APPENDIX M

Notice of Commencement Letters

April 14, 2020
Our Ref: 2019-0506

Six Nations of the Grand River
Land Use Unit
2498 Chiefswood Road
PO Box 5000,
Ohsweken, ON N0A 1M0

Attention: Lonny Bomberry
Lands and Resources Director

Re: Township of North Dumfries Stormwater Management [SWM] Plan [SWM-MP]
Ayr Stormwater Management Master Plan, Ayr, ON

The Community of Ayr requires completion of a Stormwater Management [SWM] Master Plan [SWMMP] following a Master Planning approach in accordance with the Environmental Assessment Act as outlined by the Municipal Engineer's Association Municipal Class Environmental Assessment (MEA), October 2000, as amended. First Nations are an essential part of the public consultation process; therefore, this letter is provided to make you aware of the project and the forthcoming public comment phase.

The Study is to focus on the Urban Area of the Community of Ayr (existing and emerging), as illustrated in the Township's Official Plan [AOP]. The Township of North Dumfries also requires an analysis through this Study on the potential urbanization of lands framing the Northumberland Street corridor, extending from Greenfield Road to Highway No. 401. Refer to **Figure 2-1**.

The SWMMP will serve as a decision support tool, a methodology for the prioritization of works, a means to estimate future SWM requirements and costs and a transparent community process by which the Township can establish stormwater management guidelines and policies for the next ten to fifteen years.

The SWM Master Plan shall be an integrated approach that considers flood and erosion control, groundwater and surface water quality management, natural heritage environment management and infrastructure. In addition, the plan shall integrate existing policies, regulations, acts and guidelines and where appropriate develop new policies and design guidelines to aid in implementation and shall do so within a water sustainability context.

COLE ENGINEERING GROUP LTD.
HEAD OFFICE
70 Valleywood Drive, Markham, ON Canada L3R 4T5
T. 905 940 6161 | 416 987 6161 F. 905 940 2064
www.coleengineering.ca

COLE will be arranging an online Public Information system and the Township will make a public announcement in local newspapers of the date and URL.

Yours sincerely,
COLE ENGINEERING GROUP LTD.

Roy Johnson, P. Eng.
Team Lead- Water Resources

RRJ/kjs

c.: Dawn Laforme (dlaforme@sixnations.ca)
Fawn Sault (Fawn.Sault@mncfn.ca) Consultation Manager,
Department of Consultation and Accommodation, Mississaugas of the Credit First Nation

Encls. Figure 2-1 – Site Map

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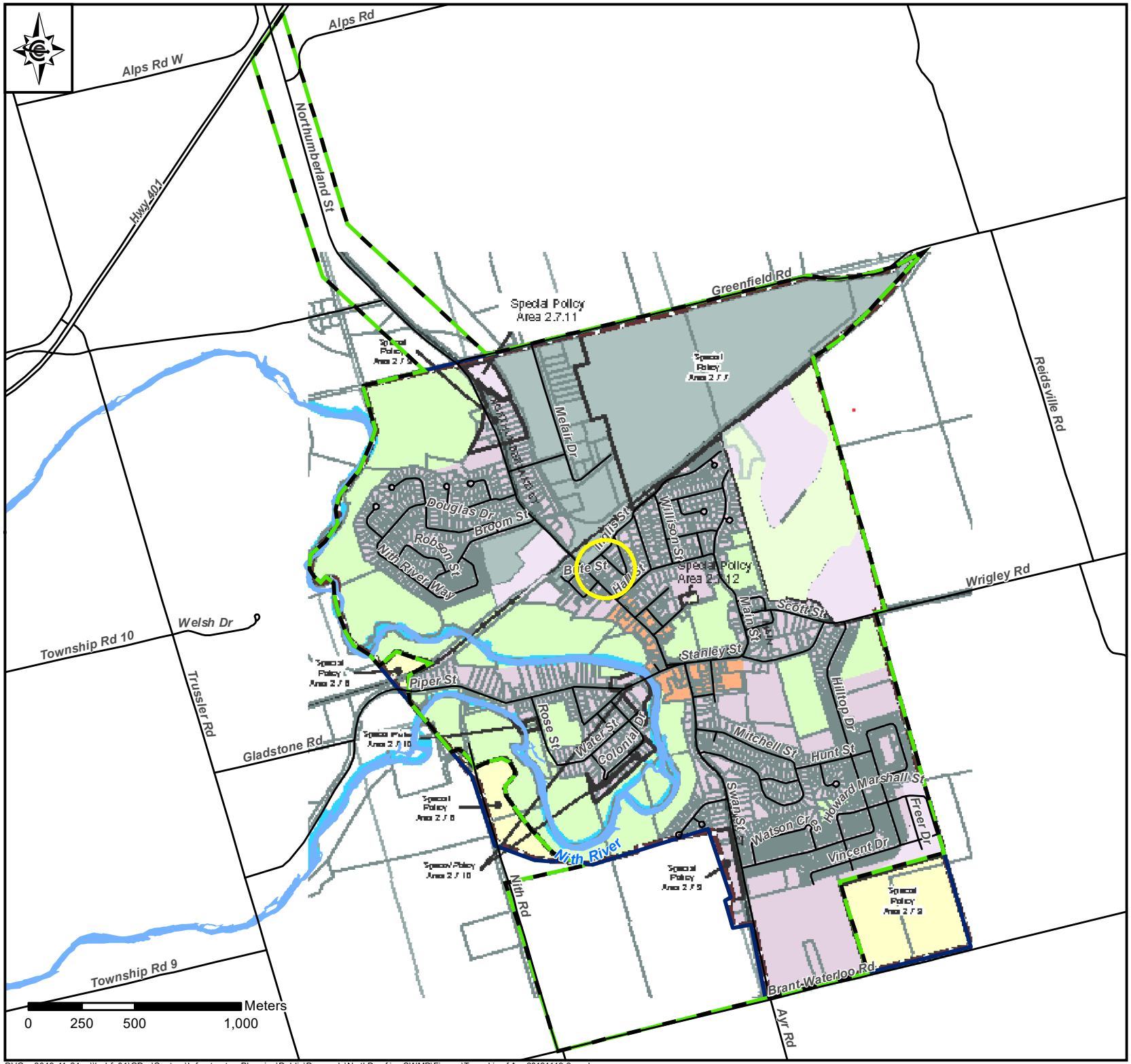

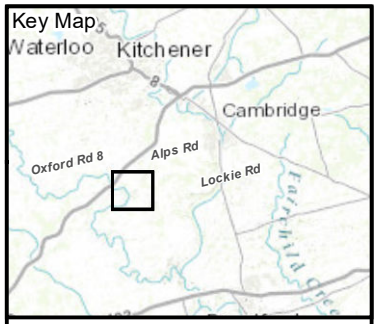

Legend

- Approximate Study Boundary
- Municipal Boundary
- Watercourse

Landuse Type

- Agricultural
- Urban Growth Centre
- General Industrial
- Open Space
- Urban Residential and Ancillary
- Urban Growth Centre

FIGURE 2-1

Ayr Land Use

Township of North Dumfries
Storm Water Management
Master Plan

COLE

Project No.:	Date:
2019-0506	November 2019

DVG 2019-11-21 \\hubfp01\ODrv\Sectors\InfrastructurePlanning\Public\Proposals\NorthDumfries SWMP\Figures\Township of Ayr 20191119v2.mxd

April 15, 2020
Our Ref: 2019-0506
Via-Email

Ministry of Natural Resources and Forestry
Guelph District
Ontario Government Building, 1 Stone Rd W,
Guelph, ON N1G 4Y2

Attention: Tammy Verhaeghe
District Manager

Re: Township of North Dumfries Stormwater Management [SWM] Plan [SWM-MP]
Ayr Stormwater Management Master Plan, Ayr, ON

The Community of Ayr requires completion of a Stormwater Management [SWM] Master Plan [SWMMP] following a Master Planning approach in accordance with the Environmental Assessment Act as outlined by the Municipal Engineer's Association Municipal Class Environmental Assessment (MEA), October 2000, as amended. MNRF is an essential part of the public consultation process; therefore, this letter is provided to make you aware of the project and the forthcoming public comment phase. Attached is a copy of the proposal.

The Study is to focus on the Urban Area of the Community of Ayr (existing and emerging), as illustrated in the Township's Official Plan [AOP]. The Township of North Dumfries also requires an analysis through this Study on the potential urbanization of lands framing the Northumberland Street corridor, extending from Greenfield Road to Highway No. 401. Refer to **Figure 2-1**.

The SWMMP will serve as a decision support tool, a methodology for the prioritization of works, a means to estimate future SWM requirements and costs and a transparent community process by which the Township can establish stormwater management guidelines and policies for the next ten to fifteen years.

The SWM Master Plan shall be an integrated approach that considers flood and erosion control, groundwater and surface water quality management, natural heritage environment management and infrastructure. In addition, the plan shall integrate existing policies, regulations, acts and guidelines and where appropriate develop new policies and design guidelines to aid in implementation and shall do so within a water sustainability context.

COLE will be arranging an online Public Information system and the Township will make a public announcement in local newspapers of the date and URL.

GRCA provided a response to information request (see attached), noting the following:

- *The MNRF has mapped one unevaluated wetland, east of Swan Street and south of Hilltop Drive. This small wetland is not currently mapped by the GRCA but is considered a regulated*

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COLE

wetland. Depending on the outcome of the EA, a site visit during the appropriate time of year may be needed to confirm the presence or absence of this wetland.

- *Two ANSI's are located within or near the study area: Turnbull Lake and McCrone's Lake. Additional detail may be obtained from the MNRF Guelph District Office.*

Can MNRF provide GIS data on these two ANSI's and any other guidance and information the Ministry would find relevant to this study?

Yours sincerely,
COLE ENGINEERING GROUP LTD.

Roy Johnson, P. Eng.
Team Lead- Water Resources

RRJ/kjs

c.: Derek Morningstar, LGL dmorningstar@lgl.com
Barry Myler, Myler Environmental bmyler@cogeco.ca
Andrew McNeely, Chief Administrative Officer, Township of North Dumfries amcneely@northdumfries.ca

Encls. Figure 2-1 – Site Map
Request for Grand River Conservation Authority Input, Ayr SWM Master Plan

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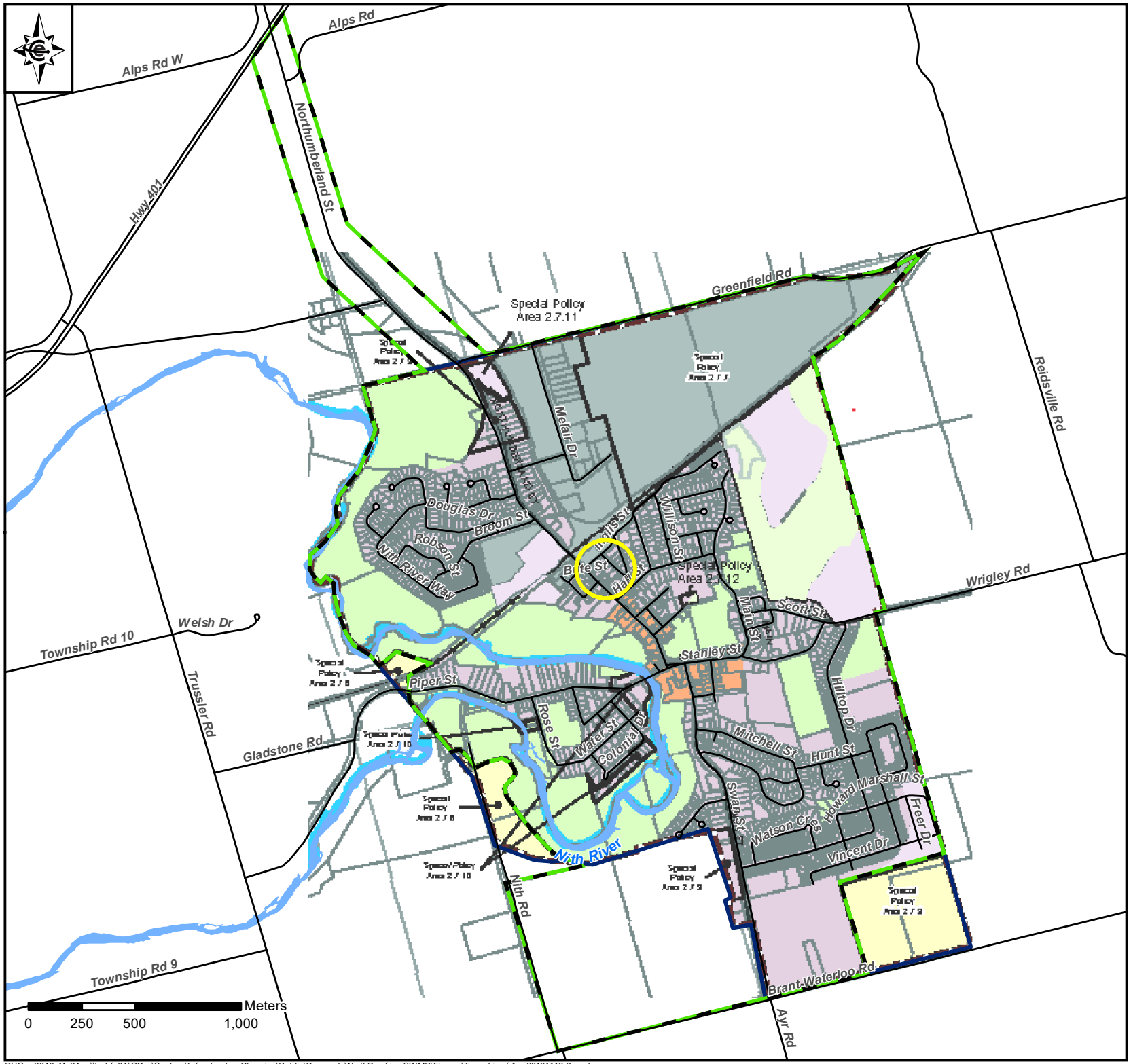

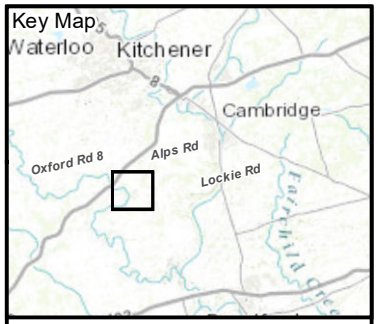

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Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6

Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

April 8, 2020

Via Email

Mr. Roy Johnson
Senior Water Resources Engineer-Team Lead
Cole Engineering Group Ltd.
70 Valleywood Drive
Markham, ON L3R 4T5

Dear Mr. Johnson:

Re: **Request for Grand River Conservation Authority Input**
Ayr Stormwater Management Master Plan
Township of North Dumfries

As per your email request of March 25, 2020, the Grand River Conservation Authority (GRCA) has now had an opportunity to review your request to provide background information and input into this study. In support of this request, you have provided the following background information and documentation:

- Request for Proposal (ND-RFP-20-2019), Preparation of a Stormwater Management Master Plan-Community of Ayr and Addenda #1 to 4 (prepared by the Township of North Dumfries); and,
- Response to the Request for Proposal (ND-RFP-20-2019), Preparation of a Stormwater Management Master Plan-Community of Ayr (prepared by Cole Engineering Ltd. and dated January 14, 2020).

General Information and Background

It is our understanding that Cole Engineering was the successful bidder on the Request for Proposal (RFP) to complete a comprehensive Stormwater Management (SWM) Master Plan for the Community of Ayr and were awarded the contract by the Township of North Dumfries. It is our further understanding that aspects of this study will be done under the Class Environmental (EA) process. We further note that the study area includes the entire Village of Ayr plus a corridor along Northumberland Street from Greenfield Road to Highway 401 (refer to the enclosed map).

We note that Cole Engineering is looking for GRCA's input on any specific requirements that should be included in the SWM Master Plan. Further, you have specifically requested the following information:

- Input on the rain gauge(s) that the GRCA uses for Ayr and any data associated with them (IDF data, historical records, recommendations on additional gauges, etc.).
- Floodplain mapping along with storm event flows and water levels at Ayr would be useful.
- Contact list for the First Nations so that they can be included as one of the stakeholders.
- Any records or information on the SWM facilities in Ayr.

As you are aware, the GRCA has already provided you with the floodplain models (HecRas) for the Nith River and Cedar Creek and have advised that our GIS mapping is available on our website at https://www.grandriver.ca/en/our-watershed/Maps-and-data.aspx). We have also provided you with a list of First Nations contacts. The GRCA has also advised that we do not have any information on municipally owned infrastructure, such as SWM facilities.

In addition to the floodplains in the Village of Ayr, there are other areas within the study area that are regulated by the GRCA under Ontario Regulation 150/06. The study area is traversed by the Nith River and Cedar Creek and their associated floodplains and areas of steep valley/erosion hazard slopes. Other smaller tributaries of the Nith River are also located within the study area. Further, there are both Provincially Significant Wetlands and other wetlands and their regulated allowances within the study area. Any future development/site alteration within these regulated areas would require the prior issuance of a GRCA permit pursuant to Ontario Regulation 150/06.

The GRCA owns several properties within the study area. The Reinhart, Rear, and Ayr Floodplain properties are 3 of the GRCA's larger landholdings within the study area. Jedburgh and Watson Ponds are part of the GRCA's Upper Mill Pond Property. The GRCA also owns and operates the dam structure on Jedburgh Pond. As such, GRCA property staff may have further comments as the study progresses.

To address your request for rain gauge data and provide input into this study, GRCA staff from Water Resources Engineering, Subwatershed Planning, Natural Heritage Resources, and Water Quality have provided the following comments and information for your review and consideration.

Water Resources Engineering and Subwatershed Planning

- The Township of North Dumfries has asked for a list of approved ETV oil grit separators (ogs). Please make it clear in the report that ETV does not approve ogs', only verifies claims on the ability to remove TSS, and that so far none of the tested ogs' would meet the enhanced criteria, with the exception of filter type units (i.e. jellyfish).

- GRCA will be better able to comment on missing items once a draft report has been circulated for further review and comment.

- The rain gauge in Ayr is problematic and does not have a good enough period of record for IDF data. If you want still want this rain gauge data, please let us know and staff will provide this for you. However, we would suggest that you use an Environment Canada (EC) station for IDF data. For historical data, there is an EC station near Roseville and you should be able to search for the Roseville station using the following link:

  https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

- We can further advise that the climate data set compiled for the Upper Cedar Creek Subwatershed Study (Matrix et al, 2019; as described in section 3.1) is available upon

request. These consist of continuous daily and hourly precipitation and air temperature data from 1950-2016 built using data from Environment Canada's Preston, Waterloo-Wellington, and Roseville climate stations (with gap filling).

- Please note that Cedar Creek, flowing into the Nith River at Ayr, is a cold water stream with brook trout, but the most sensitive reaches of the stream are upstream of the community of Ayr. The consultants have identified the Upper Cedar Creek Subwatershed Study (Matrix et al, 2019) as a resource.

- GRCA-collected aquatic monitoring data for Cedar Creek is available upon request. Data were collected 2015-2018 and include stream levels/flow, stream temperature, surface water chemistry, benthic macroinvertebrates, and fish community. Data 2015-2017 were incorporated into the Upper Cedar Creek Scoped Subwatershed Study (Matrix et al, 2019). There were monitoring sites located up and downstream of the community of Ayr.

- The RFP notes "potential urbanization of lands framing the Northumberland Street corridor, extending from Greenfield Road to Highway No. 401". Some of these lands drain to Eden Creek which has been mapped as cold water. The characterisation phase of the Master Plan should include Eden Creek (the RFP only identifies Nith River and Cedar Creek). A subwatershed study has not been completed for Eden Creek.

- The RFP section on characterisation does not identify Jedburgh or Watson ponds, although they undoubtedly play a role in stormwater management. It is not clear whether they will be considered as "stormwater ponds" for the purposes of the Master Plan. If so, it may be worthwhile engaging one of the Senior Operators in an advisory capacity with respect to operations and maintenance of the Upper Ayr (Jedburgh) Dam. This may warrant clarification with the consultant.

- The RFP lists as an objective "Design and optimize a comprehensive water quality monitoring program based on the existing program". We are not sure what the existing program is. We are not aware of a Township or Regional water quality/stormwater monitoring program. If it's referring to GRCA's program established for the Cedar Creek subwatershed study, they should be advised that water quality sampling was discontinued after 2018 as it was undertaken to support the study and urban area expansions were not anticipated in the near term.

- In addition to the background studies listed in the consultant's email, the following studies are available upon request:

    - Cedar Creek Scoped Subwatershed Study (Phase 1), LGL Environmental, 2002
    - Best Practices Guide for Reducing Urban Non-Point Source Pollution in the Grand River Watershed, AECOM, 2014
    - Grand River Fisheries Management Plan, 2005

<u>Natural Heritage Resources</u>

- In the final paragraph of Section 3.1.2 (Natural Environment) on page 12, Cole has indicated that field investigations to confirm natural heritage feature boundaries are not proposed for this project and has assumed that a desktop review is sufficient. The need for site visits with GRCA staff will depend on the potential for direct impacts on regulated

wetland features and the need to verify wetland boundaries. Recommendations for on-site delineation and verification of wetland boundaries should be made clear in the EA.

- The GRCA's wetland mapping layer should be reviewed in conjunction with the evaluated and unevaluated wetland layer maintained by the Province.

- There is at least one minor wetland mapping discrepancy west of Northumberland Street and south of the RR Tracks. A site visit during the appropriate time of year may be needed to confirm the limits of this wetland. It also appears that a stormwater outlet/outfall has been constructed recently on the north edge of this wetland. It would be helpful to identify any wetlands that have been or could potentially be altered in any way for stormwater management purposes. Wetlands that are now considered to be part of the Township's stormwater management infrastructure should be identified as part of this EA.

- The MNRF has mapped one unevaluated wetland, east of Swan Street and south of Hilltop Drive. This small wetland is not currently mapped by the GRCA but is considered a regulated wetland. Depending on the outcome of the EA, a site visit during the appropriate time of year may be needed to confirm the presence or absence of this wetland.

- With respect to the *Environmental Criteria* described on page 16 of Cole's proposal, we recommend that potential net change on hydrologic water balance and pollutant loadings to natural watercourses **and wetlands** be assessed

Advisory Comments

- Cole Engineering has asked the GRCA to confirm the extent of cold water fish habitat along Cedar Creek. Online mapping information available to the GRCA indicates that the main branch of Cedar Creek and many of its tributaries are currently classified as cold water fish habitat owing to the presence of brook trout and other cold water indicator species such as mottled sculpin. Watson and Jedburgh Ponds are also classified as cold water fish habitat owing to the presence of brown and rainbow trout. Migratory rainbow trout in the Nith River are able to get past the Lower Ayr Dam (privately owned) and into Watson Pond but are not able to get past the GRCA owned and operated Upper Ayr Dam and into Jedburgh Pond. Watson pond is also stocked with brown trout annually by the Ministry of Natural Resources and Forestry (MNRF) for public put-and-take angling. Brook trout are known to spawn above the Upper Mill Pond.

- Fisheries management issues, opportunities and constraints are outlined in the Grand River Fisheries Management Plan Technical Report (GRCA and OMNR 2001), which is available online at:

  https://www.grandriver.ca/en/ourwatershed/resources/Documents/Fishery/Fishery_ManagmentPlan_TechReport.pdf.

  For example, the impact of online ponds and stormwater discharge (i.e. sediment and nutrient loading, thermal impacts) on water quality and cold water fish species in particular is a concern.

- The watercourse associated with the Cedar Creek Tributary and the McCrone's Lake Tributary are classified as warm water fish habitat. Both watercourses appear to be situated outside the current study area.

- Two ANSI's are located within or near the study area: Turnbull Lake and McCrone's Lake. Additional detail may be obtained from the MNRF Guelph District Office.

- For current information on occurrences of Federally- and Provincially-listed Species At Risk, please contact Fisheries and Oceans Canada (DFO) and the Ministry of the Environment, Conservation, and Parks (MECP).

Water Quality

- If the consultant is looking for water quality data, there are two main sources – the MECP and the Region of Waterloo. Water quality data for the Nith River is available from MECP as part of the Provincial Water Quality Monitoring Network (PWQMN) at the website below. The Region of Waterloo also has a comprehensive surface water monitoring network around its wastewater treatment plants and there are some monitoring locations on the Nith River upstream and downstream of the Ayr WWTP, which could be used to inform the background conditions in the receiver. This data would have to be requested from the Region of Waterloo. Further data on water quality monitoring is available through this link:

  https://data.ontario.ca/dataset/provincial-stream-water-quality-monitoring-network

We appreciate the opportunity to provide input into this study. We would further appreciate being involved and participating in the review of this study and EA process going forward. Further, I will be your main contact at the GRCA. If you require any specific items listed above, please let me know and I will make arrangements with the appropriate GRCA staff.

If you have any further questions or require clarification, please do not hesitate to contact me at 519-621-2763 ext. 2233 or jbrum@grandriver.ca.

Yours truly,

John Brum
Resource Planner
Grand River Conservation Authority

JB/

Encl.

cc. Andrew McNeely, Township of North Dumfries (via email)

REQUEST FOR PROPOSAL

Preparation of a Storm Water Management Master Plan - Community of Ayr

The Corporation of the Township of North Dumfries

ND-RFP-20-2019

Closing: 23 December 201915 January 2020 at 2:00:00 PM

OFFICE

70 Valleywood Drive
Markham, ON L3R 4T5
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CONTACT

Roy Johnson, P.Eng., Project Manager
C: 416-346-3875
E: rjohnson@coleengineering.ca

DELIVERY ON-TIME: QUALITY LEADERSHIP RESOURCES

COLE

70 Valleywood Drive, Markham,
ON L3R 4T5

projectopps@coleengineering.ca

(905) 940-6161

@ColeEngineering

14 January 2020

Ashley Sage, Clerk
Township of North Dumfries
North Dumfries Community Complex
2958 Greenfield Road, P.O. Box 1060
Ayr, Ontario N0B 1E0

Re: Preparation of a Stormwater Management Master Plan - Community of Ayr
ND-RFP-20-2019
DUE Wednesday, January 15, 2020 @ 2:00:00 PM

Dear Ms. Sage;

COLE is pleased to submit 1 original and 2 unbound copies in response to the Request for Proposal for the Preparation of a Stormwater Management Master Plan in the Community of Ayr, Ontario.

In accordance with the Request for Proposal requirements, we have included the following mandatory and non-mandatory requirements in Appendix A:

- Submission Form – Appendix A
- Proof of Ability – Appendix B
- Contractor Health and Safety Form – Appendix B
- AODA Contractor Compliance Forms – Appendix B
- Acknowledgement of receipt of Addenda 1 through 4
- List of Subcontractors – Appendix B
- Schedule of Items & Pricing Response Form – Appendix D

As always, we strive to provide cost-effective engineering services which exceed the high standards our clients have to come to expect. We trust that the information enclosed within this submission meets your approval. We look forward to working with you to achieve your vision.

Yours sincerely,

COLE ENGINEERING GROUP LTD.

