REPORT

PLANNING, BUILDING & ENVIRONMENTAL COMMITTEE

DATE: January 14, 2019

REPORT NO: PD-004-19

SUBJECT: **Information Report**
Urban Boundary Expansion/Municipal Comprehensive Review Status Report and Next Steps
Township of West Lincoln

CONTACT: Brian Treble, Director of Planning and Building

OVERVIEW:

- **In September, October and December 2017, Staff presented Recommendation reports PD-126-17, PD-139-17 and PD-159-17which were the authorization and direction reports as approved by Planning Committee and Council to start the Urban Boundary Expansion process.**
- **Since that time, full and extensive Terms of Reference have been refined and are almost complete and a Land Owners Agreement is almost completed with the assistance of legal counsel for the land owners and the Township.**
- **On January 14, 2019, Township Staff, Richard Vandezande (Regional resource) and Township Legal Counsel propose to present the extensive Terms of Reference and Land Owners Agreement to Committee for information purposes prior to commencement of the Request for Proposed (RFP) process.**
- **Attached please find copies of Terms of Reference documents as now drafted. The majority of the content is complete and as presented is recommended by Township and Regional Staff.**
- **Finally, the study area has been adjusted in a minor fashion to include additional employment lands for consideration at the east end of the study area as found at Attachment 1.**

RECOMMENDATION:

1. That, Report PD-004-19, regarding "Urban Boundary Expansion/Municipal Comprehensive Review Status Report and Next Steps", dated January 14, 2019, be RECEIVED; and,
2. That it is understood that the study area as presented at attachment 1 to this report will be the area under consideration for the Urban Boundary Expansion study project.

ALIGNMENT TO STRATEGIC PLAN:

- **Value**
  Establishing, providing and sustaining a high quality of life for our residents.

- **Objective**
  The Township will work towards an expanded scope of employment opportunities to create local jobs for its citizens through innovation and clean technology, including alternative energy related industry, environmental technologies and processing of agricultural products.

BACKGROUND:
In 2017, staff began the process of working with the Region, who appointed the experienced consultant - Richard Vandezande to provide assistance and guidance to the Township of West Lincoln in the preparation and processing of this extensive project. The development community has also been of assistance and has worked to assist with the preparation of a detailed Land Owners Agreement which will help cover costs of the project and ensure proper funding arrangements.

As of early January 2019, the majority of the Terms of Reference and the Land Owners Agreement are nearing completetion. Some minor modifications are still contemplated with each document, but the general intent and specific approach is now well defined in each case.

The draft Terms of Reference were shared with the Consultant from the developers group on December 4, 2019.

CURRENT SITUATION:
To date, the authority that has been provided to staff and legal counsel is as follows:

1. That Township legal counsel work with legal counsel of the development community and the Niagara Region to finalize a binding agreement that protects Township interests and commits to a repayment program through development charge credits.

2. That, the attached Terms of Reference for the Sub-Watershed Study be endorsed in order to commence the Urban Expansion Study; and,

3. That, the attached Terms of Reference for the Secondary Plan Process be endorsed in order to commence the Urban Expansion study; and,

4. That, the draft agreement between the Township of West Lincoln and the Land Owner's Group be referred to Township legal counsel for review, such that legal counsel can prepare the proper agreement to protect Township interests, permit collection of necessary finances from the development community, appoint a Trustee, and outline repayment details relating to development charges; and,

5. That, upon recommendation from Township Legal counsel, in conjunction with the CAO and Director of Planning and Building, the Mayor and Clerk be authorized to sign the necessary agreement between the Township and Trustee of the Land Owner's Group to commence the partnership as outlined in (4) above and that an authorizing by-law to this effect be approved by Township Council; and,

6. That, Township legal counsel, Township staff and consultants be authorized to meet with the Land Owner's Group and outline (1) the process, (2) the expectations, (3) the need for a signed Land Owner's Agreement, (4) the "Permission to Enter" form, (5) the role of Township and Land Owner's Group, and (6) the appointment of a Trustee on behalf of the Land Owner's Group; and,

7. That, staff be authorized to circulate the Request for Proposal for the Sub-Watershed Study to receive submissions from consulting teams to complete the necessary works subsequent to signing the Land Owners Agreement; and,

8. That, staff report back to Planning/Building/Environmental Committee regularly to update Committee and Council on the process and progress.

Authorizing By-law 2017-138 was approved on December 11, 2017 and authorized the Township Mayor and Clerk to sign an agreement with the Land Owner's Group, and the Trustee to complete the necessary studies to effect an urban boundary expansion of Smithville based on Regional Staff report PDS 37-2016 (Niagara 2041). See Attached.

The Land Owners Agreement is now almost complete. Township legal counsel provided a final round of changes to the agreement to the Land Owner's lawyer at the end of 2018. It is contemplated that the land owners will soon be ready to sign the agreement. Once signed, staff will then circulate the RFP's to obtain (as authorized by No. 7 above) quotes from companies who are interested in carrying out this work. Before the Township does so, however, we are making this final presentation to Township Committee and Council to keep all members informed on this process.

Further, staff also wishes to bring to Committee and Council's attention a presentation that was made to Regional Committee and Council in June of 2018. This power point package shows the number of requests for Urban Boundary expansion that have been received by the Regional Staff. The requests are extensive and can be found across the Region. As Committee is aware, Township staff presented additional comments in December, 2018 (PD- 169-18) that will need to be contemplated as part of our local work.

Also, to inform the Township Committee and Council, staff wish to advise as follows:

1. Niagara Escarpment (North - South) Access is a Regional project. At present, Township staff understand that the project has been included within the Regional 10 year Capital Plan and Regional Development Changes Background Report. Such a project requires an Environmental Assessment which Township staff understand will commence in 2022. Actual construction on this timeline is not anticipated before 2030.
2. Smithville Bypass – is part of the Term of Reference for this project.
3. Sanitary Sewer and Municipal Water Requirements – as they relate to the need to get services to Smithville have already been determined and are planned by Regional staff. Proposed project costs have been incorporated into the Regional Development Charges Background Report and Regional Ten Year Capital Plan based on the growth projections of PDS 37-2016 (attachment 5). Internal sewer and water master plans for Smithville, are part of the Terms of Reference for this project.
4. Smithville as a Complete Community – part of the Terms of Reference for this project.

FINANCIAL IMPLICATIONS

A capital budget item was included in the 2018 budget for the cost of preparing and drafting the necessary agreements for this project. It is anticipated that the total cost of the consultants who will ultimately be hired to complete the required studies will top $1million which will be covered by the Land Owners Agreement with the developer's group.

INTER-DEPARTMENTAL COMMENTS

Staff from Public Works and Planning have worked jointly with Richard Vandezande and the Region on the preparation of the Terms of Reference for each study. Staff, from Treasury and our Development Charges Consultant have also been consulted on how to ensure cost recovery is possible. Finally Township Legal Counsel has worked extensively on the Land Owners Agreement. Township staff are very appreciative of all of the expertise and advice that has gone into this project, and especially, the input of the two presenters for January 14, 2019.

CONCLUSION

Staff provide this information report to inform the Committee and Council on the status of this project as well as to provide the detailed documentation to Township Committee and Council on January 14, 2019 in advance of signing of the Land Owners Agreement and release of the Request for Proposals for this project.

Tom Richardson and Richard Vanderzande will be in attendance on January 14, 2019 and will be making a presentation on this report at that time.

ATTACHMENTS

1. Study Area
2. T o R for study (3)
3. Regional Power Point (June, 2018)
4. PDS 37-2016

Prepared by:

Brian Treble, RPP, MCIP
Director of Planning and Building

Beverly Hendry
CAO

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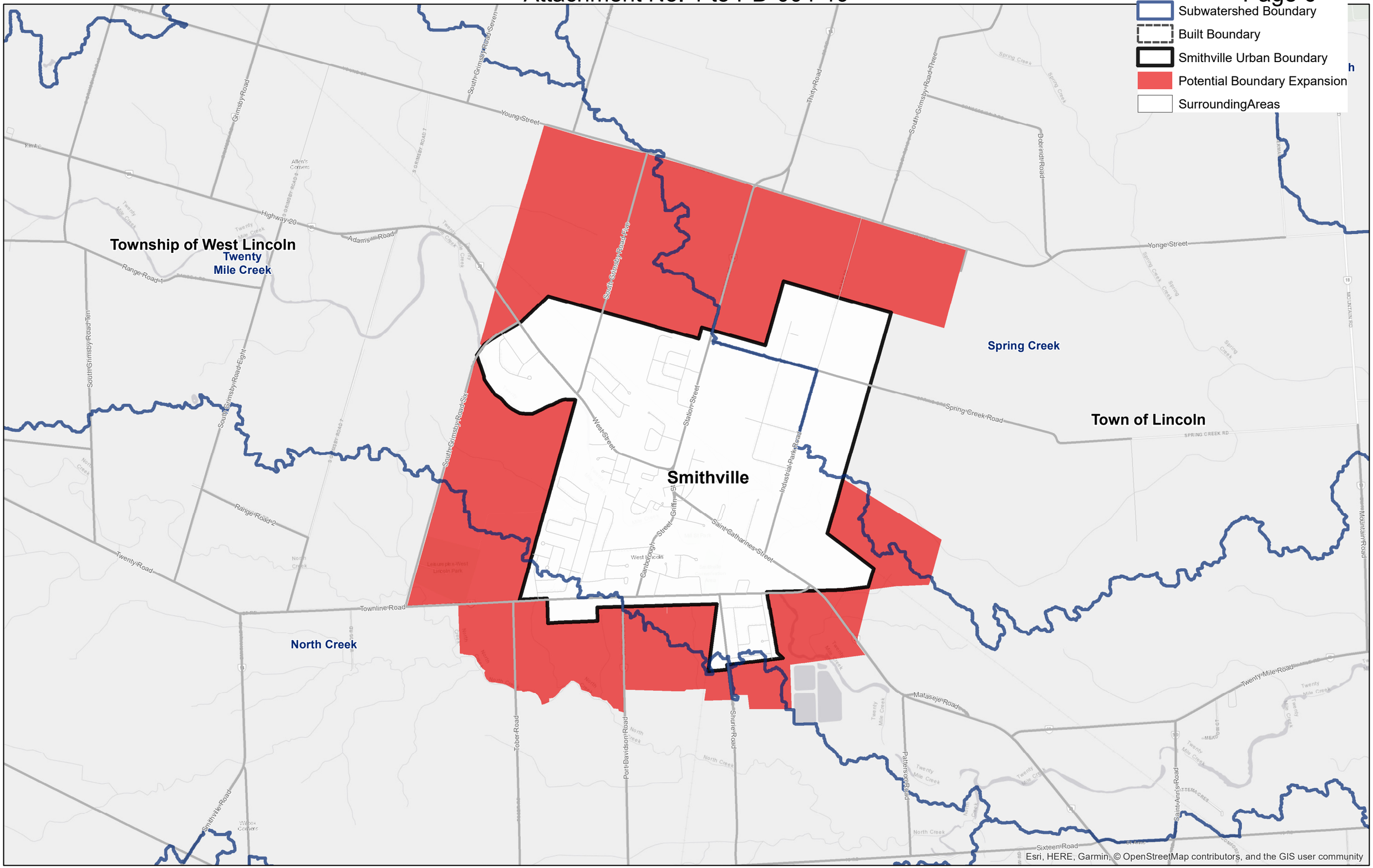
Subwatershed Boundary
Built Boundary
Smithville Urban Boundary
Potential Boundary Expansion
SurroundingAreas
Township of West Lincoln
Twenty Mile Creek
Spring Creek
Town of Lincoln
Smithville
North Creek
Young Street
Highway 20
Adams Road
Range Road 1
Range Road 2
Twenty Road
Townline Road
Spring Creek Road
Yonge Street
Dobbin Road
Thirty Road
South Grimsby Road Three
South Grimsby Road Five
South Grimsby Road Six
South Grimsby Road Seven
South Grimsby Road Eight
South Grimsby Road Ten
Grimsby Road
West Street
Station Street
Griffin Street
Canborough Street
Saint Catharines Street
Industrial Park Road
Tober Road
Port Davidson Road
Shurie Road
Matasejo Road
Patterson Road
Twenty Mile Road
Saint Ann's Road
Mountain Road
Smithville Road
Sixteen Road
Leisureplex-West Lincoln Park
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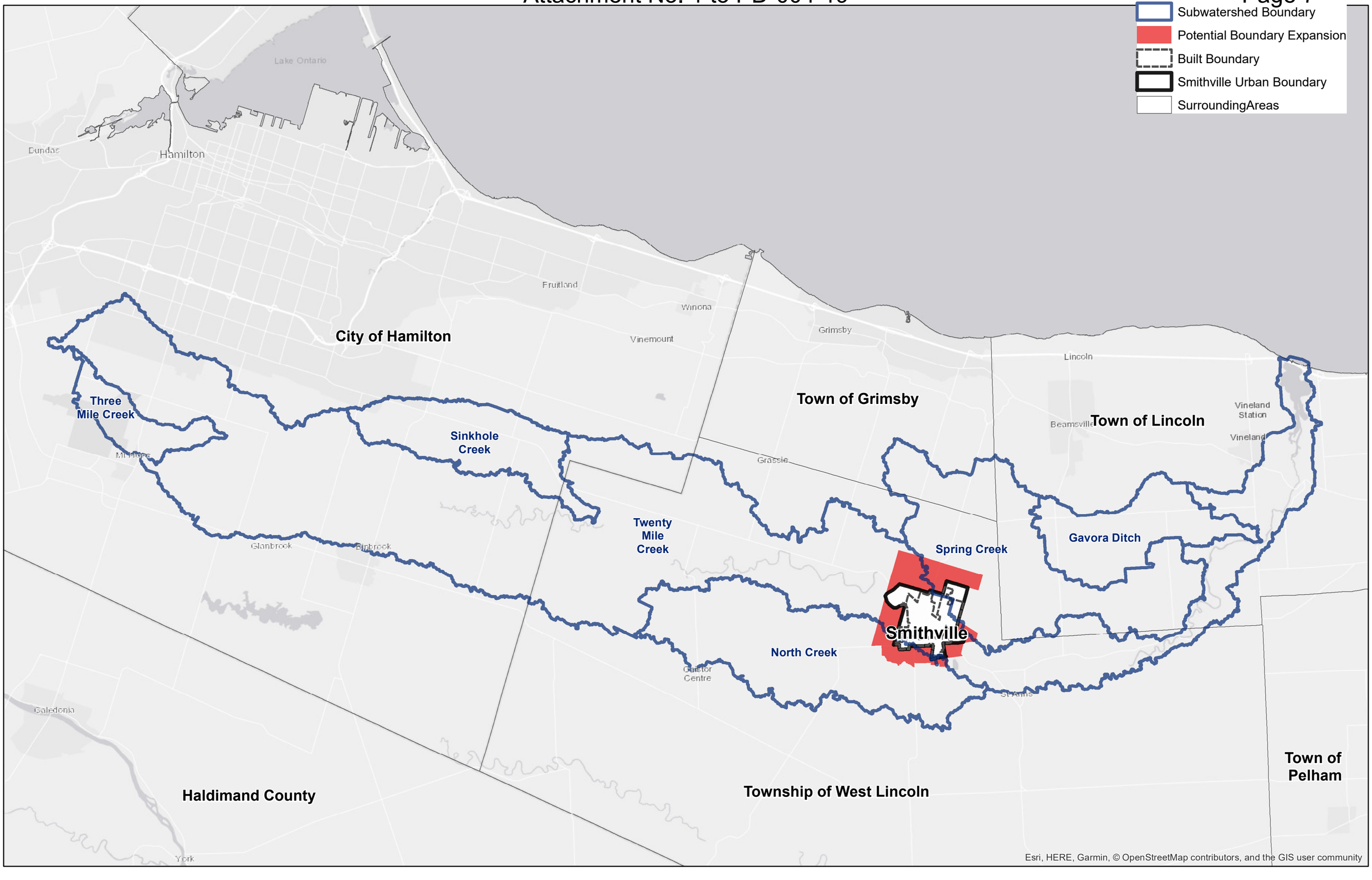
Subwatershed Boundary
Potential Boundary Expansion
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Smithville Urban Boundary
SurroundingAreas
Lake Ontario
Dundas
Hamilton
Fruitland
Winona
Vinemount
Grimsby
Lincoln
City of Hamilton
Town of Grimsby
Town of Lincoln
Three Mile Creek
Sinkhole Creek
Twenty Mile Creek
Spring Creek
Gavora Ditch
Smithville
North Creek
Mt Hope
Glanbrook
Binbrook
Grassie
Beamsville
Vineland Station
Vineland
Caledonia
Cainsville
St. Anns
Haldimand County
Township of West Lincoln
Town of Pelham
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Terms of Reference

Master Community Plan for Smithville

Township of West Lincoln

September 2018

Table of Contents

Request for Proposals
Master Community Plan for Smithville

1.0 Introduction

The Township of West Lincoln and Niagara Region are seeking Proposals from qualified consultants or consultant teams to undertake a Master Community Plan incorporating planning, urban design, environmental, agricultural, transportation, and water and wastewater servicing disciplines for Smithville. The environmental component is being addressed by a Subwatersheds Study that is being let under a separate Terms of Reference and Request for Proposal process. The Master Community Plan will guide the successful phased development of the lands in Smithville over the period of 2021-2041. The urban area of Smithville and the study area for the potential community expansion lands (Smithville Development Study Area) are shown on Figure 1.

1.1 Study Area

The Study Area encompasses the current Smithville Urban Area and the Smithville Development Study Area (SDSA). The SDSA encompasses approximately 425 gross hectares of developable land located north, west, and south of the urban area of Smithville (see Map 1 – Study Area).

The urban area of Smithville has a 2016 population of 6,245 and approximately 1,975 jobs with infilling and completion of existing designated Greenfield areas adding an anticipated 3,600 more persons and 1,800 more jobs. An additional 11,200 persons and 2,400 jobs will need to be accommodated in the 2021 to 2041 time period.

To accommodate the population and jobs increase, an expansion to the urban area of Smithville will likely be required. The amount and optimal location of land required to accommodate the allocated increase in population and jobs will be determined through the Master Community Plan process.

1.2 The Master Community Plan Approach

The Master Community Plan, with the accompanying studies, supports the development of a community structure plan (with accompanying development policies) for Smithville and potential expansion lands. The Master Community Plan process and the related studies (Subwatershed Study, Transportation Master Plan, Water and Wastewater Master Servicing Plans, Agricultural Impact Study, and Financial Impact Study) are designed to form a comprehensive and coordinated planning process that will meet the required approvals necessary under the Planning Act and the Environmental Assessment (EA) Act. The combination

of a Planning Act and Municipal Class EA process permits the Township and Region to plan the Smithville community collaboratively in a holistic manner.

The concurrent infrastructure related studies, as part of the Master Community Plan, will follow the Municipal Class EA Master Planning Process (Approach #2). The level of investigation, consultation, and documentation will be sufficient to address Phases 1 and 2 of the Class EA process to fulfill the requirements for Schedule A and B projects and establish in the documentation the basis for specific future investigations if Schedule C projects are identified. To ensure that these approaches are complete and consistent, the Region plans to retain a Project Manager to assist Regional and Township staff and the consulting teams to coordinate the studies, prepare required meeting notices and correspondence, and to assist in fully complying with requirements for public, stakeholder and agency consultation, as set out in the Planning Act and Class EA processes.

To facilitate consultation, a Technical Advisory Committee (TAC) will be formed comprising staff from the Region, the Township, NPCA, various applicable Ministry representatives, landowner technical representatives and the consulting team(s). For efficiency, it is anticipated that the same TAC will serve all the Master Community Plan consultant studies, with timed items on shared meeting agendas. The TAC will advise and assist in directing the development of the Master Community Plan and its component studies throughout what is anticipated to be a 37 month study process. The TAC will assist in ensuring that the Master Community Plan evolves from the foundational basis of the Subwatersheds Study in a collaborative manner through the integration of the other concurrent consultant studies.

Overall, the Master Community Plan will identify the community structure for Smithville and the expansion lands to ensure appropriate consideration and integration of development opportunities within Smithville. The Master Community Plan will include land use categories, a road/transit/cycling/trail and servicing network, an open space system and major community facility requirements. The objective is to ensure that the new neighbourhoods and employment areas in Smithville and potential expansion lands are developed in a phased and sustainable manner meeting the objectives and requirements of the 2017 Provincial Growth Plan as implemented through the Regional Official Plan and Township's Official Plan. As noted above, the foundation for the Master Community Plan will be defined by the Subwatersheds Study. The natural heritage system established through the Province and Regional Official Plan, refined through the Township's Official Plan, will be further refined or confirmed through the Subwatersheds Study.

A fundamental objective of the Master Community Plan is to ensure Smithville develops as a sustainable community. To achieve sustainability, Smithville will be developed based on the vision to be a compact, complete, healthy, and resilient community. The Master Community Plan will target an increased density of persons and jobs per hectare for the existing urban area

of Smithville and identify an appropriate target density and land use configuration for the expansion lands.

2.0 Context

2.1 Relevant Plans

As required, the Master Community Plan is intended to conform with the 2017 Growth Plan for the Greater Golden Horseshoe, be consistent with the 2014 Provincial Policy Statement, and to be integrated with the Region's Municipal Comprehensive Review process currently underway that includes a Regional Transportation Master Plan 2017 (TMP) and the Regional Water and Wastewater Master Servicing Plan 2016 (MSP). In addition, the Master Community Plan process forms part of the Township's Municipal Comprehensive Review (currently underway). Addressing these layered policy initiatives requires a collaborative process among the three levels of government involved.

As noted in findings of the Region's and the Township's Municipal Comprehensive Reviews, the Township is expected to grow by 14,790 persons and 4,410 jobs to the year 2041. The Region is currently developing a Work Program to accommodate 159,670 persons and 61,960 jobs in the Region by 2041. While some municipalities in the Region have adequate designated lands to accommodate their allocated population growth, the Township of West Lincoln does not. The Master Community Plan exercise is meant to address the quantum of population and jobs in the context of the current Smithville Urban Area and a potential expansion to the Urban Area. The Master Community Plan will determine the final quantum of lands for expansion, the form and function of the current Smithville Urban Area, and development form in the expansion lands.

