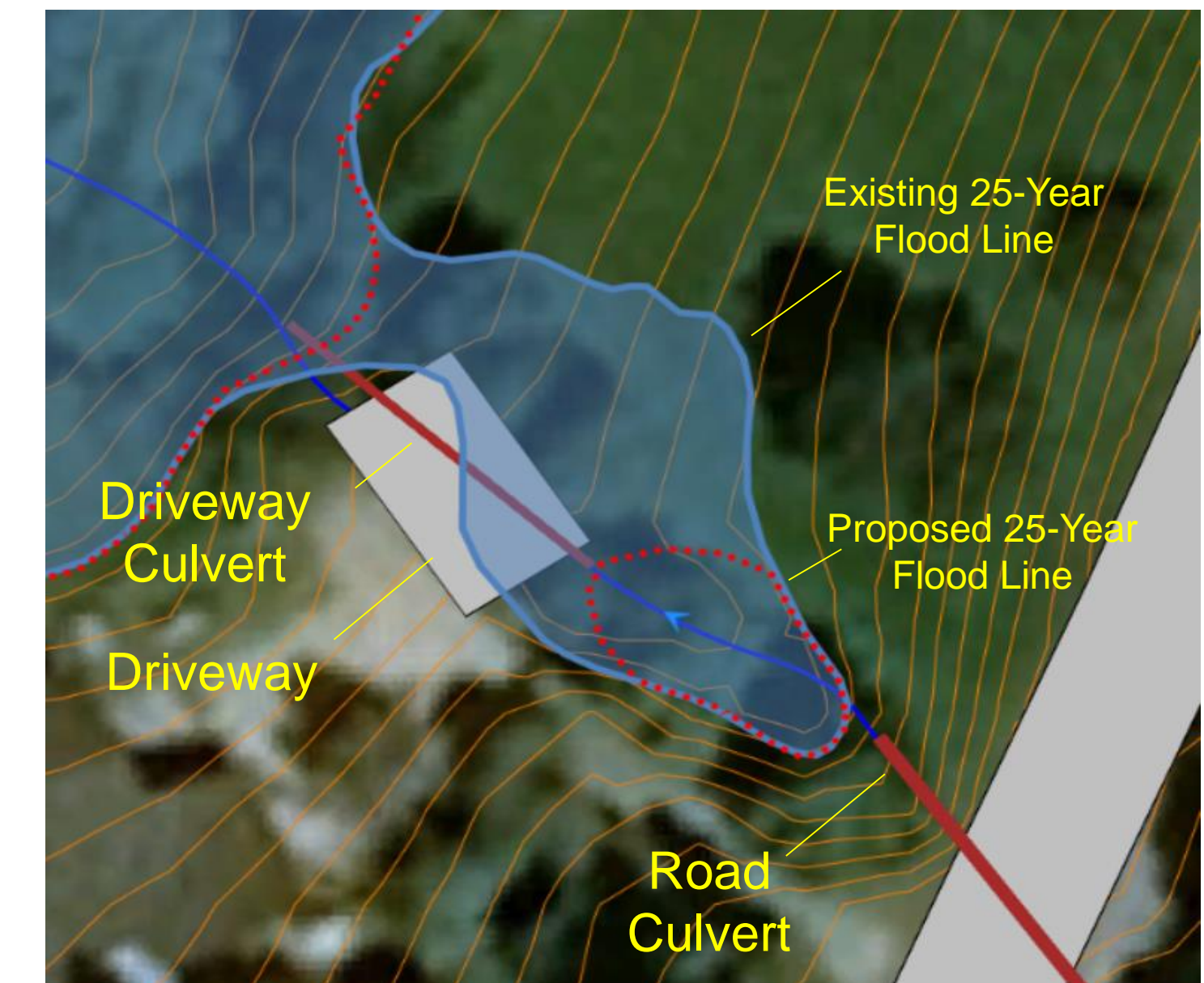
## LIVING NEAR WETLANDS

The Study Area is surrounded by numerous wetland features and Provincially Significant Wetland Complexes which provide crucial habitat for numerous species, however also add complexity to land drainage in the area. Lot-level mitigation can aid in minimizing water issues noted within the study area. Below are suggestions on how to maintain individual properties to aid in flow conveyance and minimize mosquitoes associated with wetland areas.

## WHAT CAN YOU DO AT HOME?

## PROPERTY MAINTENANCE

- Keep private property culverts clear of debris and excess vegetation/grass clippings to allow for unobstructed flow.
- Maintain channels within the property by removing excess woody debris/decaying material/sediment mounds in order to allow maximum drainage.
- Minimize impervious surfaces (i.e. concrete patios/buildings) within floodplain.
- Clean roof gutters annually to avoid unwanted debris and stagnant water.
- Utilize rain barrels with lids to minimize impervious surface runoff and lower your water bill! Make sure to use the rain barrel water frequently to avoid long-term standing water accumulation.
- Consider a natural perimeter spray such as those derived from garlic to temporarily reduce the mosquito populations within your property (available from Canadian Tire, Home Depot, online, etc.).