Robert McCollum
Chief Operating Officer

Roy Johnson, P.Eng.
Project Manager

Table of Contents

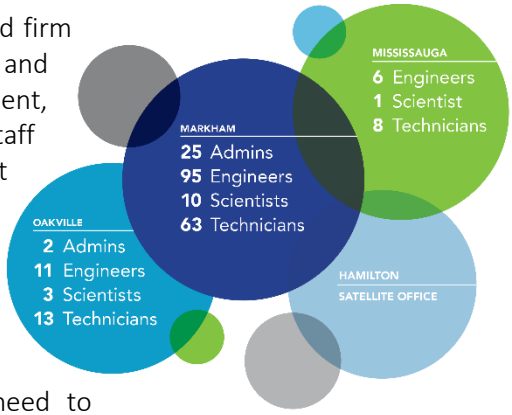
List of Tables

List of Figures

Appendices

1 Company Profile

Founded in 2003, Cole Engineering Group (COLE) is an employee-owned firm that provides consulting and advisory services in planning, engineering, and public–private partnerships in the water, transportation, urban development, and environmental sectors. With offices across southern Ontario and a staff complement of more than 200, COLE is now one of the largest independent consulting engineering firms in the province.



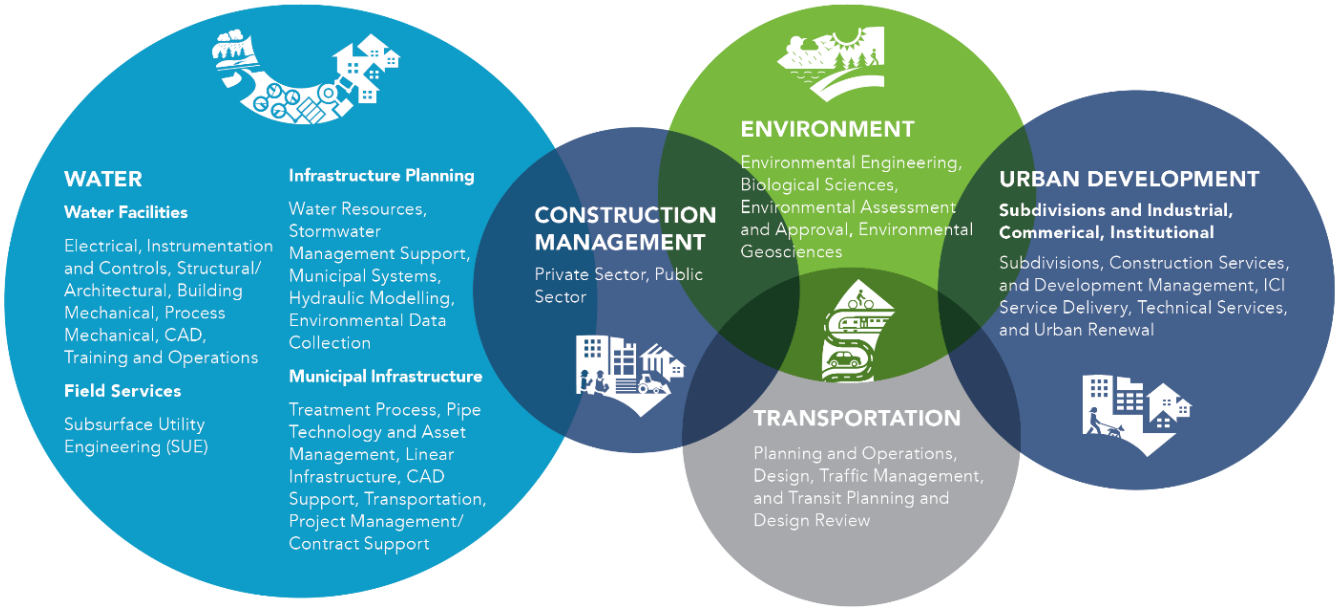
COLE has one of the largest multidisciplinary Ontario-based resource pools in the market, allowing us to provide comprehensive in-house services and expertise for our clients. We also have an end-to-end project management approach which allows us to manage our workload to better prioritize our commitments to our clients, without the need to outsource to third-party companies.

Our Corporate Brochure and copies of Insurance and WSIB certificates are included in Appendix B. Also included in Appendix B are COLE's membership in professional associations and a list of our corporate directors.

Our clients choose COLE to deliver engineering services for our integrated environment, professional approach and dedication to excellence. Our work has involves working with and for other cities and towns throughout Southern Ontario as well as Federal and Provincial Government bodies. Our major public sector clients include:

- Regions of: York, Durham, Halton, Peel, Niagara, Waterloo;
- Cities of: Hamilton, Toronto, Vaughan, Markham, Mississauga, Burlington, Brampton, Guelph, Peterborough;
- Towns of: Richmond Hill, Oakville, Newmarket, Aurora, Caledon;
- Ministries of: Transportation, Natural Resources and Forestry, Environment Conservation and Parks; and
- Authorities of: Toronto and Region Conservation, Lake Simcoe and Region Conservation, Central Lake Ontario Conservation, Credit Valley Conservation.

Our comprehensive multidisciplinary service offerings include the following:



COLE's philosophy is framed by its Mission, Vision, and Values:

COLE Mission

To take pride in providing innovative, sustainable, and value-added solutions to our clients.

COLE Vision

To be the preferred consulting firm and employer of choice.

COLE Values

To ASPIRE to offer our clients and communities the very best in who we are, and what we do, by embracing the values of Accountability, Synergy, Passion, Integrity, Respect, and Excellence.

Our Water Resources group provides a variety of services which position COLE well to undertake this assignment, including:

- Agency approval and permit expediting
- Detailed design of SWM infrastructure
- Drainage Area Studies
- Low impact development modeling and design
- Sewer capacity analysis
- Stormwater Master Planning

1.1 Subconsultants

- Myler Ecological Consulting: Mr. Barry Myler is a fisheries specialist who will be primarily responsible for reviewing existing aquatic habitat conditions across the study area and commenting on how these conditions affect stormwater management planning.
- LGL Limited: LGL will review the existing terrestrial environment and ecology. LGL's effort will be led by Allison Featherstone. This review will help to identify existing natural areas and natural features that will affect siting opportunities for stormwater facilities, and which could affect requirements for maintaining local hydrologic water budgets.

2 Project Understanding

The Community of Ayr requires completion of a Stormwater Management [SWM] Master Plan [SWMMP] following a Master Planning approach in accordance with the Environmental Assessment Act as outlined by the Municipal Engineer's Association Municipal Class Environmental Assessment (MEA), October 2000, as amended.

The Study is to focus on the Urban Area of the Community of Ayr (existing and emerging), as illustrated in the Township's Official Plan [AOP]. The Township also requires an analysis through this Study on the potential urbanization of lands framing the Northumberland Street corridor, extending from Greenfield Road to Highway No. 401. Refer to Figure 2-1.

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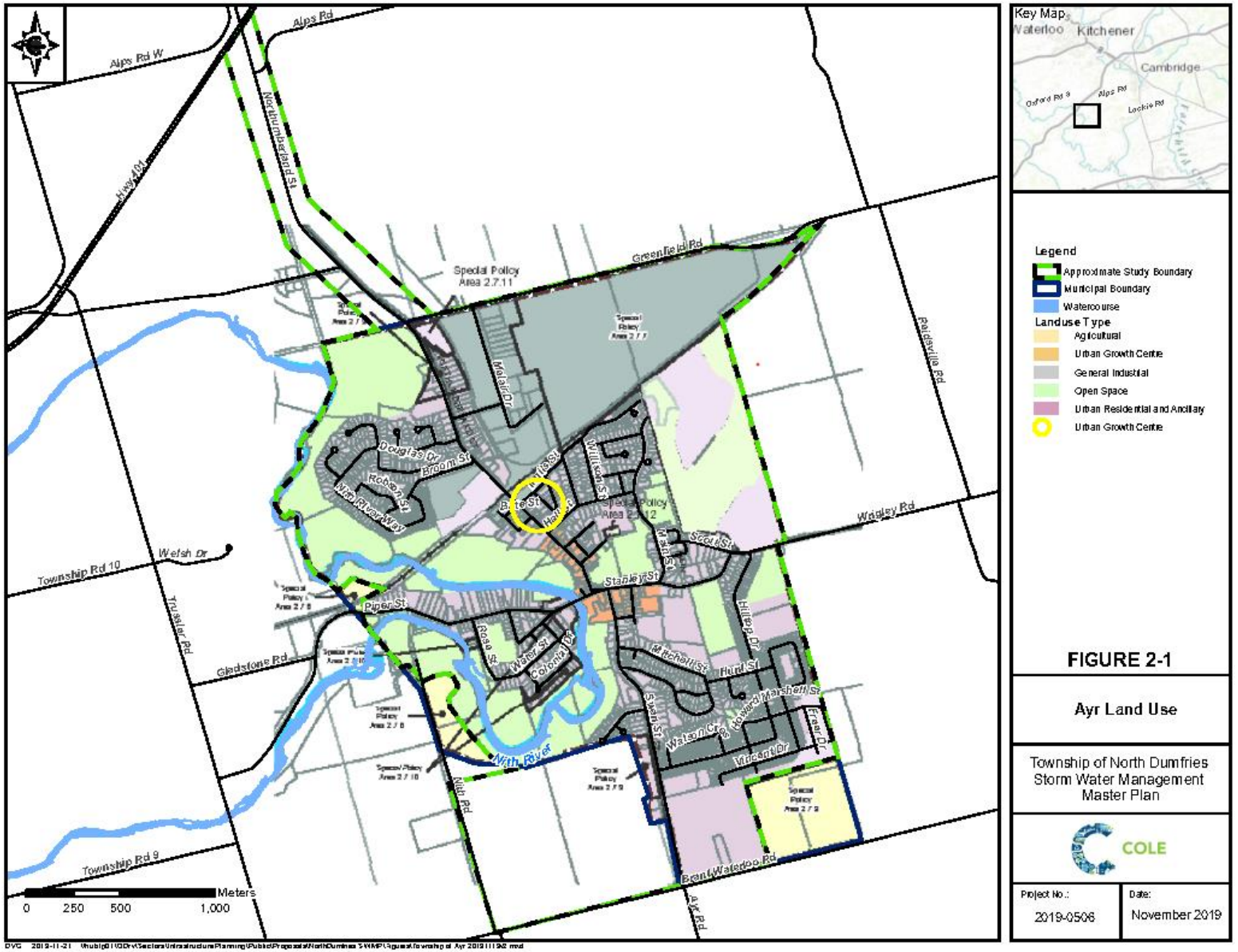


Figure 2-1 Ayr Land Use

The SWM Master Plan shall be an integrated approach that considers flood and erosion control, groundwater and surface water quality management, natural heritage environment management and infrastructure. In addition, the plan shall integrate existing policies, regulations, acts and guidelines and where appropriate develop new policies and design guidelines to aid in implementation and shall do so within a water sustainability context. In addition, the SWMMP should provide a framework for the provision of a stormwater utility tax.

COLE will work closely with the Township to ensure that the goals of the SWMMP can be accomplished in an effective and efficient manner. Based on Addendum #4, there may be challenges working within the budget set out to Council, and COLE will work with the Township to deal with these issues.

2.1 References

In preparing this proposal, we have referenced the following documents:

- *Grand River Watershed Water Management Plan*. 2014. Prepared by the Project Team, Water Management Plan. Grand River Conservation Authority [GRCA], Cambridge, ON [GRWWMP];
- *Nith River Flows*, Grand River Conservation Authority Website;
- *Preparing for Flooding, A Guide for Residents of Ayr*, prepared by GRCA [Ayr Flooding];
- *Township of North Dumfries Official Plan*, Consolidation Date: November 2018 [AOP];
- *Upper Cedar Creek Scoped Subwatershed Study*, prepared by Matrix Solutions Inc. et al, dated October 2019 [UCCSSS];
- *Waterloo Regional Official Plan*, Chapter 8 Consolidated New ROP, 2015 [WROP]; and,
- *Addenda #1-4* provided by the Township.

2.2 Background

The Community of Ayr has a population of approximately 5,000 persons and is anticipated to increase to a population of 10,000 to 11,000 persons by 2031. Increases in population require residential and employment lands, which increase the impervious cover of existing lands, and the stormwater which runs off during events requires mitigation. The SWMMP will provide specific recommendations for SWM measures to mitigate urban growth in the Study Area.

The Ayr Urban Area is designated on Maps 2 and 2.1 of the AOP. This designation is intended to serve as the primary focus for growth and development in the Township to the year 2031. Development within this designation will provide for a range of residential, commercial, employment, recreational and institutional uses. Future development within the Ayr Urban Area will be directed predominantly to the Urban Growth Centre and Designated Greenfield Area.

A goal of the AOP is to concentrate most of the growth in the Township within the Ayr Urban Area, with limited growth in designated Rural Settlement Areas and Rural Employment Area where municipal services can be provided in a cost effective and environmentally responsible manner.

The Township will encourage the provision of new dwelling units in built-up areas in the Ayr Urban Area and existing Rural Settlement Areas, through infill, conversion, intensification or redevelopment compatible with surrounding uses, except where infrastructure is inadequate or there are significant physical constraints.

The SWMMP will provide guidance for future development in these areas, including an overview of opportunities and constraints for SWM measures.

2.3 Surface Water

Ayr lies at the confluence of the Nith River and Cedar Creek, which generally flow north to south. There is a stream flow monitoring station in Ayr upstream of the confluence. Approximately 74.51ha drains to the Cedar Creek at Ayr Gauge. Regional flows at that gauge are 90.35m^3/s, per UCCSSS.

Nith River: The Nith River drains the western part of the Grand River watershed in Waterloo Region as well as Brant and Oxford counties. In the northern part of the river, water runs off the land quickly so flows can rise and fall quickly. Demand for water is high in the southern part of the river where farm irrigation is common. Typical summer flow in the Nith River at Ayr is 2.6m^3/s, with low lying areas flooded at 110m^3/s. Per Ayr Flooding, the Regional event flow is approximately 600-800m^3/s.

Cedar Creek: The UCCSSS is intended to guide and coordinate decision making by the Region, area municipalities, the GRCA and others involved in development planning, subwatershed stewardship and restoration. Cedar Creek supports a coldwater brook trout fishery and drains primarily agricultural lands, remnant natural woodlands, and low-lying wetlands south and west of the Cities of Kitchener and Cambridge, respectively. The northern part of the subwatershed is bisected by the Highway 401 corridor. The main Urban Area is the community of Ayr, in the Township of North Dumfries, located at the confluence of Cedar Creek and a meandering section of the Nith River.

2.4 Upper Cedar Creek Scoped Subwatershed Study (UCCSSS)

2.4.1 Hydrology Modeling

The study completed a continuous simulation using a calibrated GAWSER hydrologic model which applied the precipitation and temperature data from the Roseville Gauge.

The report makes various recommendations for SWM mitigation, including:

- Any potential development should be required, at a minimum, to maintain existing groundwater recharge rates.
- Potential urban developments shall only discharge stormwater offsite at an approximately similar frequency, rate, and volume as is occurring under baseline conditions. Stormwater that is not discharged offsite should be infiltrated.
- Potential urban developments shall only discharge stormwater offsite at an approximately similar frequency, rate, and volume as is occurring under baseline conditions.
- Infiltration of potentially contaminated water shall only be performed in areas where there is a lessor chance of the contaminated water reaching the municipal supply aquifer. Runoff from areas that are more likely to be contaminated (e.g., roads, sidewalks, parking spaces) should be directed toward end-of-pipe recharge facilities that are sited outside those lands that contribute recharge to AFD1. Water entering these facilities should undergo appropriate quality treatment prior to infiltration. This quality treatment may include capturing spring freshet flows to capture salt-laden water for subsequent pumping to the sanitary system or evaporate during the following summer months.

2.4.2 Existing Concerns

Per the GRWWMP and Ayr Flooding, Ayr is located within an Existing Flood Damage Centre (a community that has several structures located within the floodplain). Ayr experiences frequent nuisance flooding.

An initial review of flooding in Ayr suggests that there are few practical options to reduce flooding to the most frequently flooded properties along Tanner Street. Next steps will focus on flood preparedness,

implementing flood inundation mapping and increasing awareness of those residents located in the floodplain. Damages to property and a risk to life can occur during significant flood events. Therefore, the GRWWMP Team recommends that additional ways to reduce the flood damage potential in the community of Ayr be investigated.

2.5 Source Water Protection

Based on Map 4 Source Water Protection Areas, AOP, there are three Municipal Wellheads in Ayr. Ayr is not located in a Regional Recharge Area. The downtown core, including the Urban Growth Centre is within WPSA-4, with the remainder of the northeast portions of Ayr located in WPSA-5. Refer to Figure 2-2.

Per the WROP, those areas are defined as:

- WSPA-4: delineates medium sensitivity areas found within the two year time of travel to a municipal drinking-water supply well; and
- WSPA-5: delineates medium sensitivity areas found outside of the two year, but within the ten year time of travel to a municipal drinking-water supply well.

Development applications within all Source Water Protection Area designations will comply with the following:

(a) Employment uses that would direct infiltration of stormwater run-off without pre-treatment through the use of drywells or artificial/enhanced recharge will not be permitted; and

(b) Employment uses that would require new water taking for industrial/commercial purposes and/or for irrigation purposes, except for water taking associated with mineral aggregate operations will not be permitted.

Development applications within the WPSA 4 designation will comply with the following: underground parking garages, individual wastewater treatment systems, private wells, pipelines, sewers, stormwater management ponds (or other ponds) and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.

Development applications within the WPSA 5 designation will comply with the following: Category 'D' uses and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.

Based on the foregoing, stormwater infiltration may not be allowed in some areas. SWM most comply with Policy 8.A.4. The studies requested will vary based on the location of the development application relative to the sensitivity of the Source Water Protection Area and its proximity to a municipal drinking-water supply well or surface water intake. Studies submitted by the owner/applicant will demonstrate that the proposed use will not negatively impact the quantity and/or quality of drinking-water resources in Source Water Protection Areas for the development application to receive approval.

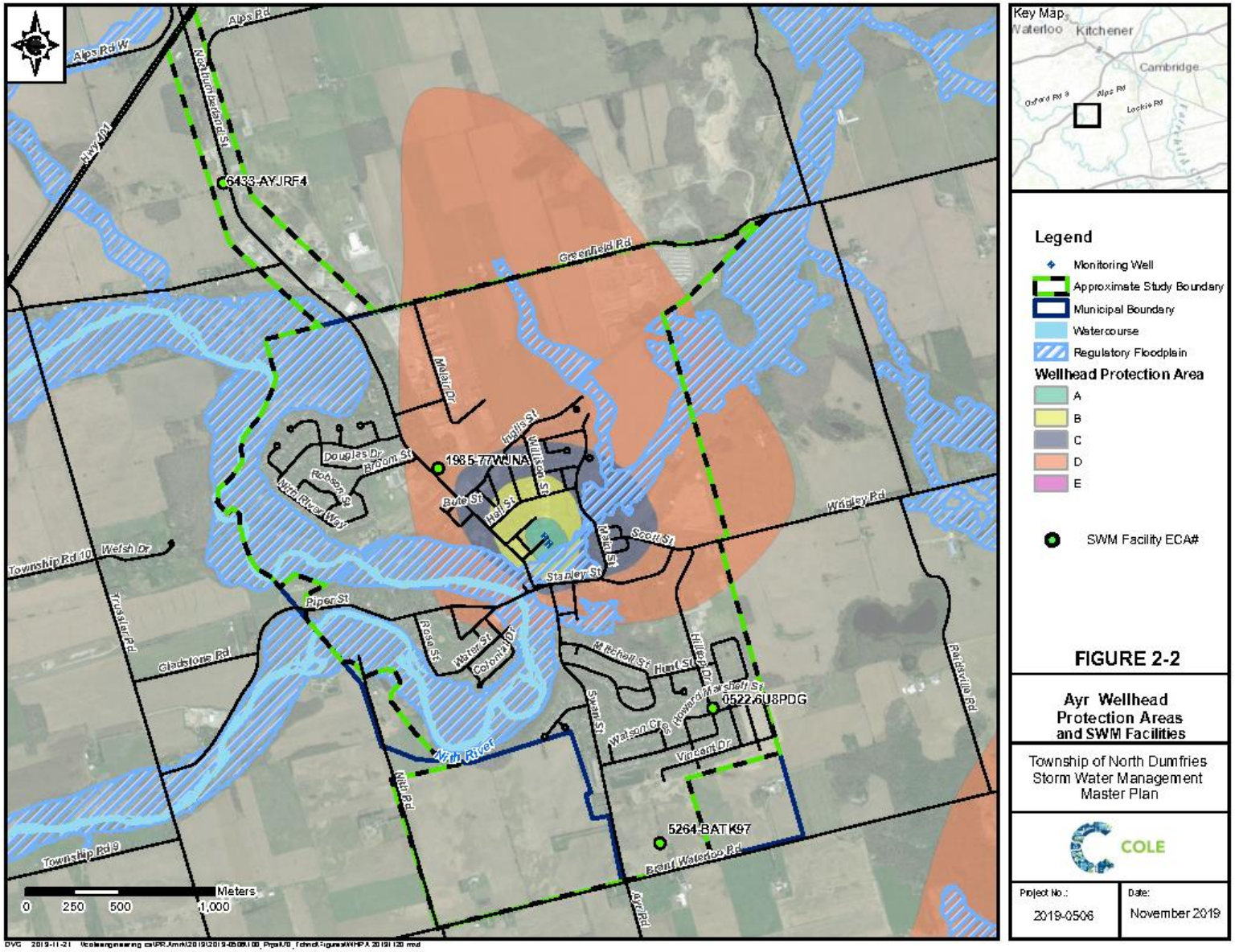


Figure 2-2 Ayr Wellhead Protection Areas and SWM Facilities

3 Approach / Methodology

COLE, after review of the RFP, has developed a detailed methodology to complete the proposed assignment. Our proposed time task matrix, indicating the time that each proposed team member will spend on the project, is located in Appendix E. The following section discusses the approach proposed by the Project Team. In order to keep our submission brief, we have focused on the key aspects of the project and we confirm that we will comply with all requirements as outlined in the RFP document.

In all respects, COLE's skills and experience will meet the needs of this project. Our team's general approach to managing this project will be based upon the following cornerstones:

- Proactive Communication between the Township and Cole Engineering Project Manager: Given the demanding timelines and the complexity of the work, timely and effective communication between the COLE Project Manager and the Township's Project Manager is mandatory. Our approach to managing this challenge is to schedule in advance regular (bi-monthly (once every two months)) progress meetings with the Project Manager. These meetings will provide a status report on the work, deliverables, and potential issues and how they are being managed. These are recommended to be conference calls.
- Ongoing Internal Co-ordination: The Project Manager and senior Cole Engineering staff will oversee the timely delivery of all aspects of the project.
- Pre-Set Milestone Delivery Dates: Co-ordination of client meetings, presentations and agency meetings often become the critical path for delivery of engineering design and environmental study products. A cornerstone of our schedule management will be to lock in dates for these meetings at the project outset. Combined consultant/client commitment to these dates will focus energies on delivering high quality design/environmental products to meet the pre-determined deadlines.
- Proactive Issue Identification and Management: We will anticipate, seek out, listen and manage client, agency and stakeholder's concerns as an integral part of our work. The depth and breadth of skill and experience of the senior members of our team, will allow us to effectively work together in this way.
- Effective Use of Senior Consultant Resources and Use of a Project Advisor: In order to ensure that the project will remain on track and will be completed efficiently, members of the Project Team will have clearly defined roles and will delegate with accountability of responsibilities. There will be a high level of back-up bench strength to protect the project interests in the event of unforeseen availability of a key team member or an unanticipated issue requiring urgent attention.

The Project Advisor, Harold Chard, M.Sc., P.Eng., will act in support of the Project Manager, Roy Johnson. Should the Project Manager be unavailable for any critical events, Harold can act as a substitute on a temporary basis.

QA/ QC Project Specific Plan

COLE will develop and implement a project specific QA/QC Plan to address all aspects of the project. All engineering deliverables will be sealed by a Professional Engineer. The QA/QC plan will address the following points:

- Control of non-conforming work
- Control of technical work
- Corrective actions
- Document control
- Document quality system
- Management responsibility and commitment
- Quality audits
- Quality milestone reviews
- Quality records
- Quality technical reviews

Will Heywood, P.Eng., will be responsible for enforcement of the QA/QC plan. At a minimum, he will review all major deliverables, and submit a signed checklist to the Township advising of the results of his review.

Schedule Control

Our proposed Project Schedule is enclosed in Appendix C. COLE's Project Manager, Roy Johnson, with the support of the Project Team, will enforce internal deadlines and notify the Township of any delays in obtaining requested information. Delays caused by the Township and/or other outside parties will be immediately brought to the attention of the Township and reflected on the project schedule. In consultation with the Township's Project Manager, contingency plans will be developed and, where possible, additional qualified staff will be utilized to overcome any delays. Other options to address delays will also be considered including recognizing the problem at an early stage and undertaking some components of the project simultaneously.

Meeting Class EA Requirements

COLE's approach to completing a Class EA, is one of open involvement of all affected stakeholders early in the process. It is therefore proposed to inform the public through multiple points of contact, exceeding the requirements under the Class EA process.

Stakeholder List

A first step in the project will be to prepare a comprehensive list of stakeholders to consult to fulfill the Class EA Master Plan process. This list will be based on parties identified by the Township as being interested in this or similar projects, as well as approval agencies and First Nations. During the full course of the project, the project stakeholder list will be maintained, and interested parties will be added for future mailings. We have assumed that the cost of publishing all notices in local newspapers and the cost of facilities for public meetings will be paid directly by the Township.

Notice of Commencement

A Notice of Commencement to be published on the Township's website and in local newspapers. The notice will also be directly mailed to the stakeholders list. A draft notice will be developed immediately after contract award and will be provided to the Township for review at the project kick-off meeting. The notice will contain the problem/opportunity statement for the project and invite the public to comment and/or join the project mailing list.

Notices of Public Information Centres

The RFP requires that three Public Information Centres (PICs) be held through the course of this project. Notices of PICs will be published approximately four (4) weeks in advance of the PIC. The notice will also be directly mailed to individuals and organizations on the stakeholder list. COLE will prepare draft notices for review by Township staff.

Public Information Centre

Given the scope of the work (equivalent to a Schedule B Class EA) and the scheduling noted in Addendum #3, COLE recommends that only two PICs be held to provide the public with an opportunity to review the problem/opportunity statement, potential alternative solutions, our proposed evaluation criteria and, finally, our recommended preferred solution. It is anticipated that each of the PICs will be an "open house" come-and-go format, with a presentation at a scheduled time.

Opinions and information gathered from this PIC will serve to guide the Master Planning process into the final stages of alternative consolidation and prioritization.

Notice of Completion

A Notice of Completion will be developed to provide the public with a final opportunity to comment on the project. The Notice will indicate the conclusions of the Master Planning/EA process, and will indicate where copies of the Master Plan can be reviewed. The Master Plan must be completed to document the Class EA process and must be filed for a 30-calendar day public review.

3.1 Task 1: Study Area Characterization

The project initiation will include a start-up meeting with the Township's staff. At this meeting the proposed work plan and project schedule will be confirmed.

3.1.1 Information Gathering and Review

Prior to the meeting, a list of information and existing data required by the Project Team will be developed and provided to the Township so that the required exchange can occur at the start-up meeting.