2.2 Current Status

The SDSA has been delineated through the Township's Municipal Comprehensive Review process. The Township, in conjunction with the Region, has developed this Work Program and related Terms of Reference for studying the development potential and suitability of the current Smithville Urban Area with the SDSA to develop a compact, complete, healthy, and resilient community that would accommodate the population and job growth allocated to the Township of West Lincoln by the Region's Municipal Comprehensive Review. The Work Program and related ToR as well as the SDSA were endorsed by the Township of West Lincoln Council by resolution on December 11, 2017.

3.0 Master Community Plan - Scope and Approach

The structure and approach of the Master Community Plan's Work Program are outlined below.

While proposals submitted in response to this Request for Proposals should respect the key tasks and timelines described below, innovative and creative ideas are welcomed. Any

adjustments to the Work Program will be addressed as an initial task to be undertaken at the beginning of the Study. The finalized Work Program will form the basis for tracking the progress of the Study, including adherence to schedule, budget, and compilation of required deliverables.

PHASE 1 - Background, Characterization, Model Development, and Preliminary Concept Options

Task 1 - Purpose: To gather background information to characterize the context of the existing urban area of Smithville and SDSA, identify Landowner interests, and address the future residential and employment needs of the Township to 2041.

Task 2 - Purpose: From the background information, develop an issues and options list, constraints and opportunities mapping, and models by which to evaluate and test the impacts of alternative future land use scenarios in Phase 2.

Task 3 – Purpose: To determine the proposed extent of the infilling and intensification development opportunities in the existing urban area of Smithville and the need for potential expansion lands in the SDSA.

Task 4 - Purpose: To develop as a Consulting Team, 2 to 4 distinct preliminary community structure concepts implementing Task 3 for screening based on the issues and options list and the constraints and opportunity mapping.

Task 5 – Purpose: To undertake a screening of the preliminary community structure concepts to determine a Preliminary Preferred Concept Option(s) for Impact Assessment in Phase 2.

Task 6 - Purpose: To document the process to meet Class EA requirements.

PHASE 2 - Impact Assessment of Preliminary Preferred Concept Option(s) to determine a Preferred Community Structure Option.

Task 1 - Purpose: Using the background information and models, test and validate the Preliminary Preferred Concept Option(s) through a 2-Stage, iterative Impact Assessment process to determine a Preferred Community Structure Option for the Smithville Urban Area and the proposed expansion lands.

Task 2 - Purpose: To determine preliminary phasing triggers, preliminary cost estimates, and undertake a risk assessment.

Task 3 - Purpose: To confirm and finalize the justification of the actual extent of the potential expansion lands.

Task 4 – Purpose: To document the process to meet Class EA requirements.

PHASE 3 - Finalize the Preferred Community Structure Plan and develop Management, Implementation, and Monitoring Plans and Policies for the Smithville Urban Area and the Potential Expansion Lands

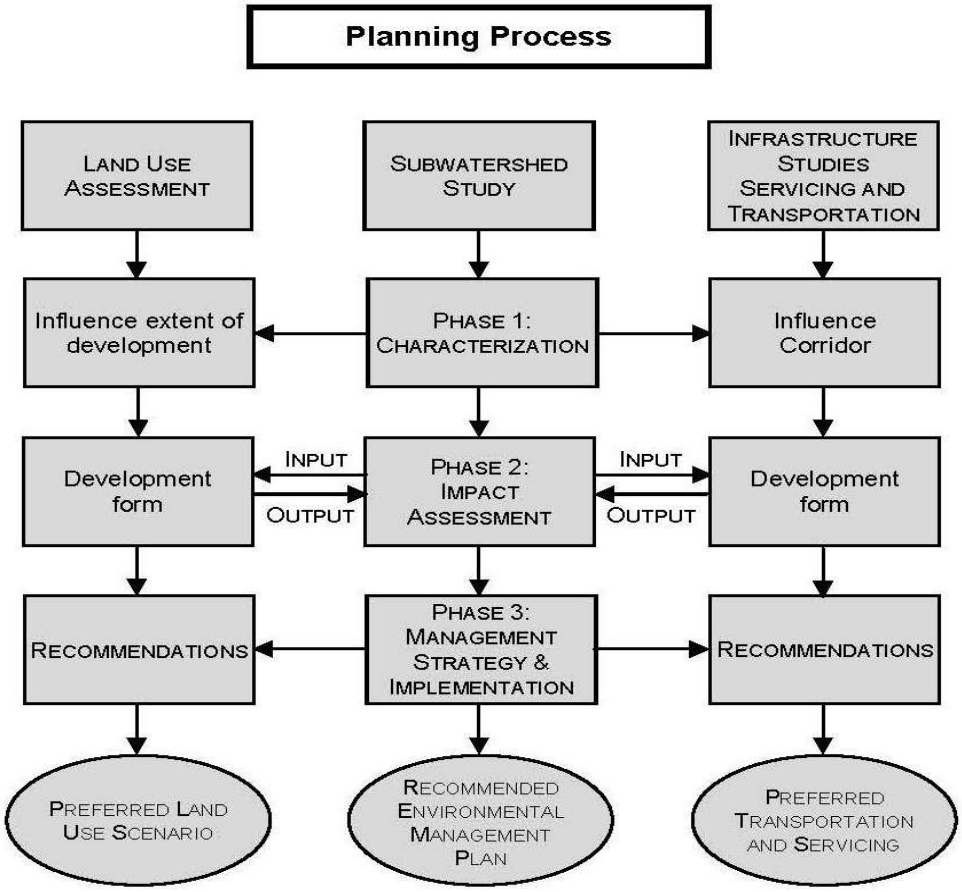
Task 1 – Purpose: To develop Management, Implementation, and Monitoring strategies for incorporation in the Master Plans and Master Community Plan.

Task 2 – Purpose: To finalize the Preferred Community Structure Plan by appropriately incorporating the management, implementation, and monitoring strategies.

Task 3 - Purpose: To finalize the contributing Master Plans for incorporation as appropriate policies in the Master Community Plan and prepare an appropriate implementing Official Plan Amendment to the Township of West Lincoln Official Plan.

Task 4 - Purpose: To finalize the list of identified projects and document the process to meet Class EA requirements.

Figure 2 – Integrated Land Use, Subwatershed, and Infrastructure Study Process



3.1 Planning and Urban Design Tasks and Deliverables

Prepare a Master Community Plan for Smithville that includes the existing urban area of Smithville and a potential expansion of the urban boundary in conformance with Provincial Policy with specific emphasis on the Growth Plan for the Greater Golden Horseshoe (2017) and consistent with the Provincial Policy Statement (2014).

Included in the preparation of the Master Community Plan is the coordination and incorporation of a Transportation Master Plan, a Water and Waste Water Servicing Master Plan, an Agricultural Impact Study, an Aggregate Potential Assessment, and a Fiscal Impact Study. The findings of a concurrent Subwatershed Study, let under a separate contract, will also need to be integrated into the preparation of the Master Community Plan.

Based on the Master Community Plan - Study Scope and Approach identified above, the Planning and Urban Design component of the Master Community Plan shall address the following Tasks:

Vision and Opportunity Statement

- Develop a Vision and Opportunity Statement for the Community of Smithville and potential expansion lands based on the sustainable planning principles to create a compact, complete, healthy, and resilient community.

Compact Community

- Develop and assess community structure options to increase the density of the existing urban area of Smithville to enhance intensification and infilling opportunities.
- Develop and justify a residential and employment density target for the existing urban area of Smithville and potential expansion lands.
- Develop and assess options to meet Regional and Provincial Density Targets for the potential expansion lands.
- Numerically quantify the options to show how the options meet the Density Targets and for incorporation in the models developed by the Subwatershed, Transportation, and Water / Waste Water Servicing Studies to assist with Impact Assessment.
- Determine the extent of the expansion lands required to achieve the objectives of the Vision and Opportunity Statement.

Complete Community

- Develop and assess community structure options that ensure that a full spectrum of community life is offered within Smithville and potential expansion lands. This includes a variety of housing types (including affordable and rental housing), employment, transit, shopping, active transportation options, connections between neighbourhoods

and between the existing urban area of Smithville and potential expansion lands, recreational and social opportunities, and public service facilities and schools.
- Undertake a Commercial Lands Review to understand the existing commercial base and opportunities to enhance the commercial opportunities in Smithville including the enhancement of the vitality and viability of the Downtown Core of Smithville.
- Undertake an Employment Lands Review to understand the existing employment base and opportunities to enhance the employment opportunities in Smithville. The Review should include the consideration of the conversion of employment lands to achieve sustainable community objectives. This Review should build on the Employment Lands Review being prepared by Niagara Region as part of the Region's Municipal Comprehensive Review.
- Undertake a Cultural Heritage Review to understand the built form of the existing urban area of Smithville and the SDSA.
- Develop complete streets program in Smithville based on Niagara Region's "Complete Streets Design Guidelines" and the Regional 2017 TMP in conjunction with the Transportation Consultant.
- Develop urban design guidelines for enhancing the urban core(s) of Smithville.

Healthy Community

- Develop and assess community structure options, in conjunction with the Subwatersheds Study Consultant, which maintains and enhances the environmental context of Smithville.
- Establish the environmental context as a priority in ensuring physical, social, and emotional heath.
- Based on the principles for creating "Walkable Communities" or "Active Neighbourhoods", develop:
    - options for active transportation as viable alternatives to the use of motorized vehicles; and,
    - ensure transit, shopping and employment areas, community facilities, schools, and recreational opportunities form part of walkable neighbourhoods.
- Include local options for community gardens, farmer's markets, and the ongoing viability of neighbouring farms.
- As the built environment influences health, promote a healthy lifestyle through innovative community design.

Resilient Community

- Develop and assess community structure options for creating resiliency for Smithville by reducing energy usage, creating local options for energy generation, maintaining and expanding opportunities for local food sources and grocery outlets, planning for anticipated climate change impacts, developing live/work opportunities, creating a wide variety of housing (including affordable and rental housing) and employment options, and developing balanced employment/residential opportunities.

- Provide a policy framework for developing a Community Energy Plan and a Climate Change Adaptation Plan for Smithville for implementation through Area Block Plans.
- Consider climate sensitive urban design options in the community structure concepts.

Class EA and Planning Act Processes

- Incorporate the Class EA process in each Task and appropriately document the process for submission on the Environmental Bill of Rights Registry.
- Develop a Study Initiation Notice and Public Information Centre (PIC) Notices / Public Meetings for all public engagement.
- Develop a template for presenting information to Council, Stakeholders, Agencies, Indigenous Communities, and the Public at each Phase of the Master Plan process, as applicable.
- Develop an innovative and comprehensive Public Participation Program for engaging and consulting with Council, interested Stakeholders, Agencies, Indigenous Communities, and the Public.
- Develop a plan for appropriately engaging all levels of government in the Planning process.
- Lead the Impact Assessment process to identify, refine, and finalize the Preferred Community Structure Plan and develop appropriate Management, Implementation, and Monitoring Policies to guide the development of Area Block Plans, and plan of subdivision / condominium / site plan / rezoning submissions.
- Ensure the final Master Community Plan is in conformity with Provincial Plans and consistent with Provincial Planning Policy, and is in a form acceptable under the Planning Act as an Official Plan Amendment to be adopted by Township Council and approved by Niagara Region / Province.

Urban Design

- Develop Urban Design Guidelines and Zoning Considerations for new development in the existing urban area of Smithville and potential expansion lands.

3.2 Transportation Master Plan Tasks and Deliverables

Prepare a Transportation Master Plan for Smithville, as part of the Master Community Planning exercise, which addresses the following Tasks:

- Utilize the Niagara Region EMME Model as the basis for developing a “sub area” Multi-modal Transportation Demand Forecast Framework that provides additional levels of detail within Smithville and the WLDSA and supports traffic operation models such as VISSIM or AIMSUN for phasing and timing of infrastructure.
- Using the population, employment, and density targets for the existing urban area of Smithville and potential expansion lands forecast transportation related impacts on the Regional Arterial Road Network and the Township Arterial and Collector Network.

- Provide further background information and operational, timing, and design detail to Regional Transportation Master Plan Projects affecting Smithville to assist in progressing their planning with particular emphasis on the proposed Smithville By-pass and connections with the proposed GO Transit Hub and QEW.
- Identify the existing Arterial / Collector Road Network in Smithville and suggest enhancements.
- Develop and assess new Arterial / Collector Road Network options in the potential expansion lands for connectivity with existing Arterial / Collector Road Network in the existing urban area of Smithville.
- Develop and assess Active Transportation Network options for the potential expansion lands and the existing urban area of Smithville.
- Incorporate Regional Transit Initiatives in the modeling to enhance the use of Transit in West Lincoln – consider a Transit First model that encourages the integration and sustained viability of transit services for inter and intra Regional trips.
- Coordinate with the Planning/Urban Design Consultant on incorporating the "Complete Streets Design Guidelines" recommendations in the planning of Smithville.
- Develop a Phasing Strategy for all proposed Transportation related infrastructure
- Assess Risks associated with the Phasing Strategy and Funding.
- Consider infrastructure resilience to climate change.
- Develop Key Performance Indicators and a Monitoring Program.
- Develop Trip-reduction Strategies that incorporate TDM and Land use considerations.
- Support the development of Policy Directions to implement the Transportation System and Strategies.
- Coordinate and collaborate with the other Master Community Plan disciplines and the Subwatershed Study Consultant.

In achieving the above noted Tasks, the Transportation Consultant will, in collaboration with the Study Team, provide documentation on the following:

- The Transportation modeling framework.
- Two to four distinct preliminary network options for motorized vehicles, active transportation, and transit plans for evaluation.
- A two-stage impact assessment on preliminary preferred concept option(s).
- Level-of-service analysis, transit usage and measures of self-containment for the different land use/transportation options tested.
- Preliminary cost estimates of the planned transportation infrastructure and high level transit operating subsidies of the different options tested.
- Active Transportation strategies, along with approaches to TDM and parking management.
- Phasing Plan for the Preferred Community Structure Plan Concept that identifies triggers/thresholds, horizon years, risk assessment, performance indicators and monitoring program.
- Management, Implementation, and Monitoring Plan for the Preferred Community Structure Plan Option that defines the roles and responsibilities of all partners.

- Assessment of the funding required for the Preferred Community Structure Plan Option and attendant risks, along with possible contingency plans.
- Future transportation requirements to guide the preparation of Area Block Plans and draft plans of subdivision (including input into the delineation of detailed Traffic Zone and Area Block Plan boundaries to be identified as part of the Master Community Plan)
- Presentation materials for TAC, Council, and PIC meetings.
- Identification of outstanding or unresolved issues, including any policy gaps.
- Identification of transportation related infrastructure subject to further Municipal Class EA Study and their appropriate schedule.
- Compliance with EA Master Plan process.
- Documentation of sufficient details to satisfy Phases 1 and 2, up to Step 6 of the Municipal Class EA process.
- The Transportation Master Plan as a component of the Master Community Plan including: finalized transportation infrastructure and transit plan; recommended cycling and pedestrian strategy, and final suggestions for approaches to implementing Land Use policies, TDM, and parking management.
- Conduct and document a high level review of transportation system alternatives as a sensitivity analysis for possible future expansions of Smithville beyond 2041 (See Section 3.6).

3.3 Water and Wastewater Master Servicing Plan(s) Tasks and Deliverables

Prepare a Water and Wastewater Master Servicing Plan(s) for Smithville, as part of the Master Community Planning exercise that addresses the following Tasks:

- Develop Water and Waste Water Flow Models for the existing urban area of Smithville and potential expansion lands building off of the existing Niagara Region 2016 Water & Waste Water MSP models and following Regional and Township standards (using InfoWater and InfoSWMM). The expectations for developing the baseline Water Model and the WasteWater Models can be found in Appendices “B” and “C” respectively.
- Based on the quantified preliminary land use concept option(s) developed for Phase 2 for Smithville and potential expansion lands, assess and forecast Water and Waste Water related impacts on the Township and Regional Water and Waste Water Systems
- Provide further background information and operational, timing, and design detail to Regional Water and Waste Water Projects identified in the Regional Master Servicing Plan that affect Smithville to assist in progressing their planning.
- Undertake an assessment of the existing Water and Waste Water Systems in Smithville and suggest enhancements.
- Develop new Water and Waste Water System options in the potential expansion lands for connectivity with the existing Water and Waste Water System in the existing urban area of Smithville.
- Incorporate Ministry, Regional, and Township Flow Reduction and Water Quality Initiatives in the modeling.
- Develop a Phasing Strategy for all proposed Water and Waste Water related infrastructure for the implementation of the Master Community Plan.

- Assess Risks associated with the Phasing Strategy and Funding.
- Consider infrastructure resilience to climate change.
- Develop Key Performance Indicators and a Monitoring Program.
- Develop Water and Waste Water Flow Reduction and Flow Timing Strategies.
- Support the development of Policy Directions to implement the Water and Waste Water System and Strategies.
- Coordinate and collaborate with the other Master Community Plan disciplines and the Subwatershed Study Consultant.

In achieving the above noted Tasks, the Water and Waste Water Master Servicing Plan Consultants will, in collaboration with the Study Team provide documentation on the following:

- The Water and Waste Water Systems modeling framework.
- Two to four distinct preliminary water and waste water system options for evaluation.
- A two-stage Impact Assessment of preliminary preferred concept option(s).
- Preliminary cost estimates of the planned water and waste water infrastructure of the different options tested.
- Phasing Plan for the preferred Community Structure Plan Concept that identifies triggers/thresholds, horizon years, risk assessment, performance indicators and monitoring program.
- Implementation Plan for the preferred Community Structure Plan Option that defines the roles and responsibilities of all partners.
- Assessment of the funding required for the preferred Community Structure Plan Option and attendant risks, along with possible contingency plans.
- Future Water and Waste Water System requirements to guide the preparation of Area Block Plans and draft plans of subdivision.
- Presentation materials for TAC, Council, and PIC/Public meetings.
- Identification of outstanding or unresolved issues, including any policy gaps.
- Identification of Water and Waste Water System infrastructure components subject to further Municipal Class EA Study and their appropriate Schedule.
- Compliance with EA Master Plan process.
- Documentation of sufficient details to satisfy Phases 1 and 2, up to Step 6, of the Municipal Class EA process.
- The Water and Waste Water Master Servicing Plan as a component of the Master Community Plan including: finalized Water and Waste Water System infrastructure, and recommended flow management strategies.
- Conduct and document a high level review of water and waste water system alternatives as a sensitivity analysis for possible future expansions of Smithville beyond 2041 (See Section 3.6).

3.4 Agricultural Impact Study and Aggregate Potential Assessment Tasks and Deliverables

Prepare an Agricultural Impact Study, including Minimum Distance Separation (MDS) Calculations, for the SDSA to inform the Region's Agricultural Review Study, in collaboration with the Study Team as part of the Master Community Plan exercise, which addresses the following Tasks:

- Characterize the Rural/Agricultural area within and outside the immediate boundary of the SDSA through background information and field studies.
- Assess the priority of the agricultural areas in the SDSA.
- Assess existing Agricultural Operations and Infrastructure in the SDSA and immediate surrounding area.
- Determining MDS Arcs within and outside the immediate boundary of the SDSA.
- Develop an Interim Strategy for existing agricultural operations / lands within the SDSA and potential expansion lands prior to development.
- Develop Phasing Recommendations for development in the potential expansion lands to facilitate the continuance of existing agricultural operations / lands within the expansion lands as long as feasible.
- Provide Development Buffering Recommendations to protect agricultural operations / lands within and outside the immediate boundary of the SDSA.
- Prepare presentation materials for TAC, Council and PIC meetings.
- Coordinate with other Master Community Plan disciplines and the Subwatershed Study Consultant.
- Assist other Master Community Plan disciplines in compliance with Class EA process.

Prepare an Aggregate Potential Assessment for the SDSA that is consistent with Provincial Policy, in collaboration with the Study Team as part of the Master Community Plan exercise, which addresses the following Tasks:

- Characterize the Aggregate Potential within and outside the immediate boundary of the SDSA through background information and field studies.
- Assess the quantity, quality, and priority of the Aggregate Potential Area(s) in the SDSA.
- Assess the capacity for extraction of any identified (from the background information and studies) Aggregate Potential Areas in the SDSA and immediate surrounding area, including impact on Natural Heritage Features/System and existing Community of Smithville, existing residential development and agricultural operations within 120 metres of the Area, and Transportation infrastructure.
- Develop, as appropriate, an Interim Strategy for the Aggregate Potential Areas.
- Prepare presentation materials for TAC, Council and PIC meetings.
- Coordinate with other Master Community Plan disciplines and the Subwatershed Study Consultant.
- Assist other Master Community Plan disciplines in compliance with Class EA process.

3.5 Fiscal Impact Study Tasks and Deliverables

Prepare a Fiscal Impact Study for the Township of West Lincoln, in collaboration with the Study Team, as part of the Master Community Plan for Smithville, which addresses the following Tasks:

- Identify and assess existing Township Projects and Funding.
- Identify and assess the fiscal impact of implementing the Master Community Plan on the Township and Region.
- Develop an Asset Management framework for achieving and maintaining the development and infrastructure contemplated by the Master Community Plan.
- Provide input and recommendations into the prioritization/phasing of Township and Regional infrastructure and public service facilities to support the Master Community Plan.
- Provide input and recommendations for Township and Regional Development Charge updates and other permitted funding sources to implement the Master Community Plan.
- Review and assess Municipal Administrative requirements, Level of Service and required Municipal Fee Structure to implement the Master Community Plan.
- Consider asset resilience to climate change.
- Prepare presentation materials for TAC, Council and PIC meetings.
- Coordinate with other Master Community Plan disciplines and the Subwatershed Study Consultant.
- Assist other Master Community Plan disciplines in compliance with Class EA process.

3.6 Additional Sensitivity Analysis

In addition to the Work Program above, a Phase 4 Analysis is contemplated that would involve a high level review of potential transportation and servicing system alternatives for possible future expansions of Smithville beyond 2041 in the SDSA. This high level review exercise will involve the Water/Waste Water, Transportation, and Planning Consultants and include assistance of the successful SWS Consultant. It would involve using the existing information obtained through Phases 1, 2, and 3 of the SWS.

This exercise should be costed out separately in the Master Community Plan Proposal.

4.0 Summary of Key Timelines

More details on the timelines of the Tasks referenced in the study process outlined in Section 3.0 above are presented in the table below. Meeting the key dates is critical to the timely exchange of information between the concurrent studies (Subwatersheds Study, Master Water/Wastewater Servicing Plan, Master Transportation Plan, and other Community Master

Plan disciplines) involved in the overall development of the Master Community Plan. Schedule adherence is important in terms of the timely completion of the entire process and in ensuring that the conditions of the EA Master Plan process are met, particularly with respect to the public participation requirements.