## MOSQUITO PREVENTION

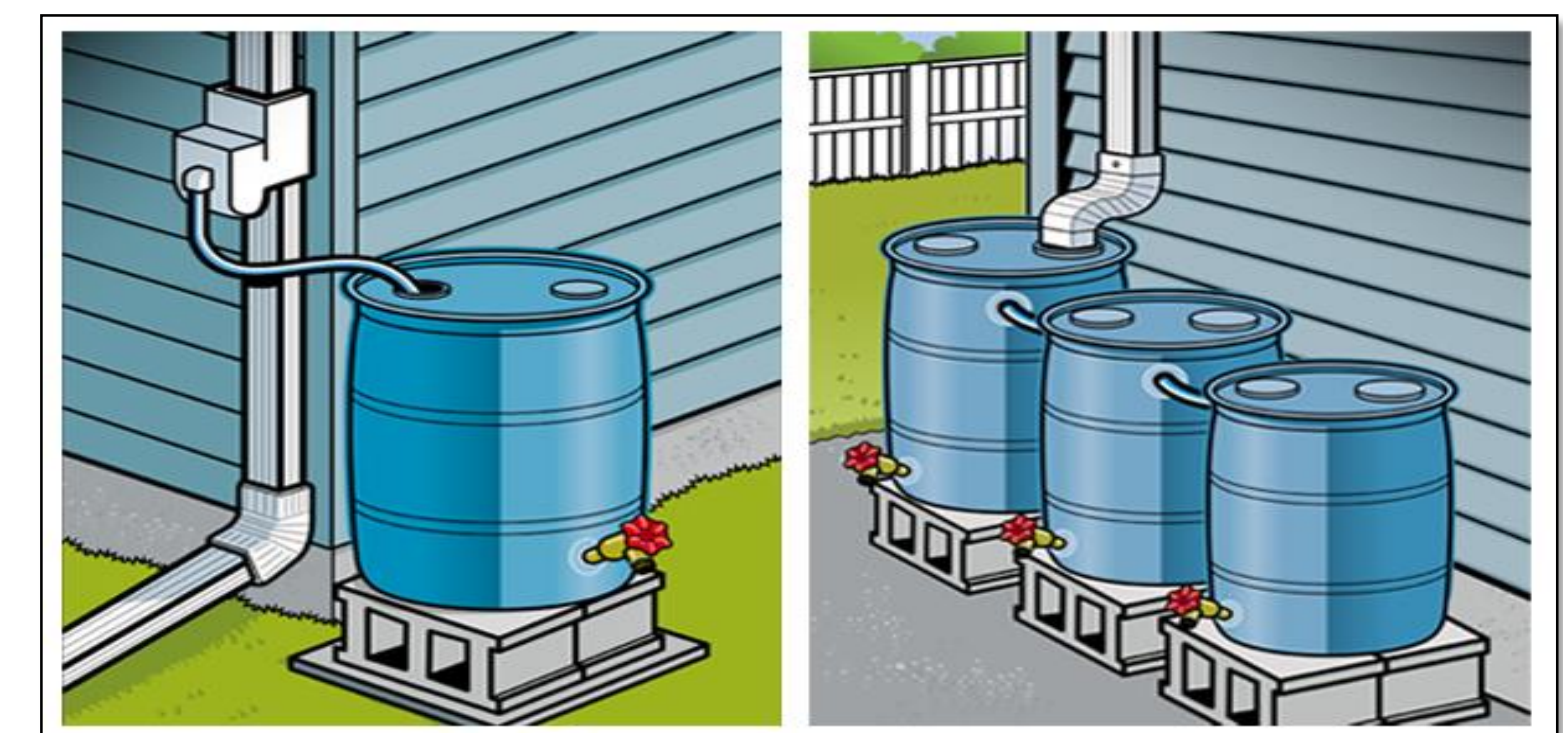
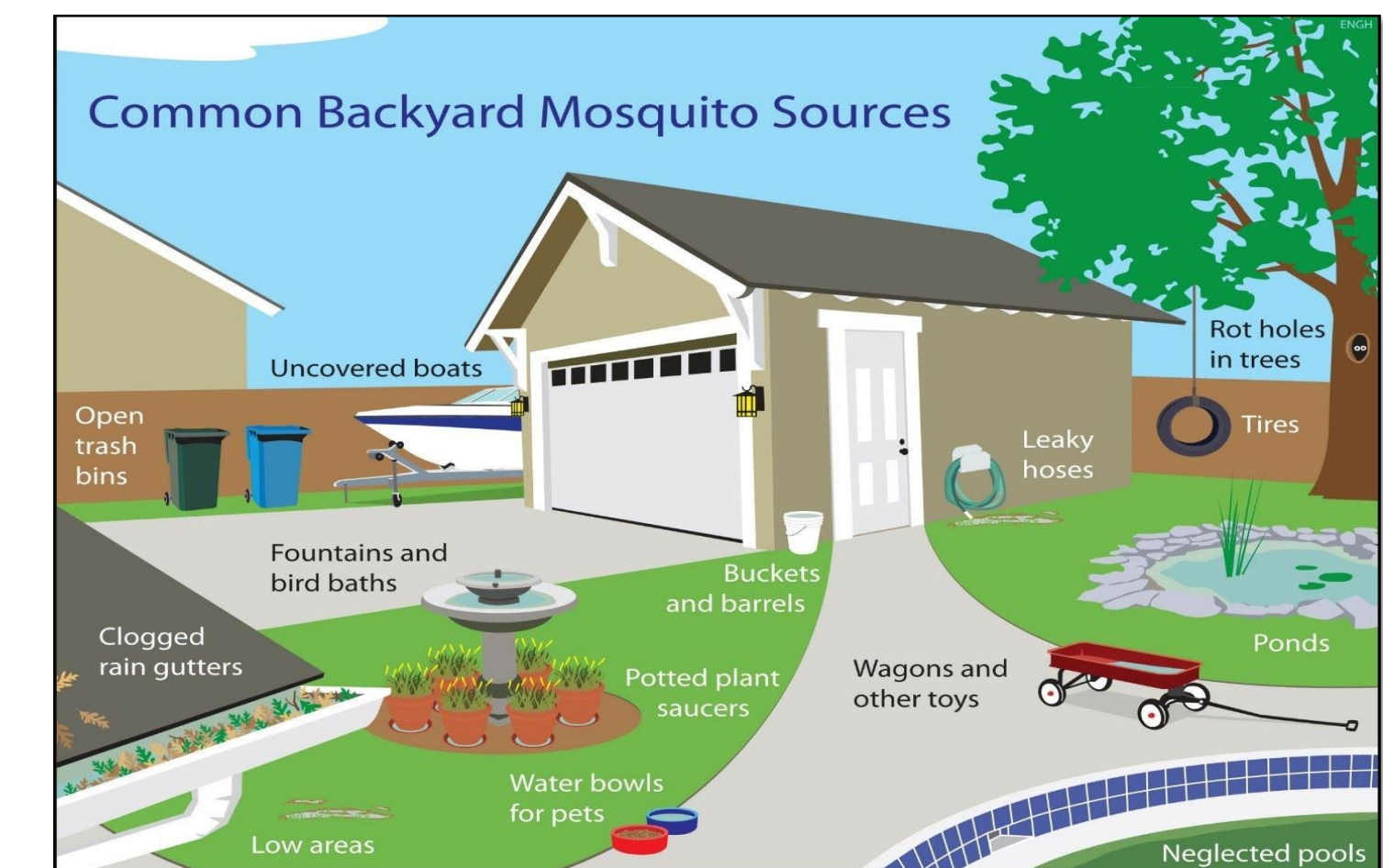