It is assumed that the Township will provide, according to the RFP documents:

- GIS Mapping layers, including watercourses, property boundaries, existing and/or future Official Plan land use; natural features mapping; natural hazard areas or zones including regulatory floodplain zones; and any other relevant GIS layers that the Township can supply.;
- LIDAR and/or existing digital elevation models for the Study Area;
- Stormwater Management Reports for any developed areas with the Study Areas;
- List of stakeholders
- Available record drawings, base plans, reports, digital ortho photography, and other relevant existing information.
- Existing SWM pond assessments with their respective design reports, as available.

We will review the information supplied by the Township and identify any significant gaps in the available information that could affect this project. We will then discuss with Township staff the most practical way to address these gaps. Examples of potential data gaps are:

- Existing storm sewer information;
- Drainage area information outside of settlement areas;
- Drainage areas to oil grit separators;
- Drainage areas to uncontrolled outlets; and,
- Existing SWM Pond IDs and reports.

As noted in Addendum #3, the Township does not have GIS information on existing storm sewers. As a result, no analysis of the system can be completed without a survey or other information on how the existing system was designed or built. This is critical to meeting the timelines outlined herein.

In preparing this proposal, the Ministry of the Environment, Conservation and Parks [MECP] Access Environment website was used to search for Environmental Compliance Approval (ECAs) in the Study Area. We located two Oil-Grit Separator (OGS) ECAs, and three SWM Facility ECAs. The MECP should also be consulted for possible additional ECAs. We understand from Addendum #3 that there are four SWMFs. Refer to Figure 2-1.

The SWMMP shall include an evaluation of the cumulative environmental impact of stormwater from existing and planned development. Existing and proposed land use within the Township can be classified

into several categories, including: parks, open space, recreational mixed areas, residential, institutional, commercial, and employment. Those areas will be assessed via hydrologic modeling for changes in runoff quantity and quality for existing and proposed conditions. We will review that available land-use mapping to determine whether it is adequate to support the required hydrologic analyses. If necessary, the mapping of existing land use will be refined based on review of available aerial photography.

The most significant water quality issue in the Grand River Watershed is the eutrophication of the river from both anthropogenic and natural sources. Eutrophication results from excessive loadings of nutrients, specifically nitrogen, phosphorus and/or carbon to freshwaters, resulting in increased growth of aquatic plants and algae. It is our understanding that in the case of the Grand River, the nutrient of most concern in phosphorus.

We will review the available information and develop estimates of existing phosphorus loadings to the Nith River attributable to existing stormwater discharges, and the potential change in loadings that might result from the foreseeable land development. This will help put future development in context and help to define what mitigation measures may be required as part of the overall SWM strategy.

3.1.2 Natural Environment

Desktop assessments of the natural environment will be completed by terrestrial and aquatic biologists. COLE's team includes the following sub-consultants who will be responsible for these reviews:

- Myler Ecological Consulting: Mr. Barry Myler is a fisheries specialist who will be primarily responsible for reviewing existing aquatic habitat conditions across the study area and commenting on how these conditions affect stormwater management planning.
- LGL Limited: LGL will review the existing terrestrial environment and ecology. LGL's effort will be led by Allison Featherstone. This review will help to identify existing natural areas and natural features that will affect siting opportunities for stormwater facilities and which could affect requirements for maintaining local hydrologic water budgets.

The main natural heritage features in the study area are the Nith River, Cedar Creek and several wetlands such as the Turnbull Lake Charlie Creek Wetland Complex, the Roseville Swamp and Cedar Creek Wetland Complex, and the Greenfield Swamp, all of which are provincially significant. Little Turnbull Lake Wetland is provincially significant and is also an Area of Natural and Scientific Interest (ANSI). In addition to designated features, several Species at Risk (SAR) in the study area. These include, but are not limited to:

- Blanding's Turtle;
- Bobolink;
- Eastern Meadowlark; and
- Eastern Ribbonsnake.

Through the Master Planning process the potential for impacts to terrestrial natural heritage components within the project area will be identified as part of the evaluation of the existing conditions as well as the evaluation of alternative solutions for the management of stormwater. The focus will be on screening to document site conditions and recommending any mitigation measures that may be required for the preferred SWM strategies. We will also identify any other studies that may be required at future phases of the Master Plan.

Our approach to the evaluation of natural heritage features will be to review, from a desktop basis, all natural heritage features that can be taken into consideration in early planning stages. The desktop review will focus on collection of available information from Grand River Conservation Authority (GRCA), Department of Fisheries and Oceans (DFO), and Ministry of Natural Resources and Forestry (MNRF) through

access to online resources and formal GIS data requests to agencies. Background data collection will include a review of available data such as designated natural features, vegetation communities, vascular plant lists, records for rare plants, atlases etc. A high level Ecological Land Classification (ELC) of vegetation communities will be completed using ortho-imagery. The ELC will then be used as part of the wildlife habitat characterization. Available background information will be used to characterize the wildlife habitat and communities in the project area and compile a summary species list for the study area.

In order to address the most current species at risk (SAR) requirements, LGL proposes to complete a SAR Screening, whereby consultation with the MECP will be undertaken to confirm a current SAR list for the project area and identify any known concerns regarding SAR. Species identified as endangered or threatened under the Species at Risk in Ontario (SARO) list are afforded protection under the Endangered Species Act, 2007 (ESA). The purpose of efforts with regard to SAR during the Master Plan preparation will be to first identify potential concerns early in the process to avoid impacts to these species through site selection and/or mitigation to the extent possible. Where SAR and their habitat cannot be avoided, LGL will identify potential impacts associated with the proposed strategies to ensure consideration for mitigation and recommendations for permits/approvals (if necessary) specific to SAR are carried through to future phases of the project.

Field investigations to confirm the limits and extents of natural heritage features documented through the background review, are not proposed for this project. It is assumed that a desktop screening is sufficient.

3.2 Task 2: Analysis and Assessment of SWM System

The information gathering and review completed under Task 1 will feed directly into Task 2. The RFP has set out clear requirements for Task 2, and the following describes COLE's approach.

3.2.1 Storm Sewer

To assess the existing capacity of the municipal storm drainage system, COLE will develop a hydrologic model using PCSWMM or Rational Method, as determined through consultation with the Township. That is, it will include the municipal storm sewer pipe network and its inlet, and will also include the overland flow pathways as conduits within the model.

- The storm pipe network and inlet types and locations will be based on available geodatabase information supplied by the Township, supplemented by some review of available record drawings to fill in missing pipe information as needed to complete a working model.
- Overland flow pathways and conduits will be developed based on review and processing of the available LiDAR dataset to be supplied by the Township.
- Inlet capture capacities will be based on available information sources such as MTO's Drainage Manual; supplemented by field reconnaissance by COLE staff to confirm the catchbasin grate types currently in place.
- Surface runoff catchment areas draining onto roadways or into specific inlets will be delineated within the available mapping and Li9DAR information, with catchment imperviousness based on available land-use mapping supplemented by sampling of selected representative areas using the available aerial photography.

Once the model has been built, it will be tested to ensure that internal connectivities are appropriate, and that the model is providing what can be considered reasonable results when rain events such as the 2-year, 5-year, 25-year and 100-year events are applied to the model.

3.2.2 Climate Change

Climate change refers to the long-term trend in the change of the world's weather patterns, including changes in average temperature and rainfall distribution. Stormwater runoff is intrinsically a function of rainfall, therefore change in the intensity, duration, and frequency of rainfall events has an impact on runoff, and the response of stormwater systems. Aquatic habitat health is also linked to temperature. The impacts of unmitigated climate change on storm infrastructure will be assessed.

For this Study, we could investigate using Station G6140954 (in the Grand River Region) as a basis for comparison, then modifying the existing Township IDF curves by applying the percent change in rainfall intensities used in Sta G6140954. We could then develop updated IDF curves for the 5-year and 100-year return periods for future conditions. Then, the effects of climate change on conveyance systems could be assessed by comparing future rainfall intensities to existing, specifically, comparing the 5-year intensities with an inlet time of 10 minutes, as these are representative of minor system conveyance structure requirements.

The potential effects of climate change on rainfall intensity-duration-frequency (IDF) statistics across southern Ontario have been explored by various researchers. The MECP has created the Ontario Climate Change Data Portal (http://ontarioccdp.ca/) that provides project changes in air temperature statistics and rainfall IDF curves for a set of 25km x 25km map grid squares that cover the Province. This provides a valuable resource of information that can be used to assess the potential impacts of increased frequency or intensity of heavy rainfall within and around Ayr. COLE's proposed approach will be to extract future IDF curves from the OCCDP and apply them within the PCSWMM model. A particular issue is what change might be expected in the magnitude of the 100-year rain event, and resulting impact on local flooding issues and stormwater system capacity.

3.2.3 Erosion Assessment

The RFP set out clear requirements about identifying existing erosion sites (by creek reach). This will feed into evaluating level of risk to public health and safety and environment, and alternatives for restoration.

COLE staff will complete a site walk of the relevant Reaches within the Study Area to identify potential areas of erosion concern and prepare a photo log to illustrate and describe any erosion sites. COLE will identify erosion sites based on the site visit and summarize them in a table.

Any sites that may affect public safety will be identified, and the Township so advised; and in such cases we would recommend further evaluations be undertaken for the Township by geotechnical specialists to better define the level of risk and advise the Township accordingly.

Priority areas of concern will be identified, including debris jams within the channel that could cause channel flows to back up into nearby residential/commercial properties, causing flooding concerns; perched culverts that have the have potential to cause problems with structural integrity of the road material, etc. Given the size of the Nith River and Cedar Creek, outfall erosion may be of greater concern than the watercourses themselves, given the large upstream areas contributing flow.

Recommendations will be developed for future development purposes to ensure that the erosion control component of ponds will be sufficient. These may include completing a detailed fluvial assessment in problem reaches, including cross-sectional surveys, establishment of erosion thresholds, and identification of critical reaches/flows; developing an erosion model to determine if retrofits to existing facilities would be effective at mitigating existing erosion issues; using the erosion model developed above to evaluate impacts of development and whether extended detention levels provided by the ponds would be enough to mitigate the erosive effect, or if additional LIDs would be required.

3.2.4 Stormwater Management Facility Assessment

A main component of the Project includes an assessment of the Township's current stormwater infrastructure. This assessment will require a visual inspection of stormwater ponds, including all 4 SWM ponds. The objective of this stage is to produce all necessary field data to be used in subsequent stages of the project.

Using data gathered from the background review and field investigations, the needs of each stormwater management facility will be assessed. Obvious maintenance requirements such as deteriorated structures, eroded slopes or outlets and adverse sediment accumulation will be determined and reported in this step.

Rain Gauge Network

A rain gauge monitoring plan will be developed to provide the Township with a well distributed, and easily maintainable gauge network. Appropriate locations for monitoring will be identified allowing for sufficient data coverage and will be selected based on the suitability of potential sites for monitoring equipment installation and maintenance. Careful location planning and equipment selection will allow for an efficient, cost-effective maintenance plan and will maximize the likelihood of successful data collection.

COLE has extensive experience in this field having developed, installed, and maintained many permanent and temporary rain gauge networks ranging from 1 to 20 telemetered and logged gauge locations within an individual municipality. Gauge locations have been planned and operated throughout Toronto, Mississauga, Brampton, Hamilton, Guelph, Peterborough, Barrie, Wellington North, Cannington, Sunderland, and more.

Field Assessments

All field work will be completed by Cole Engineering staff. We own all necessary equipment and have fully trained staff that will complete all field work. Our field staff has inspected over 200 facilities in the past few years and are very familiar with data collection and facility component assessment.

Two people will visit each of the ponds to perform a visual inspection of the general condition of the pond, access roads, vegetation, overland flow routes, inlet/outlet headwalls. Access requirements (keys, arranging field meetings with Township staff, etc.) will be discussed with Township staff at the onset of the study.

The facilities condition will be documented using the field forms as well as dated digital photographs. Digital geo-referenced photos will also be taken of the periphery land use and general facility layout for inclusion into the SWM facility database. The initial condition assessment will include condition rating of all assets as documented during the field inspection and confirmed by our Project Engineer and Project Manager.

The field data will be collected by qualified one or two-person team equipped with either a GPS or total station, inspection forms, digital camera, and other necessary field, as required.

Aquatic Habitat

Aquatic habitat within the Ayr SWMMP study area includes a reach of the Nith River and the lowermost portion of Cedar Creek above its confluence with the Nith River, including the online Jedburgh and Watson ponds. The Nith River supports a diverse warmwater fish community. Cedar Creek's fish community includes the native coldwater Brook Trout. In addition to review of existing watershed/subwatershed studies that have been prepared for the Nith River and Cedar Creek, GRCA will be contacted for fisheries and aquatic habitat information, issues, opportunities and constraints specific to the study area. For instance, the extent of Cedar Creek coldwater habitat into the study area will be confirmed with GRCA.

Aquatic Species at Risk mapping identifies two provincially and federally designated Threatened fish species (Black Redhorse and Silver Shiner) and one provincially and federally designated Special Concern mussel species (Rainbow) within the study area. Mapping does not indicate designated Critical Habitat of these at-risk species, but it is understood that the Ontario Ministry of Natural Resources and Forestry had designated portions of the Nith River as "sensitive environment" in relation to Black Redhorse, the potential occurrence and extent of which will be determined for the study area.

Policy and regulations relevant to fisheries and aquatic habitat include the federal Fisheries Act and Species at Risk Act, and the provincial Endangered Species Act, provisions of which will be identified and incorporated into the SWM Master Plan.

3.3 Task 3: Evaluation of Alternatives

Several alternative solutions for SWM measures for the existing and future land uses within the Township that consist mainly of urban areas shall be developed. The approach for developing and evaluating alternatives shall be consistent with the requirements of the planning and design process for Master Planning projects described in the Municipal Class EA (Municipal Engineers Association, June, 2000; amended 2007, 2011). It involves reviewing Phase 1 work (i.e. Identification of the Problem) and undertaking Phase 2 (i.e. Establishing Existing Conditions, Identification of Long List of Alternatives, Development and Assessment of Alternative Management Strategies and Selection of a Preferred Strategy). In addition, consultation with stakeholders is a necessary step in this process.

The MECP divides SWM measures into three broad categories:

1. Source/lot level controls;
2. Conveyance controls; and
3. End of pipe controls.

The preferred SWM strategy is to provide an integrated treatment train approach to water management based on providing control at the lot level and in conveyance (to the extent feasible) followed by end-of-pipe controls. This combination of controls is typically the only means of meeting the multiple criteria for water balance, water quality, erosion control, and water quantity.

The reasoning behind that approach is to maximize the benefits from the combination of those elements, including:

- More effective SWM;
- Reduction in land area required to implement end-of-pipe solutions;
- Enhanced opportunities to integrate SWMPs effectively as amenities;
- Decreased total cost when land value is factored in; and,
- Increased level of public awareness and involvement in the implementation and management of SWM initiatives.

A preferred SWM Strategy will then be developed by the synthesis of the inter-disciplinary inputs to the project, including computer modeling, terrestrial and aquatic habitat assessments, water balance and hydrogeology, social, cultural, and economic considerations. The approach in developing and evaluating the alternative shall be generally consistent with the Class EA planning/design process for Master Planning project.

Using the initial set of developed evaluation criteria, and incorporating public comments as appropriate, the Project Team will apply a net effects analysis to the preliminary list of alternative solutions which will involve the following steps:

- Identification of potential effects;
- Develop and apply mitigation/compensation/enhancement measures; and,
- Determine net effects after mitigation measures have been applied.

The Township would like to explore the opportunities for innovative approaches such as Low Impact Development (LID) and green infrastructure for lot level controls, conveyance controls and end of pipe facilities. To assess the most applicable alternatives, COLE will review available information regarding Site setting that could influence the infiltration capacity of each area. This will include a review of the surficial geology, topography, depth to groundwater, depth to overburden, soil cover etc. In addition, available Source Water Protection ("SWP") mapping and SWP plans will be reviewed to understand if there are any constraints regarding LIDs within Wellhead Protection Areas (WHPAs) or other SWP vulnerable areas.

In addition, a water balance will be completed using the Thornthwaite and Mather methodology to compare pre-development and post-development hydrologic recharge of groundwater. This information will aid in assessing the list of alternatives and assess the suitability of various LID measures that could be completed.

The comparative evaluation of the alternative solutions will be carried out using a systematic approach that fulfills the intent of the Class EA process. The evaluation process will be presented in the form of an evaluation matrix in which alternative is scored or ranked against the other alternatives, with respect to a number of criteria that fall into the following categories:

- Environmental criteria: These include potential impacts on natural terrestrial features and aquatic habitat, and will include consideration of net change on hydrologic water balance and pollutant loadings to natural watercourses;
- Financial criteria: Includes initial capital cost including consideration of any need for property acquisition; expected life-cycle costs; and implications for future financing of centralized stormwater facilities that may serve more than one development property;
- Public safety and public acceptability: This category will address potential concerns regarding public safety and health; and how ell proposed facilities may fit into existing or future built-up areas;
- Implementation: Includes consideration of how easily implementation can occur as new land development occurs; and how well the SWM plan integrates with current land-use planning and the development approval process.

Evaluation of the alternatives will be undertaken in consultation with the Project Team and the Township's Project Manager. Our Project Ecologist will also contribute to the evaluation of alternatives, particularly about potential impacts to the environment both during and after construction.

3.4 Task 4: Preferred SWM Strategy

The preferred SWM strategy will be comprised of several elements. These may include replacement of existing storm pipes and culverts; erosion abatement projects; construction of new storm pond/wetland facilities or other types of centralized stormwater management such as infiltration facilities; and recommendations regarding stormwater design practices within new developments to minimize stormwater volume at the source and achieve objectives for preserving existing local hydrology.

We will clearly define each separate component of the preferred strategy and identify what the implementation sequence needs to be. We will identify all projects that are to be the responsibility of the Township, and identify what future Class EA requirements may apply, and what the regulatory approval

requirements are, for each component project. As noted in the RFP, for those projects identified as Class EA "Schedule B" projects, the Master Plan document will demonstrate that the Schedule B requirements have been fulfilled, as we will have followed Approach 2 in completing the Master Plan.

The preferred strategy will include recommendations regarding existing municipal drainage infrastructure assets, to provide the Township with a prioritized list of needs.

Existing data incorporated into the database and each component will be categorized into one of the following groups:

- Excellent: Component is in a "new" condition without any visible deficiencies;
- Satisfactory: Component is functioning within normal parameters but visible signs of wear are present;
- Attention Required: Component is no longer working as designed and requires maintenance, however, maintenance actions are minor (e.g. cleaning or debris removal);
- Non-Functional: Component is not functioning and requires more immediate maintenance (e.g. pond is full of sediment, inlet is blocked, spillway is eroded, etc.); and,
- Safety Hazard: Component presents a safety hazard to the public and should be repaired immediately (e.g. grate on large inlet pipe is open or missing allowing ingress, manhole cover missing, etc.).

Once each component has been entered into the system, any components with a rating of three (3) or higher will be given maintenance tasks as well as tasks added for inspection, as deemed appropriate. This will form the basis for the maintenance and budget needs for each facility, helping to evaluate and prioritize implementation requirements.

3.5 Task 5: Implementation Plan

3.5.1 Asset Monitoring, Management and Maintenance Program

COLE will establish a City-wide stormwater asset database and to identify any components that require maintenance.

Upon analysis of the stormwater management facility assessment results, Cole Engineering will prepare a long-term stormwater asset maintenance program, which will help to guide Public Works staff in the overall operation of the stormwater infrastructure. The maintenance program will be incorporated into the Master Plan and will include cost estimates as well as relevant regulations and processes for operations and maintenance activities.

The deliverable for this stage of the project will include a complete database, along with an operation and maintenance standard operating procedure manual, which the Township may use to guide its Public Works staff.

3.5.2 Operation and Maintenance Procedures

COLE will be able to identify the operation and maintenance requirements of each SWM facility and its assets which will allow for forecasting future requirements in terms of capital costs, operation and maintenance costs, and resources required by the Township to maintain its SWM facilities. The life cycle costs of each SWM facility will be calculated based on the forecasted operations and maintenance requirements. This information will be incorporated into the database, allowing Township staff to easily identify and plan yearly costs and resources required for each SWM facility and the overall program.

After completing an inventory of the SWM facilities and their assets within the Township, we will be able to develop an inspection and maintenance approach. The approach will be documented with an operation and maintenance standard operating procedure manual that will outline how to monitor, inspect, and maintain the SWM facilities and their assets. The manual will specify in detail the procedures Township staff will need to undertake when monitoring and inspecting the SWM facility and will include the following:

- Timelines for monitoring, inspections, and maintenance activities;
- Monitoring and inspection checklist based on the timelines;
- Guidance to interpret the monitoring data;
- Recommendations for the various maintenance activities that may be undertaken for each SWM facility based on the monitoring data;
- A standardized rating system to assess the priority of the maintenance needs for the various SWM facilities;
- Procedures for sediment sampling, removal, and disposal; and,
- Procedures for obtaining required approvals for removal and disposal of sediments.

The above will help the Township ensure that it remains in compliance with the ECAs for its municipal stormwater facilities.

In prioritizing the proposed solutions, considerations will be made for future implementation of the solutions, which is outside of the scope of this project. This may include the consideration of staging plans, property acquisition, easements, utility relocation, or any other timing or physical constraints the City may encounter. The Project Team will strive to present solutions capable of achieving the highest water quality results, while simultaneously thinking of the practical aspects the City will face beyond the life of Phases I and II of this Class EA project

3.5.3 Stormwater Quality Management Strategy

The Master Plan will include a stormwater quality management strategy.

The focus will be on promoting measures that reduce stormwater pollution at source. Measures that may be included are as follows:

- Encouragement of lot level improvements on public and private property, such as:
  - Soakaway pits;
  - Roof leader splashpads;
  - Oil / grit separators;
  - Pervious pavement; and,
  - Green roof technology.
- Implementation of conveyance enhancements on municipal rights-of-way, such as:
  - Pervious piping;
  - Bioswales; and,
  - Dryswales.

3.5.4 Policy Recommendations

In addition to providing physical solutions in the stormwater quality management strategy, the Project Team will also recommend policies based on review of other local municipal, provincial, or other agency documents. The recommendations for incorporation to Township policies will be detailed in the Master Plan document. Policy recommendations will include, but not be limited to:

- Municipal standards, operations, maintenance and design practices;
- Infill development SWM practices; and,
- Disposal of material removed from municipal stormwater treatment facilities.

Municipal Standards, Operations, Maintenance and Design Practices

Comparable municipal guidelines, such as the City of Barrie's *Storm Drainage and Stormwater Management Policies and Guidelines*, 2009, or the City of Toronto's *Wet Weather Flow Management Guidelines*, 2007, will be reviewed to ensure the Township maintains current standards in stormwater maintenance and design. Review of various municipal perspectives will allow for optimization of the Township own practices.

Infill Development SWM Practices

Comparable infill development guidelines, such as the City of Ottawa's Urban Design Guidelines for Low-Medium Density Infill Housing Update, 2009, will be reviewed to ensure the Township maintains current standards in infill stormwater management maintenance and design. Review of various municipal and provincial perspectives will allow for optimization of the Township's own practices.

Disposal of Materials Removed from Municipal Stormwater Facilities

COLE will provide the Township with advice on to how to deal with material that is occasionally removed from stormwater facilities such as storm ponds. Clean-out of accumulated sediments from storm ponds is needed from time to time, to maintain ECA compliance. Disposal of that material is an important cost consideration for pond clean-outs. We will review and summarize current regulatory requirements in this regard, and provide the Township with a step-by-step procedure for designing a pond clean-out.

3.6 Task 6: Master Plan Document

The Master Plan document will be the key deliverable for the project for the implementation of future works. The document will provide the planning rationale and EA documentation required to proceed with detailed design of the recommended works. The Master Plan is expected to contain, at a minimum:

- Problem/Opportunity statement;
- Documentation of all public, agency, and First Nations comments and responses;
- Review of best practices and minimum design guidelines;
- Rationale for evaluation criteria;
- Summary evaluation of alternatives;
- Summary of preferred solution prioritization;
- Implementation, feasibility and staging recommendations;
- Supporting technical memoranda (in appendices), including:
    - Results of field data investigation of stormwater management infrastructure;
    - Maintenance program for individual stormwater assets;
    - Recommendations for stormwater management policies to be developed by others;
- Cost estimates;
- SWM Pond Long-Term Maintenance Program;
- Recommendations for Township Design Guidelines;
- Mitigation measures and commitments;
- Sufficient information to formulate a framework for stormwater utility tax;
- Operations and maintenance costs;
- Prioritization of works;

- Provide a basis for future investigations for the specific Schedule C projects identified within it, i.e. identify everything the Township needs for the first five years after study completion and complete all the site specific work required, including public consultation to meet Municipal Class EA requirements for Schedule A and B projects;
- SWM Policy for integration into Development Manual and,
- Water Resources Monitoring Program.

It is expected that the draft Master Plan document will be submitted in black and white with the exception of relevant figures. The draft Master Plan will be presented to the Township's staff for review and comment. After receipt of the Township's comments on the Master Plan, the draft will be finalized and delivered to the Township. The Master Plan will be made available for public review at selected Township facilities.

The Master Plan document will include an Executive Summary that provides a clear picture of the recommendations, and a description of how those recommendations were arrived at.

As needed, the final document will be formatted to meet the Township's AODA requirements or policies.

4 Schedule

Appendix C presents our overall detailed resource loaded, critical path project schedule. Based on Addendum #3, the Township would like a preliminary overview / assessment by March 30th, 2020 with a completed Study by June 15th, 2020. Given the scope and identified data gaps, a more reasonable time for a completed Study is early October. If the assignment is awarded and starts by February 3rd, 2020, COLE is able to provide our preliminary findings (Tasks 1 and 2) by end of March 2020.

We understand that project schedule is critical and that timelines must be met. To that end, our approach to schedule management will be as follows:

→ Immediately upon notification of award, we will prepare a baseline schedule to align the project start date and completion dates. The baseline schedule will be broken down to define timelines for sub-activities and will highlight the critical path. The baseline schedule will be included in our Project Management Plan.

→ Complete a monthly Project Progress Report, which will include an updated project schedule. We will track all dates against the baseline schedule to ensure that we are continuing to meet timelines. We will pay attention to our critical path and dedicate the resources necessary to meet these timelines.

→ Should we find that our work on a task extends beyond the completion date, we will consider options to accelerate specific activities to return to our schedule. If these tasks are on the critical path, we will consider assigning additional resources to meet timelines. Our Project Manager has the authority to assign additional staff from COLE. Where this is necessary, we will inform the Township. Where these activities are not on the critical path, we will assess the impact of schedule delays on the overall schedule and develop an approach to return to the baseline schedule.