Phase	Key Dates	Deliverables
	Nov. 2018	Consultant selection
	Nov. 2018 to Feb 2019	Study Initiation / Finalize Study Work Program with the Project Team and TAC
PHASE ONE	March 2019 to April 2020	**Background, Characterization, Model Development, and Concept Options**
	March 2019	With TAC determine and finalize the information gathering process, modeling framework, and modeling assumptions
	Dec. 2019	The Planning Consultant in collaboration with the partner consultants (including Subwatersheds Study Consultant) identify 2 to 4 preliminary concept options and conduct a preliminary evaluation of the options.
	Jan. 2020	Bring forward preliminary concept options and preliminary evaluation to the TAC for review and confirmation, including Class EA process requirements
	March 2020	Present the 2 to 4 preliminary concept options and identify issues to Council
	April 2020	Attend the first Public Information Centre (PIC #1) where background information and preliminary concept options will be presented
PHASE TWO	May 2020 to April 2021	**Impact Assessment and Preferred Community Structure Option**

Phase	Key Dates	Deliverables
	May 2020 to Sept. 2020	Following the PIC determine a preliminary preferred concept option. Conduct a 1st Stage Impact Assessment on the preliminary preferred concept option and present and document to TAC the results of the option(s) testing and validation, in as part of the Community Structure Plan development. Based on the results of the 1st Stage Impact Assessment, revise the preliminary preferred concept option for 2nd Stage Impact Assessment.
	Oct. 2020 to Jan. 2021	Conduct 2nd Stage Impact Assessment on the revised preliminary preferred option and present the results toTAC and finalize a preferred community structure option.
	Feb. 2021	Prepare and document Class EA process, preliminary development policies and strategies and possible directions for approaches to management.
	April 2021	Attend and prepare presentation material for Council and the subsequent PIC #2 meeting and provide the preferred community structure option.
PHASE THREE	May 2021 to Dec. 2021	**Monitoring, Management, and Implementation Recommendations**
	June 2021	Present monitoring, management, and implementation strategies to finalize the preferred community structure plan, including Class EA process requirements, to the TAC.
	Aug. 2021	Present and document, in final report form, the full Master Community Plan for Smithville that addresses the preferred community structure plan (including all the individual Master Plans that includes the Class EA process, elements of phasing; implementation; monitoring; costing/funding; risk analysis; development strategies; management directions, urban design requirements and Official Plan Amendment(s)).
	Sept. 2021	Prepare presentation material for and attend PIC #3/Public Meeting of Council

Phase	Key Dates	Deliverables
	Nov. 2021	Attend and prepare presentation material for the meetings of Council for adoption of Master Community Plan
PHASE FOUR	Post Dec. 2021	**Additional Sensitivity Analysis (if required)**
	April 2022	Conduct and document a high level review of transportation and servicing system alternatives beyond 2041.

5.0 Summary of Consultation / Meeting Requirements

The minimum consultation requirements for the development of the Master Community Plan are:

Technical Advisory Committee (TAC) meetings - It is anticipated that there will be a need for the Master Community Plan (MCP) Consultant Team (all disciplines) to attend at least three (3) TAC meetings in each of the first and second phases of the study and one (1) TAC meeting in Phase 3. Proposals should also include costing for up to two (2) additional TAC meetings during the assessment of the preferred community structure option in Phase 2, for a total of nine (9); It should be assumed that the TAC Meetings would be half day events.

TAC Workshops: in addition to the meetings cited above, the scope is to include one (1) full day TAC Workshop in each of Phases 1 and 2. (Total of two (2) events). These would similarly need to be attended by representatives of all disciplines.

Council - The Prime MCP Consultant will be required to attend the Committee / Council meetings that precede the Public Information Centres (PIC #1, PIC #2, and Public Meeting/PIC #3) and one final Council Meeting where Council will consider the adoption of the Master Secondary Plan (Official Plan Amendment). (Four (4) Meetings in total)

Public Information Centres – The MCP Consultant Team will need to attend all PIC's. (Total of three (3) PIC's) with appropriate team representation.

Project Team meetings: Throughout the Work Program, the Prime MCP Consultant (with other consultants appropriately represented based on key discussion topics) will need to meet with the Project Team for the Master Community Plan, in order to gather relevant information, receive feedback on the Study's progress, and coordinate findings. Project Team meetings should be assumed to be of half day duration and occur at least every three months, with agendas and materials distributed by the Project Manager five days in advance of the meeting (est. total of 12 meetings).

Additional meetings/teleconferences may be required during the Work Program involving:

- Township and Region Commissions and Departments
- Agencies (e.g. Provincial, NPCA)

- Landowner groups and their consultants
- Township Councillors

Proposals should identify the number and cost of these meetings incorporated in the Budget.

Proposals should also identify the rates and costs for additional meetings not indicated in the Proposal.

Note: Meetings identified in Appendix "B" and "C" would be in addition to the Meetings identified in this Section.

6.0 Study Data and Information Agreements

The Township requests the transfer of all consultant files of draft and/or final digital information or models (GIS, AutoCAD, or other) upon completion of the Project.

All study data, reports and presentation material are to be supplied to the Township and Region in a format compatible with Microsoft Office Suite 2007 (Word, Excel, Access, and PowerPoint), and ESRI Shape Files or Geodatabases.

Coordinates shall be to real UTM coordinates in NAD 83 (CSRS) Datum.

All required deliverables should be submitted in a format acceptable to the Township and compatible with posting on the Township's project website.

7.0 Budget

Proposals will include an estimated budget broken down by Phase and Task for each component discipline to address the work outlined in Work Program.

The cost of the Additional Sensitivity Analysis shall be identified separately from the overall cost for the Project.

8.0 Project Management

The Master Community Plan, the Subwatershed Study and the other concurrent studies, will be managed by a Project Manager of the Township and/or Region. The task of the Township/Region Project Manager is to coordinate, manage, and oversee the overall work effort related to the development of the Master Community Plan and Subwatershed Study.

The successful Prime Consultant will keep the Project Manager apprised of all correspondence or contact with internal or external stakeholders/agencies. All correspondence with internal or external stakeholders/agencies and the public will be through the Project Manager or designated representative. Periodic updates of the status of study activities and any other

questions related to the scope, schedule, budget, or study deliverables will be directed to the Project Manager or designated representative.

9.0 Experience

The Prime Consultant(s) selected to undertake the Master Community Plan will demonstrate a proven track record of managing such large-scale planning exercises. The expertise of supporting consultants will also be key to a successful proposal.

The Consultant(s) will need to understand the interrelationship between land use planning, transportation initiatives, infrastructure development, the agricultural context, fiscal responsibility, and the concurrent Subwatershed Study. Knowledge of, and experience in, innovative community planning, practical and functional urban design, maximizing strategic transportation and servicing infrastructure, progressive asset management, costing and funding opportunities and other important community building aspects will be advantageous.

Demonstrated knowledge of the Ontario and Federal Environmental Assessment process, and specifically the Municipal Class Environmental Assessment process, is mandatory.

APPENDIX "A" – LIST OF BACKGROUND DOCUMENTS AND RELEVANT INFORMATION AVAILABLE FOR REVIEW AT THE TOWNSHIP OF WEST LINCOLN

Agrology – Agricultural Screening

- Agricultural Screening Report for the Smithville Growth Management Study. Colville Consulting Inc. November 2008.
- Agricultural Screening Report Update. Colville Consulting Inc. June 2015.

Municipal Infrastructure – Water and Wastewater

- Smithville Strategic Growth Management Plan – Expansion Study Areas and Sanitary and Water Servicing – Township of West Lincoln, Region of Niagara. Philips Engineering Ltd. September 2006.
- Addendum to Smithville Strategic Growth Management Plan – Water and Wastewater Servicing – Township of West Lincoln, Region of Niagara. Philips Engineering. November 2008.
- Community of Smithville – Water and Wastewater Servicing Study. AMEC Environment and Infrastructure. June 2013.
- Wastewater Servicing – Smithville Update (Letter to Brian Treble). AMEC Environment and Infrastructure. February 2014.
- Wastewater Servicing – Smithville (Letter Report to Brian Treble). AMEC Foster Wheeler. May 2015.

Transportation

- Traffic Analysis for Proposed Urban Settlement Adjustment, Community of Smithville, Township of West Lincoln. Crozier Associates. May 2015.

Land Use Planning

- Employment Land Development Strategy and Smithville Intensification Study. MHBC. July 2011.
- Peer Review: Township of West Lincoln Growth Management Strategy. MHBC. September 2011.
- Land Analysis Report. MHBC. October 2012.
- Urban Settlement Area Expansion Analysis Report. MHBC November 2013.
- Township of West Lincoln Urban Settlement Expansion Analysis: Addendum (Letter to Brian Treble). MHBC. March 2014.
- Smithville Trails and Corridors Master Plan – Final. GSP Group. March 2012.
- Building Height Study – Township of West Lincoln 2018.

APPENDIX "B" – EXPECTATIONS FOR BASELINE WATER SYSTEM MODEL FOR SMITHVILLE

PROJECT SCOPE

General:

In support of the Region's 2016 Master Servicing Plan, the Region updated its existing Smithville Water Distribution System model. The newly updated Smithville model consists primarily of a trunk main system, booster station, and water tower network model with extensions into the local collection system to characterize local system performance on a sub-trunk level. As part of the model update, the Smithville water system fire flows were updated using available Regional hydrant data.

The Township of West Lincoln is requesting to model the local system to leverage this recent work as a build on to the newly updated Regional model. The Regional Model will be updated using water billing data to augment the current hydrant data.

This work is being undertaken to support the Township of West Lincoln's needs in relation to the community of Smithville and administration of the project will be coordinated primarily through the Master Community Plan. The final project deliverables including the expanded model will be provided to both the Township and the Region. A Memorandum of Understanding will be developed between the Township and Region to facilitate the transfer, use, and updating of the Model by both parties.

The updating of the Model will be in conjunction with the Region's Spatial Data Working Group to ensure alignment with the Niagara Integrated Infrastructure Mapping System (NIIMS).

The Modeling process and projects identified by the process must satisfy Class EA Phase 1 and 2 requirements.

The Modeling process should allow for an assessment of Water System requirements beyond the projected 2041 Planning horizon.

Note: Meetings identified in Appendix "B" would be in addition to the Meetings identified in Section 5.

Objectives:

The objective of this modeling exercise will be to determine water system upgrades needed to support the build out of the Smithville community and potential urban boundary expansions. This includes:

- Updating and re-calibrating the local water model based on available hydrant test data and water billing records.

- Completing land use analyses to determine build out demands and fire flow requirements.
- The level of service under fire flow conditions considering Ontario Building Code (OBC), Fire Underwriters Survey (FUS), Ministry of Environment and Climate Change (MOECC) and other methodologies will be reviewed and a Township Fire Flow Standard recommended by the Consultant for incorporation in the model.
- Identify which portions, if any, of the W-M-006 project: New Trunk Main in Smithville needs to be constructed.
- Review alignment options and staging of the watermain upgrades.
- Meet Class EA Phase 1 and 2 process requirements.

Further, the water system assessment and recommendations will need to account for:

- Currently planned local watermain upgrades and replacements within the Smithville water system.
- Serviceability of future urban boundary expansions along the boundaries of Smithville.

Available Information:

In support of this analysis, the following information will be provided:

- GIS records of the Smithville Water System including pipe material and diameter information
- Development layouts for the Smithville community and potential urban boundary expansions in GIS, including:
    - Arterial/Collector Road layout
    - Development capacity (number of units etc)
    - Staging and timing

  to allow coordination with future road and development needs
- Planned short-term watermain upgrades/replacements
- Historic hydrant test results
- Regional Fire flow targets for the potential development areas

Work Plan:

The proposed Work Plan is as follows:

Task 1 – Baseline System Understanding: The first Task consists of collecting and reviewing baseline information in order to establish baseline system understanding. This includes:

- A Project Kickoff Workshop
- Collection and review of relevant data
- Update of the Region's existing water system model in conjunction with the Region's Spatial Data Working Group based on:

  - Available hydrant data
  - Available Water Billing Records
  - Local water system data

  to ensure alignment with the Niagara Integrated Infrastructure Mapping System (NIIMS)
- Review of available growth data and confirmation of:
  - Development growth scenarios
  - Development phasing
  - System level of service objectives
- Confirmation of planning water system upgrades/replacement
- Review of fire flow level of service options including OBC, FUS, MOECC and other methodologies and applying these levels of service for the Smithville community and potential urban expansion areas to determine a recommended Fire Flow Standard for Smithville.

Task 2 – Infrastructure Needs Assessment: The second Task consists of identifying, with the Region and Township of West Lincoln, the water system upgrades needed to support full build out of the Smithville community and potential urban expansion areas. This includes:

- Review of the capacity of identified short-term upgrades to address existing water system capacity limitations and short-term developments.
- Review of trunk alignment options and evaluate the advantages and disadvantages of:
  - Servicing potential urban boundary expansion areas
  - Integration with the existing water system
  - Identification of local and trunk watermains needed to support identified build out densities
  - Identification of upgrade triggers based on development phasing and timing
  - Identification of water infrastructure costs.
- Allow for assessment of water system infrastructure requirements beyond the projected 2041 Planning horizon.

Task 3 – Project Recommendations: The final Task consists of identifying the recommended Water Servicing Strategy. This includes:

- A Workshop with the Township and the Region to analyze results and recommendations, and to specify required upgrades to maintain the needed level of service.
- Recommendations for a Township Fire Flow Standard.
- Memorandum of Understanding for the shared use of the updated Water System Model between the Region and West Lincoln.
- Complete project reporting outlining the project assumptions, methodology, and results.
- Identify projects to satisfy Class EA Phase 1 and 2 requirements.

APPENDIX "C" – EXPECTATIONS FOR BASELINE WASTEWATER MODEL FOR SMITHVILLE

PROJECT SCOPE

I. General:

In support of the Region's 2016 Master Servicing Plan, the Region updated its existing Smithville Wastewater trunk model. The newly updated Smithville model consists primarily of a trunk collection system and pump station network model with extensions into the local collection system to characterize local system performance on a sub-trunk level. As part of the model update, the Smithville system base dry weather flows were updated using available Regional flow monitoring data (at existing pump station and regional flow monitors) and peak wet weather flow rates (L/s/ha) were estimated at a catchment level.

The Township of West Lincoln is requesting to model the local system to leverage this recent work as a build on to the newly updated Regional model. Therefore, the wet weather flow response will be updated to support the Township's reporting requirements.

This work is being undertaken to support the Township of West Lincoln's needs in relation to the community of Smithville and administration of the project will be coordinated primarily through the Master Community Plan. The final project deliverables including the expanded model will be provided to both the Township and the Region. A Memorandum of Understanding will be developed between the Township and Region to facilitate the transfer, use, and updating of the Model by both parties.

The process to update the Model will be in conjunction with the Region's Spatial Data Working Group to ensure alignment with the Niagara Integrated Infrastructure Mapping System (NIIMS).

The Modeling process and projects identified by the process must satisfy Class EA Phase 1 and 2 requirements.

The Modeling process should allow for an assessment of Wastewater System requirements beyond the projected 2041 Planning horizon.

Note: Meetings identified in Appendix "C" would be in addition to the Meetings identified in Section 5.

II. Existing Infrastructure Info Needs Assessment

This first stage consists of coordinating with the Township and the Region to review the modeling needs and to confirm the scope of the modeling assignment. The following information will be provided to support this modeling assignment through the transition of the trunk sewer model to the All-pipe model including the local collection system:

- Multi-year flow in system flow monitoring records with supported QA/QC review and rainfall data
- GIS records of the collection system including pipe material, diameter, and invert information
- CSO inventory and records including listing of: overflow size, overflow elevation, downstream controls, and drawings (either record drawings or field inspection with schematic)
- Annual water billing records geo-coded to existing property parcels

It is envisioned that the work activities will include:

- A review of the Township's available information and identification of any potential data gaps.
- Meeting with the Township and Region representatives to walk through the proposed scope of works, methodology, and deliverables.
- Complete a level of service workshop with the Township and Region to confirm the level of service scenarios and criteria that will be used to measure Smithville's sewer system performance.
    - Confirmation of model and analysis scenarios
    - Confirmation of Reporting requirements
    - Confirmation of Inflow/Infiltration analysis scope
- Complete a data gap review and action plan of the provided information including identification of any required fieldwork to address any critical data gaps.

Deliverables
Work Plan
Request for Information (RFI)
Information Gap Study
Field Work Terms of Reference (if Required)

III. Baseline System Modeling and Model Calibration

This stage consists of updating and re-calibration the Smithville model and baseline system review. The updated model shall meet the following requirements:

- Be an All-pipe model that incorporates all Regional and Township owned wastewater and combined collection and conveyance infrastructure
- Modeling catchments will be delineated on a pipe by pipe basis, with baseline flows allocated using existing water billing records
- System sewershed will on average have an equivalent servicing population of 2,500 people. – *To be confirmed at the initial meeting*
- Include a dynamic wet weather flow response, using RTK method, to allow for both peak flow/HGL analysis and volume/overflow analysis

- Include all Township and Region owned PS, CSO, and siphons, including downstream forcemain and control structures

The following design scenarios are to be included in the final model:

- Dry Weather Flow – 2016 & 2041
- Wet Weather Flow – 2016 & 2041
- System capacity based on the Regional Design incorporating 0.286 L/s/ha as an I/I allowance
- 2 Year Storm – 2016 & 2041
- 5 Year Storm – 2016 & 2041
- Average Year Storm for the F-5-5 Reporting requirements – 2016

Recognizing that the updated model will be calibrated using an expanded source of data, it is understood that the updated model will not match the existing MSP model completely. However, at key locations within the Regional System the updated model results are expected to be consistent with the current MSP model under the critical MSP design scenario.

The assignment will consist of the following key tasks:

- Expand the collection network to include all Regional and Township owned pipes
- Review and update configuration of the system CSO, PS, and Siphons
- Delineate the catchments at the pipe level using automated methods and the Township's parcel information
- Allocate the existing water billing records to parcels using the geo-code billing information and newly delineated catchments
- Delineate the system sewershed using:
    - Township and Regional flow monitoring locations
    - Siphons, CSO, and PS locations
    - Changes in system pipes (combined and separated sewer)
- Complete analysis of existing flow information to define existing:
    - Ground water infiltration rates
    - Rapid inflow
    - Delayed inflow
    - Infiltration
    - Dry weather flows
    - Observed critical precipitation events in the context of Smithville's IDF curve
    - QA/QC of data to determine suitability for model calibration
- Calibrate dry weather flows on a sewershed level by globally adjusting the sewershed diurnal curve, GWI, and billing data to base flow conversion rate
- Calibrate the model's dynamic wet weather flow response to a minimum of three critical events. Calibration will be completed by globally adjusting the sewershed RTK parameters

- Develop baseline existing and growth system scenarios:
    - Design scenarios to be included in the model will be identified at the level of service workshop
    - System growth will be added based on the identified growth parcels developed through the MSP and new existing data
    - Following the model update, a baseline analysis of the existing system will be completed
- Project Workshop with Township and Region staff to validate results of the baseline model

During this phase, any identified fieldwork shall be completed. The required fieldwork will need to be coordinated and approved by the Township and Region before any work proceeds.

Deliverables
Baseline Model
Flow Monitoring Results Analysis
Stage Summary Report (Calibration and Baseline Performance)

IV. Inflow/Infiltration Analysis

This stage consists of completing design event analysis to identify existing areas of high inflow and infiltration and developing a preliminary monitoring and investigation plan to support the Township's ongoing inflow and infiltration reduction program.

It is expected that through this process, the Consultants will characterize the system inflow and infiltration responses on a sewershed levels and:

- Identify areas in Smithville with:
    - High inflow, high infiltration and likelihood of sources based on the analysis
    - Areas with high wet weather system HGL which are at increased risk of basement flooding
    - Major CSO locations
- Utilize the system performance results to develop an inflow and infiltration elimination/reduction program
    - Identify candidate areas for inflow reduction and areas for infiltration reduction
    - Develop draft flow monitoring program
        - Identify long-term flow monitoring locations for permanent monitoring
        - Develop a short-term monitoring approach and identify locations for candidate catchments
        - Identify likely sources and potential remediation actions within candidate catchments

The inflow/infiltration analysis will consist of the following key tasks:

- Complete wet weather system sewershed analysis utilizing the updated model
- Develop an inflow and infiltration elimination/reduction program
- Facilitate a workshop to review draft program.

Deliverables
Inflow/Infiltration Analysis Report
Inflow/Infiltration Monitoring Program
Stage Summary Memo

Township of
West Lincoln

APPENDIX No. 1

Terms of Reference

Smithville Karst Review and Study

SEPTEMBER 2018

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1.0 PURPOSE & OBJECTIVES OF THE KARST REVIEW AND STUDY

The purpose of the Smithville Karst Review and Study is to assist in developing a sustainable development plan for Smithville through ensuring maximum protection and benefits to the natural and human environments. The Karst Review and Study is intended to enhance the knowledge of the karst environment within the Smithville Development Study Area (SDSA) and the urban area of Smithville and incorporate an approach that will limit the impact of future development on the hydrogeologic regime. The findings of the Karst Review and Study will be considered in establishing the land use and associated management strategies as an element of the overall Subwatershed Study objectives and targets.

The Karst Review and Study will provide the following:

- Review all existing information regarding the karst terrain in the SDSA and existing Smithville Urban Area including the existing Phase 1 Study for the Smithville Area prepared by Terra Dynamics and the Journal of Hydrology Article entitled "A Field Investigation of Groundwater/Surface Water Interaction in a Fractured Bedrock Environment" (A Study of Groundwater/Surface Water interaction between Twenty Mile Creek and the local aquifer in Smithville) prepared by Jaime P.A. Oxtobee, and Kent Novakowski (These Studies are attached at the end of the Appendix);
- Based on the Review, confirm the Work Plan;
- Coordinate the Karst Work Plan with the Subwatershed Study and Master Community Plan Work Programs;
- Identify the location, extent, and sensitivity of the karst terrain in the Study Area;
- Identify associated development constraints and opportunities;
- Identify lands where development may be considered, and determine how future land uses can be developed compatibly with karst features and functions;
- Through the broader land use study and Subwatershed Study, participate in a two-stage, iterative Impact Assessment based on a Preliminary Community Structure Concept(s) (This inherently will require establishing an initial land use concept which will need to be tested and assessed, followed by a refined land use concept developed through the feedback from the initial testing);
- Provide direction on Karst-specific best management practices (BMPs) to support the implementation of the Preferred Community Structure Plan (from an environmental context and water management perspective), as part of the overall Subwatershed Study;
- Support the Class Environmental Assessment process undertaken as part of the infrastructure planning for the Master Community Plan, including water, wastewater, stormwater and roadway infrastructure.