Female mosquitoes require stagnant, shallow waters (generally less than 3 feet in depth) that exist for a minimum of seven days to breed. Minimizing breeding zones is the most effective control.

- Remove **all** areas of standing water (i.e. old tires, buckets, tarps, garbage, kiddie pools, wheel barrels, flower pots etc.)
- Fill in tree holes with sand or mortar to prevent creating breeding habitat.
- Increase the number of natural predators in the area by incorporating bird feeders, bat boxes and native fish in ponds.
- Add mosquito repellent plants to your gardens (examples: Lavender, Marigolds, Citronella Grass, Rosemary, Basil, Bee Balm, Mint, Sage)

### Do you own a pond?

- Consider incorporating native minnows into your pond to minimize the amount of mosquito larvae under the water surface.
- Increasing water circulation with a fountain or waterfall feature will reduce stagnant water and deter breeding.
- Remove excess vegetation and algae from pond edges with a pool skimmer. This material provides unwanted habitat, shelter and food for mosquitoes.



Source: Riley County Kansas (2019).  
<https://rileycountyks.gov/1829/Mosquito>



# COMMENTS AND NEXT STEPS

Public Participation forms an integral part of the Study to ensure that the ongoing concerns of the public within the Study Area are identified, documented and assessed. Please complete your comment form and submit them to the Consultant Team Members before you leave, so that your views and comments will be recorded and considered.

If you would like to provide comments following the Public Information Centre, or for any further information on the study, please contact the study leaders below:

**Cassie Schembri**  
Project Manager  
Town of Caledon  
6311 Old Church Road  
Caledon, ON L7C 1J6  
Tel: 905-584-2272 ext. 4258  
E-mail: [cassie.schembri@caledon.ca](mailto:cassie.schembri@caledon.ca)

**Janusz Czuj, P.Eng.**  
Consultant Project Manager  
GHD  
455 Phillip Street  
Waterloo, ON N2L 3X2  
Tel: 519-340-4269  
E-mail: [Janusz.Czuj@ghd.com](mailto:Janusz.Czuj@ghd.com)