The following Table 4.1 outlines critical areas of our schedule review:

Table 4.1 Project Schedule Summary

Task	Activity	Completion Date
-	Closing Date	January 15, 2020
-	Estimated Project Award	January 29, 2020
-	Estimated Start Date	January 30, 2020
1	Task 1 Project Start-up Meeting	February 3, 2020
2	Project Management Plan/Gantt Chart of key milestones	February 5, 2020
3	Summarize Data Gaps to Project Team	February 14, 2020
4	Public Consultation Plan	February 14, 2020
5	Task 2 Meeting	March 10, 2020
6	Task 2 PIC Meeting 1	April 22, 2020
7	Task 2 Draft SWMMP (30%)	May 6, 2020
8	Task 3 Meeting	June 1, 2020
9	Task 3 PIC Meeting 2	June 24, 2020
10	Task 3 Draft SWMMP (60%)	July 31, 2020
11	Task 4 Meeting	August 7, 2020
12	Task 4 Asset Management Planning Meeting	August 24, 2020
13	Task 5 Draft SWMMP (90%) – agency review	August 31, 2020
14	Task 5 EA Report Meeting – Project Team	September 14, 2020
15	Task 5 EA Report Meeting – Township Council	September 30, 2020
16	Final SWWMP (100%)	October 7, 2020

Note: All Report Submission dates subject to confirmation with Township Project Team and can be moved as required.
Review time assumed 2 weeks per submission, time noted under "Agency Review" in "SUBCONSULTANTS" column of TTM

5 Experience and References

COLE brings forward a project team with extensive master planning team experience. Staff proposed on our team have a long working relationship on similar assignments including: the Uxbridge Comprehensive Stormwater Management Master Plan, the Town of Newmarket Water and Wastewater Master Plan, Toronto Waterfront Sanitary Master Plan EA, the Town of Markham Water and Wastewater Master Plan, and York Region's Water and Wastewater Master Plan.

The following project descriptions and references demonstrate relevant experience of COLE to undertake this assignment. Each of the projects presented have involved project team members named in this proposal.

Table 5.1 lists 3 corporate projects demonstrates recent relevant projects (last 5 years) in which COLE successfully delivers (or is currently delivering) similar investigative services. Additional details of these and other similar projects are included in Appendix B. The Township of North Dumfries' Schedule "C" – Reference Form is included in Appendix A.

Table 5.1 Project References

#1 CITY OF TORONTO BASEMENT FLOODING REMEDIATION & WATER QUALITY IMPROVEMENTS MASTER PLAN CLASS EA, AREA 36 (AREAS 30, 7-12, 1-2, 4-6, 36)	
COMPANY NAME:	City of Toronto
ADDRESS:	100 Queen St. W.
CITY/PROV/POSTAL CODE:	Toronto, ON M5H 2N2
CONTACT PERSON/TITLE/PHONE NUMBER AND E-MAIL ADDRESS:	Kirill Cheiko, P.Eng./Capital Works Delivery, Toronto Water T: 416-338-5556 | E: kcheiko@toronto.ca
Scope: The COLE team has completed 14 basement flooding studies and is currently near completion of a 14th area and is starting on another three areas coving downtown Toronto. Each of the studies have flowed a similar work scope. The Master Plan Class EA studies are part of the City of Toronto's extensive basement flooding protection program, and are completed to provide the City with comprehensive basement flooding solutions. The projects aim to determine the primary cause and mechanisms which cause basement flooding in the study areas, and develop cost effective flood and water quality remedial measures that meet the level of service criteria and other goals of the City. COLE's involvement in the Toronto Basement Flooding Program is as a trusted consultant to the City. The projects involve many of the key work items identified in this Roster Category including all aspects of infrastructure planning including background review, field investigations, hydraulic model development and application, wastewater flow monitoring data analysis, alternatives development, constructability, developing SQL tools, developing webapps including ArcCollector and ArcSurvey, groundwater data analysis, and the EA process (public and stakeholder consultation). **Project Value and Schedule:** $ 1.0M; Completed 2019	

#2 CITY OF OTTAWA – HALIFAX AND VALLEY DRIVE DUAL DRAINAGE STUDY	
COMPANY NAME:	City of Ottawa
ADDRESS:	100 Constellation Crescent, 6th Floor East
CITY/PROV/POSTAL CODE:	Ottawa, ON K2G 6J8
CONTACT PERSON/TITLE/PHONE NUMBER AND E-MAIL ADDRESS:	Hiran Sandanayake, P.Eng./Senior Engineer, Water Resources T: 613-580-2424 X13848 | E: hiran.sandanayake@ottawa.ca
Scope: The Halifax and Valley Drive area of Ottawa is primarily residential with commercial development on the main roadways. The area is approximately 860ha. The storm system in the area was not designed using modern dual drainage principles and is known to surcharge in the 2-year design storm as well as result in overland flooding that has led to basement flooding. In 2015, the City developed a dual drainage model. A key component of this assignment was to expand the existing model to include additional area and to include more detail delineation of drainage features and systems. The existing PCSWMM model was expanded to include additional areas and in doing so the original model was also validated. Flow monitoring data and field investigations were undertaken to confirm data and connection anomalies. With the completion of the model, the storm system assessment looked at a range of design and historical events, including the City's climate change events. An objective of the study is to develop a conceptual Inlet Control Device (ICD) plan to improve overland and sewer performance (optimize major and minor systems) as an early action imitative followed by identifying opportunities for short- and long-term infrastructure replacement and rehabilitation. **Project Schedule:** Completed 2019	

Table 5.1 Project References

OAKVILLE PART III MIDTOWN EA – STORMWATER MANAGEMENT (SWM)	
COMPANY NAME:	Town of Oakville
ADDRESS:	1225 Trafalgar Road
CITY/PROV/POSTAL CODE:	Oakville, ON L6H 0H3
CONTACT PERSON/TITLE/PHONE NUMBER AND E-MAIL ADDRESS:	Kristina Parker, Water Resources Engineer; T: (905) 845-6601, x3889| E: Kristina.parker@oakville.ca
Scope: Schedule 'C' Municipal Class EA and preliminary design for road, transit, and stormwater infrastructure for Midtown Oakville, a designated urban growth centre adjacent to 400 series highway and GO Rail corridor. COLE completed the SWM Report as part of a Municipal Class EA of proposed transportation improvements within Midtown Oakville. The stormwater component of this EA study included hydrologic analysis, hydraulic analysis and development of future SWM criteria in support of the proposed major transportation improvements. Project complications included unsteady modelling of the Morrison-Wedgewood Diversion Channel, assessment of flooding potential at 12 culvert crossings and within several residential areas previously identified as being flood prone. **Project Value and Schedule:** $380,000; 2012 - May 2015.	

5.1 Additional Relevant Project Experience

To demonstrate the depth of our experience in all areas of this assignment, we have included additional relevant projects in each topic area. Each of the projects presented below have involved project team members named in this proposal.

MARKHAM VILLAGE AND UNIONVILLE FLOODING STUDY | CITY OF MARKHAM. The COLE project team is tasked with completing a full assessment of all storm drainage systems in two areas of the City of Markham: Markham Village and Unionville. Markham Village is comprised of 21 neighbourhoods, while the Unionville area is one storm system that can be affected by the local receiving stream (Fonthill Creek) and is a Special Policy Area (SPA). The outcome of this project will be a comprehensive Flood Remediation Plan for both areas to address the primary cause of and reduce the risk of flooding. (Ongoing)

CITY OF VAUGHAN STORMWATER MANAGEMENT (SWM) MASTER PLAN. Development of a Storm Drainage / Storm Water Management Master Plan. The project was city-wide with a specific focus on new growth and secondary plan areas in addition to areas of intensification. The project followed the Master Planning process established by the Municipal Class Environmental Assessment Phases 1 and 2 and included public consultation through two Public Information Centres, coordination with the public, and a technical advisory committee developed in partnership with the relevant review agencies. (2014)

CITY OF PETERBOROUGH STORMWATER QUALITY MASTER PLAN. Master Plan for the management of stormwater quality. The study was carried out as a Master Plan in accordance with Ontario's Municipal Class Environmental Assessment process. The study provided the City with a long-term strategy for reducing the amount of pollution reaching local waterways. (2014)

CITY OF GUELPH DOWNTOWN SERIVICING STUDY. In preparing the Downtown Servicing Study, COLE looked at the alternative water, wastewater and stormwater servicing strategies to make efficient use of existing municipal water, wastewater and stormwater services to support growth, while considering other factors that affect municipal servicing and the community such as climate change, adaptability, infrastructure security, low impact development, and conservation. (2017-Ongoing)

6 Team Structure / Staff Qualifications

6.1 Structured for Program Delivery

To structure the COLE team to ensure successful delivery, on-time of the project, we selected experienced Program Manager (PM) Roy Johnson supported by a strong Technical Team. Together they will focus on the critical factors of leadership, resources, and quality. The qualifications and dedication of the team members, as shown in the organization chart in Figure 6-1 is critical to this assignment. CVs are provided in Appendix D.

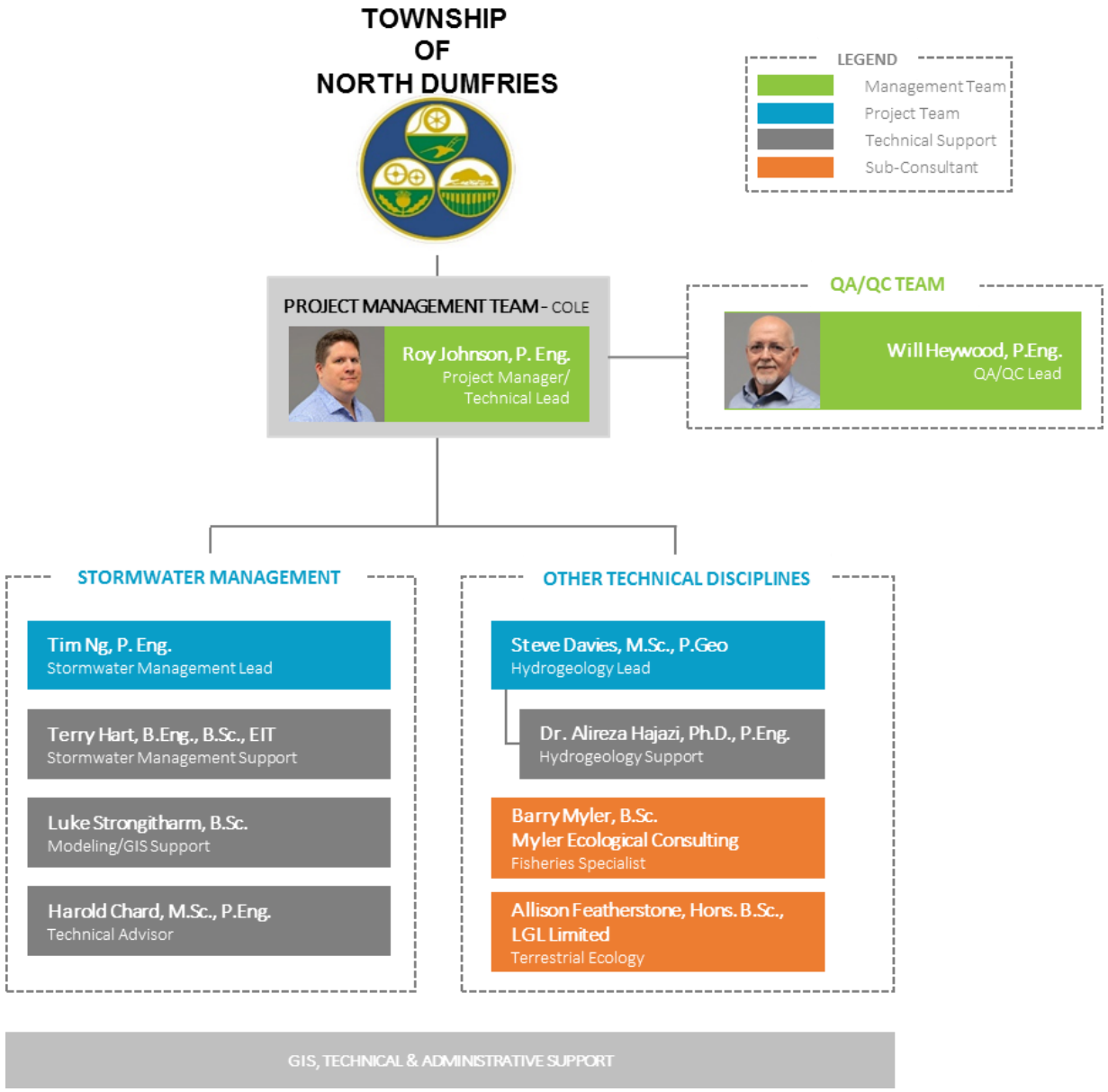


Figure 6-1 Organization Chart

The COLE team is structured to respond to the Township's vision for the program and includes Management and Technical teams. The Management Team leads the project, serving as a point of contact for the Township and the Township's Senior PM. They provide consistency through the project and are dedicated for its duration to manage contract strategies, develop cost estimates and schedules, facilitate meetings, initiate technical input, drive the permit process, and assure conformance with the Township's objectives and standards. This team monitors progress to proactively address schedule concerns and serve as the Township's liaison or communications officer with stakeholders. COLE recognizes that priorities change. The COLE team is structured to work with the Township to develop a work plan to drive schedule that will accomplish the Township of North Dumfries's objectives within a flexible framework that allows for modifications as appropriate to account for changing priorities.

The Technical Team gathers and reviews the data collection, conducts field verifications, ensures all necessary approvals. COLE has the bench strength to provide the Township confidence that our team has adequate resources and will deliver consistent quality throughout the length of the Program.

6.2 Stormwater Management Planning and Design, Including Preparation of Master Drainage Plans

Our team has extensive experience in the preparation of master drainage plans. For each project, we take into consideration the future needs of the study area and closely document the existing stormwater management facilities, flood risk zones, and sewer conditions. Our staff is also specialized in conducting micro-drainage studies by analyzing dual drainage systems using advanced hydrologic modelling techniques.

6.3 Expertise in Hydrologic and Hydraulic Modelling and Design

Each of the staff members of the Water Resources team are involved in hydrologic and/or hydraulic modeling using a broad range of software. Our combined staff are well-versed in Visual OTTHYMO and HEC-RAS, but is also experienced in modeling and analysis with MIKE URBAN, InfoWorks, PCSWMM, QUALHYMO, DDSWMM, XPSWMM, Flow 2D, WABAS, AutoCAD Civil 3D and other software.

In-house tools have been developed specifically for stormwater applications in AutoCAD Civil 3D to simplify hydrologic and hydraulic processes, such as the digital mapping of floodlines. Many of our projects have been completed by first establishing the baseline existing conditions in order to assess the impacts of difference design alternatives. All of our hydrologic and Hydraulic models can be prepared using the "what if" scenarios. Our staff has completed a number of pipe capacity studies, where existing sanitary and stormwater infrastructure is assessed to determine their capacity under different development scenarios.

6.4 Experience and Knowledge of the Municipal Class Environmental Assessment process and other Regulatory Requirements for Stormwater Management Projects

The COLE team has undertaken the Class Environmental Assessment process many times and is confident in leading every phase of a Class EA project. Our staff is familiar with both the Municipal Class EA process as well as the Conservation Ontario Class EA process to complete stormwater management projects. From junior staff to project managers, our team is technically skilled to provide feasible design alternatives while still being able to communicate various facets of the designs effectively through reports and presentations at Public Information Centres for all stakeholders. Experience in Processing Permit Applications and Complying with Acts and Regulations

The proposed team is highly experienced in identifying and acquiring all permits and approvals required to complete water resources and stormwater management projects. Immediately after project commencement, our project teams will begin the consultation process with approval agencies and identify required permits and approvals. This approach has been highly effective at mitigating the risk to the project from unexpected approval issues. We are highly experienced with the approval process of the Ministry of Natural Resources and Forestry, Ministry of Environment Conservation and Parks, Department of Fisheries and Ocean and the local conservation authorities, and has the contacts with agency staff to assist in expediting approvals when required.

6.5 Experience in Using Technical & Stormwater Management Modelling Tools

We confirm that our staff have extensive experience in using technical and stormwater management software and models as part of the design process: including but not limited to: MIKE URBAN, InfoWorks ICM, Visual OTTHYMO, PCSWMM, CulvertMaster / HY8, FlowMaster, HEC-RAS, GeoHEC-RAS and other associated software.

6.6 Project Management

ROY JOHNSON, P.ENG. — PROJECT MANAGER / TECHNICAL LEAD

Roy Johnson is a Senior Project Manager in COLE's Infrastructure Planning Group with over 17 years of experience in the planning, analysis, and design of stormwater management systems. He is an experienced Project Manager and has successfully completed various master plan Class EAs.

As a Water Resources Project Manager, Roy has overseen and developed hydrologic and hydraulic computer models for use in flood plain studies and stormwater management planning; led multidisciplinary teams to prepare comprehensive Master Environmental Servicing Plans, Functional Servicing Plans, Stormwater Management Plans, and other technical and environmental initiatives; and has also interpreted various municipal, provincial, and federal regulations to ensure design compliance and oversee permit application processes. Roy has been effective in ensuring all multi-discipline objectives are met to deliver a quality project. He establishes meaningful communication structures with our clients, safeguards staff engagement, and ensures that all budget and schedule control targets are met.

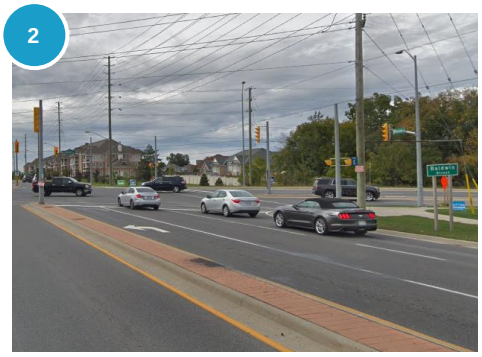
Roy has additional recent experience acting as Project Manager and Technical Lead at Stantec for the following projects:

1

Uxbridge Comprehensive Stormwater Management Master Plan, Township of Uxbridge, ON

Senior Water Resources Engineer/Project Manager responsible for the preparation

2



Winchester Road Reconstruction and Widening, Town of Whitby. Brooklyn, ON.

Stormwater Management Reviewer. Detailed design for the proposed reconstruction and widening of

3

Rodick Road/Miller Avenue Stormwater Management Options Assessment, City of Markham, ON.

Stormwater Management Engineer. As part of the development of the Miller

of a Comprehensive Stormwater Management (SWM) Master Plan for the Uxbridge Urban Area and Hamlet of Coppin's Corner in in accordance with the Comprehensive SWM Master Plan Guidelines, prepared by the LSRCA and the Municipal Class EA process. Through the Class EA Master Plan process, planning and technical review, several 'preferred alternatives' were established with respect to the existing natural environment; provided the design criteria for future new development, redevelopment, and/or the upgrading or replacement of existing infrastructure. SWM design criteria as it relates to water quality, water quantity, water balance, and erosion controls were established for both Uxbridge and Coppin's Corners. The Master Plan also provided recommendations for SWM implementation approaches and ongoing inspection/ maintenance considerations. Completion Date: 2015.	Winchester Road (Regional Road 3) through the Community of Brooklin including reconstruction and widening of Thickson Road (Regional Road 26) in the vicinity of Winchester Road. The approximate project limits for this assignment extend on Winchester Road from Baldwin Street to 200m east of Garrard Road and on Thickson Road from 400m south of Winchester Road to 350m north of Winchester Road in the Town of Whitby. The drainage work consists of the preparation a Drainage and Stormwater Management Report, building on the report prepared during the EA, describing existing and proposed conditions for roadway drainage, transverse drainage crossings and stormwater management. Completion Date: 2018	lands near Rodick Road, a stormwater management pond was proposed to be located on City lands, currently used as their snow dumping Site. The project included the evaluation of various options to eliminate the pond, including on-site detention, oil-grit separators, etc. One option was using StormTrap products in place of the pond. The project also included the coordination with the manufacturer to develop a conceptual design of the StormTrap system, including costs of materials, construction, and maintenance. Also provided the City with a matrix of solutions, including costs, likelihood of approval, degree to which criteria are met, and a preferred solution. Completion Date: 2015

Roy will be our Project Manager as well as the Technical Lead. He was Project Manager for the Township of Uxbridge's Comprehensive Stormwater Master Plan.

WILLIAM HEYWOOD, P.ENG. — QA/QC REVIEWER

Quality Management promotes consistency and delivery of the highest quality products. William, with **over 30 years** of infrastructure master planning and EA experience will lead the QA/QC review process. He will undertake QA/QC review of key project deliverables and assign an experienced discipline-specific professional to review technical deliverables. Will is very familiar with the quality expectations of our clients and will be able to guide the QA/QC team in their activities. Will is familiar with similar projects through his work on the following project:

- Project Manager for Storm Runoff Water Quality and Investigation of Basement Flooding Areas 41, 40 and 34, City of Toronto
- Project Manager and Technical Lead for Black Creek Sanitary Drainage Area Servicing Improvements Class EA Study, City of Toronto
- Project Manager and Technical Lead for Emery Creek Quality Control Plans Design, City of Toronto
- Project Manager and Technical Lead for Churchill Park Redevelopment Phase 1 where rain gardens were incorporated into stormwater management system using a treatment train approach, City of Hamilton.
- Project Manager and Technical Lead for Glynwood Tributary Area Sewer Surcharge and Flood Remediation Class EA, City of Markham.

William will provide senior technical review of all deliverables to the Township.

6.7 Project Team

The team members listed below have critical roles in the development and completion of this project and were chosen for their area of expertise. All our team members will be available for the duration of the project and/or the phase of work to which they are assigned.

6.7.1 Stormwater Management Team Members

TIMOTHY NG, P.ENG. — **STORMWATER MANAGEMENT LEAD**

Timothy is a Water Resources Engineer at COLE and has over 6 years of experience in hydraulic and hydrologic analyses, water permitting, stormwater management systems, pond design, water quality analysis and erosion and sediment control. Tim has prepared and provided technical input on various Stormwater Management (SWM) Reports, Functional Servicing Reports (FSR), Master Environmental Servicing Plans (MESP), and Stormwater Master Drainage Plans for several commercial, industrial and residential development designs within Ontario. Tim has also prepared several stormwater related peer reviews for several municipalities.

Some of Tim's recent relevant experience includes:

- Water Resources Designer for the Uxbridge Comprehensive Stormwater Management Plan, Township of Uxbridge
- Water Resources Designer for the South Sharon (Green Lane MESP and FSR) Modelling and Pond Design, Baif Developments, East Gwillimbury, ON.

Tim will provide technical guidance to junior staff.

TERENCE HART, B.ENG., B.SC., EIT — **STORMWATER MANAGEMENT SUPPORT**

Terence has over 1 year of experience in Water Resources Engineering and has been involved in a variety of projects focusing on stormwater management, highway drainage, floodplain impact analysis, tree protection and erosion and sediment controls. He has made site inspections and assisted with topographic and tree surveys. Terence has applied AutoCad Civil 3D, Visual HYMO Suite, GeoHEC-RAS, Bentley FlowMaster and CulvertMaster software to support his work in analysis, detailed design, report writing and tender preparation. Some of Terence's recent relevant experience includes:

- Drinkwater Pond Outfall Rehabilitation and Retrofit, City of Brampton – Water Resources Designer
- Environmental and Climate Change, North Harbour Sediment Management Options, Thunder Bay – Water Resources Designer
- West Whitby Holdings, West Whitby Holdings Inc. Whitby – Water Resources Designer
- Detail Design at Various Sewage Pumping Stations, Regional Municipality of Peel – Water Resources Designer

Terrence will provide technical analysis and report writing.

LUKE STRONGITHARM, B.SC., — **MODELLING/GIS SUPPORT**

Luke Strongitharm is a Geographical Information Systems Specialist and Hydraulic Model Developer with over 18 years of experience in spatial analysis, data implementation and visualization. He has led several large engineering projects coordinating data collection, organization and analysis. Luke has significant technical knowledge of ArcGIS, InfoNet, InfoWorks, databases and many other software projects. Luke has done similar work for the Township of Markham to reconcile various data sources to develop population and flow projections/demands for the Township of Markham water and wastewater servicing study, as well as for the Township of Toronto, York Region, and Peel Region. Other project roles are to manage all data

from the Township, undertake a critical review of GIS data, support project team modelling needs, and prepare study graphics for reports and meetings. His relevant project experience includes:

- Technical Lead for GIS and Data Analysis for the Basement Flooding Remediation and Water Quality Improvements Master Plan Class EA for Areas 1, 2, 4, 5, 6, 7, 8, 9, 11, 12, 30, 36, 45, and now 42, 44 and 62 City of Toronto
- GIS Analysis for West Thornhill Flood Control Implementation Refinement, City of Markham.
- Technical Lead for Update and Calibration of Peel Region's Wastewater Hydraulic Model, Region of Peel
- GIS Specialist for Stormwater Quality Management Master Plan Class EA, City of Peterborough

Luke will lead and direct all GIS analyses completed as part of this project.

HAROLD CHARD, M.Sc., P.Eng. — TECHNICAL ADVISOR

Harold Chard has over 30 years of experience in planning and design of municipal stormwater management facilities, combined sewer overflow control facilities, and storm and sanitary sewer systems. He has extensive experience in hydrologic and hydraulic modelling of pipe systems and watercourses as needed for infrastructure planning, watershed studies, and pollution control studies. Harold has broad experience in preparation of Provincial and Federal environmental assessment (EA) documents, public presentations, and technical reports for support of urban planning initiates. His projects include:

- Stormwater Quality Management Master Plan, City of Peterborough – Project Manager
- Water Resource Protection Funding Feasibility Study, City of Peterborough – Project Manager
- Basement Flood Remediation Areas #42, #44 and #62, City of Toronto – Technical Advisor
- Pollution Control Plan Update, City of Cornwall – Project Manager

Harold will act as technical advisor to the Project Manager, Roy Johnson, and input on operation and maintenance costs.

6.7.2 Hydrogeological Team Members

STEVE DAVIES, M.Sc., P.Geo. — HYDROGEOLOGY LEAD

Steve is a Senior Hydrogeologist and Team Leader at COLE with over 25 years of diverse experience in the private and public sectors leading multi-disciplinary teams of geoscientists, ecologists and engineers. Extensive experience with source water protection studies, groundwater supply investigations, municipal infrastructure studies, land development studies, Environmental Impact Studies (EISs), mining studies, Environmental Site Assessments (ESAs), and remediation projects. He works closely with various stakeholders to resolve permitting requirements, estimate construction dewatering requirements, assess potential impacts to the natural environment and other users of water, and to develop effective environmental monitoring and management plans. He acts as a third party reviewer for various municipalities for various development applications and ESAs. Steve has also appeared before the Ontario Municipal Board (OMB) as an expert witness in hydrogeology. His relevant experience includes:

- Sustainable Halton Water and Wastewater Master Plan, Regional Municipality of Halton. Halton Hills – Hydrogeology Lead
- Clair-Maltby Master Environmental Servicing Plan, City of Guelph – Hydrogeological Lead
- Southwest Georgetown Secondary Plan Subwatershed Management Strategy, Town of Halton Hills – Hydrogeological Lead

For this project, Steve will senior input and review of hydrogeology tasks

ALIREZA HEJAZI, PH.D., P.ENG. — HYDROGEOLOGY SUPPORT

Dr. Hejazi is an Environmental Engineer and Hydrogeologist with over **10 years** of experience in groundwater hydrology, physical hydrogeology, groundwater flow and contaminant transport modeling. His areas of expertise include conducting and organizing groundwater engineering projects, managing and analyzing soil and groundwater data, and developing and implementing comprehensive groundwater and surface water monitoring program. Dr. Hejazi has expertise in conducting and analyzing infiltration testing, water balance assessments, LID assessments and Source Water Protection studies. Similar relevant project experience includes:

Dr. Hejazi's will provide technical analysis of water balance and other hydrogeology input to the report.