2.0 BACKGROUND INFORMATION

Karst topography or karst terrain is a type of landform that is typically characterized by sinking streams and additional karst features. Karst terrain forms in carbonate rock environments such as dolostone or

limestone which are present within the Niagara Peninsula Conservation Authority watershed on the Niagara Escarpment. Karst features that can occur in these carbonate rock environments include soil pipes, sinkholes, sinkpoints, fissures or grikes, integrated subsurface conduits, caves and springs. The Niagara Peninsula Conservation Authority (NPCA) prepared an inventory of areas affected by karst topography within its jurisdiction in 2006, which is documented in "Geologic Hazard Mapping, Karst Topography, Phase 1, NPCA Watershed Area" (Terra-Dynamics Consulting Inc., 2006).

Urban development within areas subject to karstification is subject to constraints. These can include the following - from the extreme level to the lowest level of constraint(s):

i. Complete restriction to development per the Provincial definition of a hazardous site (see below);
ii. Limitations to development with the inclusions of remedial measures; and/or
iii. Best management practices and contingency plans to minimize potential impacts.

In order to fulfill the requirements of the Provincial Policy Statement (PPS) (2014) pertaining to karst, a Karst Review and Study will be required to assess constraints and opportunities to development from both the perspectives of delineating hazards and identifying environmental or ecosystem-based concerns. Both of these perspectives are further described and defined herein. Hazards associated with karst are addressed in Section 3.1.5 and 3.1.7 of the PPS (2014).

The Provincial Policy Statement (2014) defines hazardous sites in Section 6.0 as:

"Hazardous sites: means property or lands that could be unsafe for development and site alteration due to naturally occurring hazards. These may include unstable soils (sensitive marine clays [leda], organic soils) or unstable bedrock (karst topography)."

Section 3.1.5 of the PPS indicates:

"Development shall not be permitted to locate in *hazardous lands* and *hazardous sites* where the use is:
a) an *institutional use* including hospitals, long-term care homes, retirement homes, pre-schools, school nurseries, day cares and schools;
b) an *essential emergency service* such as that provided by fire, police and ambulance stations and electrical substations; or
c) uses associated with the disposal, manufacture, treatment or storage of *hazardous substances*."

Section 3.1.7 of the PPS indicates:

Further to policy 3.1.6, and except as prohibited in policies 3.1.2 and 3.1.5, *development* and *site alteration* may be permitted in those portions of *hazardous lands* and *hazardous sites* where the effects and risk to public safety are minor, could be mitigated in accordance with provincial standards, and where all of the following are demonstrated and achieved:

a) *development* and *site alteration* is carried out in accordance with *floodproofing standards*, *protection works standards*, and *access standards*;
b) vehicles and people have a way of safely entering and exiting the area during times of flooding, erosion and other emergencies;
c) new hazards are not created and existing hazards are not aggravated; and
d) no adverse environmental impacts will result.

The intent of the PPS (2014) as it pertains to karst terrains can be summarized as follows:
1. To assess the risk to public safety and property with respect to karst hazards; and,
2. To identify environmental concerns regarding areas subject to karst terrain.

2.1 Guidance from the Ministry of Natural Resources and Forestry regarding Karst Hazards

Responsibility for the management of karst hazards related to structural failures lies with the Ontario Ministry of Natural Resources and Forestry (MNRF). The MNRF provides an introductory guide to Policy 3.1 of the PPS (2005) in the document Understanding Natural Hazards (MNR, 2001). This document also helps explain the intent of the current Provincial Policy Statement.

MNRF has also prepared an in-depth technical guide to identifying and managing natural hazards, entitled “Hazardous Sites Technical Guide” (MNR, 1997). It provides a specific methodology for identifying and evaluating hazardous sites and also provides examples of procedures for mitigating karst hazards where development is permissible.

Further to this document, the MNRF produced a report entitled “Karst Hazard Mitigation, Next Steps Strategy for Ontario” MNRF (2008). That study addresses karst-related hazards in the context MNRF’s responsibility for their management and presents the next steps and strategy to mitigate those hazards in accordance with MNRF’s emergency management and source water protection mandates. This pertains specifically to the structural and flooding aspects, and potential water quality impacts of karst hazards, respectively.

2.2 Karst Terrain Natural Hazards

Karst terrain, relative to hazard potential, is where carbonate bedrock has the potential to further erode when exposed to flowing water through erosion or dissolutionally through the enlargement of joints (fissures) and/or bedding planes. This mechanism has the greatest potential to occur when carbonate rock (limestone and/or dolomite) is exposed at surface or where shallow soil deposits overlay carbonate rock. Animal burrows or decaying tree roots have the potential, when exposed to flooding conditions over time, to act as soil pipes to convey water to the top of rock and initiate the erosion and/or dissolution process. Hazards can take on the form of sinkhole subsidence or bedrock collapse causing funnel shaped depressions with associated integrated subsurface conduits that have further potential to subside. These sinkholes can flood during storm events when the runoff flowing into a sinkhole exceeds the capacity of the storage of the sinkhole, subsurface conduit(s) and the discharge capability of the outlet or spring. In areas where groundwater is used for water supply, the process of quickly being able to transmit significant quantities of water into, and out of, the usually porous carbonate bedrock aquifer creates an increased potential for groundwater contamination. Groundwater contamination can further be exacerbated by infilling the sinkhole with trash material in an attempt to fill in the void.

2.3 The Occurrence of Karst Terrain in the Smithville Area

"In the Smithville Area, the Eramosa Member of the Lockport Formation makes-up the bedrock surface. The Smithville Area was subject to intensive geologic and hydrogeologic studies during the characterization of the property associated with the Smithville Phase IV Bedrock Remediation Program (2002). A thorough description of the geology and hydrogeology of the Smithville Area is provided in Golder Associates Ltd (1990), karst potential by Acres Associates (2001) and karst features of neighbouring quarries by Worthington and Ford (1999).

Golder Associates (1990) described bedding planes in the Eramosa Member and the Vinemount Member as major primary flow zones. Acres Associates (2001) and Worthington and Ford (1997) describe the location of the Smithville Cave within a tributary of Twenty Mile Creek located in the Town of Smithville to be approximately 250 m long with an average aperture (opening) of 0.8 m. They describe the cave to be a product of solution-enhanced enlargement along a bedding plane of the Eramosa Member of the Lockport Formation and that it appears to be an isolated case due to its proximity to Twenty Mile Creek and other hydraulic forces that may have accelerated the erosion of the cave. (A map of the cave and CWML site is as presented by Acres Associates (2001) is included at the end of the Appendix*.) Mapping performed as part of the Phase I Study* (prepared by Terra-Dynamics for the NPCA*) show that the formation of the karst features associated with the Smithville cave is not an isolated case.*

Acres Associates (2001) describe instantaneous drilling bit drops during the monitoring well installation program around the former CWML site. They describe several bit drops of 1 to 10 cm and one drop of approximately 1.0 m in the Eramosa Member. They also describe bedding plane interconnection in the Eramosa Member between boreholes 15 m apart during the use of pressurized air in the drilling programs.

An immature sinkhole feature within the Eramosa Member is located west - southwest of Smithville adjacent to a housing development. It is a fluviokarst feature that is located within an intermittent drainage channel that is a tributary of Twenty Mile Creek. The drainage presently discharges into a storm water management pond and storm sewer associated with the housing development.

2.4 The Geologic Hazard Mapping Study, Karst Topography, NPCA Watershed Area Phase 1 Report

The Phase 1 Report prepared by Terra Dynamics for the NPCA (2006), indicated further study of the Karst topography in the Smithville Area was warranted and recommended the following hazard assessment criteria.

"The following issues must be addressed when developing on karst:

- *Storm water drainage: When the amount of paved surface is increased in developments, the rush of extra water gathered over the area can cause flooding.*
- *Utilities: Buried utility lines can serve as a focus for sinkhole development, as they provide a break in the bedrock for storm water to enter and slowly dissolve it.*
- *Groundwater contamination: Because water moves rapidly through karst, and undergoes little filtration, groundwater in karst areas is easily polluted. If contaminants are introduced into a karst system, they will spread quickly.*

- *Flooding: Sinkholes and conduits may become blocked with debris and litter, resulting in back-up and flooding. Sinkholes are often used as a convenient place to place trash……*

The recommendations went on to suggest that development proposals should not be approved in areas identified as having karst topography or in other areas where there is evidence to suggest the presence of unstable soils or bedrock, unless:

a) *"Sufficient soils and engineering information (a geotechnical report prepared by a qualified engineer) is provided to indicate that, although the site is identified as having unstable soils or bedrock, it is suitable for development;*
b) *Alterations to the site will not result in adverse environmental impacts;*
c) *Alterations to the site will not aggravate hazards elsewhere or create new hazards; and*
d) *The development does not include the disposal, manufacture, treatment, or storage of hazardous substances.*

Geotechnical studies will determine potential karst or unstable soil risks for proposed development sites identifying the soils, geology, and hydrology above and below the surface of the site. These studies should define the nature and limits of possible design, construction, and operating concerns that could result from the presence of karst or unstable soils.

Note: The wording in *italics* are excerpts from "Geologic Hazard Mapping Study, Karst Topography, Phase I Report" prepared by Terra-Dynamics Consulting Inc. (2006) for the Niagara Peninsula Conservation Authority.

2.5 Karst Assessments

As noted earlier, based on the PPS (2014), a Karst Assessment is required prior to any land development or alteration if karst topography is present or suspected. The purpose of Karst Assessments is to identify:

(i) potential safety concerns to the public and property as is described in Section 2.0 herein; and,
(ii) potential interferences with the ecological function of the sinking water and the discharge point(s) of the sinking water.

The two documents that MNRF has developed, namely the Hazardous Sites Technical Guide (MNR, 1997) and the Karst Hazard Mitigation, Next Steps Strategy for Ontario (MNR, 2008) deal with identifying and managing natural hazards. They provide a specific methodology for identifying and evaluating hazardous sites and also provide examples of procedures for mitigating karst hazards where development is allowed. Within the Guide document, there is a recommended approach that is summarized in Table 5.1 of the Guide, a "Checklist for Development in Karst Terrain". This recommended approach forms the basis of the Work Plan described in Section 4.0 of this document

2.6 Policy Implementation/Management/Monitoring

As each karst-related setting is unique, similarly unique planning policies, standards and guidelines, will be required to properly address future land development plans in areas affected by karst. It is recommended that where karst terrain in the subject Study Area karst is exhibited, the areas be subject to a karst assessment to evaluate both potential hazards to public safety and potential impacts on

ecosystems associated with the karst features. The goal of this Karst Study is to provide guidance and associated criteria that should be considered during a detailed karst assessment,- where necessary and when development is proposed, and assist in the development of recommendations for a karst risk assessment, contingency plans, and management/monitoring plans.

3.0 GAP ANALYSIS/WORK PLAN CONFIRMATION

3.1 Gap Analysis:

In addition to the relevant Documents for Review listed in the body of the Subwatershed Study Terms of Reference, the successful karst consultant will also review existing desk-top information relevant to the Karst Review and Study. The additional Documents to be reviewed include, but are not limited to:

- Acres Associates. 2001 – September. Agreement 603-100, Task 6, Deliverable 9 – Solution-Enhanced Features at the Smithville Site. Smithville Phase IV Bedrock Remediation Program.

- Bolton, T.E. 1957. Silurian Stratigraphy and Paleontology of the Niagara Escarpment in Ontario. Geological Survey of Canada, Memoir 289, 153 p, 12 pl.

- Buck, M., Worthington, S.R.H. and D.C. Ford. 2002. Evaluation of the Eramosa Karst in Stoney Creek, Ontario as a Candidate for an Earth Science ANSI. Prepared for the Ontario Ministry of Natural Resources and the Region of Hamilton-Wentworth.

- Feenstra, B.H. 1975. Quaternary Geology of the Grimsby Area, Southern Ontario: Ontario Division of Mines, Preliminary Map P. 993, Geologic Series, Scale 1:50,000. Geology 1974, NTS Reference 30 M/4.

- Feenstra, B.H. 1984. Quaternary Geology of the Niagara-Welland Area. Ontario Geologic Survey. Map 2496. Quaternary Geology Series. Scale 1:50,000. Geology 1969 –1972.

- Golder Associates Ltd. 1990 – February. Results of Geological and Hydrogeological Investigation and Contaminant Plume Delineation Study. 1988 and 1989. Smithville, ON.

- Harrington & Hoyle Ltd., Totten Sims Hubicki Associates and Dr. Keith Tinkler. 1999 – September. Twenty Mile Creek Geomorphology Study.

- Jaime P.A. Oxtobee, Kent Novakowski “A field investigation of groundwater/surface water interaction in a fractured bedrock environment” Journal of Hydrology 269 (2002) Pgs 169–193.

- Ministry of Natural Resources. 1997. Hazardous Sites Technical Guide. Toronto, Queen’s Printer, Ontario.

- Ministry of Natural Resources. 2008. Karst Hazard Mitigation, Next Steps Strategy for Ontario, Grace & Associates Inc. and Oakridge Environmental Ltd., 71 p.

- Ministry of Natural Resources. 2001. Understanding Natural Hazards. Queen's Printer. 40 p.

- Smithville Phase IV Bedrock Remediation Program. 2002 – January. Recommendation Report and Supporting Documents for the Former CWML Site, Smithville, ON.

- Smithville Phase IV Bedrock Remediation – 2016 Site Operations Report.

- Terra-Dynamics Consulting Inc. 2006. Geologic Hazard Mapping Study, Karst Topography, Phase 1, NPCA Watershed Area, prepared for the Niagara Peninsula Conservation Authority, 10 p. plus photograph attachments.

- Worthington, S.R.H. and D.C. Ford. 1997. Analysis and modeling of the potential and evidence for a channel network in the fractured carbonate bedrock at Smithville. Report prepared for Smithville Phase IV Bedrock Remediation Program, December, 1997.

- Worthington, S.R.H. and D.C. Ford. 1999. Chemical Hydrogeology of the Carbonate Bedrock at Smithville. Supporting Report for Step 5. Smithville Phase IV Bedrock Remediation Program Report.

Note: Additional documents and databases may be recommended by the Technical Advisory Committee (TAC) for Consultant review during the Work Plan confirmation process.

The successful consultant will need to document the background data used to prepare the Karst Review and Study, listing its source and format (e.g. municipal report/agency website/personal communication). For map data, the map scale shall be specified. The list of source materials shall follow a generally accepted bibliographic format. The purpose of documenting the background data is to facilitate a "gap analysis" which the information gaps are summarized by the consultant and methods identified by which to appropriately address the information gaps.

The successful consultant will need to produce a summary of each document from which information was used to prepare the Gap Analysis. For each source, a brief (single paragraph) review shall be produced, summarizing the source's contents, describing its relevance to the Karst Review and Study and the potential relationship to the Subwatershed Study and SWM Master Plan.

3.2 Work Plan Confirmation:

Once all of the existing background data have been reviewed and the Gap Analysis prepared, the need and requirements for obtaining additional information to address the core scope of the below noted Work Plan shall be determined, and a proposed program for collecting additional data shall be outlined to the Technical Advisory Committee for consideration. This process allows for collaborative

consultation on the Work Plan. It will be important to receive final sign-off from the Technical Advisory Committee prior to advancing the updated/refined work plan. Any budget implications (plus or minus) will need to be appropriately reviewed and approved by Niagara Region and the Township of West Lincoln in advance of execution by the successful consultant.

4.0 WORK PLAN

The Work Plan for assessing the karstification of existing and potential sites within the urban area of Smithville and the Smithville Development Study Area should be primarily be a desktop based exercise and build upon the large body of related information for the Smithville area (See list of documents identified in Section 3.1)

1. ***Existing Information Evaluation***:
   Review historic and recent documents, including aerial photographs, geological and topographic mapping, subsurface investigation data and Ontario water well records data. Of particular interest to the Smithville Study Area will be the well records and hydrogeological investigations and ongoing Site Operations Reports associated former CWML Site conducted by the MECP .

2. ***Site Inspections***:
   Field observations of karst features should occur during freshet and storm events in the Spring. Field observations should include soil conditions and permeability, man-made alterations, hydrologic and geomorphologic functions of streams/creeks including surface water infiltration sites and groundwater discharge areas.

3. ***Karst Assessment and Evaluation***:
   i) Based on the existing information, prepare a Study Area map or plan of the Smithville Study Area describing the underlying geology and establish a conceptual model of the surface water/groundwater interactions at the site including surface water infiltration sites, such as depressions (incipient infiltration), sinkpoints or sinkholes (direct infiltration), and subsequent groundwater discharge or spring areas. As part of this desktop exercise, flow rates, groundwater tracing and water quality should be evaluated. Areas of bedrock outcrop should be mapped.
   ii) Assess the Study Area for hazardous sites, potential hazardous sites, eco-sensitive areas and advise on their potential impacts to proposed development in the Study Area.
   iii) Advise on the suitability of drainage outlets for proposed development.

4. ***Subsurface Investigation***:
   Site investigations should define subsurface conditions for input into potential land use plans and should be well coordinated with the hydrological and hydrogeological work programs. These subsurface investigations could be performed concurrent with Task 3 above.

5. ***Reporting:***
   i) Prepare a report summarizing the subsurface conditions, interactions of the surface water with groundwater, - and assist in the development of recommendations for a karst risk assessment and contingency plans, remedial work, site improvements and management/monitoring plans.

ii) Coordinate Karst Work Plan outcomes with the Hydrologic and Hydrogeologic findings through the Subwatershed Study.

iii) Participate and provide direction during the process of generating and screening the preliminary land use concept plans and support the 2-Stage Impact Assessment of the preliminary preferred Community Structure Plan.

iv) Participate in, and provide direction to, developing Management, Implementation, and Monitoring Strategies and Policies for the Subwatershed Study and Master Community Plan. Guidance and associated criteria that should be considered for a detailed karst assessment should be identified – where necessary and when development is proposed.

v) Support the Class EA Evaluation process for infrastructure planning, specific to storm, water, wastewater and roadway infrastructure.

5.0 SUMMARY OF MASTER COMMUNITY PLAN / SUBWATERSHED STUDY KEY TIMELINES

More details on the timelines of the Tasks referenced in the study process are outlined in main body of the SWS Terms of Reference. Meeting the key dates is critical to the timely exchange of information between the concurrent studies (Subwatershed Study, Master Water/Wastewater Servicing Plan, Master Transportation Plan, and other Community Master Plan disciplines) involved in the overall development of the Master Community Plan. Schedule adherence is important in terms of the timely completion of the entire process and in ensuring that the conditions of the EA Master Planning process are met, particularly with respect to the public participation requirements.

6.0 STUDY DATA AND INFORMATION AGREEMENTS

The Township requests the transfer of all consultant files of draft and/or final digital information (GIS, AutoCAD or other) upon completion of the Project.

All study data, reports and presentation material are to be supplied to the Township and Region in a format compatible with Microsoft Office Suite 2007 (Word, Excel, Access, and PowerPoint), and ESRI Shape Files or Geodatabases.

Coordinates shall be to real UTM coordinates in NAD 83 (CSRS) Datum.
All required deliverables should be submitted in a format acceptable to the Township and compatible with posting on the Township's project website.

Township of
West Lincoln

Terms of Reference

Smithville Subwatershed Study

SEPTEMBER 2018

Table of Contents

Request for Proposals

Subwatershed Study and Stormwater Management Master Plan for the Community of Smithville

1.0 INTRODUCTION

The Growth Plan for the Greater Golden Horseshoe (2017), along with other guiding documents, promote integrated land use planning processes which consider multiple factors when planning for communities and neighbourhoods. These factors include the natural and physical environment, infrastructure needs, transportation, as well as socio-economic considerations. A cornerstone to contemporary planning, as recognized by the Growth Plan (2017), is the need for multi-disciplinary subwatershed studies which comprehensively establish a baseline characterization of the environmental conditions and natural resources in a subject study area developed on the basis of a subwatershed unit. This systems based assessment involves an examination of the role of water (both surface and ground) in sustaining area resources, including creeks, wetlands, and other water-based features. This baseline characterization then serves as the basis from which to examine and assess potential impacts due to planned urbanization. The impact assessment process includes a vetting of concept plans through a comprehensive planning exercise, that includes infrastructure studies such as Master Servicing and Transportation Plans, which are advanced for consideration through a highly consultative process involving local and Regional municipalities, agencies, landowners, Indigenous groups, and the public. Once appropriately vetted, management and monitoring recommendations to implement the Master Plans are translated into policy and strategies for community development.

The Township of West Lincoln and Niagara Region are seeking Proposals from qualified consultants or consultant teams to undertake a Subwatershed Study (SWS) and a Stormwater Management (SWM) Master Plan that would provide the environmental context in support of a Master Community Plan for Smithville. The Master Community Plan Terms of Reference are being prepared under a separate Request for Proposal process. The Master Community Plan will guide the successful phased development of the lands in the current urban area of Smithville and potential community expansion lands over the period of 2021-2041. The current urban area of existing Smithville and the study area for the potential community expansion lands (Smithville Development Study Area) are shown on Figure 1.

1.1 Study Area

The Study Area encompasses the current Smithville Urban Area and the Smithville Development Study Area.

The urban area of Smithville has a 2016 population of 6,245 and approximately 1,975 jobs, with infilling and completion of existing designated Greenfield areas adding an anticipated 3,600 more persons and 1,800 more jobs. Based on the Region's forecasts for West Lincoln, an additional 11,200 persons and 2,400 jobs will need to be accommodated in the 2021 to 2041 time period.

To accommodate the population and jobs increase, an expansion to the urban area of Smithville will likely be required. The community expansion lands are anticipated to accommodate much of this increase in population and jobs. The amount, and optimal location, of land required to accommodate the

allocated increase in population and jobs will be determined through the Master Community Plan process.

The Smithville Development Study Area (SDSA) encompasses approximately 425 gross hectares of potentially developable land located north, west, and south of the urban area of Smithville. The SDSA falls entirely within three subwatersheds of the Twenty Mile Creek Watershed namely: Twenty Mile Creek main branch, North Creek, and Spring Creek.

Figure 2 shows the urban area of Smithville and the SDSA in relation to the subwatersheds. Furthermore, there are numerous smaller outlets which drain directly to the larger subwatersheds - these will be the specific focus of the Subwatershed Study.

1.2 The Master Community Plan Approach

This Section is meant to assist the Subwatershed Study Consultant in understanding the context of the Subwatershed Study in relation to the Master Community Plan.

The Master Community Plan, with the accompanying studies, supports the development of a community structure plan (with accompanying development policies) for the current urban area of Smithville and potential expansion lands. The Master Community Plan process and the related studies (Subwatershed Study, SWM Master Plan, Transportation Master Plan, Water and Wastewater Master Plans, Agricultural Impact Study, and Fiscal Impact/Asset Management Study) have been established to form a comprehensive and coordinated planning process that will meet the required approvals necessary under the Planning Act and the Environmental Assessment (EA) Act.

The SWS will provide the environmental base and context for the natural systems to support the infrastructure planning for the SDSA. The SWS will focus on the SDSA while the SWM Master Plan will focus on the impact and management of the intensification/infilling within urban Smithville. Combining the Planning Act and Municipal Class EA process permits the Township and Region to plan the Smithville community and its required infrastructure collaboratively in a holistic manner.

The concurrent infrastructure related studies, as part of the Master Community Plan, will follow the Municipal Class EA Master Planning Process (Approach #2). The level of investigation, consultation, and documentation will be sufficient to address Phases 1 and 2 of the Class EA process to fulfill the requirements for Schedule A and B projects and establish in the documentation the basis for specific future investigations if Schedule C projects are identified. To ensure that these approaches are complete and consistent, the Region plans to retain a Project Manager to assist Regional and Township staff and the consulting teams to coordinate the studies, prepare required meeting notices and correspondence, and to assist in fully complying with requirements for public, stakeholder and agency consultation, as set out in the Planning Act and Class EA processes.

To facilitate consultation, a Technical Advisory Committee (TAC) will be formed comprising staff from the Region, the Township, Niagara Peninsula Conservation Authority (NPCA), various applicable Provincial representatives, landowner technical representatives, and the consulting team(s). For efficiency, it is anticipated that the same TAC will serve the SWS and all the infrastructure Master Planning studies, with timed items on shared meeting agendas. For specific and specialized matters, “sub TACs”, involving the

specific professionals, will be used. The TAC will advise and assist in directing the development of the Master Community Plan and its component studies throughout what is anticipated to be a 37 month study process. The TAC will assist in ensuring that the Master Community Plan evolves from the foundational basis of the Subwatershed Study to a Community Plan in a collaborative manner through the integration of the concurrent consultant studies.

Overall, the Master Community Plan will identify the community structure for the current urban area of Smithville and potential expansion lands to ensure appropriate integration and consideration for development opportunities within the Smithville community. The Master Community Plan will include land use categories, a road/transit/cycling/trail and municipal servicing network, a natural heritage system and open space/major community facility requirements. The objective is to ensure that the new community neighbourhoods and employment areas in the current Smithville Urban Area and potential expansion lands are developed sustainably in the optimal location, meeting the objectives and requirements of the Growth Plan (2017), as implemented through the Regional Official Plan and Township's Official Plan.

As noted above, the environmental base for the Master Community Plan will be defined by the Subwatershed Study. The natural heritage system established through the Province and Regional Official Plan, refined through the Township's Official Plan, will be further refined or confirmed through the Subwatershed Study.

A fundamental objective of the Master Community Plan is to ensure Smithville develops as a sustainable community. To achieve sustainability, Smithville will be developed based on the vision to be a compact, complete, healthy, and resilient community. The Master Community Plan will target an increased density of persons and jobs per net hectare for the existing community of Smithville and identify an appropriate target density and land use configuration for the expansion lands.

1.3. Purpose & Objectives of the Smithville Subwatershed Study

The purpose of the Smithville Subwatershed Study is to assist in developing a sustainable development plan for Smithville through ensuring maximum protection and benefits to the natural and human environments. The Subwatershed Study is intended to incorporate a natural heritage systems management approach that will protect, rehabilitate, and enhance the environment within the SDSA limits, as well as the urban area of Smithville. The broader subwatersheds (i.e. Twenty, North, and Spring) within the study area may have existing downstream constraints beyond the identified study area and, to the appropriate extent, these will have to be considered in establishing the management strategies based on the overall study objectives and ultimate targets.

The Subwatershed Study will provide the following:

- Identify the location, extent, present status, significance, and sensitivity of the existing natural environment;
- Identify environmentally sensitive areas and hazard lands, including constraints and opportunities;
- Identify an environmental resource system(s) to protect, rehabilitate, and enhance the ecological function of the system within the SDSA and environs;

- Identify lands where development may be considered, and determine how existing and future land uses can be developed compatibly with natural features;
- Undertake a two-stage, iterative Impact Assessment based on a Preliminary Community Structure Concept(s) (This inherently will require establishing an initial land use concept which will need to be tested and assessed, followed by a refined land use concept developed through the feedback from the initial testing);
- Provide direction on best management practices (BMPs) to implement the Preferred Community Structure Plan (from an environmental context and water management perspective);
- Provide direction on future infrastructure needs (from an environmental context and water management perspective);
- Prepare a Stormwater Management Master Plan for the existing community of Smithville focused on managing drainage impacts from infill/intensification lands, as well as required upgrades to drainage infrastructure to support the development of external lands (new/improved outlets);
- Establish an implementation and management strategy and requirements for environmental systems monitoring;
- Provide technical information to assist in the development of the concurrent Master Community Plan; and,
- Support the Class Environmental Assessment process undertaken as part of the infrastructure planning for the Master Community Plan.

2.0 GENERAL SUMMARY OF THE OVERALL STUDY PROCESS

2.1 Master Community Plan – Scope and Approach

The structure and approach of the Master Community Plan's Work Program, in collaboration and coordinated with the Subwatershed Study, is outlined below. The proposals submitted in response to this Request for Proposals should respect the key tasks described below and the timelines outlined in Section 4. Any adjustments to the Work Program will need to be addressed as an initial task to be undertaken at the beginning of the Study. The finalized Work Program will form the basis for tracking the progress of the Study, including adherence to schedule, budget, and compilation of required deliverables.

PHASE 1 - Background, Characterization, Model Development, and Preliminary Concept Options

Task 1: To gather background information to characterize the context of the existing urban area of Smithville and SDSA, identify Landowner interests, and address the future residential and employment needs of the Township to 2041.

Task 2 : From the background information, develop an issues and options list, constraints and opportunities mapping, and models by which to evaluate and test the impacts of alternative future land use scenarios in Phase 2 .

Task 3 : To determine the proposed extent of the infilling and intensification development opportunities in the existing urban area of Smithville and the need for potential community expansion lands in the SDSA.

Task 4 : To develop as a Consulting Team, 2 to 4 distinct preliminary community structure concepts implementing Task 3 for screening based on the issues and options list and the constraints and opportunity mapping.

Task 5 : To undertake a screening of the preliminary community structure concepts to determine a Preliminary Preferred Concept Option(s) for Impact Assessment in Phase 2.

Task 6 : To document the process to meet Class EA requirements.

PHASE 2 - Impact Assessment of a Preliminary Preferred Concept Option(s) to determine a Preferred Community Structure Option.

Task 1 : Using the background information and models, test and validate the Preliminary Preferred Concept Option(s) through a 2-Stage, iterative Impact Assessment process to determine a Preferred Community Structure Option for the Smithville Urban Area and the potential expansion lands.

Task 2 : To determine preliminary phasing triggers, preliminary cost estimates, and undertake a risk assessment.

Task 3 : To confirm and finalize the justification of the actual extent of the potential expansion lands.

Task 4 : To document the process to meet Class EA requirements.

PHASE 3 - Finalize the Preferred Community Structure Plan and develop Management, Implementation, and Monitoring Plans and Policies for the Smithville Urban Area and the Potential Expansion Lands

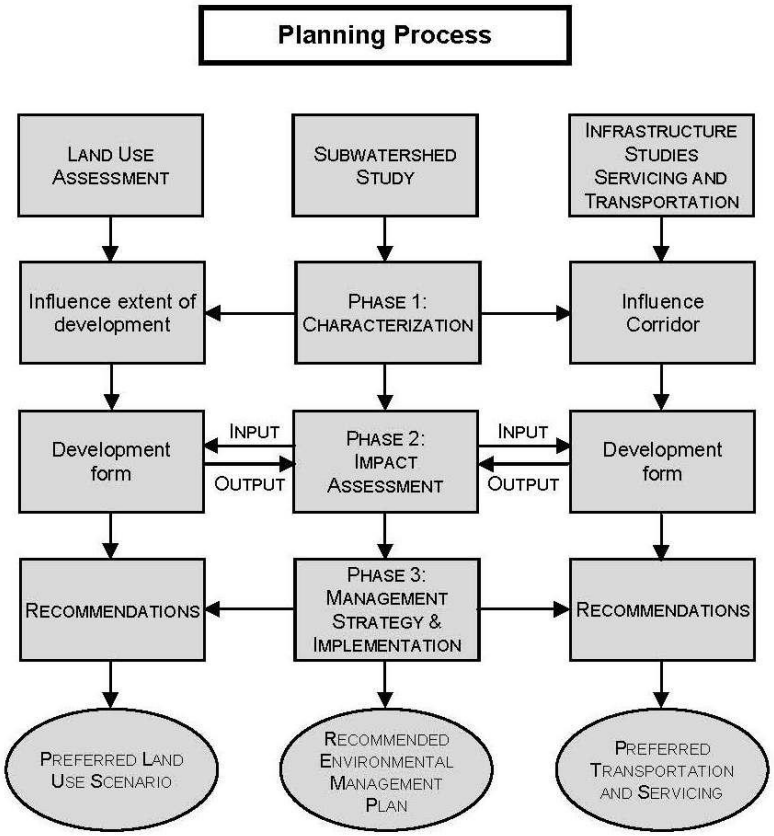
Task 1 : To develop Management, Implementation, and Monitoring strategies to incorporate in the Master Plans and Master Community Plan.

Task 2 : To finalize the Preferred Community Structure Plan by appropriately incorporating the management, implementation, and monitoring strategies.

Task 3 : To finalize the contributing Master Plans for incorporation as appropriate policies in the Master Community Plan and prepare an appropriate implementing Official Plan Amendment to the Township of West Lincoln Official Plan.

Task 4 : To finalize the list of identified projects and document the process to meet Class EA requirements.

Figure 2: Integrated Land Use, Subwatershed, and Infrastructure Study Process



2.2 Smithville Subwatershed Study – Scope and Approach

The Master Community Plan Work Program and related Studies will guide the development of Smithville, both within the existing urban area of Smithville and the SDSA, through a consultative, collaborative, and coordinated process to develop a compact, complete, healthy, and resilient community.

The Subwatershed Study and SWM Master Plan for Smithville and SDSA will describe the location, extent, sensitivity and significance of natural features and functions within the identified study area and evaluate the factors and influences that are important to their sustainability. The respective studies will establish goals and objectives for terrestrial and aquatic systems (i.e. natural heritage) and water resources systems in accordance with the Provincial Policy Statement, the Region's Official Plan, Township's Official Plan, and the Twenty Mile Creek Watershed Plan. Using existing desktop information and studies from a variety of sources and reconnaissance-level and detailed fieldwork (as appropriate), the respective studies will document existing conditions, assess potential impacts of existing and future development and recommend management strategies to manage and mitigate the predicted impacts, including comprehensive stormwater management strategies to protect, enhance

and restore hydrologic functions. In conjunction with the concurrent development of the Master Community Plan, including Transportation and Servicing Master Plans (storm, water, and wastewater), the Subwatershed Study (including the Landscape Scale Analysis sub-component) will reflect and refine the Township's Natural Heritage System in the subwatershed study area and identify strategies to protect, enhance and restore ecological functions and promote compatible activities.

Phase 1: Characterization and Integration

Phase 1 characterizes the resources associated with each subwatershed (and outlet) by study discipline (i.e., hydrology/hydraulics, groundwater, water quality, stream morphology, aquatic, and terrestrial ecology). Background and supplemental field data are to be assessed by each discipline, and then across disciplines, to:

a) establish the form, function and linkages of the environmental resources,
b) identify environmental constraints and opportunities related to terrestrial and aquatic habitat, features, and systems,
c) establish surface water and groundwater constraints and opportunities associated with flooding, erosion, water quality, water budgets, including recharge and discharge areas through new numerical tools (models) suitably calibrated to local conditions
d) establish criteria and constraints for management opportunities associated with the environmental features and systems.

From this work, preliminary "working" goals, objectives, and targets will be developed and refined over the study period for the respective subwatershed(s) in consultation with the Technical Advisory Committee (TAC).

Phase 2: Subwatershed Impact Assessment

Phase 2 identifies stressors (past, present and future), describes (past, present) and predicts (future) impacts, and assesses these impacts against the preliminary goals, objectives, and targets developed as part of Phase 1. Future land use scenario(s) are evaluated based on input from the Land Use Team. For various disciplines (i.e. groundwater, hydrology, hydraulics and water quality) analytical tools are used to predict changes to existing conditions in relation to subwatershed-based targets. Information and analyses from previous background studies (i.e. Watershed Plan, Hydrologic Investigations, Tier 3 Studies, etc.) will be used to assist modeling future land use scenarios. For others (i.e., terrestrial and aquatic ecology) predictions will be semi-quantitative, qualitative or conceptual, integrated with predictions from other subwatershed disciplines (i.e., hydrogeology, hydrology hydraulics and water quality) and experience elsewhere including knowledge of habitat/biota interactions.

As noted earlier the Subwatershed Impact Assessment process is expected to be a two-stage iterative process whereby an initial land use concept will be evaluated/tested against the preliminary targets, and the feedback from this initial test will then inform the establishment of a refined land use concept.

Phase 3: Management Strategies, Implementation, and Monitoring Plan

Phase 3 will use the findings of Phase 2: Impact Assessment (first and second iteration) to refine and finalize the evaluation of various land use scenarios and recommend a set of preferred management strategies, addressing the preferred land use designations and form, established through broader planning input to achieve the identified goals and objectives, and to establish the recommended strategies. The SWM Master Plan will identify the management strategies to accommodate infill/intensification, as well as the outlet improvements required to accommodate external lands. An Implementation Plan will be prepared to offer guidance on: locations and types of SWM facilities, staging/phasing, future study requirements, monitoring, Environmental Assessment requirements, and general economics.

Phase 3 also involves the development of a long-term monitoring initiative that is to evaluate the effectiveness of the proposed management strategies by assessing whether the assumptions made at the SWS and SWM Master Plan scale are appropriate and predictions made are sufficiently correct, and determining if parts of the Subwatershed Study strategies and/or recommendations should be modified based on an adaptive management approach. While the execution of the monitoring plan is not included within the scope of work for the Subwatershed Study, the Subwatershed Study is nevertheless to provide framework-level direction regarding the components, methods, duration, and key locations for the execution of the monitoring program as part of future work. Further details on area specifics would need to be considered as part of future neighbourhood scale studies.

2.3 PHASE 1 – SUBWATERSHED CHARACTERIZATION AND INTEGRATION

2.3.1 Background Information Review/Gap Analysis/Work Plan Confirmation

Background Information Review:

During Phase 1, the Study Area will need to be characterized and preliminary mapping of constraints and opportunities will need to be developed. Information shall be obtained through three levels of investigation, including (i) review of desk-top secondary sources (compiling information from existing documents); (ii) reconnaissance-level fieldwork; and/or (iii) detailed fieldwork.

The successful consultant will review existing desk-top information relevant to the Smithville Subwatershed Study. Documents to be reviewed include, but not limited to:

- Niagara Peninsula Conservation Authority Twenty Mile Creek Watershed Study, 2006
- Niagara Peninsula Conservation Authority Twenty Mile Creek Flood Plain Mapping Study 2007
- Twenty Mile Creek Geomorphology Study, TSH, 1999
- Niagara Peninsula Conservation Authority Sinkhole Creek Flood Plain Mapping Study 2006
- Niagara Peninsula Conservation Authority Spring Creek Flood Plain Mapping Study 2006
- Niagara Peninsula Conservation Authority North Creek Flood Plain Mapping Study 2006
- Niagara Peninsula Conservation Authority Water Quality Report 2017
- Niagara Peninsula Conservation Authority Watershed Hydrology Study 1989

- Niagara Peninsula Conservation Authority Storm Water Management Guidelines 2010
- Niagara Peninsula Source Protection Assessment Report, including Niagara Peninsula Conservation Authority Groundwater Study, Waterloo Hydrogeologic, Inc., 2005
- Water Availability Study for the Twenty Mile Creek Watershed Plan Area, Niagara Peninsula Source Protection Area, AquaResource Inc. and Niagara Peninsula Conservation Authority, 2009
- Significant Groundwater Recharge Area Delineation, Niagara Peninsula Source Protection Area, AquaResource Inc. and Niagara Peninsula Conservation Authority, 2009
- Groundwater Vulnerability Analysis, Niagara Peninsula Source Protection Area, Niagara Peninsula Conservation Authority, 2009
- Niagara Peninsula Tier 1 Water Budget and Water Quantity Stress Assessment, Final Report, Niagara Peninsula Source Protection Area, Niagara Peninsula Conservation Authority and AquaResource Inc., 2010
- Updated Assessment Report, Niagara Peninsula Source Protection Area, Niagara Peninsula Source Protection Committee, 2013
- Hamilton Groundwater Resources Characterization and Wellhead Protection Partnership Study, Charlesworth and Associates, and SNC-Lavalin Engineers and Constructors Inc., 2006
- Geologic Hazard Mapping Study, Karst Topography, Phase 1, Niagara Peninsula Conservation Authority Watershed Area, Terra-Dynamics, 2006
- Nature Counts Project Report, J. K. Dwyer (Ed.)
- Hamilton Natural Areas Inventory 2003 Species Checklist. (2nd ed.), Hamilton, Ontario, Hamilton Naturalists Club
- Niagara Peninsula Conservation Authority 2012 Watershed Report Card
- Niagara Peninsula Conservation Authority 2018 Watershed Report Card
- Niagara Peninsula Conservation Authority Natural Areas Inventory 2009
- Environmental Screening Report – Smithville Growth Management Study. Colville Consulting Inc. December 2008.
- Environmental Screening Report Update. Colville Consulting. June 2015.
- Smithville Trails and Corridors Master Plan – Final. GSP Group. March 2012
- Preliminary Bedrock Resource Assessment. Urban Settlement Area Expansion. MHBC. May 2014.
- Smithville Phase IV Bedrock Remediation – 2016 Site Operations Report.
- GeoTechnical Investigation Report – "Proposed Smithville Sewage Pumping Station Forcemain Replacement Project" – Inspec Sol, January 8, 2013.
- Recommendations for New Stormwater Management Policies & Guidelines, Niagara Region 2016
- *Smithville Master Drainage Plans (1989) – to be confirmed*
- Northwest Smithville Secondary Plan and supporting studies
- Elfrida Subwatersheds Study (ongoing) – City of Hamilton
- Elfrida Secondary Plan (ongoing) – City of Hamilton
- GIS and environmental databases relevant to the Study from the Province, Niagara Region, Township of West Lincoln, NPCA, and City of Hamilton
- Flow and Precipitation Data from Niagara Peninsula Conservation Authority Gauge Stations located at:
    - Twenty Mile Creek at Woodburn Road, Hamilton
    - Twenty Mile Creek at Smithville, West Lincoln
    - Twenty Mile Creek At Ball's Falls, Lincoln
    - North Creek, West Lincoln

.

Note: Additional documents and databases may be recommended by the Technical Advisory Committee (TAC) for Consultant review during this Work Plan confirmation process; this is also expected to include some data from the local landowners.

Gap Analysis:

The successful consultant will need to document available background data to prepare the Subwatershed Study and SWM Master Plan, listing its source and format (e.g. municipal report/agency website/personal communication). For map data, the map scale shall be specified. The list of source materials shall follow a generally accepted bibliographic format. The purpose of documenting the background data is to facilitate a "gap analysis" for which the information gaps are to be summarized by the consultant and methods identified by which to appropriately address the information gaps in Phase 1.

The successful proponent will need to produce a summary of each document from which information will be used to prepare the Smithville Subwatershed Study and SWM Master Plan. For each source, a brief (single paragraph) review shall be produced, summarizing the source's contents, describing its relevance to the Subwatershed Study and SWM Master Plan.

Work Plan Confirmation:

Once all of the background data have been collected, the need and requirements for obtaining additional information beyond that outlined in the core scope shall be determined, and a proposed program for collecting additional data shall be outlined to the TAC. This process allows for collaborative consultation on the Work Plan. It will be important to receive final sign-off from the TAC prior to advancing the updated/refined work plan. Any budget implications (plus or minus) will need to be appropriately reviewed and approved by Niagara Region and the Township of West Lincoln in advance of execution by the successful consultant.

2.3.2. Hydrology and Hydraulics

Background information on the study area is to be collected from all available sources. Maps of the study area will be provided by the Township, Region, and NPCA. For each subwatershed and associated outlets (main branch of Twenty Mile Creek, North Creek and Spring Creek) the physical features (e.g. subwatershed boundary, physiography, topography, soils, major watercourses, drainage swales, and wetland features) within the SDSA shall be established. Any specific areas of interest shall be defined identifying important implications on development potential, environmental features, and / or watercourse system function.

Hydrology:

A detailed hydrologic model (continuous) shall be selected for use in the SWS and SWM Master Plan development. The model(s) will need to be developed and calibrated for the subwatersheds' existing

condition. **The model shall be a continuous, deterministic, hydrologic model, approved by the TAC,** with a strong physical representation of surface runoff, baseflows, and surface and groundwater interaction. The successful Consultant is to justify the applicability and sufficiency in utilizing the proposed numerical model(s). The modelling should ensure the hydrology and hydraulics features are well represented for each subwatershed within the study area. Future Township or NPCA use of the model, and model results, will be considered as an asset.