6.7.3 Subconsultants

MYLER ECOLOGICAL CONSULTING – FISHERIES

Barry Myler, B.Sc., is a consulting Fisheries Biologist with over **26 years** of experience. He has addressed Federal Fisheries Act compliance and both Federal Species at Risk Act and Provincial Endangered Species Act compliance for aquatic Species at Risk for a wide variety of public and private sector clients and project types. Barry will conduct a desktop analysis and prepare an existing conditions summary of fisheries and aquatic Species at Risk constraints and opportunities within the Nith River and Cedar Creek reaches in the Ayr SWMMP study area, including reference to pertinent policy and regulatory requirements. He will contribute to the evaluation of identified erosion sites, development of assessment criteria for SWM alternatives and preparation of summary subwatershed factsheets.

LGL LIMITED - NATURAL HERITAGE AND PROTECTION MEASURES

LGL Limited is an environmental research and consulting firm specializing in environmental assessment and planning, and terrestrial, aquatic, wetland and marine ecology. LGL was founded in 1971, and is Canadian-owned and operated by its employees. A copy of their corporation information can be found in Appendix B.

Allison Featherstone, Hons.B.Sc. Vice-President, Senior Planning Ecologist
Project Role: Project Manager, Ecologist, SAR Specialist

Allison Featherstone is a Senior Manager and Ecologist at LGL Limited environmental research associates, where she leads a team of ecologists, biologists and planners. Since joining LGL in June 2003, Allison has been involved with over 150 natural heritage investigations in support of infrastructure, Renewable and Clean Energy Projects, Comprehensive Broad Scale Environmental Studies and Environmental Assessments/Environmental Impact Statements. She regularly represents LGL at project team meetings, agency meetings, technical and stakeholder advisory committee, public and stakeholder consultation, and consultation with First Nations and Métis. Allison's community involvement includes participation as a member (2007-2018) and Chair (2014-2018) of the Region of Waterloo's Ecological and Environmental Advisory Committee, where she also served as a member on the Region of Waterloo Technical Advisory Committee for Wastewater Master Plan, the Region of Waterloo Transportation Master Plan Stakeholder Advisory Committee, and the Climate Change Adaptation Committee.

Allison has considerable experience navigating the Endangered Species Act, 2007 and has direct experience with the species identified in the Ayr study area. Allison participated in several peer reviews of studies in the Ayr study area as part of her role on EEAC, in addition to direct project experience with LGL in Ayr for Northumberland Road, Stanley Street and Swan Street EA, and has participated in all aspects of the Surface Water Quality Monitoring Program.

Allison will provide support to the project team by providing expertise in natural heritage issues and protection measures that arise during this project.

7 Project Cost

Our copy of the Schedule of Items & Pricing Response Form (Appendix D of the RFP) is included in Appendix A. Our detailed Time-Task Matrix and Cost Breakdown for the proposed Stormwater Management Master Plan is included in Appendix E.

8 Closing

We look forward to working with the Township on this project that will provide long term stormwater planning solutions for the community. COLE is willing to discuss budget and scope of work with the Township to ensure your needs are met.

Yours sincerely,

COLE ENGINEERING GROUP LTD.

Roy Johnson, P.Eng.
Project Manager

April 22, 2020
Our Ref: 2019-0506
Via-Email

Ministry of Environment, Conservation and Parks
Guelph MECP District
Ontario Government Building, 1 Stone Rd W,
Guelph, ON N1G 4Y2

Attention: Amy Shaw
Manager

Re: Township of North Dumfries Stormwater Management [SWM] Plan [SWM-MP]
Ayr Stormwater Management Master Plan, Ayr, ON

The Community of Ayr requires completion of a Stormwater Management [SWM] Master Plan [SWMMP] following a Master Planning approach in accordance with the Environmental Assessment Act as outlined by the Municipal Engineer's Association Municipal Class Environmental Assessment (MEA), October 2000, as amended. MECP is an essential part of the public consultation process; therefore, this letter is provided to make you aware of the project and the forthcoming public comment phase. Attached is a copy of the proposal.

The Study is to focus on the Urban Area of the Community of Ayr (existing and emerging), as illustrated in the Township's Official Plan [AOP]. The Township of North Dumfries also requires an analysis through this Study on the potential urbanization of lands framing the Northumberland Street corridor, extending from Greenfield Road to Highway No. 401. Refer to **Figure 2-1**.

The SWMMP will serve as a decision support tool, a methodology for the prioritization of works, a means to estimate future SWM requirements and costs and a transparent community process by which the Township can establish stormwater management guidelines and policies for the next ten to fifteen years.

The SWM Master Plan shall be an integrated approach that considers flood and erosion control, groundwater and surface water quality management, natural heritage environment management and infrastructure. In addition, the plan shall integrate existing policies, regulations, acts and guidelines and where appropriate develop new policies and design guidelines to aid in implementation and shall do so within a water sustainability context.

COLE ENGINEERING GROUP LTD.
HEAD OFFICE
70 Valleywood Drive, Markham, ON Canada L3R 4T5
T. 905 940 6161 | 416 987 6161 F. 905 940 2064
www.coleengineering.ca

COLE will be arranging an online Public Information system and the Township will make a public announcement in local newspapers of the date and URL.

Can MECP provide any guidance on Study requirements and information the Ministry would find relevant to this study?

Yours sincerely,
COLE ENGINEERING GROUP LTD.

Roy Johnson, P. Eng.
Team Lead- Water Resources

RRJ/kjs

c.: Aziz Ahmed, MECP Manager, Municipal Water and Wastewater Permissions
aziz.ahmed@ontario.ca
Andrew McNeely, Chief Administrative Officer, Township of North Dumfries
amcneely@northdumfries.ca

Encls. Figure 2-1 – Site Map
RFP, COLE Proposal

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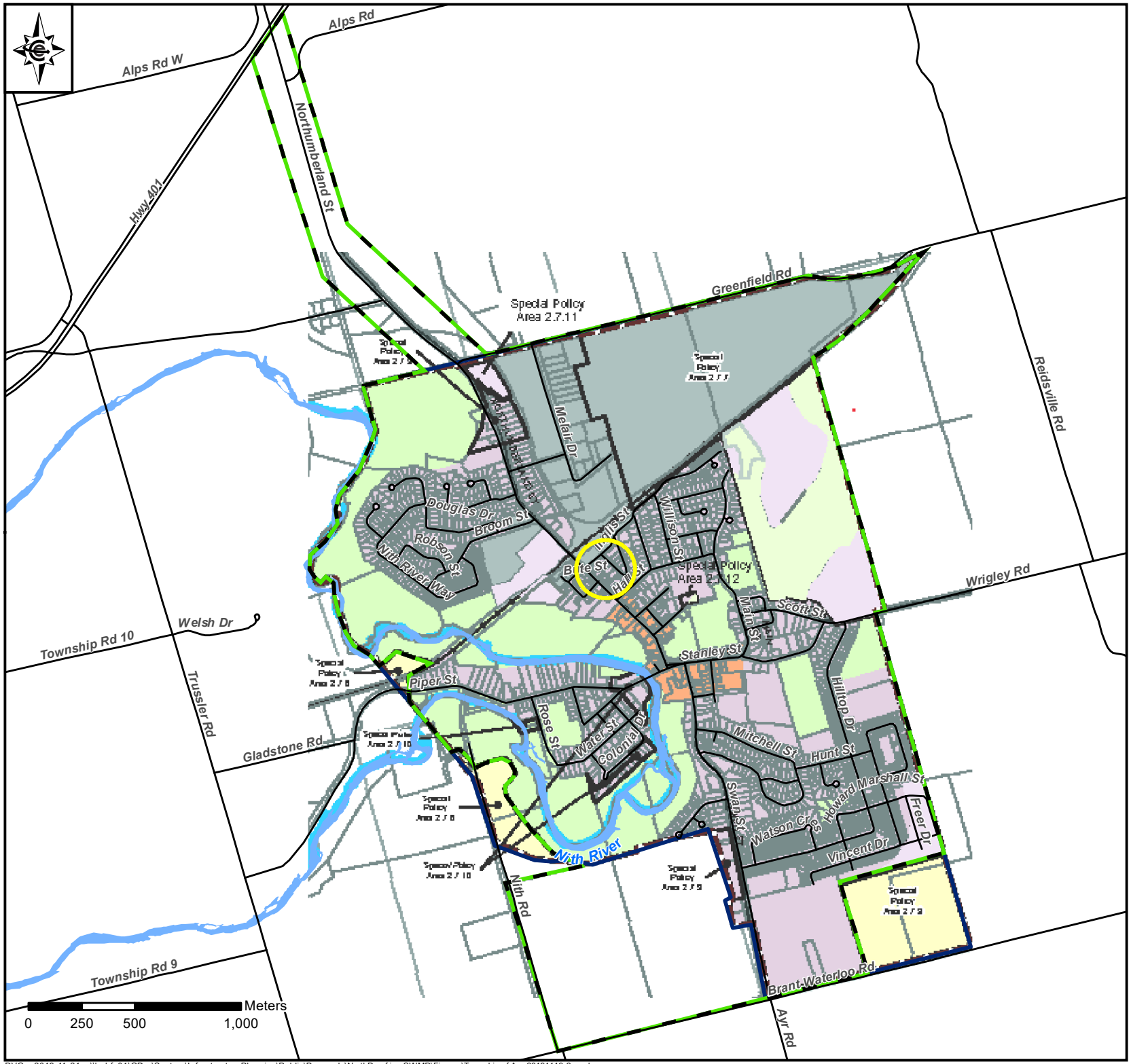
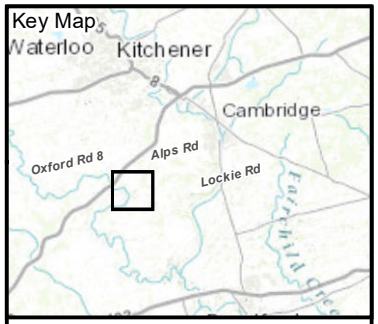




Legend

- Approximate Study Boundary
- Municipal Boundary
- Watercourse

Landuse Type

- Agricultural
- Urban Growth Centre
- General Industrial
- Open Space
- Urban Residential and Ancillary
- Urban Growth Centre

FIGURE 2-1

Ayr Land Use

Township of North Dumfries
Storm Water Management
Master Plan

COLE

Project No.:	Date:
2019-0506	November 2019

DVG 2019-11-21 \\hubfp01\ODrv\Sectors\InfrastructurePlanning\Public\Proposals\NorthDumfries SWMP\Figures\Township of Ayr 20191119v2.mxd

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6

Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

April 8, 2020

Via Email

Mr. Roy Johnson
Senior Water Resources Engineer-Team Lead
Cole Engineering Group Ltd.
70 Valleywood Drive
Markham, ON L3R 4T5

Dear Mr. Johnson:

Re: **Request for Grand River Conservation Authority Input**
Ayr Stormwater Management Master Plan
Township of North Dumfries

As per your email request of March 25, 2020, the Grand River Conservation Authority (GRCA) has now had an opportunity to review your request to provide background information and input into this study. In support of this request, you have provided the following background information and documentation:

- Request for Proposal (ND-RFP-20-2019), Preparation of a Stormwater Management Master Plan-Community of Ayr and Addenda #1 to 4 (prepared by the Township of North Dumfries); and,
- Response to the Request for Proposal (ND-RFP-20-2019), Preparation of a Stormwater Management Master Plan-Community of Ayr (prepared by Cole Engineering Ltd. and dated January 14, 2020).

General Information and Background

It is our understanding that Cole Engineering was the successful bidder on the Request for Proposal (RFP) to complete a comprehensive Stormwater Management (SWM) Master Plan for the Community of Ayr and were awarded the contract by the Township of North Dumfries. It is our further understanding that aspects of this study will be done under the Class Environmental (EA) process. We further note that the study area includes the entire Village of Ayr plus a corridor along Northumberland Street from Greenfield Road to Highway 401 (refer to the enclosed map).

We note that Cole Engineering is looking for GRCA's input on any specific requirements that should be included in the SWM Master Plan. Further, you have specifically requested the following information:

- Input on the rain gauge(s) that the GRCA uses for Ayr and any data associated with them (IDF data, historical records, recommendations on additional gauges, etc.).
- Floodplain mapping along with storm event flows and water levels at Ayr would be useful.
- Contact list for the First Nations so that they can be included as one of the stakeholders.
- Any records or information on the SWM facilities in Ayr.

As you are aware, the GRCA has already provided you with the floodplain models (HecRas) for the Nith River and Cedar Creek and have advised that our GIS mapping is available on our website at https://www.grandriver.ca/en/our-watershed/Maps-and-data.aspx). We have also provided you with a list of First Nations contacts. The GRCA has also advised that we do not have any information on municipally owned infrastructure, such as SWM facilities.

In addition to the floodplains in the Village of Ayr, there are other areas within the study area that are regulated by the GRCA under Ontario Regulation 150/06. The study area is traversed by the Nith River and Cedar Creek and their associated floodplains and areas of steep valley/erosion hazard slopes. Other smaller tributaries of the Nith River are also located within the study area. Further, there are both Provincially Significant Wetlands and other wetlands and their regulated allowances within the study area. Any future development/site alteration within these regulated areas would require the prior issuance of a GRCA permit pursuant to Ontario Regulation 150/06.

The GRCA owns several properties within the study area. The Reinhart, Rear, and Ayr Floodplain properties are 3 of the GRCA's larger landholdings within the study area. Jedburgh and Watson Ponds are part of the GRCA's Upper Mill Pond Property. The GRCA also owns and operates the dam structure on Jedburgh Pond. As such, GRCA property staff may have further comments as the study progresses.

To address your request for rain gauge data and provide input into this study, GRCA staff from Water Resources Engineering, Subwatershed Planning, Natural Heritage Resources, and Water Quality have provided the following comments and information for your review and consideration.

Water Resources Engineering and Subwatershed Planning

- The Township of North Dumfries has asked for a list of approved ETV oil grit separators (ogs). Please make it clear in the report that ETV does not approve ogs', only verifies claims on the ability to remove TSS, and that so far none of the tested ogs' would meet the enhanced criteria, with the exception of filter type units (i.e. jellyfish).

- GRCA will be better able to comment on missing items once a draft report has been circulated for further review and comment.

- The rain gauge in Ayr is problematic and does not have a good enough period of record for IDF data. If you want still want this rain gauge data, please let us know and staff will provide this for you. However, we would suggest that you use an Environment Canada (EC) station for IDF data. For historical data, there is an EC station near Roseville and you should be able to search for the Roseville station using the following link:

  https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

- We can further advise that the climate data set compiled for the Upper Cedar Creek Subwatershed Study (Matrix et al, 2019; as described in section 3.1) is available upon

request. These consist of continuous daily and hourly precipitation and air temperature data from 1950-2016 built using data from Environment Canada's Preston, Waterloo-Wellington, and Roseville climate stations (with gap filling).

- Please note that Cedar Creek, flowing into the Nith River at Ayr, is a cold water stream with brook trout, but the most sensitive reaches of the stream are upstream of the community of Ayr. The consultants have identified the Upper Cedar Creek Subwatershed Study (Matrix et al, 2019) as a resource.

- GRCA-collected aquatic monitoring data for Cedar Creek is available upon request. Data were collected 2015-2018 and include stream levels/flow, stream temperature, surface water chemistry, benthic macroinvertebrates, and fish community. Data 2015-2017 were incorporated into the Upper Cedar Creek Scoped Subwatershed Study (Matrix et al, 2019). There were monitoring sites located up and downstream of the community of Ayr.

- The RFP notes "potential urbanization of lands framing the Northumberland Street corridor, extending from Greenfield Road to Highway No. 401". Some of these lands drain to Eden Creek which has been mapped as cold water. The characterisation phase of the Master Plan should include Eden Creek (the RFP only identifies Nith River and Cedar Creek). A subwatershed study has not been completed for Eden Creek.

- The RFP section on characterisation does not identify Jedburgh or Watson ponds, although they undoubtedly play a role in stormwater management. It is not clear whether they will be considered as "stormwater ponds" for the purposes of the Master Plan. If so, it may be worthwhile engaging one of the Senior Operators in an advisory capacity with respect to operations and maintenance of the Upper Ayr (Jedburgh) Dam. This may warrant clarification with the consultant.

- The RFP lists as an objective "Design and optimize a comprehensive water quality monitoring program based on the existing program". We are not sure what the existing program is. We are not aware of a Township or Regional water quality/stormwater monitoring program. If it's referring to GRCA's program established for the Cedar Creek subwatershed study, they should be advised that water quality sampling was discontinued after 2018 as it was undertaken to support the study and urban area expansions were not anticipated in the near term.

- In addition to the background studies listed in the consultant's email, the following studies are available upon request:

    - Cedar Creek Scoped Subwatershed Study (Phase 1), LGL Environmental, 2002
    - Best Practices Guide for Reducing Urban Non-Point Source Pollution in the Grand River Watershed, AECOM, 2014
    - Grand River Fisheries Management Plan, 2005

<u>Natural Heritage Resources</u>

- In the final paragraph of Section 3.1.2 (Natural Environment) on page 12, Cole has indicated that field investigations to confirm natural heritage feature boundaries are not proposed for this project and has assumed that a desktop review is sufficient. The need for site visits with GRCA staff will depend on the potential for direct impacts on regulated

wetland features and the need to verify wetland boundaries. Recommendations for on-site delineation and verification of wetland boundaries should be made clear in the EA.

- The GRCA's wetland mapping layer should be reviewed in conjunction with the evaluated and unevaluated wetland layer maintained by the Province.

- There is at least one minor wetland mapping discrepancy west of Northumberland Street and south of the RR Tracks. A site visit during the appropriate time of year may be needed to confirm the limits of this wetland. It also appears that a stormwater outlet/outfall has been constructed recently on the north edge of this wetland. It would be helpful to identify any wetlands that have been or could potentially be altered in any way for stormwater management purposes. Wetlands that are now considered to be part of the Township's stormwater management infrastructure should be identified as part of this EA.

- The MNRF has mapped one unevaluated wetland, east of Swan Street and south of Hilltop Drive. This small wetland is not currently mapped by the GRCA but is considered a regulated wetland. Depending on the outcome of the EA, a site visit during the appropriate time of year may be needed to confirm the presence or absence of this wetland.

- With respect to the *Environmental Criteria* described on page 16 of Cole's proposal, we recommend that potential net change on hydrologic water balance and pollutant loadings to natural watercourses **and wetlands** be assessed

Advisory Comments

- Cole Engineering has asked the GRCA to confirm the extent of cold water fish habitat along Cedar Creek. Online mapping information available to the GRCA indicates that the main branch of Cedar Creek and many of its tributaries are currently classified as cold water fish habitat owing to the presence of brook trout and other cold water indicator species such as mottled sculpin. Watson and Jedburgh Ponds are also classified as cold water fish habitat owing to the presence of brown and rainbow trout. Migratory rainbow trout in the Nith River are able to get past the Lower Ayr Dam (privately owned) and into Watson Pond but are not able to get past the GRCA owned and operated Upper Ayr Dam and into Jedburgh Pond. Watson pond is also stocked with brown trout annually by the Ministry of Natural Resources and Forestry (MNRF) for public put-and-take angling. Brook trout are known to spawn above the Upper Mill Pond.

- Fisheries management issues, opportunities and constraints are outlined in the Grand River Fisheries Management Plan Technical Report (GRCA and OMNR 2001), which is available online at:

  https://www.grandriver.ca/en/ourwatershed/resources/Documents/Fishery/Fishery_ManagmentPlan_TechReport.pdf.

  For example, the impact of online ponds and stormwater discharge (i.e. sediment and nutrient loading, thermal impacts) on water quality and cold water fish species in particular is a concern.

- The watercourse associated with the Cedar Creek Tributary and the McCrone's Lake Tributary are classified as warm water fish habitat. Both watercourses appear to be situated outside the current study area.

- Two ANSI's are located within or near the study area: Turnbull Lake and McCrone's Lake. Additional detail may be obtained from the MNRF Guelph District Office.

- For current information on occurrences of Federally- and Provincially-listed Species At Risk, please contact Fisheries and Oceans Canada (DFO) and the Ministry of the Environment, Conservation, and Parks (MECP).

Water Quality

- If the consultant is looking for water quality data, there are two main sources – the MECP and the Region of Waterloo. Water quality data for the Nith River is available from MECP as part of the Provincial Water Quality Monitoring Network (PWQMN) at the website below. The Region of Waterloo also has a comprehensive surface water monitoring network around its wastewater treatment plants and there are some monitoring locations on the Nith River upstream and downstream of the Ayr WWTP, which could be used to inform the background conditions in the receiver. This data would have to be requested from the Region of Waterloo. Further data on water quality monitoring is available through this link:

  https://data.ontario.ca/dataset/provincial-stream-water-quality-monitoring-network

We appreciate the opportunity to provide input into this study. We would further appreciate being involved and participating in the review of this study and EA process going forward. Further, I will be your main contact at the GRCA. If you require any specific items listed above, please let me know and I will make arrangements with the appropriate GRCA staff.

If you have any further questions or require clarification, please do not hesitate to contact me at 519-621-2763 ext. 2233 or jbrum@grandriver.ca.

Yours truly,

John Brum
Resource Planner
Grand River Conservation Authority

JB/

Encl.

cc. Andrew McNeely, Township of North Dumfries (via email)

REQUEST FOR PROPOSAL

Preparation of a Storm Water Management Master Plan - Community of Ayr

The Corporation of the Township of North Dumfries

ND-RFP-20-2019

Closing: 23 December 201915 January 2020 at 2:00:00 PM

OFFICE

70 Valleywood Drive
Markham, ON L3R 4T5
T. 906 940 6161 F. 905 940 2064
www.coleengineering.ca

CONTACT

Roy Johnson, P.Eng., Project Manager
C: 416-346-3875
E: rjohnson@coleengineering.ca

DELIVERY ON-TIME: QUALITY LEADERSHIP RESOURCES

COLE

70 Valleywood Drive, Markham,
ON L3R 4T5

projectopps@coleengineering.ca

(905) 940-6161

@ColeEngineering

14 January 2020

Ashley Sage, Clerk
Township of North Dumfries
North Dumfries Community Complex
2958 Greenfield Road, P.O. Box 1060
Ayr, Ontario N0B 1E0

Re: Preparation of a Stormwater Management Master Plan - Community of Ayr
ND-RFP-20-2019
DUE Wednesday, January 15, 2020 @ 2:00:00 PM

Dear Ms. Sage;

COLE is pleased to submit 1 original and 2 unbound copies in response to the Request for Proposal for the Preparation of a Stormwater Management Master Plan in the Community of Ayr, Ontario.

In accordance with the Request for Proposal requirements, we have included the following mandatory and non-mandatory requirements in Appendix A:

- Submission Form – Appendix A
- Proof of Ability – Appendix B
- Contractor Health and Safety Form – Appendix B
- AODA Contractor Compliance Forms – Appendix B
- Acknowledgement of receipt of Addenda 1 through 4
- List of Subcontractors – Appendix B
- Schedule of Items & Pricing Response Form – Appendix D

As always, we strive to provide cost-effective engineering services which exceed the high standards our clients have to come to expect. We trust that the information enclosed within this submission meets your approval. We look forward to working with you to achieve your vision.

Yours sincerely,

COLE ENGINEERING GROUP LTD.

Robert McCollum
Chief Operating Officer

Roy Johnson, P.Eng.
Project Manager

Table of Contents

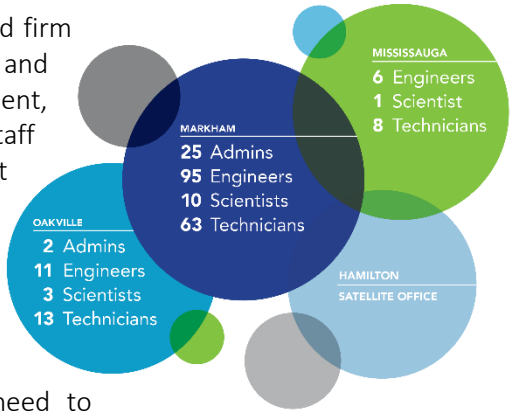
List of Tables

List of Figures

Appendices

1 Company Profile

Founded in 2003, Cole Engineering Group (COLE) is an employee-owned firm that provides consulting and advisory services in planning, engineering, and public–private partnerships in the water, transportation, urban development, and environmental sectors. With offices across southern Ontario and a staff complement of more than 200, COLE is now one of the largest independent consulting engineering firms in the province.



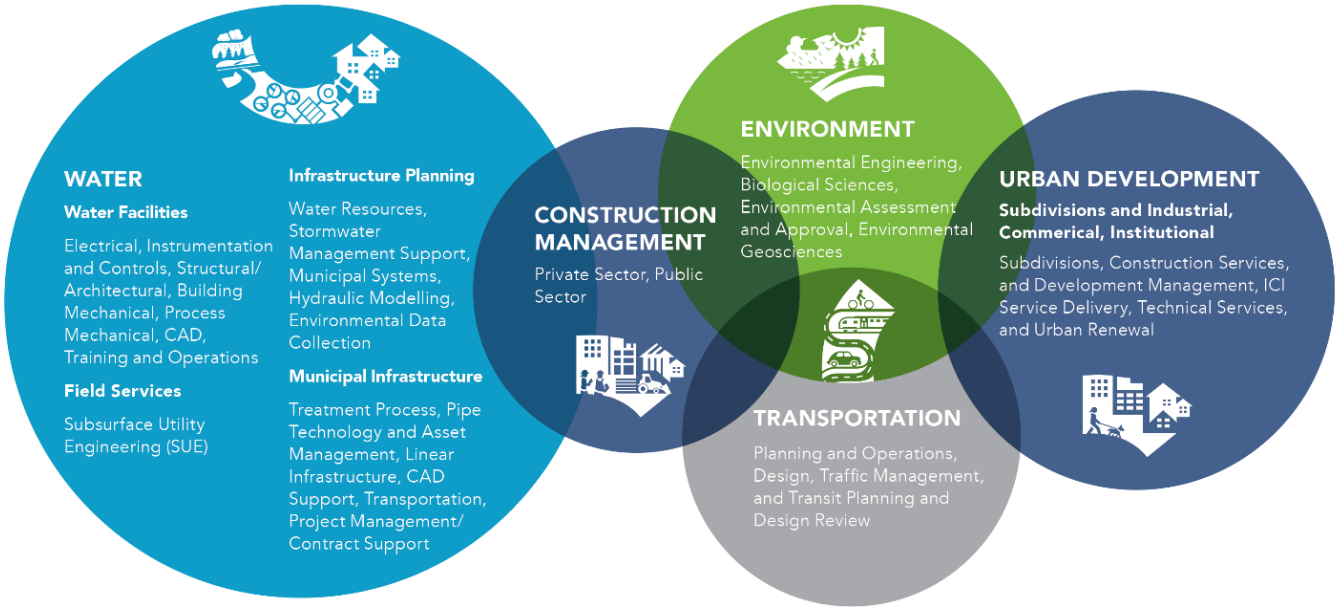
COLE has one of the largest multidisciplinary Ontario-based resource pools in the market, allowing us to provide comprehensive in-house services and expertise for our clients. We also have an end-to-end project management approach which allows us to manage our workload to better prioritize our commitments to our clients, without the need to outsource to third-party companies.