It is recommended that as part of the review of background data, the consultant identify the locations for streamflow/sewer gauges (3 minimum.) and rain gauge (1 minimum). Field data for model calibration/validation should be collected between April and November inclusive. Once calibrated/validated the model is to be executed in both event and continuous mode to generate peak flows for a range of storms including 2, 5, 10, 25, 50, and 100 year. Special focus will be placed on the interaction of surface and groundwater due to karst terrain (See Appendix 1 for Karst Review and Study Terms of Reference) in the SDSA environs.

The successful consultant shall also use the results from the surface water model to corroborate the water budget developed as part of the Hydrogeologic assessment.

The numeric hydrologic modeling will establish the baseline hydrology for the subwatershed systems. As noted, it is expected that the model(s) will be calibrated based upon both historical rainfall and flow monitoring data, as well as new study data collected as part of this initiative. The exercise should meet the accuracy and completeness to provide a comprehensive understanding of the existing hydrologic conditions of the study area. The model shall be calibrated to provide comparable flows at the subwatershed outlets to those determined in the previous watershed or drainage studies for the given watercourses. The model input parameters shall be compared to previous studies and modified to represent more detailed subwatershed model and shall be completed to the satisfaction of the TAC.

Furthermore, it will be necessary to prepare a coarse model of the study area using NPCA's existing modeling (HEC-HMS) to define the potential for off-site impacts at a larger subwatershed scale. The work in this regard is to include on-going work in the headwaters (Elfrida Secondary Plan) in the City of Hamilton. As part of Phase 1, existing off-site flows will be set at locations sufficiently far downstream to ensure no potential impacts. These flows would become the targets for use in the Phase 2 and 3 stages of the SWS and SWM Master Plan.

Erosion potential assessment shall also be carried out using continuous simulation of watercourse flows over a period of at least 5 years to evaluate cumulative shear stress exceedance based on the erosion thresholds established by the study stream morphologist.

Hydraulics:

The successful consultant will need to prepare a field inventory of creeks, road crossings (culverts and bridges), stormwater facilities, etc. (ref Drawing 1). The current drainage systems and outlets

shall be identified with drainage constraints and opportunities. The intent of hydraulic modelling is to define system constraints, including capacity, flood limits and risks.

For established watercourses located in the study area (ref. Dwg 1), hydraulic analyses shall be conducted. Flood lines shall be established for the Regulatory Event (i.e. 100 Year Storm) for existing conditions. For the creeks that have flood plain delineation, as identified in previous studies, the flood lines shall be updated to reflect the current situation. The flood plain delineation includes the hydraulic modeling, using the Hydrologic Engineering Centers River Analysis System (HEC-RAS) model from the U.S. Army Corps of Engineers, to generate the associated flood lines based on the hydrographs established with the hydrologic analysis conducted for this subwatersheds study. It is noteworthy that this study, while preparing preliminary floodlines for land use planning purposes, is not intended to be a formal floodline mapping study.

2.3.3. Hydrogeology

The goal of this Subwatershed Study with respect to hydrogeology is to establish a hydrogeological conceptual model for the study area, determine the key characteristics of the bedrock and overburden systems, in addition to their functions in terms of controlling groundwater movement, availability, and quality in the subwatershed study area. An integral component is to assess the interactions between the groundwater system and the surface water system, and to determine the overall role or function of these interactions in an ecosystem context. The contribution of the karst terrain to these interactions will need to be investigated (See Appendix 1 for Karst Review and Study Terms of Reference). It is also important to have an understanding of the effects of future development on the local groundwater resources to assist in the need and suitability for implementing low-impact development.

In order to accomplish the above goals, the existing desk top data will need to be reviewed to develop a preliminary understanding of the hydrogeological processes operating within the subwatersheds. To support this understanding, the successful consultant will need to:

- Conduct a detailed site reconnaissance to identify surface watercourses, areas of visible groundwater discharge and recharge, and areas of potential groundwater piezometer installations. There is significant hydrogeological information for the Smithville area through the work completed for the former CWML Site (in the Smithville Industrial Park) which may be sufficient for the purposes of this Study. Through the Work Plan Review process, the Consultant will confirm the level of additional hydrogeological information required (if any). For the purposes of this proposal, the consultant teams are to contingently cost out that 20 piezometers are to be installed – 10 appropriately spaced on each side of Twenty Mile Creek . Particular focus shall be placed on identification of sinkholes and their outlets typical of karst terrain;

- Carry out a karst study. (See Appendix 1 for Karst Review and Study Terms of Reference). The

Review shall identify any significant karst features, delineate any hazardous lands as a result of karst, and identify and characterize key subsurface flow paths within the karst.

- Review and compile the following hydrogeological information from NPCA's Source Water Protection Plan – Assessment Report to identify and address any data gaps:
    - o General delineation of aquifers and karst terrain:
    - o Well locations as obtained from the MECP well record database;
    - o Areas of ground or surface water takings as permitted by the MECP;
    - o Areas of significant groundwater recharge or discharge;
    - o Areas susceptible to contamination; and,
    - o Areas suitable for stormwater infiltration.

- If required, implement the Hydrogeological Work Program determined through the Work Plan Review process and install and monitor groundwater piezometers (assume 10 piezometers north of Twenty Mile Creek and 10 piezometers south of Twenty Mile Creek for this work plan) across the study area, to determine water table levels, assess shallow groundwater flow directions, and determine the functional relationships between the shallow aquifers and Twenty Mile Creek subwatersheds in the Study Area;

- Measure stream flow (spot flows) at appropriate locations along the study area creeks, to identify areas of groundwater recharge/discharge and establish baseflow conditions. The monitoring should be coordinated with the flow monitoring gauge in Smithville of Water Survey of Canada as necessary to calibrate the hydrologic model;

- Develop a water balance model based on the NPCA's Regional hydrologic model of the hydrogeology of the area to match the existing baseline (2009) developed by AquaResource and NPCA. The water budget shall include a monthly estimate of precipitation, evapo-transpiration, runoff, and infiltration, including groundwater recharge / discharge estimations. Potential constraints associated with water takings and land use changes shall be identified with reference to the specific locations of interest. A water budget exercise has already been completed for the NPCA through its Source Water Protection project at a broader watershed scale. Reports and results are available from the NPCA. Any data/information gaps in the NPCA information should be identified and addressed. The intent of this effort is to update and refine the broader-scale model and refine it for use in the Smithville study area to provide appropriate planning targets for water management. As noted under the hydrologic section the results from each will need to be appropriated corroborated and justified to the acceptance of the TAC.

2.3.4. Stream Morphology and Channel Erosion

Several objectives concerning aquatic habitat are intended to protect the morphological and fluvial character of the area streams, with the intent (where feasible) to restore sinuosity, maintain physical

habitat attributes (e.g. pools, riffles etc.), diversity and fluvial processes (e.g. bed load transport, energy reduction through sinuosity, etc.), and to prevent increases in erosion and deposition through the maintenance of the hydrological regime.

The successful consultant will review data collected for the Twenty Mile Creek Watershed Study and other existing sources, and confirm and update the existing information. The successful consultant will need to characterize each reach of the streams depicted on Drawing #1 using industry standards [Note: this does not include-Headwater Drainage Features (HWDF)]. A baseline morphologic assessment, according to stream characterization and flood /erosion considerations, is required including a detailed inventory of stream morphology observations.

The successful consultant shall undertake an erosion potential analysis, based on the erosion data collected to understand the erosion processes and to identify areas which are prone to erosion, or where structures may be at risk. The erosion potential analysis is also to determine the threshold flows for erosion at strategic points in the subwatersheds for input to the hydrologic assessment. Assessments will identify sites most sensitive to erosion, with reasonable details covering the entire study area.

The successful consultant shall also undertake a meander belt assessment of each watercourse, identifying the appropriate meander belt for each reach. (This does not include headwater drainage features)

In addition, the Study Team's Stream Morphologist, along with others on the Study Team including aquatic and terrestrial ecologists and surface and groundwater specialists, are to conduct an assessment of the headwater drainage features (HWDF) in accordance with the TRCA/CVC 2014 protocol. For the purpose of this current work plan, consultants are to assume the coverage shown on Drawing #1, which would be verified as part of the gap analysis. The assessment will need to involve one year multi-seasonal fieldwork and an integrated interpretation of the data to establish current classification and future management (Phase 3).

2.3.5. Aquatic Environment

The successful consultant will need to conduct an assessment of fisheries in the subwatershed study area for the locations shown on Drawing #1. Detailed field assessments of the aquatic environments shall generally be undertaken in the areas of fish and riparian habitat, including areas immediately upstream and downstream of these habitat areas. Stream classifications based on the priority of the habitat type as well as cold, cool, and warm water designations shall be identified. An assessment of stream barriers and on-line ponds will need to be undertaken to determine potential impacts of development on aquatic resources. Where applicable, the criteria and considerations contained in Table 1 will form the basis for evaluating watercourses. The data collected will be used to ensure that future development will have no negative impacts on fish habitat or the ecological functions for which the area has been identified. Opportunities for enhancement of the aquatic environment shall also be identified.

When assessing species, status should include federal, provincial and local rankings. In addition, maps that identify the results of the aquatic investigations shall be provided. Areas of interest should be identified by comparing existing land uses to sensitive aquatic habitats.

Further, as noted above, the Study Team Aquatic Ecologist will need to support the HWDF assessment based on the "Evaluation, Classification and Management of Headwater Drainage Features Guidelines" (CVC & TRCA, January 2014).

Table 1: Aquatic Environment Inventory Requirements

Biophysical Inventory	**Inventory Requirements**
Fisheries Assessment	Electrofishing may be required. If required, MNRF Permits would need to be obtained. Acceptable protocols (i.e.Ontario Stream Assessment Protocol (OSAP)) should be followed.
Habitat Assessment	Assess watercourse habitat using acceptable protocols, i.e. the OSAP module.
Species at Risk Screening	Screening should include results from all available sources, i.e. Natural Heritage Information Centre, Ministry of Natural Resources and Forestry (MNRF), Municipal List and Conservation Authority database, and Fisheries and Oceans Canada (DFO) screening map.

2.3.6. Terrestrial Environment

Landscape Scale Screening

In order to better understand the ecological context of the urban area of Smithville and the SDSA, a review of the Provincial and Regional Natural Heritage System will be required. The purpose of this review will be to generate information on the ecological context of the Smithville Study Area and its potential connectivity within the broader landscape. This Landscape Scale Screening will be helpful to identify terrestrial and wetland habitat connectivity, potential wildlife movements, and the ecological context of the urban area of Smithville and the SDSA, in relation to the surrounding environs to help understand and to develop linkages between the ecological systems. This screening will rely on existing information sources and will be expected to be delivered in a mapping format and associated text, as part of the Phase 1 Report.

Assessment of Terrestrial Resources

An assessment of terrestrial resources in the subwatershed shall be undertaken. The Natural Area Inventory information from NPCA should be reviewed prior to the initiation of field work. The data

collected shall be used to ensure that future development is consistent with Section 2.1 of the Provincial Policy Statement, 2014. The criteria for evaluating the terrestrial features should include the following requirements. Depending on the vegetation community, Ecological Land Classification (ELC) results and habitats determined to be present in the study area The Significant Wildlife Habitat Eco-Region 7E Criteria Schedules (MNRF, 2015) should be used in conjunction with the Significant Wildlife Habitat Technical Guide when assessing Significant Wildlife Habitat.

Detailed field assessment of the terrestrial resources shall be conducted to characterize the terrestrial environment and establish a baseline terrestrial environment for the SDSA, including the proximity to, and the degree of linkage with other habitats. When assessing species, status should include federal, provincial and local rankings. In addition, maps that identify natural heritage features and the results of the terrestrial investigations shall be provided by the Consultant. Opportunities for enhancement of the terrestrial environment shall also be identified.

Table 2: Terrestrial Environment Inventory Requirements

Biophysical Inventory	**Inventory Requirements**
Vegetation Community Identification	Use Ecological Land Classification to classify vegetation communities according to Lee et al. (1998).
Botanical Inventory	3 season survey (spring, summer and fall) to identify species.
Native / Invasive Flora Survey	Determine the percentage of Invasive Species in surveyed vegetation communities.
Evaluation of Unclassified Wetlands	Use Ontario Wetland Evaluation System (OWES) to evaluate non-mapped or unevaluated wetlands.
Breeding Bird Surveys	2 surveys at least 10 days apart; the first between May 24th and June 16th and the second between June 17th and July 10th using 10 minute point counts and area searches. Breeding evidence by species should be recorded according to the Ontario Breeding Bird Atlas protocol.

Reptile Surveys	Use active searching or other commonly accepted MNRF protocols/methods (April- July and Sept.-Oct.)
Amphibian Breeding Surveys	3 surveys between April and June corresponding to specific nighttime temperatures of >5°C, >10°C and >17°C, according to the Marsh Monitoring Protocol. Salamander surveys are required using active searching and should be completed in spring in appropriate ponds to determine the presence or absence of salamander breeding areas.
Incidental Wildlife Observations	Incidental sightings of all wildlife (mammals, birds, butterflies, dragonflies, damselflies, amphibians, and reptiles).
Wildland Fire Screening	Using MNRF Protocols, screen for Wildland Fire Potential in forested areas.
Species at Risk Screening	Screening should include results from all available sources, i.e. Natural Heritage Information Centre, wildlife atlases, MNRF Municipal List and Conservation Authority
Significant Wildlife Habitat Screening and Assessment	This assessment will include identifying candidate and confirmed Significant Wildlife Habitat and will utilize the MNR's *Significant Wildlife Habitat Technical Guide 2000)* and associated Criteria Schedules (MNRF 2015).

2.3.7. Surface Water Quality

Currently available background information shall be used to provide a preliminary understanding of the baseline water quality in the SDSA. The NPCA has surface water quality monitoring stations. These existing datasets shall be reviewed to understand the existing water quality status proximate to the study area. The existing water quality status shall be assessed to provide the

baseline reference, and identify any water quality concerns and constraints in the study area. Other studies such as the NPCA's Source Water Protection work will have some relevant data to contribute to this understanding. The study will also locate existing SWM facilities and the respective catchment areas (as part of the SWM Master Plan), as the baseline reference for stormwater management in terms of water quantity/ quality control.

2.3.8. Phase 1 Report – Subwatershed Characterization and Integration

At the completion of Phase 1, the general characteristics of the subwatershed study area and the existing urban area of Smithville will have been identified and a clear understanding of the constraints and opportunities will have been developed. Constraints (including: floodplains, PSW's, meander belts, valley lands, Karst, erosion prone areas etc.) and opportunities mapping shall be developed, and a preliminary Natural Heritage System should be identified. The Phase 1 Report will establish the general characteristics of the subwatersheds and the existing urban Smithville, which will be the starting point from which the proposed land uses are to be developed.

The Phase 1 Report shall include:

- Summary of background literature and data reviewed;
- Subwatershed study area characterization including:
    a. Climate, landform, geology, and soils
    b. Hydrogeology/groundwater quantity and quality
    c. Surface water quantity and quality
    d. Stream geomorphology
    e. Aquatic and Terrestrial ecosystems
    f. Karst

  Findings based on:
    (i) review of secondary sources (compiling information from existing documents);
    (ii) reconnaissance-level fieldwork; and/or,
    (iii) detailed fieldwork.
- Assessment of above identified features and functions to evaluate their significance
- Summary of the subwatershed study area major issues, concerns and constraints; and,
- Summary of the opportunities for potential development and mapping of the preliminary Natural Heritage System.

The constraints and opportunities for potential future development shall be assessed based on the following considerations:

- High Constraint: Native vegetation communities with highly significant habitat attributes present and / or with severe slope constraints or karst topography and / or located directly adjacent to a permanent watercourse. High constraint areas should be protected and enhanced within the Natural Heritage System.

- Medium Constraint: Native vegetation communities with moderately significant habitat

attributes present and / or with moderate slope constraints and / or associated with imperfect drainage. May include successional communities. Features should be protected and integrated into potential development where feasible. If not developed, opportunities to enhance these features as part of the Natural Heritage System should be examined.

- Low Constraint: Cultural communities with limited significant habitat attributes present, no slope constraints and not associated with hydrological features and linkages. The features do not represent direct constraints to development and represent opportunities for potential development or for habitat restoration.

Note: It is expected that a Draft Table of Contents for the Phase 1 Report will be submitted for review and comment well in advance of the Draft Report submission. A minimum of three (3) weeks should be allowed for assembly of comments on all submitted deliverables, including Draft and Final Reports.

2.4. PHASE 2 – IMPACT ASSESSMENT

Based on the outcomes of Phase 1, including the review of background information sources and supplementary fieldwork, Phase 2 will require an iterative assessment of the potential impacts of future land use changes on the natural environment and water system within the study area. The findings from the Phase 1 Characterization and Integration work, completed by the various disciplines, along with the outcomes of the initial servicing and transportation needs, will need to be considered in an integrated manner in developing a preliminary land use concept. A screening of the preliminary land use concepts will be undertaken in Phase 1 to determine a preliminary preferred concept(s) for impact assessment in Phase 2. The consultant is to include time in their work plan/scope to support this effort with the Study Land Use Planning Team, principally the SWS Project Manager and the Natural Heritage Lead.

The Phase 2 Impact Assessment work will be completed concurrently to the other component studies such as the Transportation Master Plan, and Water / Waste Water Master Servicing Plan, which will also be assessing the impacts and requirements of the preliminary preferred land use concept.

The intent of Phase 2 is to assess the impacts of the preliminary preferred land use concept and inform the preliminary establishment of initial management strategies which:

- protect the critical elements and systems of the subwatershed and local drainage networks;
- prevent environmental degradation;
- provide adequate flexibility for integration with adjacent development and redevelopment areas;
- assist in the establishment of open space linkages;
- identify opportunities and constraints to development (principally from Phase 1);
- provide a strategy to manage existing land uses;
- detail preliminary locations and areas for stormwater management (LID BMPs and end-of-pipe facilities); and
- identify restoration and enhancement opportunities.

In Phase 2, a detailed analysis shall be completed to assess the impacts of potential future land use changes in Smithville (Infill/Intensification) and the SDSA (Greenfield). Various options and practices for mitigating these impacts shall be reviewed and management strategies to create net benefit shall be advanced. The assessment of future land use changes is premised on a 2-stage iterative approach whereby the feedback from the initial assessment shall be provided to the TAC and the Land Use Prime Consultant.
The information from the SWS and SWM Master Plan at this stage, will be considered, along with the information from the concurrent transportation and servicing assessments, to refine the preliminary preferred concept option(s) to eventually develop a preferred community structure plan.

The second iteration of impact assessment will be expected to be more scoped and focused on the specific changes to the land use and environmental impact management strategies. Hence the scope outlined in the following sections will need to be conducted twice, the first time will inherently be more complex and detailed than the second time. It is expected that the majority of the impacts and associated management and land use changes will have been captured as part of the first iteration.

2.4.1. Hydrologic and Hydraulic Analysis

Hydrology:

A hydrologic analysis shall be conducted for the initial (1st Iteration) future development land use concept to determine post- development flows, hydrographs and water balance (integrated with the groundwater assessment).

The existing conditions hydrologic model shall be modified to reflect post-development conditions and executed continuously and in event mode to generate peak flows for all events ranging from 2, 5, 10, 25, 50, and 100 year. As in the hydrologic analysis for existing conditions, the model results shall be reviewed by the TAC. Further, as noted earlier, it is expected that both a local and regional model will need to be developed and executed to determine the potential for impacts both locally and regionally, and help inform the development of an appropriate management strategy. The modelling will be used to determine the potential impacts on surface water, groundwater and water budgets. Surface water and groundwater interactions shall be assessed due to the potential for land use changes on the karst terrain in the study area as well. The Phase 2 Impact assessment hydrologic analysis will need to :

- Delineate a discrete drainage area plan based on potential future development;
- Calculate post-development flows for all event storms at predetermined locations, as per discretized drainage area plan and model schematic diagram within the study area. The post-development flows shall be compared to existing flows for all storm events at the key hydrologic nodes of interest;
- Conduct the water budget assessment at the nodes of interest coordinated with the

Groundwater modeling (see below).

- For the continuous simulation, it will be necessary to conduct/support the analysis to determine the potential impact of the planned development on the erosion susceptibility of the receiving systems based on the erosion thresholds established per Task 2.4.3
- Identify constraints related to imperviousness and intensity of development. Assess the requirement and/or performance of proposed stormwater management facilities including the potential approach to Regulatory event impact management;
- Assess the future discharge impacts on the local systems and the broader creek systems; and,

Note: For the broad scale assessment, the hydrologic findings from the City of Hamilton's Elfrida Subwatersheds Study will need to be incorporated and corroborated.

The future development impact assessment should evaluate the impacts on both runoff volumes and peak flow rates.

Hydraulics:

The existing hydraulic conditions shall be reviewed in the context of the proposed development, with the land use changes, runoff increases and/or channel modifications. For those watercourses which may receive additional flow or perhaps require no controls, the study shall assess the impacts of the proposed development on watercourse water levels, flow velocities and water surface profiles for all storm events. Any potential erosion and flood concerns due to the proposed development shall be identified. Again, for any watercourses where flow would be anticipated to change, current flood line information shall be updated for post-development scenarios. The model results shall be reviewed and approved by the TAC.

The updated future land use flood lines (where changes are considered) are to be presented on the maps, with Regulatory Event flood line locations and cross sections identified with flood elevations. The overtopping depths, caused by the Regulatory Event (100 year), shall be assessed and documented on existing roads at all crossing structures. The flood plain maps should confirm the post-development flood levels are consistent with the existing condition. Any changes in the flood inundation magnitude must be listed in inventory, with explanations of such changes. Any preliminary stormwater management strategies, required to control the post-development flows to existing conditions, shall be identified.

2.4.2. Hydrogeology

The hydrogeology analysis shall examine the impact of future development and land use changes on groundwater systems. It will be necessary to assess the potential for impacts and establish initial guidance to adequately protect groundwater from both water quality and quantity perspectives; this stage will necessarily need to consider the MECP and NPCA Source Water Plan program The hydrogeology impact assessment will also need to consider the need to prevent disturbance to any significant recharge/discharge areas identified in Phase 1. The hydrogeological

component of the subwatersheds investigation shall:

- ensure the groundwater sensitive areas are recognized and protected from future urbanizing and disturbances;
- Within the water balance assessment, update the overall groundwater budget model, at the pre- determined nodes of interest in the study area and the subwatersheds outlet, along with the surface water components for both existing and future scenarios; as part of this task, estimate the fraction of flows, which will be maintained within the watercourses, versus the fraction, which will be lost to sinkholes. The water budget for the study area shall estimate precipitation, evapo-transpiration, runoff and infiltration, in addition to the groundwater recharge and discharge; and,
- Provide information about the interactions of surface water and groundwater due to karst terrain.

2.4.3. Stream Morphology and Erosion Analysis

The continuous erosion analysis (ref. hydrologic assessment above) for the existing conditions shall be updated with the future development scenarios. Erosion potential for the study area shall be estimated by establishing erosion thresholds for the existing channel / bank conditions using the post-development flows. This analysis is to be completed for the same cross sections that were assessed as part of the detailed geomorphological assessment. Appropriate mitigation measures shall be recommended for locations showing a significant increase in erosion potential. Erosion thresholds shall be used to establish discharge rates for stormwater management systems for the proposed development to ensure there is no increase in downstream erosion (i.e.< 5%). This process will involve determination of the impacts without mitigation and then defining the necessary levels of control in an iterative manner to ensure downstream systems are appropriately protected.

Based on the results presented in Phase 1, identify which watercourses and drainage features in the proposed development area are considered stable and have sufficient conveyance capacity; and which watercourses and drainage features require restoration or alteration through natural channel design approaches. Stream morphology shall be assessed downstream of the future development areas, with a focus on the existing and potential erosion concerns. Existing and future development impacts shall be evaluated and managed to limit the negative impacts, while accommodating opportunities to restore and improve the existing channel system. This will need to consider those watercourses and HWDFs which are to remain on the landscape versus those which can be removed subject to appropriate management practices.

For areas of new development, the size of the channel block necessary to facilitate a stable natural channel design to occur shall be determined. The sizing will include the meander belt, hydraulic criteria, fisheries setbacks and Natural Heritage System planning. The natural channel design information on which the preliminary assessments are made, shall be documented for use at the next stages of planning (i.e. neighbourhood scale). The natural channel design strategy must clearly define that all channel

blocks have the ability to convey flows associated with the Regulatory event (100-year). As noted, the size determination should be made based on stream morphology objectives, in addition to the considerations of aquatic and terrestrial features and setbacks. The determination of which watercourses and HWDFs are to be maintained and which are to be considered for relocation or removal, needs approval of the TAC. The NPCA and MNRF and others will ultimately need to be consulted for any channel works proposed.

2.4.4. Aquatic Environment

The successful proponent shall assess the potential impacts of future land uses on the aquatic resources. Recommendations shall be identified for improvement of aquatic habitat, including in-stream, stream bank and flood plain habitat enhancement, removal of barriers and on-line ponds, and retrofitting existing altered habitats. The assessment shall relate physical characteristics and processes of the aquatic environment to biological communities. The assessment shall also identify appropriate buffers/setbacks, and linkage of these habitats, which reflect the specific stream sensitivity and required buffer functions.

Detailed assessment shall be generally focused on the significant areas identified in Phase 1 and areas immediately downstream of new developments. Considerations should be given to Low Impact Development approaches. The Aquatic Ecologist will be required to support HWDF management, as part of an integrated team approach.

2.4.5. Terrestrial Environment

The successful proponent shall investigate potential land use impacts on the terrestrial features. Appropriate buffers/setbacks should be identified in order to protect the natural heritage features and functions from disturbance. In addition, potential linkages (natural areas that ecologically connect core areas) shall be identified and protected. Linkages are important in reducing the potential for adverse impacts due to habitat fragmentation on natural areas. The management strategies shall be documented related to the protection of these sensitive resources and functions. Linkage and buffer alternatives, should be presented in appropriate maps to:

- Identify successional habitat that include potential restoration areas within the Natural Heritage System;

- Identify habitat features that will be retained as part of the Natural Heritage System due to their quality.

The assessment shall generally focus on the sensitive areas identified in Phase 1 and areas in the immediate vicinity of new developments. Where a continuous ELC-defined vegetation community extends beyond the subject areas, the assessment shall generally address the entire community, including portions beyond the study area boundaries.

2.4.6. Surface Water Quality

The successful consultant shall investigate potential land use impacts and develop strategies to maintain

or enhance in-stream water quality. Actions to address existing point and non-point sources of pollution (ref. Source water Protection Plan) resulting in degraded water quality shall be developed. Best Management Practices (BMPs) for urban stormwater management shall be recommended for all new development to address stormwater quality. The proposed BMPs shall be in accordance with the requirements of the MECP, Niagara Region, and the Township of West Lincoln including the emerging provincial guidance which focuses on a treatment train approach using LID BMPs.

2.4.7. Phase 2 Report - Impact Assessment

At the completion of the Phase 2 1st Iteration and 2nd Iteration Stages, Reports will need to be prepared (i.e. one for each iteration) outlining the results of the Impact Assessment and preliminary management recommendations. These Reports shall be submitted to document the impact assessment and the preliminary evaluation of the stormwater management options and recommended subwatershed management strategies as they relate to the proposed development. The computer modelling input and output files shall be appended to these reports. In addition, constraints and opportunities (largely identified from Phase 1) present in the study area, in terms of urban expansion, environment impacts and protection, shall be clearly documented/refined with GIS maps for the associated locations.

Note: It is expected that a Draft Table of Contents for the Phase 2 report will be submitted for review and comment well in advance of the Draft Report submission. A minimum of three weeks should be allowed for assembly of comments on all submitted deliverables, including Draft and Final Report

2.5. PHASE 3 – MANAGEMENT, IMPLEMENTATION, AND MONITORING PLAN

Phase 3 shall set the framework for implementation and monitoring of the preferred subwatersheds management strategy building from the results of the second iteration land use impact assessment. A Management, Implementation, and Monitoring Plan, including the recommendations from the SWM Master Plan, shall be developed, which sets out the requirements for phasing, financing, operation of facilities, and monitoring, to ensure the future development(s) are in compliance with the approved Subwatershed Study and SWM Master Plan. The Phase 3 work will be completed concurrent with the land use planning work, when a preferred community structure plan has been determined. The findings of this study will provide a technical framework for future infrastructure works, and support the future development proposals in accordance with the approved Master Community Plan.

Phase 3 will provide the detailed subwatershed management strategy for the proposed development, based on the evaluation of a range of subwatersheds management options through Phase 2, established on the basis of the preliminary subwatershed goals, objectives and targets, established in Phase 1. The scope for additional studies will also be identified that are to be completed in support of future Block Plans, Draft Plans of Subdivisions or Condominium, and Site Plans as required to meet the objectives and targets of this Subwatershed Study. The Subwatershed Study is to identify preliminary locations for logical blocks or sheds for consideration as part of future neighbourhood plans.

Phase 3 shall outline the agencies/organizations that are responsible for carrying out the various recommendations, and specify when in the development process the various recommendations need to be initiated. Phase 3 shall include:

- Timing and Phasing recommendations for the construction of any required stormwater management facilities with respect to the future development; these recommendations will inherently need to consider the influence of other infrastructure as well;

- Asset Management Strategies such as:
    - A Phasing and Funding strategy for the construction and maintenance of the facilities;
    - A monitoring program to ensure compliance with the subwatersheds study, and a strategy for corrective actions which may be necessary based on results of the monitoring program;
    - Recommendations for future studies;

- An Adaptive Management and Monitoring Plan to monitor the subwatershed's response to land use change and suggest adaptive responses where impacts are being observed;

- Assist Master Community Plan Consultant with developing policies for consideration in the Master Community Plan;

- Time frame for the review/update of the Subwatershed Plan;

- Identification of Class EA Projects and completion of the documentation of the Class EA process for the SWM Master Plan recommendations.

The Management, Implementation, and Monitoring Plan shall provide preliminary input to the phasing of development. The plan will require a risk assessment to address and consider climate change influences. For the climate change "stress test" it is recommended to test the influence of a 250 year event as regulatory for the open watercourses and similarly for the major system design, and a 25 year event for the minor system design specific to the existing urban networks. A cost-benefit and risk-based assessment is to provide insights to the planning of both the greenfield and infilling/intensification lands in Smithville. This will permit changes to recommend mitigation measures and management strategies for future phases of the development, in the case results of monitoring from the initial phases suggest that changes are warranted.

Note: It is expected that a Draft Table of Contents for the Phase 3 report will be submitted for review and comment well in advance of the Draft Report submission. A minimum of three weeks should be allowed for assembly of comments on all submitted deliverables, including Draft and Final Report

2.5.1 Development of the Stormwater Management Master Plan

Building from the results of Phase 2 (1st and 2nd Iteration) along with the outcomes of Phase 3 of the SWS, the results of the hydrologic analysis for existing and developed conditions shall be used to develop the Stormwater Management Master Plan for existing urban Smithville to manage post-

development peak flows, as a result of infill and intensification. Locally generated storm runoff must be treated before it is discharged to receiving waters through the use of source controls, conveyance controls, and/or end of pipe controls.

All proposed SWM strategies shall confirm to acceptable standards as outlined in:

- Ministry of Environment's "Stormwater Management Planning and Design Manual" (2003), and all subsequent updates;
- Niagara Region's "Stormwater Management Policies and Guidelines and all subsequent updates;
- The Niagara Peninsula Conservation Authority's "Stormwater Management Guidelines" (2010);
- The Credit Valley Conservation's "Low Impact Development Planning and Design Guidelines (2010) and all subsequent updates; and,
- The Township of West Lincoln's municipal drainage policies, standards, and guidelines., Consideration of the Township's existing Master Drainage Plans will be required.

The Stormwater Management Master Plan for the proposed infill/intensification development shall incorporate relevant SWM measures, alternate development standards, including low impact development (LID) BMPs, particularly where groundwater recharge and discharge is critical. Constraints and opportunities shall be evaluated for the specific strategy. End of pipe treatments or retrofits should include the required storage volumes, flow targets, land area requirements and locations; Details should include the stage – storage – discharge relationships.

In general, with effective SWM source control measures, the post-development flow rates will need to be controlled to pre-development levels as close as feasible. Consequently, the future flood plains are expected to be consistent with the existing conditions. As part of the Stormwater Management Master Plan for future development, the successful consultant shall:

- Identify any drainage and stormwater works required for the urban area of Smithville , including new or retrofit stormwater management facilities, channel modifications, deficient major overland flow route retrofits, deficient culvert crossing upgrades, and infiltration works.;
- Based on MECP guidelines, establish stormwater management criteria related to water quality (Total Suspended Solids);
- Identify the SWM facility locations and the appropriate outlets to the receiving water bodies;
- Incorporate the proposed stormwater management facilities into the post-development model and select the sizes of the facilities to conform to the established criteria;
- Prepare a conceptual design of the proposed stormwater management facilities for water quantity and quality control;

2.6 PHASE 4 - ADDITIONAL SENSITIVITY ANALYSIS

In addition to the Work Program above, a Phase 4 Analysis is contemplated that would involve a high level review of potential transportation and servicing system alternatives beyond 2041 in the SDSA. This exercise will require assistance of the successful SWS Consultant in the high level review. It would involve using the existing information obtained through Phases 1, 2, and 3 of the SWS.
This exercise should be costed out separately in the SWS Proposal.

3.0 SUMMARY OF MASTER COMMUNITY PLAN / SUBWATERSHED STUDY KEY TIMELINES

More details on the timelines of the Tasks referenced in the study process outlined in Section 2.2 above are presented in the table below. Meeting the key dates is critical to the timely exchange of information between the concurrent studies (Subwatershed Study, Master Water/Wastewater Servicing Plan, Master Transportation Plan, and other Community Master Plan disciplines) involved in the overall development of the Master Community Plan. Schedule adherence is important in terms of the timely completion of the entire process and in ensuring that the conditions of the EA Master Planning process are met, particularly with respect to the public participation requirements.

Phase	Key Dates	Deliverables
	Oct. 2018	Consultant selection
	Nov. 2018 to Feb. 2019	Study Initiation / Finalize Study Work Program with the Project Team and TAC
PHASE ONE	March 2019 to April 2020	**Background, Characterization, Model Development, and Concept Options**
	March 2019	With the input/support from the TAC determine and finalize the information gathering process, modelling framework, and modelling assumptions. Three season data collection begins.
	Dec. 2019	The Planning Consultant, in collaboration with the partner consultants (including Subwatershed Study Consultant), identify 2 to 4 preliminary concept options
	Jan. 2020	Bring forward preliminary concept options to the TAC for review and confirmation, including Class EA process requirements. Conduct a screening of the preliminary concept options.
	March 2020	Present 2 to 4 preliminary concept options, the results of the screening exercise of the preliminary concept options, and identify issues/opportunities for presentation to Council

Phase	Key Dates	Deliverables
	April 2020	Public Information Centre (PIC #1) where background information, the preliminary concept options, and the screening exercise will be presented.
PHASE TWO	May 2020 to April 2021	**Impact Assessment and Preferred Community Structure Option (1st and 2nd Iteration)**
	May 2020 to Sept. 2020	Finalize a Preliminary Preferred Concept Option for Impact Assessment. Conduct 1st Stage Impact Assessment on the preliminary preferred concept option and present and document to TAC the results of the option(s) testing and validation, as part of the Community Structure Plan development. Based on the results of the 1st Stage Impact Assessment, revise the preliminary preferred concept option for 2nd Stage Impact Assessment.
	Oct. 2020 to Jan. 2021	Conduct 2nd Stage Impact Assessment and present the results to TAC and finalize a Preferred Community Structure Option.
	Feb. 2021	Prepare and document Class EA process, preliminary development policies and strategies and possible directions for approaches to management.
	April 2021	Prepare presentation material for, and attend Council meeting and the subsequent PIC #2 and provide the Preferred Community Structure Option.
PHASE THREE	May 2021 to Dec. 2021	**Monitoring, Management, and Implementation Recommendations**
	June 2021	Establish monitoring, management, and implementation strategies to develop the Preferred Community Structure Plan, including Class EA process requirements.
	Aug. 2021	Present and document, in final report form, the full Master Community Plan for Smithville (including all the individual infrastructure-based Master Plans that includes the Class EA process, elements of phasing; implementation; monitoring; costing/funding; risk analysis tied to climate change resiliency planning; development strategies; management directions, urban design requirements and Official Plan Amendment(s)).

Phase	Key Dates	Deliverables
	Sept. 2021	Prepare presentation material for and attend PIC #3/Public Meeting of Council
	Nov. 2021	Attend and prepare presentation material for the meetings of Council for adoption of Master Community Plan
PHASE FOUR	Post Dec. 2021	**Additional Sensitivity Analysis (if required)**
	April 2022	Assist in conducting a high level review of transportation and servicing system alternatives beyond 2041.

4.0 SUMMARY OF CONSULTATION / MEETING REQUIREMENTS

The minimum consultation requirements for the development of the Subwatershed Study are:

Technical Advisory Committee (TAC) meetings - It is anticipated that there will be a need for the SWS Consultant Team (all disciplines) to attend at least three (3) TAC meetings in each of the first and second phases of the study and one (1) TAC meeting in Phase 3. Proposals should also include costing for up to two (2) additional TAC meetings during the assessment of the preferred community structure option in Phase 2, for a total of nine (9); It should be assumed that the TAC Meetings would be half day events.

TAC Workshops: in addition to the meetings cited above, the scope is to include one (1) full day TAC Workshop in each of Phases 1 and 2. (Total of two (2) events). These would similarly need to be attended by representatives of all disciplines.

Council - The Prime SWS Consultant will be required to attend the Committee / Council meetings that precede the Public Information Centres (PIC #1, PIC #2, and Public Meeting/PIC #3) and one final Council Meeting where Council will consider the adoption of the Master Secondary Plan (Official Plan Amendment). (Four (4) Meetings in total)

Public Information Centres – The SWS Consultant Team will need to attend all PIC's. (Total of three (3) PIC's) with appropriate team representation.

Project Team meetings: Throughout the Work Program, the Subwatershed Study Consultant (appropriately represented based on key discussion topics) will need to meet with the Project Team for the Master Community Plan, in order to gather relevant information, receive feedback on the Study's progress, and coordinate findings. Project Team meetings should be assumed to be of half day duration and occur at least every three months, with agendas and materials distributed by the Project Manager five days in advance of the meeting (est. total of 12 meetings) .

Additional meetings/teleconferences may be required during the Work Program involving:

- Township and Region Commissions and Departments
- Agencies (e.g. Provincial, NPCA)
- Landowner groups and their consultants
- Township Councillors

Proposals should identify the number and cost of these meetings incorporated in the Budget.

Proposals should also identify the rates and costs for additional meetings not indicated in the Proposal.

5.0 STUDY DATA AND INFORMATION AGREEMENTS

The Township requests the transfer of all consultant files of draft and/or final digital information (GIS, AutoCAD or other) upon completion of the Project.

All study data, reports and presentation material are to be supplied to the Township and Region in a format compatible with Microsoft Office Suite 2007 (Word, Excel, Access, and PowerPoint), and ESRI Shape Files or Geodatabases.

Coordinates shall be to real UTM coordinates in NAD 83 (CSRS) Datum.

All required deliverables should be submitted in a format acceptable to the Township and compatible with posting on the Township's project website.

6.0 BUDGET

Proposals will include an estimated budget broken down by Phase and Task to address the work outlined in Work Program.

The cost of assisting the Additional Sensitivity Analysis shall be identified separately from the overall cost for the Project.

7.0 PROJECT MANAGEMENT

The Master Community Plan, the Subwatershed Study and the other concurrent studies, will be managed by a Project Manager of the Township and Region. The task of the Township/Region Project Manager is to coordinate, manage, and oversee the overall work effort related to the development of the Master Community Plan and Subwatershed Study.

The successful Prime Consultant will keep the Project Manager apprised of all correspondence or contact with internal or external stakeholders/agencies. All correspondence with internal or external stakeholders/agencies and the public will be through the Project Manager or designated representative. Periodic updates of the status of study activities and any other questions related to the scope, schedule, budget, or study deliverables will be directed to the Project Manager or designated representative.

8.0 EXPERIENCE

The Prime Consultant(s) selected to undertake the Subwatershed Study will demonstrate a proven track record of managing similar multi-disciplinary large-scale ecological planning exercises. The expertise of supporting consultants will also be key to a successful proposal.

The Consultant(s) will need to understand the interrelationship between the Subwatershed Study and the Master Community Planning exercise (that includes land use planning, transportation initiatives, infrastructure development, the agricultural context, and fiscal responsibility). Knowledge of, and experience in, establishing the environmental framework for innovative community planning, practical and functional urban design, strategic transportation and servicing infrastructure, progressive asset management, costing and funding opportunities and other important community building aspects will be advantageous.

Demonstrated knowledge of the Ontario and Federal Environmental Assessment process, and specifically the Municipal Class Environmental Assessment process, is mandatory.

9.0 PROPOSAL SELECTION

All proposals will be evaluated through a comprehensive review and analysis by a Selection Committee comprising Senior West Lincoln and Niagara Region Staff members, and administered by the West Lincoln Finance Department Procurement Staff. The aim of the Selection Committee is to select the proposal that best meets the Township and Region's requirements and gives the best overall value. The project will not necessarily be awarded to the lowest cost proposal as price is only one component that will be used to determine the best overall value for the Township and Region. Proposals will be judged, in part, on the availability and amount of time that identified leading staff are prepared to dedicate to the project.

By responding to this Request for Proposal, Proponents will be deemed to have agreed that the decision of the Selection Committee will be final and binding.

Niagara Region

Land Needs and Urban Boundary Expansion Discussion

Area Planners – June 22nd 2018

Purpose

- Required Provincial lands needs assessment will determine if (1) we have enough land, (2) require additional urban lands or (3) have excess urban lands.
- Need to establish process for identifying location of excess lands.
- Need to establish a process and assessment criteria, to deal with 30 expansion requests to date, that provides a transparent and rational evaluation to deal with potential urban boundary scenarios:
  1. Expansions where a municipality does not have sufficient lands to 2041
  2. Rationalization of boundaries where a municipalities has sufficient or excess lands to 2041

Niagara Region

Provincial Land Needs Assessment Background

- Provincial guidance document finalized May 4th 2018.
- Required Provincial lands needs assessment will determine if (1) we have enough land, (2) require additional urban lands or (3) have excess urban lands.
- Land Needs Assessment is a standard methodology for assessing land use needs for Schedule 3 of the Growth Plan.
- The assessment is based on housing units, not housing unit mix.
- Employment Strategy, Intensification Strategy and Housing Strategy are required before land needs assessment can finish.
- Urban Structure and Greenfield density targets (alternative) are also required before completion of assessment.

Land Needs Assessment Background

- Methodology optimizes the use of the existing land supply and establishes an intensification first approach to development (automatic allocation of 60% of new housing units to built boundary across the Region).
- Due to Person Per Unit differences, bulk of housing unit growth will be in built boundary but majority of population growth will be in Designated Greenfield Area.
- Significant Provincial engagement required throughout the process prior to finalizing Regional land needs quantum.

Niagara Region

Vacant Land Supply End of Year 2016

Municipality	DGA Res	DGA Emp	BB Res	BB Emp	Area (ha)
Fort Erie	86	52	150	144	**431**
Grimsby	0	3	18	12	**33**
Lincoln	39	32	19	34	**124**
Niagara-on-the-Lake	76	87	48	8	**220**
Niagara Falls	197	244	84	136	**661**
Pelham	110	13	42	0	**166**
Port Colborne	320	104	39	4	**466**
St. Catharines	29	65	63	58	**215**
Thorold	363	185	65	55	**668**
Welland	80	79	125	173	**457**
West Lincoln	45	64	10	2	**120**
Niagara Region	**1,345**	**926**	**663**	**627**	**3,561**

Draft Process for Identifying Excess Lands

Draft process for identifying location of excess:

1. Complete land needs assessment to determine if excess lands exist.
2. Establish criteria for determining location of excess lands with Area Planners.
3. Municipalities to identify excess lands using the approved criteria.
4. Region to identify/designate excess lands in Regional Official Plan.

Discussion: Criteria for Determining Excess Lands Location

- Criteria will only be applied within municipalities that have excess lands beyond 2041.
- Possible criteria for discussion for determining excess lands:
  1. Land identified must be designated Greenfield;
  2. Land free of development approval (i.e. Draft plans);
  3. Lands that are not serviced and not within Master Servicing Plans;
  4. Lands not zoned to facilitate significant development;
  5. Lands that are constrained (i.e. Aggregate resource areas, soil contamination).

- Discussion: What other criteria exist? Are there options or exceptions for any of these?