Our Corporate Brochure and copies of Insurance and WSIB certificates are included in Appendix B. Also included in Appendix B are COLE's membership in professional associations and a list of our corporate directors.

Our clients choose COLE to deliver engineering services for our integrated environment, professional approach and dedication to excellence. Our work has involves working with and for other cities and towns throughout Southern Ontario as well as Federal and Provincial Government bodies. Our major public sector clients include:

- Regions of: York, Durham, Halton, Peel, Niagara, Waterloo;
- Cities of: Hamilton, Toronto, Vaughan, Markham, Mississauga, Burlington, Brampton, Guelph, Peterborough;
- Towns of: Richmond Hill, Oakville, Newmarket, Aurora, Caledon;
- Ministries of: Transportation, Natural Resources and Forestry, Environment Conservation and Parks; and
- Authorities of: Toronto and Region Conservation, Lake Simcoe and Region Conservation, Central Lake Ontario Conservation, Credit Valley Conservation.

Our comprehensive multidisciplinary service offerings include the following:



COLE's philosophy is framed by its Mission, Vision, and Values:

COLE Mission

To take pride in providing innovative, sustainable, and value-added solutions to our clients.

COLE Vision

To be the preferred consulting firm and employer of choice.

COLE Values

To ASPIRE to offer our clients and communities the very best in who we are, and what we do, by embracing the values of Accountability, Synergy, Passion, Integrity, Respect, and Excellence.

Our Water Resources group provides a variety of services which position COLE well to undertake this assignment, including:

- Agency approval and permit expediting
- Detailed design of SWM infrastructure
- Drainage Area Studies
- Low impact development modeling and design
- Sewer capacity analysis
- Stormwater Master Planning

1.1 Subconsultants

- Myler Ecological Consulting: Mr. Barry Myler is a fisheries specialist who will be primarily responsible for reviewing existing aquatic habitat conditions across the study area and commenting on how these conditions affect stormwater management planning.
- LGL Limited: LGL will review the existing terrestrial environment and ecology. LGL's effort will be led by Allison Featherstone. This review will help to identify existing natural areas and natural features that will affect siting opportunities for stormwater facilities, and which could affect requirements for maintaining local hydrologic water budgets.

2 Project Understanding

The Community of Ayr requires completion of a Stormwater Management [SWM] Master Plan [SWMMP] following a Master Planning approach in accordance with the Environmental Assessment Act as outlined by the Municipal Engineer's Association Municipal Class Environmental Assessment (MEA), October 2000, as amended.

The Study is to focus on the Urban Area of the Community of Ayr (existing and emerging), as illustrated in the Township's Official Plan [AOP]. The Township also requires an analysis through this Study on the potential urbanization of lands framing the Northumberland Street corridor, extending from Greenfield Road to Highway No. 401. Refer to Figure 2-1.

The SWMMP will serve as a decision support tool, a methodology for the prioritization of works, a means to estimate future SWM requirements and costs and a transparent community process by which the Township can establish stormwater management guidelines and policies for the next ten to fifteen years.

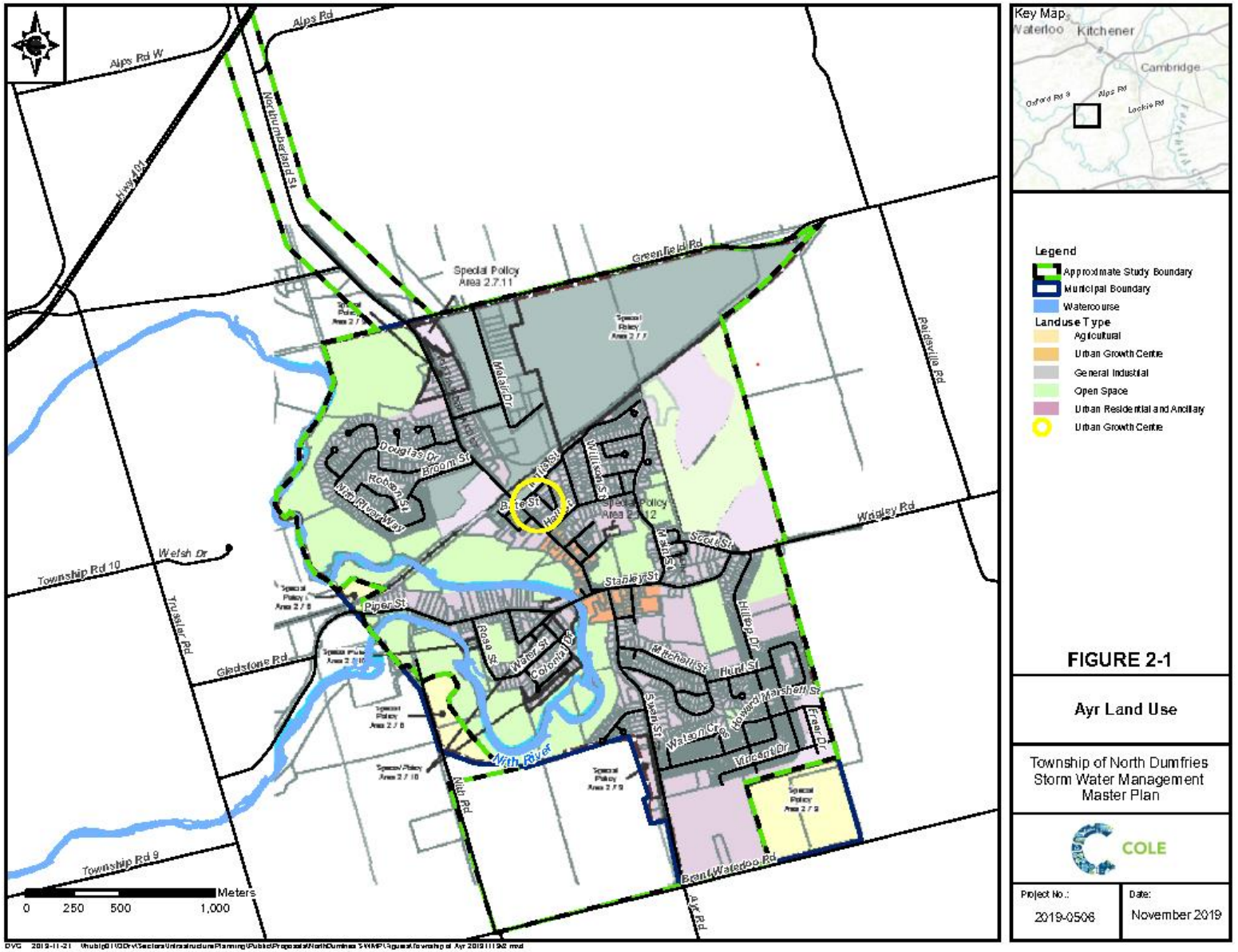


Figure 2-1 Ayr Land Use

The SWM Master Plan shall be an integrated approach that considers flood and erosion control, groundwater and surface water quality management, natural heritage environment management and infrastructure. In addition, the plan shall integrate existing policies, regulations, acts and guidelines and where appropriate develop new policies and design guidelines to aid in implementation and shall do so within a water sustainability context. In addition, the SWMMP should provide a framework for the provision of a stormwater utility tax.

COLE will work closely with the Township to ensure that the goals of the SWMMP can be accomplished in an effective and efficient manner. Based on Addendum #4, there may be challenges working within the budget set out to Council, and COLE will work with the Township to deal with these issues.

2.1 References

In preparing this proposal, we have referenced the following documents:

- *Grand River Watershed Water Management Plan*. 2014. Prepared by the Project Team, Water Management Plan. Grand River Conservation Authority [GRCA], Cambridge, ON [GRWWMP];
- *Nith River Flows*, Grand River Conservation Authority Website;
- *Preparing for Flooding, A Guide for Residents of Ayr*, prepared by GRCA [Ayr Flooding];
- *Township of North Dumfries Official Plan*, Consolidation Date: November 2018 [AOP];
- *Upper Cedar Creek Scoped Subwatershed Study*, prepared by Matrix Solutions Inc. et al, dated October 2019 [UCCSSS];
- *Waterloo Regional Official Plan*, Chapter 8 Consolidated New ROP, 2015 [WROP]; and,
- *Addenda #1-4* provided by the Township.

2.2 Background

The Community of Ayr has a population of approximately 5,000 persons and is anticipated to increase to a population of 10,000 to 11,000 persons by 2031. Increases in population require residential and employment lands, which increase the impervious cover of existing lands, and the stormwater which runs off during events requires mitigation. The SWMMP will provide specific recommendations for SWM measures to mitigate urban growth in the Study Area.

The Ayr Urban Area is designated on Maps 2 and 2.1 of the AOP. This designation is intended to serve as the primary focus for growth and development in the Township to the year 2031. Development within this designation will provide for a range of residential, commercial, employment, recreational and institutional uses. Future development within the Ayr Urban Area will be directed predominantly to the Urban Growth Centre and Designated Greenfield Area.

A goal of the AOP is to concentrate most of the growth in the Township within the Ayr Urban Area, with limited growth in designated Rural Settlement Areas and Rural Employment Area where municipal services can be provided in a cost effective and environmentally responsible manner.

The Township will encourage the provision of new dwelling units in built-up areas in the Ayr Urban Area and existing Rural Settlement Areas, through infill, conversion, intensification or redevelopment compatible with surrounding uses, except where infrastructure is inadequate or there are significant physical constraints.

The SWMMP will provide guidance for future development in these areas, including an overview of opportunities and constraints for SWM measures.

2.3 Surface Water

Ayr lies at the confluence of the Nith River and Cedar Creek, which generally flow north to south. There is a stream flow monitoring station in Ayr upstream of the confluence. Approximately 74.51ha drains to the Cedar Creek at Ayr Gauge. Regional flows at that gauge are 90.35m^3/s, per UCCSSS.

Nith River: The Nith River drains the western part of the Grand River watershed in Waterloo Region as well as Brant and Oxford counties. In the northern part of the river, water runs off the land quickly so flows can rise and fall quickly. Demand for water is high in the southern part of the river where farm irrigation is common. Typical summer flow in the Nith River at Ayr is 2.6m^3/s, with low lying areas flooded at 110m^3/s. Per Ayr Flooding, the Regional event flow is approximately 600-800m^3/s.

Cedar Creek: The UCCSSS is intended to guide and coordinate decision making by the Region, area municipalities, the GRCA and others involved in development planning, subwatershed stewardship and restoration. Cedar Creek supports a coldwater brook trout fishery and drains primarily agricultural lands, remnant natural woodlands, and low-lying wetlands south and west of the Cities of Kitchener and Cambridge, respectively. The northern part of the subwatershed is bisected by the Highway 401 corridor. The main Urban Area is the community of Ayr, in the Township of North Dumfries, located at the confluence of Cedar Creek and a meandering section of the Nith River.

2.4 Upper Cedar Creek Scoped Subwatershed Study (UCCSSS)

2.4.1 Hydrology Modeling

The study completed a continuous simulation using a calibrated GAWSER hydrologic model which applied the precipitation and temperature data from the Roseville Gauge.

The report makes various recommendations for SWM mitigation, including:

- Any potential development should be required, at a minimum, to maintain existing groundwater recharge rates.
- Potential urban developments shall only discharge stormwater offsite at an approximately similar frequency, rate, and volume as is occurring under baseline conditions. Stormwater that is not discharged offsite should be infiltrated.
- Potential urban developments shall only discharge stormwater offsite at an approximately similar frequency, rate, and volume as is occurring under baseline conditions.
- Infiltration of potentially contaminated water shall only be performed in areas where there is a lessor chance of the contaminated water reaching the municipal supply aquifer. Runoff from areas that are more likely to be contaminated (e.g., roads, sidewalks, parking spaces) should be directed toward end-of-pipe recharge facilities that are sited outside those lands that contribute recharge to AFD1. Water entering these facilities should undergo appropriate quality treatment prior to infiltration. This quality treatment may include capturing spring freshet flows to capture salt-laden water for subsequent pumping to the sanitary system or evaporate during the following summer months.

2.4.2 Existing Concerns

Per the GRWWMP and Ayr Flooding, Ayr is located within an Existing Flood Damage Centre (a community that has several structures located within the floodplain). Ayr experiences frequent nuisance flooding.

An initial review of flooding in Ayr suggests that there are few practical options to reduce flooding to the most frequently flooded properties along Tanner Street. Next steps will focus on flood preparedness,

implementing flood inundation mapping and increasing awareness of those residents located in the floodplain. Damages to property and a risk to life can occur during significant flood events. Therefore, the GRWWMP Team recommends that additional ways to reduce the flood damage potential in the community of Ayr be investigated.

2.5 Source Water Protection

Based on Map 4 Source Water Protection Areas, AOP, there are three Municipal Wellheads in Ayr. Ayr is not located in a Regional Recharge Area. The downtown core, including the Urban Growth Centre is within WPSA-4, with the remainder of the northeast portions of Ayr located in WPSA-5. Refer to Figure 2-2.

Per the WROP, those areas are defined as:

- WSPA-4: delineates medium sensitivity areas found within the two year time of travel to a municipal drinking-water supply well; and
- WSPA-5: delineates medium sensitivity areas found outside of the two year, but within the ten year time of travel to a municipal drinking-water supply well.

Development applications within all Source Water Protection Area designations will comply with the following:

(a) Employment uses that would direct infiltration of stormwater run-off without pre-treatment through the use of drywells or artificial/enhanced recharge will not be permitted; and

(b) Employment uses that would require new water taking for industrial/commercial purposes and/or for irrigation purposes, except for water taking associated with mineral aggregate operations will not be permitted.

Development applications within the WPSA 4 designation will comply with the following: underground parking garages, individual wastewater treatment systems, private wells, pipelines, sewers, stormwater management ponds (or other ponds) and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.

Development applications within the WPSA 5 designation will comply with the following: Category 'D' uses and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.

Based on the foregoing, stormwater infiltration may not be allowed in some areas. SWM most comply with Policy 8.A.4. The studies requested will vary based on the location of the development application relative to the sensitivity of the Source Water Protection Area and its proximity to a municipal drinking-water supply well or surface water intake. Studies submitted by the owner/applicant will demonstrate that the proposed use will not negatively impact the quantity and/or quality of drinking-water resources in Source Water Protection Areas for the development application to receive approval.

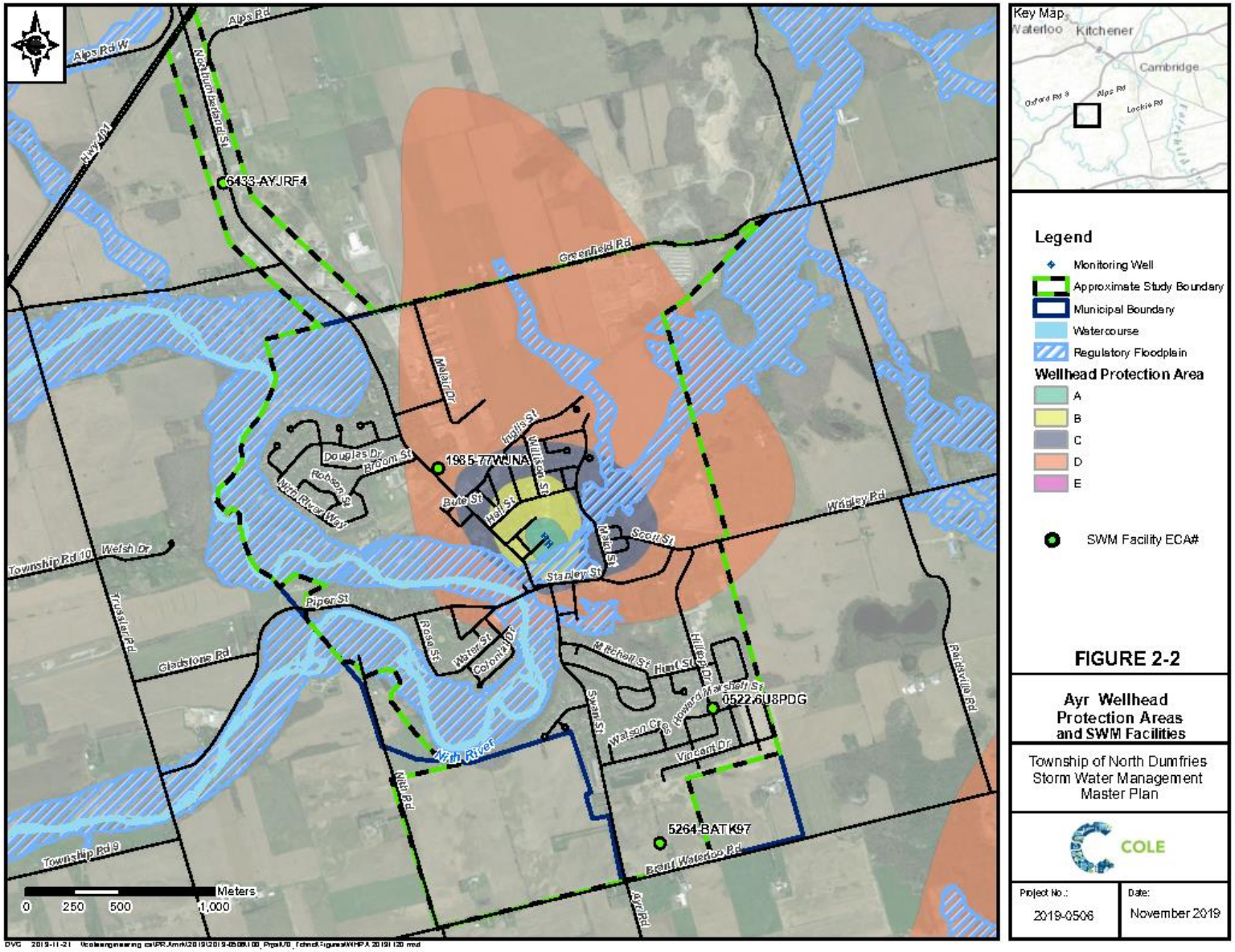


Figure 2-2 Ayr Wellhead Protection Areas and SWM Facilities

3 Approach / Methodology

COLE, after review of the RFP, has developed a detailed methodology to complete the proposed assignment. Our proposed time task matrix, indicating the time that each proposed team member will spend on the project, is located in Appendix E. The following section discusses the approach proposed by the Project Team. In order to keep our submission brief, we have focused on the key aspects of the project and we confirm that we will comply with all requirements as outlined in the RFP document.

In all respects, COLE's skills and experience will meet the needs of this project. Our team's general approach to managing this project will be based upon the following cornerstones:

- Proactive Communication between the Township and Cole Engineering Project Manager: Given the demanding timelines and the complexity of the work, timely and effective communication between the COLE Project Manager and the Township's Project Manager is mandatory. Our approach to managing this challenge is to schedule in advance regular (bi-monthly (once every two months)) progress meetings with the Project Manager. These meetings will provide a status report on the work, deliverables, and potential issues and how they are being managed. These are recommended to be conference calls.
- Ongoing Internal Co-ordination: The Project Manager and senior Cole Engineering staff will oversee the timely delivery of all aspects of the project.
- Pre-Set Milestone Delivery Dates: Co-ordination of client meetings, presentations and agency meetings often become the critical path for delivery of engineering design and environmental study products. A cornerstone of our schedule management will be to lock in dates for these meetings at the project outset. Combined consultant/client commitment to these dates will focus energies on delivering high quality design/environmental products to meet the pre-determined deadlines.
- Proactive Issue Identification and Management: We will anticipate, seek out, listen and manage client, agency and stakeholder's concerns as an integral part of our work. The depth and breadth of skill and experience of the senior members of our team, will allow us to effectively work together in this way.
- Effective Use of Senior Consultant Resources and Use of a Project Advisor: In order to ensure that the project will remain on track and will be completed efficiently, members of the Project Team will have clearly defined roles and will delegate with accountability of responsibilities. There will be a high level of back-up bench strength to protect the project interests in the event of unforeseen availability of a key team member or an unanticipated issue requiring urgent attention.

The Project Advisor, Harold Chard, M.Sc., P.Eng., will act in support of the Project Manager, Roy Johnson. Should the Project Manager be unavailable for any critical events, Harold can act as a substitute on a temporary basis.

QA/ QC Project Specific Plan

COLE will develop and implement a project specific QA/QC Plan to address all aspects of the project. All engineering deliverables will be sealed by a Professional Engineer. The QA/QC plan will address the following points:

- Control of non-conforming work
- Control of technical work
- Corrective actions
- Document control
- Document quality system
- Management responsibility and commitment
- Quality audits
- Quality milestone reviews
- Quality records
- Quality technical reviews

Will Heywood, P.Eng., will be responsible for enforcement of the QA/QC plan. At a minimum, he will review all major deliverables, and submit a signed checklist to the Township advising of the results of his review.

Schedule Control

Our proposed Project Schedule is enclosed in Appendix C. COLE's Project Manager, Roy Johnson, with the support of the Project Team, will enforce internal deadlines and notify the Township of any delays in obtaining requested information. Delays caused by the Township and/or other outside parties will be immediately brought to the attention of the Township and reflected on the project schedule. In consultation with the Township's Project Manager, contingency plans will be developed and, where possible, additional qualified staff will be utilized to overcome any delays. Other options to address delays will also be considered including recognizing the problem at an early stage and undertaking some components of the project simultaneously.

Meeting Class EA Requirements

COLE's approach to completing a Class EA, is one of open involvement of all affected stakeholders early in the process. It is therefore proposed to inform the public through multiple points of contact, exceeding the requirements under the Class EA process.

Stakeholder List

A first step in the project will be to prepare a comprehensive list of stakeholders to consult to fulfill the Class EA Master Plan process. This list will be based on parties identified by the Township as being interested in this or similar projects, as well as approval agencies and First Nations. During the full course of the project, the project stakeholder list will be maintained, and interested parties will be added for future mailings. We have assumed that the cost of publishing all notices in local newspapers and the cost of facilities for public meetings will be paid directly by the Township.

Notice of Commencement

A Notice of Commencement to be published on the Township's website and in local newspapers. The notice will also be directly mailed to the stakeholders list. A draft notice will be developed immediately after contract award and will be provided to the Township for review at the project kick-off meeting. The notice will contain the problem/opportunity statement for the project and invite the public to comment and/or join the project mailing list.

Notices of Public Information Centres

The RFP requires that three Public Information Centres (PICs) be held through the course of this project. Notices of PICs will be published approximately four (4) weeks in advance of the PIC. The notice will also be directly mailed to individuals and organizations on the stakeholder list. COLE will prepare draft notices for review by Township staff.

Public Information Centre

Given the scope of the work (equivalent to a Schedule B Class EA) and the scheduling noted in Addendum #3, COLE recommends that only two PICs be held to provide the public with an opportunity to review the problem/opportunity statement, potential alternative solutions, our proposed evaluation criteria and, finally, our recommended preferred solution. It is anticipated that each of the PICs will be an "open house" come-and-go format, with a presentation at a scheduled time.

Opinions and information gathered from this PIC will serve to guide the Master Planning process into the final stages of alternative consolidation and prioritization.

Notice of Completion

A Notice of Completion will be developed to provide the public with a final opportunity to comment on the project. The Notice will indicate the conclusions of the Master Planning/EA process, and will indicate where copies of the Master Plan can be reviewed. The Master Plan must be completed to document the Class EA process and must be filed for a 30-calendar day public review.

3.1 Task 1: Study Area Characterization

The project initiation will include a start-up meeting with the Township's staff. At this meeting the proposed work plan and project schedule will be confirmed.

3.1.1 Information Gathering and Review

Prior to the meeting, a list of information and existing data required by the Project Team will be developed and provided to the Township so that the required exchange can occur at the start-up meeting.

It is assumed that the Township will provide, according to the RFP documents:

- GIS Mapping layers, including watercourses, property boundaries, existing and/or future Official Plan land use; natural features mapping; natural hazard areas or zones including regulatory floodplain zones; and any other relevant GIS layers that the Township can supply.;
- LIDAR and/or existing digital elevation models for the Study Area;
- Stormwater Management Reports for any developed areas with the Study Areas;
- List of stakeholders
- Available record drawings, base plans, reports, digital ortho photography, and other relevant existing information.
- Existing SWM pond assessments with their respective design reports, as available.

We will review the information supplied by the Township and identify any significant gaps in the available information that could affect this project. We will then discuss with Township staff the most practical way to address these gaps. Examples of potential data gaps are:

- Existing storm sewer information;
- Drainage area information outside of settlement areas;
- Drainage areas to oil grit separators;
- Drainage areas to uncontrolled outlets; and,
- Existing SWM Pond IDs and reports.

As noted in Addendum #3, the Township does not have GIS information on existing storm sewers. As a result, no analysis of the system can be completed without a survey or other information on how the existing system was designed or built. This is critical to meeting the timelines outlined herein.

In preparing this proposal, the Ministry of the Environment, Conservation and Parks [MECP] Access Environment website was used to search for Environmental Compliance Approval (ECAs) in the Study Area. We located two Oil-Grit Separator (OGS) ECAs, and three SWM Facility ECAs. The MECP should also be consulted for possible additional ECAs. We understand from Addendum #3 that there are four SWMFs. Refer to Figure 2-1.

The SWMMP shall include an evaluation of the cumulative environmental impact of stormwater from existing and planned development. Existing and proposed land use within the Township can be classified

into several categories, including: parks, open space, recreational mixed areas, residential, institutional, commercial, and employment. Those areas will be assessed via hydrologic modeling for changes in runoff quantity and quality for existing and proposed conditions. We will review that available land-use mapping to determine whether it is adequate to support the required hydrologic analyses. If necessary, the mapping of existing land use will be refined based on review of available aerial photography.

The most significant water quality issue in the Grand River Watershed is the eutrophication of the river from both anthropogenic and natural sources. Eutrophication results from excessive loadings of nutrients, specifically nitrogen, phosphorus and/or carbon to freshwaters, resulting in increased growth of aquatic plants and algae. It is our understanding that in the case of the Grand River, the nutrient of most concern in phosphorus.

We will review the available information and develop estimates of existing phosphorus loadings to the Nith River attributable to existing stormwater discharges, and the potential change in loadings that might result from the foreseeable land development. This will help put future development in context and help to define what mitigation measures may be required as part of the overall SWM strategy.

3.1.2 Natural Environment

Desktop assessments of the natural environment will be completed by terrestrial and aquatic biologists. COLE's team includes the following sub-consultants who will be responsible for these reviews:

- Myler Ecological Consulting: Mr. Barry Myler is a fisheries specialist who will be primarily responsible for reviewing existing aquatic habitat conditions across the study area and commenting on how these conditions affect stormwater management planning.
- LGL Limited: LGL will review the existing terrestrial environment and ecology. LGL's effort will be led by Allison Featherstone. This review will help to identify existing natural areas and natural features that will affect siting opportunities for stormwater facilities and which could affect requirements for maintaining local hydrologic water budgets.

The main natural heritage features in the study area are the Nith River, Cedar Creek and several wetlands such as the Turnbull Lake Charlie Creek Wetland Complex, the Roseville Swamp and Cedar Creek Wetland Complex, and the Greenfield Swamp, all of which are provincially significant. Little Turnbull Lake Wetland is provincially significant and is also an Area of Natural and Scientific Interest (ANSI). In addition to designated features, several Species at Risk (SAR) in the study area. These include, but are not limited to:

- Blanding's Turtle;
- Bobolink;
- Eastern Meadowlark; and
- Eastern Ribbonsnake.

Through the Master Planning process the potential for impacts to terrestrial natural heritage components within the project area will be identified as part of the evaluation of the existing conditions as well as the evaluation of alternative solutions for the management of stormwater. The focus will be on screening to document site conditions and recommending any mitigation measures that may be required for the preferred SWM strategies. We will also identify any other studies that may be required at future phases of the Master Plan.

Our approach to the evaluation of natural heritage features will be to review, from a desktop basis, all natural heritage features that can be taken into consideration in early planning stages. The desktop review will focus on collection of available information from Grand River Conservation Authority (GRCA), Department of Fisheries and Oceans (DFO), and Ministry of Natural Resources and Forestry (MNRF) through

access to online resources and formal GIS data requests to agencies. Background data collection will include a review of available data such as designated natural features, vegetation communities, vascular plant lists, records for rare plants, atlases etc. A high level Ecological Land Classification (ELC) of vegetation communities will be completed using ortho-imagery. The ELC will then be used as part of the wildlife habitat characterization. Available background information will be used to characterize the wildlife habitat and communities in the project area and compile a summary species list for the study area.

In order to address the most current species at risk (SAR) requirements, LGL proposes to complete a SAR Screening, whereby consultation with the MECP will be undertaken to confirm a current SAR list for the project area and identify any known concerns regarding SAR. Species identified as endangered or threatened under the Species at Risk in Ontario (SARO) list are afforded protection under the Endangered Species Act, 2007 (ESA). The purpose of efforts with regard to SAR during the Master Plan preparation will be to first identify potential concerns early in the process to avoid impacts to these species through site selection and/or mitigation to the extent possible. Where SAR and their habitat cannot be avoided, LGL will identify potential impacts associated with the proposed strategies to ensure consideration for mitigation and recommendations for permits/approvals (if necessary) specific to SAR are carried through to future phases of the project.

Field investigations to confirm the limits and extents of natural heritage features documented through the background review, are not proposed for this project. It is assumed that a desktop screening is sufficient.

3.2 Task 2: Analysis and Assessment of SWM System

The information gathering and review completed under Task 1 will feed directly into Task 2. The RFP has set out clear requirements for Task 2, and the following describes COLE's approach.

3.2.1 Storm Sewer

To assess the existing capacity of the municipal storm drainage system, COLE will develop a hydrologic model using PCSWMM or Rational Method, as determined through consultation with the Township. That is, it will include the municipal storm sewer pipe network and its inlet, and will also include the overland flow pathways as conduits within the model.

- The storm pipe network and inlet types and locations will be based on available geodatabase information supplied by the Township, supplemented by some review of available record drawings to fill in missing pipe information as needed to complete a working model.
- Overland flow pathways and conduits will be developed based on review and processing of the available LiDAR dataset to be supplied by the Township.
- Inlet capture capacities will be based on available information sources such as MTO's Drainage Manual; supplemented by field reconnaissance by COLE staff to confirm the catchbasin grate types currently in place.
- Surface runoff catchment areas draining onto roadways or into specific inlets will be delineated within the available mapping and Li9DAR information, with catchment imperviousness based on available land-use mapping supplemented by sampling of selected representative areas using the available aerial photography.

Once the model has been built, it will be tested to ensure that internal connectivities are appropriate, and that the model is providing what can be considered reasonable results when rain events such as the 2-year, 5-year, 25-year and 100-year events are applied to the model.

3.2.2 Climate Change

Climate change refers to the long-term trend in the change of the world's weather patterns, including changes in average temperature and rainfall distribution. Stormwater runoff is intrinsically a function of rainfall, therefore change in the intensity, duration, and frequency of rainfall events has an impact on runoff, and the response of stormwater systems. Aquatic habitat health is also linked to temperature. The impacts of unmitigated climate change on storm infrastructure will be assessed.

For this Study, we could investigate using Station G6140954 (in the Grand River Region) as a basis for comparison, then modifying the existing Township IDF curves by applying the percent change in rainfall intensities used in Sta G6140954. We could then develop updated IDF curves for the 5-year and 100-year return periods for future conditions. Then, the effects of climate change on conveyance systems could be assessed by comparing future rainfall intensities to existing, specifically, comparing the 5-year intensities with an inlet time of 10 minutes, as these are representative of minor system conveyance structure requirements.

The potential effects of climate change on rainfall intensity-duration-frequency (IDF) statistics across southern Ontario have been explored by various researchers. The MECP has created the Ontario Climate Change Data Portal (http://ontarioccdp.ca/) that provides project changes in air temperature statistics and rainfall IDF curves for a set of 25km x 25km map grid squares that cover the Province. This provides a valuable resource of information that can be used to assess the potential impacts of increased frequency or intensity of heavy rainfall within and around Ayr. COLE's proposed approach will be to extract future IDF curves from the OCCDP and apply them within the PCSWMM model. A particular issue is what change might be expected in the magnitude of the 100-year rain event, and resulting impact on local flooding issues and stormwater system capacity.

3.2.3 Erosion Assessment

The RFP set out clear requirements about identifying existing erosion sites (by creek reach). This will feed into evaluating level of risk to public health and safety and environment, and alternatives for restoration.

COLE staff will complete a site walk of the relevant Reaches within the Study Area to identify potential areas of erosion concern and prepare a photo log to illustrate and describe any erosion sites. COLE will identify erosion sites based on the site visit and summarize them in a table.

Any sites that may affect public safety will be identified, and the Township so advised; and in such cases we would recommend further evaluations be undertaken for the Township by geotechnical specialists to better define the level of risk and advise the Township accordingly.

Priority areas of concern will be identified, including debris jams within the channel that could cause channel flows to back up into nearby residential/commercial properties, causing flooding concerns; perched culverts that have the have potential to cause problems with structural integrity of the road material, etc. Given the size of the Nith River and Cedar Creek, outfall erosion may be of greater concern than the watercourses themselves, given the large upstream areas contributing flow.

Recommendations will be developed for future development purposes to ensure that the erosion control component of ponds will be sufficient. These may include completing a detailed fluvial assessment in problem reaches, including cross-sectional surveys, establishment of erosion thresholds, and identification of critical reaches/flows; developing an erosion model to determine if retrofits to existing facilities would be effective at mitigating existing erosion issues; using the erosion model developed above to evaluate impacts of development and whether extended detention levels provided by the ponds would be enough to mitigate the erosive effect, or if additional LIDs would be required.

3.2.4 Stormwater Management Facility Assessment

A main component of the Project includes an assessment of the Township's current stormwater infrastructure. This assessment will require a visual inspection of stormwater ponds, including all 4 SWM ponds. The objective of this stage is to produce all necessary field data to be used in subsequent stages of the project.

Using data gathered from the background review and field investigations, the needs of each stormwater management facility will be assessed. Obvious maintenance requirements such as deteriorated structures, eroded slopes or outlets and adverse sediment accumulation will be determined and reported in this step.

Rain Gauge Network

A rain gauge monitoring plan will be developed to provide the Township with a well distributed, and easily maintainable gauge network. Appropriate locations for monitoring will be identified allowing for sufficient data coverage and will be selected based on the suitability of potential sites for monitoring equipment installation and maintenance. Careful location planning and equipment selection will allow for an efficient, cost-effective maintenance plan and will maximize the likelihood of successful data collection.

COLE has extensive experience in this field having developed, installed, and maintained many permanent and temporary rain gauge networks ranging from 1 to 20 telemetered and logged gauge locations within an individual municipality. Gauge locations have been planned and operated throughout Toronto, Mississauga, Brampton, Hamilton, Guelph, Peterborough, Barrie, Wellington North, Cannington, Sunderland, and more.

Field Assessments

All field work will be completed by Cole Engineering staff. We own all necessary equipment and have fully trained staff that will complete all field work. Our field staff has inspected over 200 facilities in the past few years and are very familiar with data collection and facility component assessment.

Two people will visit each of the ponds to perform a visual inspection of the general condition of the pond, access roads, vegetation, overland flow routes, inlet/outlet headwalls. Access requirements (keys, arranging field meetings with Township staff, etc.) will be discussed with Township staff at the onset of the study.

The facilities condition will be documented using the field forms as well as dated digital photographs. Digital geo-referenced photos will also be taken of the periphery land use and general facility layout for inclusion into the SWM facility database. The initial condition assessment will include condition rating of all assets as documented during the field inspection and confirmed by our Project Engineer and Project Manager.

The field data will be collected by qualified one or two-person team equipped with either a GPS or total station, inspection forms, digital camera, and other necessary field, as required.

Aquatic Habitat

Aquatic habitat within the Ayr SWMMP study area includes a reach of the Nith River and the lowermost portion of Cedar Creek above its confluence with the Nith River, including the online Jedburgh and Watson ponds. The Nith River supports a diverse warmwater fish community. Cedar Creek's fish community includes the native coldwater Brook Trout. In addition to review of existing watershed/subwatershed studies that have been prepared for the Nith River and Cedar Creek, GRCA will be contacted for fisheries and aquatic habitat information, issues, opportunities and constraints specific to the study area. For instance, the extent of Cedar Creek coldwater habitat into the study area will be confirmed with GRCA.

Aquatic Species at Risk mapping identifies two provincially and federally designated Threatened fish species (Black Redhorse and Silver Shiner) and one provincially and federally designated Special Concern mussel species (Rainbow) within the study area. Mapping does not indicate designated Critical Habitat of these at-risk species, but it is understood that the Ontario Ministry of Natural Resources and Forestry had designated portions of the Nith River as "sensitive environment" in relation to Black Redhorse, the potential occurrence and extent of which will be determined for the study area.

Policy and regulations relevant to fisheries and aquatic habitat include the federal Fisheries Act and Species at Risk Act, and the provincial Endangered Species Act, provisions of which will be identified and incorporated into the SWM Master Plan.

3.3 Task 3: Evaluation of Alternatives

Several alternative solutions for SWM measures for the existing and future land uses within the Township that consist mainly of urban areas shall be developed. The approach for developing and evaluating alternatives shall be consistent with the requirements of the planning and design process for Master Planning projects described in the Municipal Class EA (Municipal Engineers Association, June, 2000; amended 2007, 2011). It involves reviewing Phase 1 work (i.e. Identification of the Problem) and undertaking Phase 2 (i.e. Establishing Existing Conditions, Identification of Long List of Alternatives, Development and Assessment of Alternative Management Strategies and Selection of a Preferred Strategy). In addition, consultation with stakeholders is a necessary step in this process.

The MECP divides SWM measures into three broad categories:

1. Source/lot level controls;
2. Conveyance controls; and
3. End of pipe controls.

The preferred SWM strategy is to provide an integrated treatment train approach to water management based on providing control at the lot level and in conveyance (to the extent feasible) followed by end-of-pipe controls. This combination of controls is typically the only means of meeting the multiple criteria for water balance, water quality, erosion control, and water quantity.

The reasoning behind that approach is to maximize the benefits from the combination of those elements, including:

- More effective SWM;
- Reduction in land area required to implement end-of-pipe solutions;
- Enhanced opportunities to integrate SWMPs effectively as amenities;
- Decreased total cost when land value is factored in; and,
- Increased level of public awareness and involvement in the implementation and management of SWM initiatives.

A preferred SWM Strategy will then be developed by the synthesis of the inter-disciplinary inputs to the project, including computer modeling, terrestrial and aquatic habitat assessments, water balance and hydrogeology, social, cultural, and economic considerations. The approach in developing and evaluating the alternative shall be generally consistent with the Class EA planning/design process for Master Planning project.

Using the initial set of developed evaluation criteria, and incorporating public comments as appropriate, the Project Team will apply a net effects analysis to the preliminary list of alternative solutions which will involve the following steps:

- Identification of potential effects;
- Develop and apply mitigation/compensation/enhancement measures; and,
- Determine net effects after mitigation measures have been applied.

The Township would like to explore the opportunities for innovative approaches such as Low Impact Development (LID) and green infrastructure for lot level controls, conveyance controls and end of pipe facilities. To assess the most applicable alternatives, COLE will review available information regarding Site setting that could influence the infiltration capacity of each area. This will include a review of the surficial geology, topography, depth to groundwater, depth to overburden, soil cover etc. In addition, available Source Water Protection ("SWP") mapping and SWP plans will be reviewed to understand if there are any constraints regarding LIDs within Wellhead Protection Areas (WHPAs) or other SWP vulnerable areas.

In addition, a water balance will be completed using the Thornthwaite and Mather methodology to compare pre-development and post-development hydrologic recharge of groundwater. This information will aid in assessing the list of alternatives and assess the suitability of various LID measures that could be completed.

The comparative evaluation of the alternative solutions will be carried out using a systematic approach that fulfills the intent of the Class EA process. The evaluation process will be presented in the form of an evaluation matrix in which alternative is scored or ranked against the other alternatives, with respect to a number of criteria that fall into the following categories:

- Environmental criteria: These include potential impacts on natural terrestrial features and aquatic habitat, and will include consideration of net change on hydrologic water balance and pollutant loadings to natural watercourses;
- Financial criteria: Includes initial capital cost including consideration of any need for property acquisition; expected life-cycle costs; and implications for future financing of centralized stormwater facilities that may serve more than one development property;
- Public safety and public acceptability: This category will address potential concerns regarding public safety and health; and how ell proposed facilities may fit into existing or future built-up areas;
- Implementation: Includes consideration of how easily implementation can occur as new land development occurs; and how well the SWM plan integrates with current land-use planning and the development approval process.

Evaluation of the alternatives will be undertaken in consultation with the Project Team and the Township's Project Manager. Our Project Ecologist will also contribute to the evaluation of alternatives, particularly about potential impacts to the environment both during and after construction.

3.4 Task 4: Preferred SWM Strategy

The preferred SWM strategy will be comprised of several elements. These may include replacement of existing storm pipes and culverts; erosion abatement projects; construction of new storm pond/wetland facilities or other types of centralized stormwater management such as infiltration facilities; and recommendations regarding stormwater design practices within new developments to minimize stormwater volume at the source and achieve objectives for preserving existing local hydrology.

We will clearly define each separate component of the preferred strategy and identify what the implementation sequence needs to be. We will identify all projects that are to be the responsibility of the Township, and identify what future Class EA requirements may apply, and what the regulatory approval

requirements are, for each component project. As noted in the RFP, for those projects identified as Class EA "Schedule B" projects, the Master Plan document will demonstrate that the Schedule B requirements have been fulfilled, as we will have followed Approach 2 in completing the Master Plan.

The preferred strategy will include recommendations regarding existing municipal drainage infrastructure assets, to provide the Township with a prioritized list of needs.

Existing data incorporated into the database and each component will be categorized into one of the following groups:

- Excellent: Component is in a "new" condition without any visible deficiencies;
- Satisfactory: Component is functioning within normal parameters but visible signs of wear are present;
- Attention Required: Component is no longer working as designed and requires maintenance, however, maintenance actions are minor (e.g. cleaning or debris removal);
- Non-Functional: Component is not functioning and requires more immediate maintenance (e.g. pond is full of sediment, inlet is blocked, spillway is eroded, etc.); and,
- Safety Hazard: Component presents a safety hazard to the public and should be repaired immediately (e.g. grate on large inlet pipe is open or missing allowing ingress, manhole cover missing, etc.).

Once each component has been entered into the system, any components with a rating of three (3) or higher will be given maintenance tasks as well as tasks added for inspection, as deemed appropriate. This will form the basis for the maintenance and budget needs for each facility, helping to evaluate and prioritize implementation requirements.

3.5 Task 5: Implementation Plan

3.5.1 Asset Monitoring, Management and Maintenance Program

COLE will establish a City-wide stormwater asset database and to identify any components that require maintenance.

Upon analysis of the stormwater management facility assessment results, Cole Engineering will prepare a long-term stormwater asset maintenance program, which will help to guide Public Works staff in the overall operation of the stormwater infrastructure. The maintenance program will be incorporated into the Master Plan and will include cost estimates as well as relevant regulations and processes for operations and maintenance activities.

The deliverable for this stage of the project will include a complete database, along with an operation and maintenance standard operating procedure manual, which the Township may use to guide its Public Works staff.

3.5.2 Operation and Maintenance Procedures

COLE will be able to identify the operation and maintenance requirements of each SWM facility and its assets which will allow for forecasting future requirements in terms of capital costs, operation and maintenance costs, and resources required by the Township to maintain its SWM facilities. The life cycle costs of each SWM facility will be calculated based on the forecasted operations and maintenance requirements. This information will be incorporated into the database, allowing Township staff to easily identify and plan yearly costs and resources required for each SWM facility and the overall program.

After completing an inventory of the SWM facilities and their assets within the Township, we will be able to develop an inspection and maintenance approach. The approach will be documented with an operation and maintenance standard operating procedure manual that will outline how to monitor, inspect, and maintain the SWM facilities and their assets. The manual will specify in detail the procedures Township staff will need to undertake when monitoring and inspecting the SWM facility and will include the following:

- Timelines for monitoring, inspections, and maintenance activities;
- Monitoring and inspection checklist based on the timelines;
- Guidance to interpret the monitoring data;
- Recommendations for the various maintenance activities that may be undertaken for each SWM facility based on the monitoring data;
- A standardized rating system to assess the priority of the maintenance needs for the various SWM facilities;
- Procedures for sediment sampling, removal, and disposal; and,
- Procedures for obtaining required approvals for removal and disposal of sediments.

The above will help the Township ensure that it remains in compliance with the ECAs for its municipal stormwater facilities.

In prioritizing the proposed solutions, considerations will be made for future implementation of the solutions, which is outside of the scope of this project. This may include the consideration of staging plans, property acquisition, easements, utility relocation, or any other timing or physical constraints the City may encounter. The Project Team will strive to present solutions capable of achieving the highest water quality results, while simultaneously thinking of the practical aspects the City will face beyond the life of Phases I and II of this Class EA project

3.5.3 Stormwater Quality Management Strategy

The Master Plan will include a stormwater quality management strategy.

The focus will be on promoting measures that reduce stormwater pollution at source. Measures that may be included are as follows:

- Encouragement of lot level improvements on public and private property, such as:
  - Soakaway pits;
  - Roof leader splashpads;
  - Oil / grit separators;
  - Pervious pavement; and,
  - Green roof technology.
- Implementation of conveyance enhancements on municipal rights-of-way, such as:
  - Pervious piping;
  - Bioswales; and,
  - Dryswales.

3.5.4 Policy Recommendations

In addition to providing physical solutions in the stormwater quality management strategy, the Project Team will also recommend policies based on review of other local municipal, provincial, or other agency documents. The recommendations for incorporation to Township policies will be detailed in the Master Plan document. Policy recommendations will include, but not be limited to:

- Municipal standards, operations, maintenance and design practices;
- Infill development SWM practices; and,
- Disposal of material removed from municipal stormwater treatment facilities.

Municipal Standards, Operations, Maintenance and Design Practices

Comparable municipal guidelines, such as the City of Barrie's *Storm Drainage and Stormwater Management Policies and Guidelines*, 2009, or the City of Toronto's *Wet Weather Flow Management Guidelines*, 2007, will be reviewed to ensure the Township maintains current standards in stormwater maintenance and design. Review of various municipal perspectives will allow for optimization of the Township own practices.

Infill Development SWM Practices

Comparable infill development guidelines, such as the City of Ottawa's Urban Design Guidelines for Low-Medium Density Infill Housing Update, 2009, will be reviewed to ensure the Township maintains current standards in infill stormwater management maintenance and design. Review of various municipal and provincial perspectives will allow for optimization of the Township's own practices.

Disposal of Materials Removed from Municipal Stormwater Facilities

COLE will provide the Township with advice on to how to deal with material that is occasionally removed from stormwater facilities such as storm ponds. Clean-out of accumulated sediments from storm ponds is needed from time to time, to maintain ECA compliance. Disposal of that material is an important cost consideration for pond clean-outs. We will review and summarize current regulatory requirements in this regard, and provide the Township with a step-by-step procedure for designing a pond clean-out.

3.6 Task 6: Master Plan Document

The Master Plan document will be the key deliverable for the project for the implementation of future works. The document will provide the planning rationale and EA documentation required to proceed with detailed design of the recommended works. The Master Plan is expected to contain, at a minimum:

- Problem/Opportunity statement;
- Documentation of all public, agency, and First Nations comments and responses;
- Review of best practices and minimum design guidelines;
- Rationale for evaluation criteria;
- Summary evaluation of alternatives;
- Summary of preferred solution prioritization;
- Implementation, feasibility and staging recommendations;
- Supporting technical memoranda (in appendices), including:
    - Results of field data investigation of stormwater management infrastructure;
    - Maintenance program for individual stormwater assets;
    - Recommendations for stormwater management policies to be developed by others;
- Cost estimates;
- SWM Pond Long-Term Maintenance Program;
- Recommendations for Township Design Guidelines;
- Mitigation measures and commitments;
- Sufficient information to formulate a framework for stormwater utility tax;
- Operations and maintenance costs;
- Prioritization of works;

- Provide a basis for future investigations for the specific Schedule C projects identified within it, i.e. identify everything the Township needs for the first five years after study completion and complete all the site specific work required, including public consultation to meet Municipal Class EA requirements for Schedule A and B projects;
- SWM Policy for integration into Development Manual and,
- Water Resources Monitoring Program.

It is expected that the draft Master Plan document will be submitted in black and white with the exception of relevant figures. The draft Master Plan will be presented to the Township's staff for review and comment. After receipt of the Township's comments on the Master Plan, the draft will be finalized and delivered to the Township. The Master Plan will be made available for public review at selected Township facilities.

The Master Plan document will include an Executive Summary that provides a clear picture of the recommendations, and a description of how those recommendations were arrived at.

As needed, the final document will be formatted to meet the Township's AODA requirements or policies.

4 Schedule

Appendix C presents our overall detailed resource loaded, critical path project schedule. Based on Addendum #3, the Township would like a preliminary overview / assessment by March 30th, 2020 with a completed Study by June 15th, 2020. Given the scope and identified data gaps, a more reasonable time for a completed Study is early October. If the assignment is awarded and starts by February 3rd, 2020, COLE is able to provide our preliminary findings (Tasks 1 and 2) by end of March 2020.

We understand that project schedule is critical and that timelines must be met. To that end, our approach to schedule management will be as follows:

→ Immediately upon notification of award, we will prepare a baseline schedule to align the project start date and completion dates. The baseline schedule will be broken down to define timelines for sub-activities and will highlight the critical path. The baseline schedule will be included in our Project Management Plan.

→ Complete a monthly Project Progress Report, which will include an updated project schedule. We will track all dates against the baseline schedule to ensure that we are continuing to meet timelines. We will pay attention to our critical path and dedicate the resources necessary to meet these timelines.

→ Should we find that our work on a task extends beyond the completion date, we will consider options to accelerate specific activities to return to our schedule. If these tasks are on the critical path, we will consider assigning additional resources to meet timelines. Our Project Manager has the authority to assign additional staff from COLE. Where this is necessary, we will inform the Township. Where these activities are not on the critical path, we will assess the impact of schedule delays on the overall schedule and develop an approach to return to the baseline schedule.

The following Table 4.1 outlines critical areas of our schedule review:

Table 4.1 Project Schedule Summary

Task	Activity	Completion Date
-	Closing Date	January 15, 2020
-	Estimated Project Award	January 29, 2020
-	Estimated Start Date	January 30, 2020
1	Task 1 Project Start-up Meeting	February 3, 2020
2	Project Management Plan/Gantt Chart of key milestones	February 5, 2020
3	Summarize Data Gaps to Project Team	February 14, 2020
4	Public Consultation Plan	February 14, 2020
5	Task 2 Meeting	March 10, 2020
6	Task 2 PIC Meeting 1	April 22, 2020
7	Task 2 Draft SWMMP (30%)	May 6, 2020
8	Task 3 Meeting	June 1, 2020
9	Task 3 PIC Meeting 2	June 24, 2020
10	Task 3 Draft SWMMP (60%)	July 31, 2020
11	Task 4 Meeting	August 7, 2020
12	Task 4 Asset Management Planning Meeting	August 24, 2020
13	Task 5 Draft SWMMP (90%) – agency review	August 31, 2020
14	Task 5 EA Report Meeting – Project Team	September 14, 2020
15	Task 5 EA Report Meeting – Township Council	September 30, 2020
16	Final SWWMP (100%)	October 7, 2020

Note: All Report Submission dates subject to confirmation with Township Project Team and can be moved as required.
Review time assumed 2 weeks per submission, time noted under "Agency Review" in "SUBCONSULTANTS" column of TTM

5 Experience and References

COLE brings forward a project team with extensive master planning team experience. Staff proposed on our team have a long working relationship on similar assignments including: the Uxbridge Comprehensive Stormwater Management Master Plan, the Town of Newmarket Water and Wastewater Master Plan, Toronto Waterfront Sanitary Master Plan EA, the Town of Markham Water and Wastewater Master Plan, and York Region's Water and Wastewater Master Plan.

The following project descriptions and references demonstrate relevant experience of COLE to undertake this assignment. Each of the projects presented have involved project team members named in this proposal.

Table 5.1 lists 3 corporate projects demonstrates recent relevant projects (last 5 years) in which COLE successfully delivers (or is currently delivering) similar investigative services. Additional details of these and other similar projects are included in Appendix B. The Township of North Dumfries' Schedule "C" – Reference Form is included in Appendix A.