Niagara Region

Urban Boundary Expansion Processes

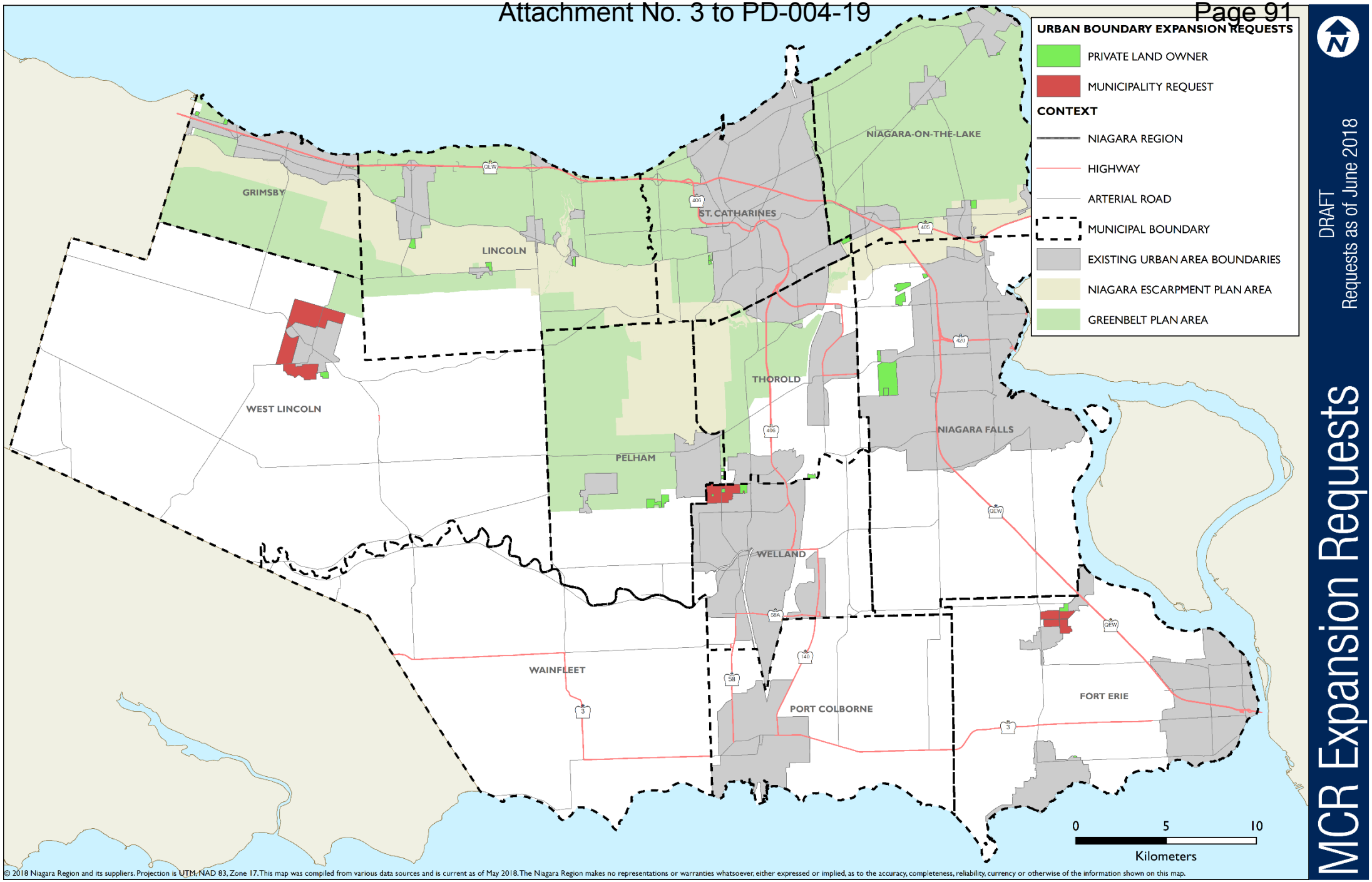
- Need to establish a process and assessment criteria, to deal with 30 expansion requests to date, that provides a transparent and rational evaluation to deal with potential urban boundary scenarios:
  1. Expansions where a municipality does not have sufficient lands to 2041
  2. Rationalization of boundaries where a municipalities has sufficient or excess lands to 2041

Niagara Region

Urban Boundary Expansion Requests to Date

Municipality	# of Private Requests	# of Municipal Requests	Municipal Area (ha)	Private Area (ha)	Total Area (ha)
Fort Erie	2	1	152	16	168
Grimsby	2	0	0	10	10
Lincoln	4	0	0	39	39
Niagara-on-the-Lake	2	0	0	16	16
Niagara Falls	5	0	0	276	276
Pelham	3	0	0	59	59
Port Colborne	0	0	0	0	0
St. Catharines	2	0	0	22	22
Thorold	1	0	0	9	9
Welland	5	1	187	26	212
West Lincoln*	1	1	574	15	589
Total	**27**	**3**	**913**	**489**	**1,401**

* West Lincoln's 574 ha municipal ask is a study area for potential expansion.


URBAN BOUNDARY EXPANSION REQUESTS
PRIVATE LAND OWNER
MUNICIPALITY REQUEST
CONTEXT
NIAGARA REGION
HIGHWAY
ARTERIAL ROAD
MUNICIPAL BOUNDARY
EXISTING URBAN AREA BOUNDARIES
NIAGARA ESCARPMENT PLAN AREA
GREENBELT PLAN AREA
NIAGARA-ON-THE-LAKE
GRIMSBY
ST. CATHARINES
LINCOLN
THOROLD
WEST LINCOLN
NIAGARA FALLS
PELHAM
WELLAND
WAINFLEET
PORT COLBORNE
FORT ERIE
0
5
10
Kilometers
DRAFT
Requests as of June 2018
MCR Expansion Requests
© 2018 Niagara Region and its suppliers. Projection is UTM, NAD 83, Zone 17. This map was compiled from various data sources and is current as of May 2018. The Niagara Region makes no representations or warranties whatsoever, either expressed or implied, as to the accuracy, completeness, reliability, currency or otherwise of the information shown on this map.

Niagara Region

Urban Boundary Expansion Draft Process

1. Expansions where a municipality does not have sufficient lands to 2041
   - Urban boundary expansion must be supported by the background studies identified in the Growth Plan 2.2.8.
   - Background studies will be paid by either the municipality or land owners group. The Region will not pay for background studies related to urban expansion.
   - Identified expansion area to be supported by municipal council prior to Regional approval.
   - De-designation of excess lands will be required elsewhere in the Region.

- Discussion: What other process steps exist? Are there options or exceptions for any of these?

Niagara Region

Urban Boundary Expansion Draft Process

2. Rationalization of boundaries where a municipalities has sufficient or excess lands to 2041
   - Urban boundary expansion must be supported by the background studies identified in the Growth Plan 2.2.8.
   - Background studies will be paid by either the municipality or land owners group. The Region will not pay for background studies related to urban expansion.
   - Identified expansion area to be supported by municipal council prior to Regional approval.
   - If a municipality has sufficient lands, a greater amount of developable land must be de-designated than added.
   - If a municipality has excess lands, a greater amount of developable land must be de-designated than added and all additional excess lands be identified.

- Discussion: What other process steps exist? Are there options or exceptions for any of these?

Discussion: Draft Urban Boundary Evaluation Process

- Possible criteria for evaluating urban boundary expansion requests:
  1. Expansions into the Greenbelt Plan area are not allowed;
  2. Urban expansion(s) must be adjacent to an existing Urban Area Boundary;
  3. Requests in a municipality with a clear oversupply of Urban designated land and with no municipal support for the expansion should not be supported;
  4. Urban boundary expansion requests should be of a sufficient size to be developed by a secondary plan.

- Discussion: What other criteria exist? Are there options or exceptions for any of these?

End.

REPORT TO: **Planning and Development Committee**

MEETING DATE: **Wednesday, November 30, 2016**

SUBJECT: **Niagara 2041 Growth Strategy**
Local Municipal Growth Allocations

RECOMMENDATIONS

1. That Council **ENDORSE** the local municipal growth allocations (population and employment) contained in this report.

2. That this report **BE FORWARDED** to the Local Municipalities, the NPCA, Niagara School Boards, Industrial Association, Homebuilders Association and the Ministry of Municipal Affairs and Housing.

KEY FACTS

- The purpose of this report is to seek Council endorsement of population and employment allocation to local municipalities to 2041.
- The Province has provided a forecast to Niagara Region to grow to 610,000 people and 265,000 jobs by 2041. This is an increase of 168,000 people and 79,000 jobs between 2011 (the last Census year) and 2041.
- The *"Niagara 2041 Growth Strategy",* comprised of the Municipal Comprehensive Review (MCR), Transportation Master Plan (TMP) and Water/Wastewater Master Servicing Plan, is a coordinated approach to plan for, achieve and support Niagara's forecasted growth.
- The MCR is a growth management exercise that updates the Niagara Region's population and employment forecasts to the year 2041 in order to conform to the Provincial Growth Plan.
- The TMP and MSP rely on the MCR population and employment forecasts to align future infrastructure project requirements to accommodate future growth.
- The Region's New Development Charges By-law will rely on the infrastructure projects identified thru the TMP and MSP to ensure that there is sufficient revenue from development to invest in growth related infrastructure.
- The Region needs to proceed with the preferred growth allocations to inform TMP and MSP and to determine new development charges rates.

CONSIDERATIONS

Financial

The Municipal Comprehensive Review (MCR) has approved funding. The local municipal growth allocations proposed in this report will be used by the TMP and MSP inform future infrastructure project requirements for the Region's updated Development Charges By-law.

Corporate

The Niagara 2041 Growth Strategy is composed of 'How We Grow', the Region's Municipal Comprehensive Review (MCR), 'How We Go' the Transportation Master Plan (TMP) and 'How We Flow' the Water/Wastewater Master Servicing Plan (MSP). These three initiatives work together to implement and support Niagara's forecasted growth by ensuring that land use planning and infrastructure decisions are integrated. The outcomes of the MCR, TMP and MSP will feed directly into the Region's Development Charges By-law review.

Governmental Partners

Government partners are key stakeholders of the 2041 Growth Strategy. Collaboration with the local municipalities, the Province of Ontario and the Niagara Peninsula Conservation Authority has been ongoing throughout the MCR process. The Province allocates population and employment forecasts to the Region. Then the Region must plan for those projections in accordance with provincial legislation as the Province is the final approval authority of the MCR.

Public and/or Service Users

The public have been and will continue to be engaged throughout the MCR with opportunities to provide input via Pubic Information Centres (PIC), meetings, emails etc. To date two rounds of PICs have been held in Niagara in November 2015 and June 2016 respectively. The input received during these rounds of consultation has been considered in the generation of the local municipal population and employment forecasts. The next round of PIC's will be held in December (Pelham, Niagara-on-the-Lake, Lincoln and Niagara Falls) and will provide an opportunity for the public to review and comment on projections, allocations and requirements to accommodate growth.

ANALYSIS

Background:

The background analysis provides the context of how the current population and employment allocations have been arrived at and how they will be applied subject to Provincial policy direction.

The Provincial Growth Plan (2006)

The Provincial Growth Plan for the Greater Golden Horseshoe, 2006 *("Places to Grow")* establishes policies and forecasts to support municipalities in planning for the future growth and required infrastructure. Amendment 2 to the Growth Plan, which came into effect in June 2013, provided updated forecasts of population and employment forecasts to 2036 and 2041. The Growth Plan states Niagara is forecasted to grow to a population of 610,000 and employment of 265,000 by 2041.

Draft Provincial Growth Plan (2016) and the Co-ordinated Plan Review

In May 2016, as part of the Co-ordinated Plan Review (CPR), a new revised Provincial Growth Plan was released. The draft 2016 Growth Plan identified revised *"greenfield"* and *"intensification"* targets as shown below:

2006 Growth Plan Density Targets	**2016 Growth Plan Density Targets**
• **50** people and jobs per hectare in greenfield areas	• **80** people and jobs per hectare in greenfield areas
• **40%** residential intensification for built up areas	• **60%** residential intensification for built up areas

The draft Growth Plan has also proposed new requirements for a MCR including the introduction of a land budget methodology (to be released in 2018).This may affect the MCR as it relates to the density requirements and ultimate land needs.

The MCR commenced in November 2014 and is intended to implement Amendment 2 to the Growth Plan (2006). The release of the 2016 draft Growth Plan and related density targets and land budget process, may influence the ultimate land needs for Niagara.

Niagara 2041Growth Strategy

Growth must be proactively planned, promoted and managed in order to create livable communities and positive market conditions. The Niagara 2041 is a coordinated response to achieve and support Niagara's forecasted growth by ensuring that land use planning and infrastructure decisions are integrated.

The intent of Niagara 2041 is to assist in positioning Niagara competitively within the Greater Toronto/Hamilton Area by supporting an urban vision through the creation of vibrant, authentic communities that optimize current and future infrastructure investment and are efficient and sustainable in terms of compactness, transit supportiveness and energy.

The MCR (How We Grow), Niagara 2041 and the 2017 Development Charges Study

As component of Niagara 2041, the MCR began by considering the Region's population and employment forecasts and developing allocations to the local municipalities. Niagara 2041 is taking a contemporary approach to growth by directing it to areas that are serviceable and strategically located (i.e. four GO Transit stations, Downtown St. Catharines) in order to achieve Regional Council's strategic priorities.

Niagara 2041 takes a short, medium and long term approach to growth management:

- In the short term Niagara 2041 reflects current market conditions and patterns. The anticipated population and employment growth will be urban in nature and will occur in a compact, dense and mixed use form and primarily accommodated within existing urban area boundaries. PDS 34-2015 outlining the Niagara 2041 Growth Strategy was endorsed by Regional Council in October 2015.

- In the medium to long term, growth will be balanced across the Region. It is expected that growth will migrate along the QEW/406 corridor to the southern communities over the medium term. Some communities may grow at different rates.

The local municipal population and employment allocations proposed by the MCR are fed into the TMP and MSP, to help determine the infrastructure project requirements to support future growth.

Establishing a Growth Option to Implement Niagara 2041

The MCR is a 4 phase process.

Phase 1 and 2

Phase 1 and 2 of the MCR involved an analysis of historic and emerging growth trends, development patterns and future opportunities. The Phase 1 and 2 work concluded that Niagara is not growing at a fast pace overall. It is also noted that the level of growth occurring varies significantly across the Region as the capacity to accommodate population and employment is unevenly distributed across Niagara's municipalities.

Phase 3 - Strategic Growth Option

Phase 3 (the current phase of the MCR) involves establishing a set of growth options based on population and employment distribution to guide growth to 2041. Through consultation with local Area Municipal Planners, Regional Council and Regional staff, three growth options were established:

1. Current Policy;
2. Market Trends; and,
3. Strategic Policy

Tables 1 and 2 are the proposed population and employment forecasts by municipality to 2041 and are represent the "*Strategic Growth Option"*. This option is a derivative of two important influencing factors:

1. The release of the Draft Growth Plan (May 2016) which will establish new density and intensification targets; and,
2. The announcement of GO Train service to Niagara (June 2016) which will influence future development patterns.

It is important to note with under the Strategic Growth Option, each municipality will get an increase in population and employment compared with the previous 2031 population and employment forecasts. In order to achieve the Region's 2041 population target of 610,000 people, the population will need to grow at an annual rate of 1.22%. Since the 2006, the Region has been experiencing a 0.2% annual growth rate or 7,600 people.

The growth allocations recommended in the Strategic Growth Option will be integrated into the TMP, MSP and DC bylaw.

Appendix I "*Strategic Growth Option for Niagara Region, (Hemson 2016)*" has been provided for information and includes a detailed timeline of the process to date with information on stakeholder consultations and specific outcomes of each step and a full breakdown of characteristics and projections for each growth option.

2041 Population and Employment Forecasts

TABLE 1 : MCR - Strategic Growth Option Forecast Total Population by Local Municipality, 2016 -2041											
Municipality	Total Population Including Net Undercoverage									2016-2041	
	2001	2006	2011	2016	2021	2026	2031	2036	2041	Net Change	Compound Annual Growth Rate
Fort Erie	29,120	30,960	30,760	31,030	32,310	34,720	37,780	41,220	43,940	12,910	1.40%
Grimsby	22,030	24,760	26,000	27,580	29,430	31,400	33,200	35,140	37,150	9,570	1.20%
Lincoln	21,320	22,460	23,080	23,950	24,990	26,230	28,060	30,030	31,590	7,640	1.11%
Niagara Falls	81,550	85,040	85,200	87,740	92,830	99,990	108,770	117,670	124,580	36,840	1.41%
Niagara-on-the-Lake	14,320	15,090	15,810	17,950	19,750	21,420	22,850	24,700	26,580	8,630	1.58%
Pelham	15,790	16,710	17,040	17,190	17,900	19,410	21,560	23,720	25,260	8,070	1.55%
Port Colborne	19,080	19,240	18,910	18,510	18,600	19,210	20,080	21,050	21,820	3,310	0.66%
St. Catharines	133,660	136,570	134,890	133,820	136,930	142,560	150,590	160,040	167,480	33,660	0.90%
Thorold	18,670	18,880	18,410	18,790	19,680	21,500	23,850	26,470	28,470	9,680	1.68%
Wainfleet	6,470	6,830	6,520	6,540	6,590	6,760	6,990	7,260	7,480	940	0.54%
Welland	50,080	52,080	51,980	52,550	54,130	56,540	59,600	63,160	66,180	13,630	0.93%
West Lincoln	12,690	13,620	14,200	14,670	16,170	18,930	22,630	26,530	29,460	14,790	2.83%
Niagara Region	**424,780**	**442,240**	**442,800**	**450,320**	**469,310**	**498,670**	**535,960**	**576,990**	**609,990**	**159,670**	**1.22%**

TABLE 2 : MCR - Strategic Growth Option
Forecast Employment by Local Municipality, 2016 -2041

Municipality	Total Place of Work Employment									2016-2041	
	2001	2006	2011	2016	2021	2026	2031	2036	2041	Net Change	Compound Annual Growth Rate
Fort Erie	11,580	11,920	11,290	12,460	13,270	13,960	14,920	15,940	17,240	4,780	1.31%
Grimsby	6,820	8,140	7,720	9,870	10,780	11,440	12,380	13,310	14,630	4,760	1.59%
Lincoln	9,430	10,340	9,740	11,280	11,870	12,300	13,040	13,710	14,600	3,320	1.04%
Niagara Falls	37,410	42,250	41,030	45,360	47,790	49,630	52,060	54,570	57,720	12,360	0.97%
Niagara-on-the-Lake	10,090	11,050	10,650	13,010	13,720	14,150	14,660	15,230	16,030	3,020	0.84%
Pelham	4,020	4,290	4,090	4,540	4,880	5,220	5,750	6,280	6,930	2,390	1.71%
Port Colborne	6,500	6,810	5,860	5,770	5,900	6,080	6,350	6,640	7,000	1,230	0.78%
St. Catharines	63,180	66,080	60,180	62,660	65,530	67,820	71,480	75,240	80,240	17,580	0.99%
Thorold	8,010	8,340	7,360	8,070	8,480	8,870	9,390	9,960	10,660	2,590	1.12%
Wainfleet	1,470	1,520	1,160	1,300	1,350	1,400	1,470	1,550	1,650	350	0.96%
Welland	20,970	20,280	22,090	23,590	24,490	25,170	26,220	27,300	28,760	5,170	0.80%
West Lincoln	3,390	3,980	4,280	5,150	5,770	6,370	7,270	8,280	9,560	4,410	2.51%
Niagara Region	**182,870**	**195,000**	**185,450**	**203,060**	**213,830**	**222,410**	**234,990**	**248,010**	**265,020**	**61,960**	**1.07%**

Phase 4 - Additional MCR Work Required

Upon Regional Council endorsement of the population and employment forecasts, the MCR will advance into Phase 4 – determination of the land requirements. This will fulfill the Region's obligation to implement Amendment 2 of the Growth Plan.

Completion of Phase 4, however, will require direction regarding density and intensification targets to be contained in the final version of the Provincial Growth Plan (to be released in early 2017). The calculations may result in an some modification of population and employment forecasts to meet the Provincial targets.

COMMISSIONER'S COMMENTS

The approval of the Strategic Growth Option represents a foundational change to planning and managing growth in the Niagara Region. It represents a departure from the *"grow south"* paradigm and recognizes contemporary patterns of growth and development in the GTHA. This change has a basis in significant objective research undertaken over the last several months.

The Strategic Growth Option recognizes that development does not just happen – it must be proactively planned, promoted and managed. Along with increased growth comes increased responsibility on the part of both the Region and municipalities to do the necessary work to plan for the growth that has been allocated. This includes the preparation of district and secondary plans that cover all of the development nodes across the region that respond to the concept of complete communities, appropriate densities and quality design.

This report is asking Council to approve a strategic allocation of population and employment in order to begin to create an environment for long term prosperity. The work needed for Niagara to achieve a growth rate of 1.22% requires a significant coordinated effort between the Regional, local governments and the private sector. Great communities are supported by a strong vision and a planning framework that is consistent across the region and supports investment and economic development.

ALTERNATIVES REVIEWED

1. Regional Council can decide not to endorse the local municipal population and employment allocations as put forth in the preferred growth option. This would impact the TMP and MSP infrastructure project list and likely result in the underfunding of the Regions development charge by-law program.

2. If Council decides to endorse an alternative set of growth projections it could put Council ability to foster an environment for economic prosperity at risk.

ORIGIN OF REPORT

This report has been brought forward by staff to seek Regional Council endorsement the local municipal growth allocations contained in the report. The TMP and MSP will use these forecasts to generate an infrastructure project list to inform the review of the development charges by-law which expires by August 31, 2017.

OTHER PERTINENT REPORTS

- PDS 30-2014- Project Awareness Pre-Initiation Report- 2015 Regional Municipal Comprehensive Review
- PDS 8-2015 -Project Initiation Report -2015 Regional Municipal Comprehensive Review
- PDS 34-2015- Niagara 2041- Establishing a Growth Strategy
- PDS 43-2015 – Implementation of Amendment 2 to the Growth Plan for the Greater Golden Horseshoe
- PDS 15-2016 – Regional Municipal Comprehensive Review-How We Grow: Phase 1 and 2 Summary Report
- PDS -2016 **-**Niagara 2041 Growth Strategy: Local Municipal Council Engagement Summary Report

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APPENDICES

Appendix I Municipal Comprehensive Review Phase 3: Strategy Growth Option for Niagara Region Summary Report