Table 5.1 Project References

#1 CITY OF TORONTO BASEMENT FLOODING REMEDIATION & WATER QUALITY IMPROVEMENTS MASTER PLAN CLASS EA, AREA 36 (AREAS 30, 7-12, 1-2, 4-6, 36)	
COMPANY NAME:	City of Toronto
ADDRESS:	100 Queen St. W.
CITY/PROV/POSTAL CODE:	Toronto, ON M5H 2N2
CONTACT PERSON/TITLE/PHONE NUMBER AND E-MAIL ADDRESS:	Kirill Cheiko, P.Eng./Capital Works Delivery, Toronto Water T: 416-338-5556 | E: kcheiko@toronto.ca
Scope: The COLE team has completed 14 basement flooding studies and is currently near completion of a 14th area and is starting on another three areas coving downtown Toronto. Each of the studies have flowed a similar work scope. The Master Plan Class EA studies are part of the City of Toronto's extensive basement flooding protection program, and are completed to provide the City with comprehensive basement flooding solutions. The projects aim to determine the primary cause and mechanisms which cause basement flooding in the study areas, and develop cost effective flood and water quality remedial measures that meet the level of service criteria and other goals of the City. COLE's involvement in the Toronto Basement Flooding Program is as a trusted consultant to the City. The projects involve many of the key work items identified in this Roster Category including all aspects of infrastructure planning including background review, field investigations, hydraulic model development and application, wastewater flow monitoring data analysis, alternatives development, constructability, developing SQL tools, developing webapps including ArcCollector and ArcSurvey, groundwater data analysis, and the EA process (public and stakeholder consultation). **Project Value and Schedule:** $ 1.0M; Completed 2019	

#2 CITY OF OTTAWA – HALIFAX AND VALLEY DRIVE DUAL DRAINAGE STUDY	
COMPANY NAME:	City of Ottawa
ADDRESS:	100 Constellation Crescent, 6th Floor East
CITY/PROV/POSTAL CODE:	Ottawa, ON K2G 6J8
CONTACT PERSON/TITLE/PHONE NUMBER AND E-MAIL ADDRESS:	Hiran Sandanayake, P.Eng./Senior Engineer, Water Resources T: 613-580-2424 X13848 | E: hiran.sandanayake@ottawa.ca
Scope: The Halifax and Valley Drive area of Ottawa is primarily residential with commercial development on the main roadways. The area is approximately 860ha. The storm system in the area was not designed using modern dual drainage principles and is known to surcharge in the 2-year design storm as well as result in overland flooding that has led to basement flooding. In 2015, the City developed a dual drainage model. A key component of this assignment was to expand the existing model to include additional area and to include more detail delineation of drainage features and systems. The existing PCSWMM model was expanded to include additional areas and in doing so the original model was also validated. Flow monitoring data and field investigations were undertaken to confirm data and connection anomalies. With the completion of the model, the storm system assessment looked at a range of design and historical events, including the City's climate change events. An objective of the study is to develop a conceptual Inlet Control Device (ICD) plan to improve overland and sewer performance (optimize major and minor systems) as an early action imitative followed by identifying opportunities for short- and long-term infrastructure replacement and rehabilitation. **Project Schedule:** Completed 2019	

Table 5.1 Project References

OAKVILLE PART III MIDTOWN EA – STORMWATER MANAGEMENT (SWM)	
COMPANY NAME:	Town of Oakville
ADDRESS:	1225 Trafalgar Road
CITY/PROV/POSTAL CODE:	Oakville, ON L6H 0H3
CONTACT PERSON/TITLE/PHONE NUMBER AND E-MAIL ADDRESS:	Kristina Parker, Water Resources Engineer; T: (905) 845-6601, x3889| E: Kristina.parker@oakville.ca
Scope: Schedule 'C' Municipal Class EA and preliminary design for road, transit, and stormwater infrastructure for Midtown Oakville, a designated urban growth centre adjacent to 400 series highway and GO Rail corridor. COLE completed the SWM Report as part of a Municipal Class EA of proposed transportation improvements within Midtown Oakville. The stormwater component of this EA study included hydrologic analysis, hydraulic analysis and development of future SWM criteria in support of the proposed major transportation improvements. Project complications included unsteady modelling of the Morrison-Wedgewood Diversion Channel, assessment of flooding potential at 12 culvert crossings and within several residential areas previously identified as being flood prone. **Project Value and Schedule:** $380,000; 2012 - May 2015.	

5.1 Additional Relevant Project Experience

To demonstrate the depth of our experience in all areas of this assignment, we have included additional relevant projects in each topic area. Each of the projects presented below have involved project team members named in this proposal.

MARKHAM VILLAGE AND UNIONVILLE FLOODING STUDY | CITY OF MARKHAM. The COLE project team is tasked with completing a full assessment of all storm drainage systems in two areas of the City of Markham: Markham Village and Unionville. Markham Village is comprised of 21 neighbourhoods, while the Unionville area is one storm system that can be affected by the local receiving stream (Fonthill Creek) and is a Special Policy Area (SPA). The outcome of this project will be a comprehensive Flood Remediation Plan for both areas to address the primary cause of and reduce the risk of flooding. (Ongoing)

CITY OF VAUGHAN STORMWATER MANAGEMENT (SWM) MASTER PLAN. Development of a Storm Drainage / Storm Water Management Master Plan. The project was city-wide with a specific focus on new growth and secondary plan areas in addition to areas of intensification. The project followed the Master Planning process established by the Municipal Class Environmental Assessment Phases 1 and 2 and included public consultation through two Public Information Centres, coordination with the public, and a technical advisory committee developed in partnership with the relevant review agencies. (2014)

CITY OF PETERBOROUGH STORMWATER QUALITY MASTER PLAN. Master Plan for the management of stormwater quality. The study was carried out as a Master Plan in accordance with Ontario's Municipal Class Environmental Assessment process. The study provided the City with a long-term strategy for reducing the amount of pollution reaching local waterways. (2014)

CITY OF GUELPH DOWNTOWN SERIVICING STUDY. In preparing the Downtown Servicing Study, COLE looked at the alternative water, wastewater and stormwater servicing strategies to make efficient use of existing municipal water, wastewater and stormwater services to support growth, while considering other factors that affect municipal servicing and the community such as climate change, adaptability, infrastructure security, low impact development, and conservation. (2017-Ongoing)

6 Team Structure / Staff Qualifications

6.1 Structured for Program Delivery

To structure the COLE team to ensure successful delivery, on-time of the project, we selected experienced Program Manager (PM) Roy Johnson supported by a strong Technical Team. Together they will focus on the critical factors of leadership, resources, and quality. The qualifications and dedication of the team members, as shown in the organization chart in Figure 6-1 is critical to this assignment. CVs are provided in Appendix D.

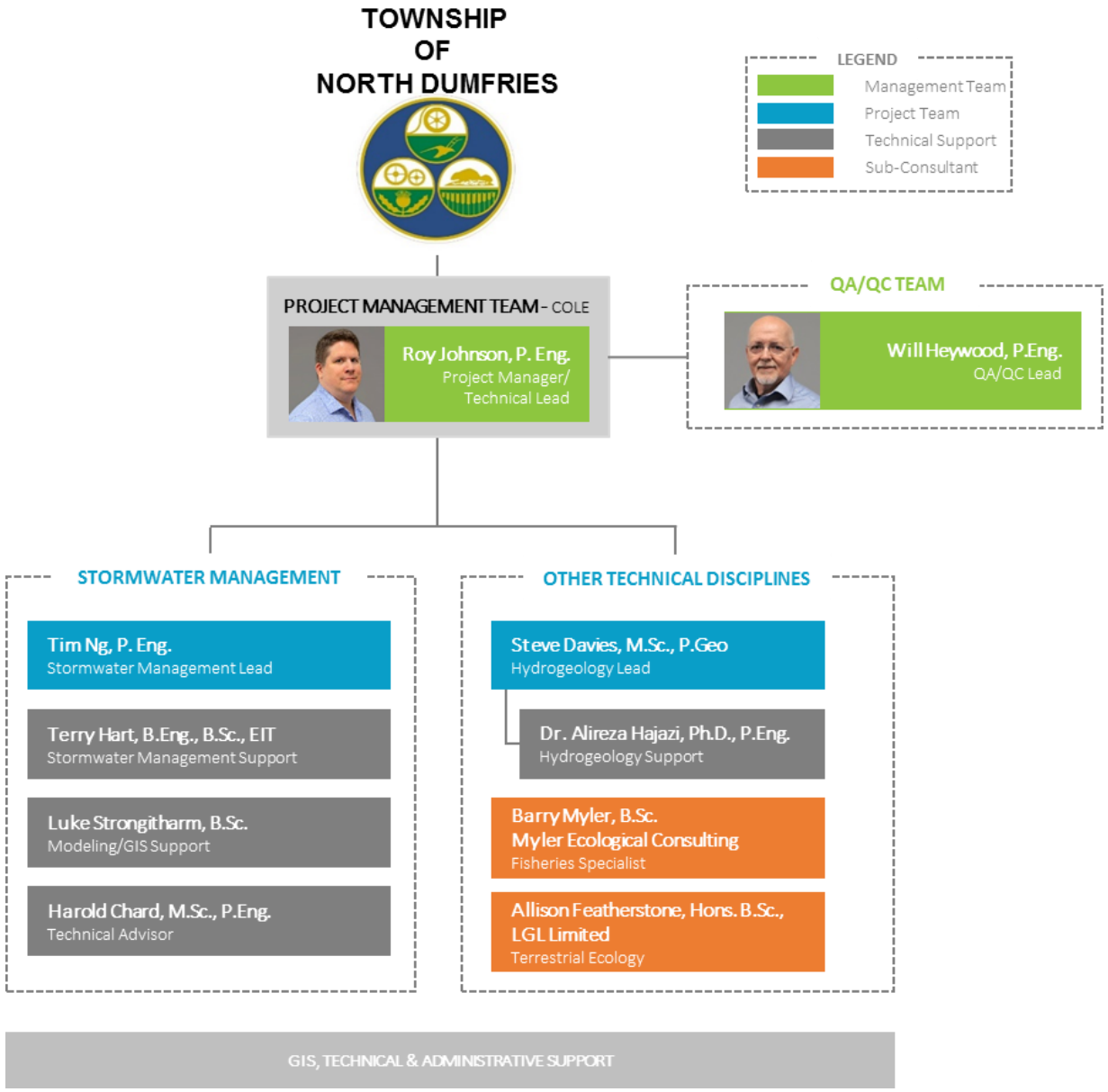


Figure 6-1 Organization Chart

The COLE team is structured to respond to the Township's vision for the program and includes Management and Technical teams. The Management Team leads the project, serving as a point of contact for the Township and the Township's Senior PM. They provide consistency through the project and are dedicated for its duration to manage contract strategies, develop cost estimates and schedules, facilitate meetings, initiate technical input, drive the permit process, and assure conformance with the Township's objectives and standards. This team monitors progress to proactively address schedule concerns and serve as the Township's liaison or communications officer with stakeholders. COLE recognizes that priorities change. The COLE team is structured to work with the Township to develop a work plan to drive schedule that will accomplish the Township of North Dumfries's objectives within a flexible framework that allows for modifications as appropriate to account for changing priorities.

The Technical Team gathers and reviews the data collection, conducts field verifications, ensures all necessary approvals. COLE has the bench strength to provide the Township confidence that our team has adequate resources and will deliver consistent quality throughout the length of the Program.

6.2 Stormwater Management Planning and Design, Including Preparation of Master Drainage Plans

Our team has extensive experience in the preparation of master drainage plans. For each project, we take into consideration the future needs of the study area and closely document the existing stormwater management facilities, flood risk zones, and sewer conditions. Our staff is also specialized in conducting micro-drainage studies by analyzing dual drainage systems using advanced hydrologic modelling techniques.

6.3 Expertise in Hydrologic and Hydraulic Modelling and Design

Each of the staff members of the Water Resources team are involved in hydrologic and/or hydraulic modeling using a broad range of software. Our combined staff are well-versed in Visual OTTHYMO and HEC-RAS, but is also experienced in modeling and analysis with MIKE URBAN, InfoWorks, PCSWMM, QUALHYMO, DDSWMM, XPSWMM, Flow 2D, WABAS, AutoCAD Civil 3D and other software.

In-house tools have been developed specifically for stormwater applications in AutoCAD Civil 3D to simplify hydrologic and hydraulic processes, such as the digital mapping of floodlines. Many of our projects have been completed by first establishing the baseline existing conditions in order to assess the impacts of difference design alternatives. All of our hydrologic and Hydraulic models can be prepared using the "what if" scenarios. Our staff has completed a number of pipe capacity studies, where existing sanitary and stormwater infrastructure is assessed to determine their capacity under different development scenarios.

6.4 Experience and Knowledge of the Municipal Class Environmental Assessment process and other Regulatory Requirements for Stormwater Management Projects

The COLE team has undertaken the Class Environmental Assessment process many times and is confident in leading every phase of a Class EA project. Our staff is familiar with both the Municipal Class EA process as well as the Conservation Ontario Class EA process to complete stormwater management projects. From junior staff to project managers, our team is technically skilled to provide feasible design alternatives while still being able to communicate various facets of the designs effectively through reports and presentations at Public Information Centres for all stakeholders. Experience in Processing Permit Applications and Complying with Acts and Regulations

The proposed team is highly experienced in identifying and acquiring all permits and approvals required to complete water resources and stormwater management projects. Immediately after project commencement, our project teams will begin the consultation process with approval agencies and identify required permits and approvals. This approach has been highly effective at mitigating the risk to the project from unexpected approval issues. We are highly experienced with the approval process of the Ministry of Natural Resources and Forestry, Ministry of Environment Conservation and Parks, Department of Fisheries and Ocean and the local conservation authorities, and has the contacts with agency staff to assist in expediting approvals when required.

6.5 Experience in Using Technical & Stormwater Management Modelling Tools

We confirm that our staff have extensive experience in using technical and stormwater management software and models as part of the design process: including but not limited to: MIKE URBAN, InfoWorks ICM, Visual OTTHYMO, PCSWMM, CulvertMaster / HY8, FlowMaster, HEC-RAS, GeoHEC-RAS and other associated software.

6.6 Project Management

ROY JOHNSON, P.ENG. — PROJECT MANAGER / TECHNICAL LEAD

Roy Johnson is a Senior Project Manager in COLE's Infrastructure Planning Group with over 17 years of experience in the planning, analysis, and design of stormwater management systems. He is an experienced Project Manager and has successfully completed various master plan Class EAs.

As a Water Resources Project Manager, Roy has overseen and developed hydrologic and hydraulic computer models for use in flood plain studies and stormwater management planning; led multidisciplinary teams to prepare comprehensive Master Environmental Servicing Plans, Functional Servicing Plans, Stormwater Management Plans, and other technical and environmental initiatives; and has also interpreted various municipal, provincial, and federal regulations to ensure design compliance and oversee permit application processes. Roy has been effective in ensuring all multi-discipline objectives are met to deliver a quality project. He establishes meaningful communication structures with our clients, safeguards staff engagement, and ensures that all budget and schedule control targets are met.

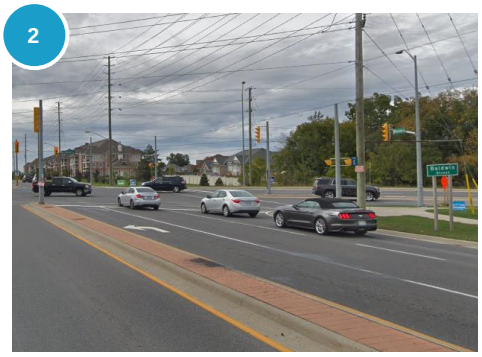
Roy has additional recent experience acting as Project Manager and Technical Lead at Stantec for the following projects:

1

Uxbridge Comprehensive Stormwater Management Master Plan, Township of Uxbridge, ON

Senior Water Resources Engineer/Project Manager responsible for the preparation

2



Winchester Road Reconstruction and Widening, Town of Whitby. Brooklyn, ON.

Stormwater Management Reviewer. Detailed design for the proposed reconstruction and widening of

3

Rodick Road/Miller Avenue Stormwater Management Options Assessment, City of Markham, ON.

Stormwater Management Engineer. As part of the development of the Miller

of a Comprehensive Stormwater Management (SWM) Master Plan for the Uxbridge Urban Area and Hamlet of Coppin's Corner in in accordance with the Comprehensive SWM Master Plan Guidelines, prepared by the LSRCA and the Municipal Class EA process. Through the Class EA Master Plan process, planning and technical review, several 'preferred alternatives' were established with respect to the existing natural environment; provided the design criteria for future new development, redevelopment, and/or the upgrading or replacement of existing infrastructure. SWM design criteria as it relates to water quality, water quantity, water balance, and erosion controls were established for both Uxbridge and Coppin's Corners. The Master Plan also provided recommendations for SWM implementation approaches and ongoing inspection/ maintenance considerations. Completion Date: 2015.	Winchester Road (Regional Road 3) through the Community of Brooklin including reconstruction and widening of Thickson Road (Regional Road 26) in the vicinity of Winchester Road. The approximate project limits for this assignment extend on Winchester Road from Baldwin Street to 200m east of Garrard Road and on Thickson Road from 400m south of Winchester Road to 350m north of Winchester Road in the Town of Whitby. The drainage work consists of the preparation a Drainage and Stormwater Management Report, building on the report prepared during the EA, describing existing and proposed conditions for roadway drainage, transverse drainage crossings and stormwater management. Completion Date: 2018	lands near Rodick Road, a stormwater management pond was proposed to be located on City lands, currently used as their snow dumping Site. The project included the evaluation of various options to eliminate the pond, including on-site detention, oil-grit separators, etc. One option was using StormTrap products in place of the pond. The project also included the coordination with the manufacturer to develop a conceptual design of the StormTrap system, including costs of materials, construction, and maintenance. Also provided the City with a matrix of solutions, including costs, likelihood of approval, degree to which criteria are met, and a preferred solution. Completion Date: 2015

Roy will be our Project Manager as well as the Technical Lead. He was Project Manager for the Township of Uxbridge's Comprehensive Stormwater Master Plan.

WILLIAM HEYWOOD, P.ENG. — QA/QC REVIEWER

Quality Management promotes consistency and delivery of the highest quality products. William, with **over 30 years** of infrastructure master planning and EA experience will lead the QA/QC review process. He will undertake QA/QC review of key project deliverables and assign an experienced discipline-specific professional to review technical deliverables. Will is very familiar with the quality expectations of our clients and will be able to guide the QA/QC team in their activities. Will is familiar with similar projects through his work on the following project:

- Project Manager for Storm Runoff Water Quality and Investigation of Basement Flooding Areas 41, 40 and 34, City of Toronto
- Project Manager and Technical Lead for Black Creek Sanitary Drainage Area Servicing Improvements Class EA Study, City of Toronto
- Project Manager and Technical Lead for Emery Creek Quality Control Plans Design, City of Toronto
- Project Manager and Technical Lead for Churchill Park Redevelopment Phase 1 where rain gardens were incorporated into stormwater management system using a treatment train approach, City of Hamilton.
- Project Manager and Technical Lead for Glynwood Tributary Area Sewer Surcharge and Flood Remediation Class EA, City of Markham.

William will provide senior technical review of all deliverables to the Township.

6.7 Project Team

The team members listed below have critical roles in the development and completion of this project and were chosen for their area of expertise. All our team members will be available for the duration of the project and/or the phase of work to which they are assigned.

6.7.1 Stormwater Management Team Members

TIMOTHY NG, P.ENG. — **STORMWATER MANAGEMENT LEAD**

Timothy is a Water Resources Engineer at COLE and has over 6 years of experience in hydraulic and hydrologic analyses, water permitting, stormwater management systems, pond design, water quality analysis and erosion and sediment control. Tim has prepared and provided technical input on various Stormwater Management (SWM) Reports, Functional Servicing Reports (FSR), Master Environmental Servicing Plans (MESP), and Stormwater Master Drainage Plans for several commercial, industrial and residential development designs within Ontario. Tim has also prepared several stormwater related peer reviews for several municipalities.

Some of Tim's recent relevant experience includes:

- Water Resources Designer for the Uxbridge Comprehensive Stormwater Management Plan, Township of Uxbridge
- Water Resources Designer for the South Sharon (Green Lane MESP and FSR) Modelling and Pond Design, Baif Developments, East Gwillimbury, ON.

Tim will provide technical guidance to junior staff.

TERENCE HART, B.ENG., B.SC., EIT — **STORMWATER MANAGEMENT SUPPORT**

Terence has over 1 year of experience in Water Resources Engineering and has been involved in a variety of projects focusing on stormwater management, highway drainage, floodplain impact analysis, tree protection and erosion and sediment controls. He has made site inspections and assisted with topographic and tree surveys. Terence has applied AutoCad Civil 3D, Visual HYMO Suite, GeoHEC-RAS, Bentley FlowMaster and CulvertMaster software to support his work in analysis, detailed design, report writing and tender preparation. Some of Terence's recent relevant experience includes:

- Drinkwater Pond Outfall Rehabilitation and Retrofit, City of Brampton – Water Resources Designer
- Environmental and Climate Change, North Harbour Sediment Management Options, Thunder Bay – Water Resources Designer
- West Whitby Holdings, West Whitby Holdings Inc. Whitby – Water Resources Designer
- Detail Design at Various Sewage Pumping Stations, Regional Municipality of Peel – Water Resources Designer

Terrence will provide technical analysis and report writing.

LUKE STRONGITHARM, B.SC., — **MODELLING/GIS SUPPORT**

Luke Strongitharm is a Geographical Information Systems Specialist and Hydraulic Model Developer with over 18 years of experience in spatial analysis, data implementation and visualization. He has led several large engineering projects coordinating data collection, organization and analysis. Luke has significant technical knowledge of ArcGIS, InfoNet, InfoWorks, databases and many other software projects. Luke has done similar work for the Township of Markham to reconcile various data sources to develop population and flow projections/demands for the Township of Markham water and wastewater servicing study, as well as for the Township of Toronto, York Region, and Peel Region. Other project roles are to manage all data

from the Township, undertake a critical review of GIS data, support project team modelling needs, and prepare study graphics for reports and meetings. His relevant project experience includes:

- Technical Lead for GIS and Data Analysis for the Basement Flooding Remediation and Water Quality Improvements Master Plan Class EA for Areas 1, 2, 4, 5, 6, 7, 8, 9, 11, 12, 30, 36, 45, and now 42, 44 and 62 City of Toronto
- GIS Analysis for West Thornhill Flood Control Implementation Refinement, City of Markham.
- Technical Lead for Update and Calibration of Peel Region's Wastewater Hydraulic Model, Region of Peel
- GIS Specialist for Stormwater Quality Management Master Plan Class EA, City of Peterborough

Luke will lead and direct all GIS analyses completed as part of this project.

HAROLD CHARD, M.Sc., P.Eng. — TECHNICAL ADVISOR

Harold Chard has over 30 years of experience in planning and design of municipal stormwater management facilities, combined sewer overflow control facilities, and storm and sanitary sewer systems. He has extensive experience in hydrologic and hydraulic modelling of pipe systems and watercourses as needed for infrastructure planning, watershed studies, and pollution control studies. Harold has broad experience in preparation of Provincial and Federal environmental assessment (EA) documents, public presentations, and technical reports for support of urban planning initiates. His projects include:

- Stormwater Quality Management Master Plan, City of Peterborough – Project Manager
- Water Resource Protection Funding Feasibility Study, City of Peterborough – Project Manager
- Basement Flood Remediation Areas #42, #44 and #62, City of Toronto – Technical Advisor
- Pollution Control Plan Update, City of Cornwall – Project Manager

Harold will act as technical advisor to the Project Manager, Roy Johnson, and input on operation and maintenance costs.

6.7.2 Hydrogeological Team Members

STEVE DAVIES, M.Sc., P.Geo. — HYDROGEOLOGY LEAD

Steve is a Senior Hydrogeologist and Team Leader at COLE with over 25 years of diverse experience in the private and public sectors leading multi-disciplinary teams of geoscientists, ecologists and engineers. Extensive experience with source water protection studies, groundwater supply investigations, municipal infrastructure studies, land development studies, Environmental Impact Studies (EISs), mining studies, Environmental Site Assessments (ESAs), and remediation projects. He works closely with various stakeholders to resolve permitting requirements, estimate construction dewatering requirements, assess potential impacts to the natural environment and other users of water, and to develop effective environmental monitoring and management plans. He acts as a third party reviewer for various municipalities for various development applications and ESAs. Steve has also appeared before the Ontario Municipal Board (OMB) as an expert witness in hydrogeology. His relevant experience includes:

- Sustainable Halton Water and Wastewater Master Plan, Regional Municipality of Halton. Halton Hills – Hydrogeology Lead
- Clair-Maltby Master Environmental Servicing Plan, City of Guelph – Hydrogeological Lead
- Southwest Georgetown Secondary Plan Subwatershed Management Strategy, Town of Halton Hills – Hydrogeological Lead

For this project, Steve will senior input and review of hydrogeology tasks

ALIREZA HEJAZI, PH.D., P.ENG. — HYDROGEOLOGY SUPPORT

Dr. Hejazi is an Environmental Engineer and Hydrogeologist with over **10 years** of experience in groundwater hydrology, physical hydrogeology, groundwater flow and contaminant transport modeling. His areas of expertise include conducting and organizing groundwater engineering projects, managing and analyzing soil and groundwater data, and developing and implementing comprehensive groundwater and surface water monitoring program. Dr. Hejazi has expertise in conducting and analyzing infiltration testing, water balance assessments, LID assessments and Source Water Protection studies. Similar relevant project experience includes:

Dr. Hejazi's will provide technical analysis of water balance and other hydrogeology input to the report.

6.7.3 Subconsultants

MYLER ECOLOGICAL CONSULTING – FISHERIES

Barry Myler, B.Sc., is a consulting Fisheries Biologist with over **26 years** of experience. He has addressed Federal Fisheries Act compliance and both Federal Species at Risk Act and Provincial Endangered Species Act compliance for aquatic Species at Risk for a wide variety of public and private sector clients and project types. Barry will conduct a desktop analysis and prepare an existing conditions summary of fisheries and aquatic Species at Risk constraints and opportunities within the Nith River and Cedar Creek reaches in the Ayr SWMMP study area, including reference to pertinent policy and regulatory requirements. He will contribute to the evaluation of identified erosion sites, development of assessment criteria for SWM alternatives and preparation of summary subwatershed factsheets.

LGL LIMITED - NATURAL HERITAGE AND PROTECTION MEASURES

LGL Limited is an environmental research and consulting firm specializing in environmental assessment and planning, and terrestrial, aquatic, wetland and marine ecology. LGL was founded in 1971, and is Canadian-owned and operated by its employees. A copy of their corporation information can be found in Appendix B.

Allison Featherstone, Hons.B.Sc. Vice-President, Senior Planning Ecologist
Project Role: Project Manager, Ecologist, SAR Specialist

Allison Featherstone is a Senior Manager and Ecologist at LGL Limited environmental research associates, where she leads a team of ecologists, biologists and planners. Since joining LGL in June 2003, Allison has been involved with over 150 natural heritage investigations in support of infrastructure, Renewable and Clean Energy Projects, Comprehensive Broad Scale Environmental Studies and Environmental Assessments/Environmental Impact Statements. She regularly represents LGL at project team meetings, agency meetings, technical and stakeholder advisory committee, public and stakeholder consultation, and consultation with First Nations and Métis. Allison's community involvement includes participation as a member (2007-2018) and Chair (2014-2018) of the Region of Waterloo's Ecological and Environmental Advisory Committee, where she also served as a member on the Region of Waterloo Technical Advisory Committee for Wastewater Master Plan, the Region of Waterloo Transportation Master Plan Stakeholder Advisory Committee, and the Climate Change Adaptation Committee.

Allison has considerable experience navigating the Endangered Species Act, 2007 and has direct experience with the species identified in the Ayr study area. Allison participated in several peer reviews of studies in the Ayr study area as part of her role on EEAC, in addition to direct project experience with LGL in Ayr for Northumberland Road, Stanley Street and Swan Street EA, and has participated in all aspects of the Surface Water Quality Monitoring Program.

Allison will provide support to the project team by providing expertise in natural heritage issues and protection measures that arise during this project.

7 Project Cost

Our copy of the Schedule of Items & Pricing Response Form (Appendix D of the RFP) is included in Appendix A. Our detailed Time-Task Matrix and Cost Breakdown for the proposed Stormwater Management Master Plan is included in Appendix E.

8 Closing

We look forward to working with the Township on this project that will provide long term stormwater planning solutions for the community. COLE is willing to discuss budget and scope of work with the Township to ensure your needs are met.

Yours sincerely,

COLE ENGINEERING GROUP LTD.

Roy Johnson, P.Eng.
Project Manager