

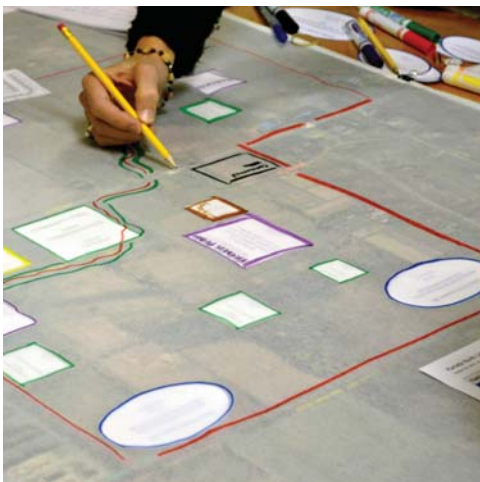


KANATA NORTH

COMMUNITY DESIGN PLAN

MASTER SERVICING STUDY

REPORT



FINAL DRAFT
JUNE 28, 2016





KANATA NORTH COMMUNITY DESIGN PLAN

MASTER SERVICING STUDY

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JUNE/28/2016

NOVATECH FILE NO. 112117
REPORT NO. R-2016-041



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EXECUTIVE SUMMARY

This Master Servicing Study (MSS) has been prepared as a component of the Community Design Plan (CDP) for Kanata North. The Master Servicing Study provides a functional design solution for on-site storm drainage, wastewater collection, and water distribution in the Kanata North Urban Expansion Area (KNUEA). Future Plan of Subdivision development applications under the *Planning Act* are intended to build upon and refine the solutions presented herein.

The Kanata North Urban Expansion Area (KNUEA) includes approximately 181 hectares (447.6 acres) between the established urban communities of Morgan, Grant, Briarbrook, and Brookside to the south and the Abandoned CN Railway corridor to the east.

The major landowners in the KNUEA, known collectively as the Kanata North Land Owners Group+ (KNLOG), initiated a Community Design Plan process to fulfill the requirements of the Official Plan. Collectively, the sponsoring land owners represent approximately 87% of the land within the KNUEA. The CDP, while funded by the KNLOG, will be balanced and shaped in accordance with the goals, objectives and policy directives of the City of Ottawa Official Plan.

The objective of the CDP is to create a set of guiding documents which will help shape the future of Kanata North as a liveable community, with a land use plan, Master Servicing Study, Transportation Master Plan and an Environmental Management Plan. A critical element of completing a successful planning exercise is the integration of the CDP preparation process with the Municipal Class Environmental Assessment (Class EA) processes for required infrastructure to service the KNUEA. Meeting the requirements of the Environmental Assessment Act is a requirement of Section 3.11 of the Official Plan.

Servicing alternatives for the storm, sanitary, and water infrastructure systems are evaluated. It was concluded that an expansion and upgrade of the municipal infrastructure system provides the best servicing alternative to achieve the land use objectives, while minimizing negative impact to both the social and natural environment.

The subsequent municipal servicing evaluation of 4 Concept Plans concludes that all plans have similar ratings. This suggests that factors other than municipal servicing will likely dictate selection of the final Demonstration Plan; these factors would include planning rationale, design of transportation corridors, public feedback, input from the Technical Advisory Committee, etc. The Demonstration Plan was then used to evaluate on-site and off-site servicing alternatives. A preferred servicing alternative was recommended and a functional design completed to demonstrate feasibility of servicing the KNUEA with on-site storm sewer infrastructure, wastewater collection system, water distribution system and utility infrastructure.

The findings and recommendations of the servicing evaluations are as follows:

Storm Drainage

- The EMP evaluates the stormwater management servicing options for the KNUEA and recommends servicing the development using three stormwater management ponds. The EMP also outlines design criteria for the stormwater management system.
- The storm drainage design includes a dual-drainage approach and design criteria are provided which provides guidance for future draft plan and site plan applications.
- A preliminary trunk sewer network was designed based on the Demonstration Plan to confirm feasibility of servicing the KNUEA.
- The preliminary trunk sewer network was modelled and adjusted to ensure the HGL for the storm sewer system is no more than 0.6m above the obvert of the storm sewer at any given point.
- A preliminary grading plan was prepared and used to develop overland flow catchment areas.
- Allowable release rates were developed based on land use for the minor and major storm systems. These allowable release rates should be used in future detailed designs for the development.
- A storm sewer servicing evaluation was completed and is summarized to document the results using the criteria and indicators as shown in Section 5.5 on the preferred storm servicing solution.
- Additional capacity has been incorporated into the storm sewer system which permits design flexibility for a moderate degree of intensification within KNUEA and suggests the system can readily accommodate moderate change and minor adjustments to the land use plan are readily accommodated.
- Drainage solutions for two off-site, upstream drainage areas are provided and incorporated into the storm servicing design.
- The existing ditch and culverts within the abandoned rail corridor have the capacity to convey the major system flows from the proposed development to Pond 3.

Wastewater Collection

- The March Pump Station is to be the wastewater outlet for the KNUEA.
- The two constraints of elevation and capacity were reviewed to determine that the East March Trunk Sewer is the most viable option to service the KNUEA. The connection point to the East March Trunk Sewer is proposed at the intersection of Shirley & Brook Drive and Sandhill Road just east of March Road.
- Off-site servicing was further evaluated and it was recommended that two routes will be used to service the KNUEA. A sanitary sewer will be constructed northward along March Road and along Shirley & Brook Drive. The second sanitary sewer will be installed and connected to the existing sanitary sewer that runs along the existing Abandoned CN Railway corridor to the Briar Ridge Pump Station. The Briar Ridge Forcemain then connects to the East March Trunk Sewer at the same connection point.
- The Briar Ridge Pump Station was reviewed and it was determined that there is a residual capacity of 74L/s that can be used to service the KNUEA. Upgrades will be required to the BRPS which involve larger impellers and the installation of a third pump as per the original design. These upgrades will require an amendment to the MOE Certificate of Approval.
- Six off-site servicing alternatives were reviewed and evaluated and Option #2 was recommended as the preferred option based on the reasons provided in Section 6.5. Option #2 includes a new gravity sanitary sewer along March Road that services the area west of March Road and west of the ridge. The area east of the ridge will be serviced by the existing 375mm diameter sanitary sewer along the rail corridor which outlets to the Briar Ridge Pump Station (BRPS). Upgrades will be required to the BRPS as well as to the existing sanitary sewer system as noted previously.
- This servicing option will require upgrading an existing 375mm diameter sanitary sewer along Shirley & Brook Drive to a 600mm diameter to be able to accommodate the increased flows and provide a lower outlet elevation. Upgrades will also be required to existing infrastructure along the rail corridor. A section of the existing 375mm diameter sanitary sewer will be replaced with 450mm diameter sewer. The BRPS can accommodate the flow from the Kanata North Urban Expansion Area (50L/s) within the ultimate design capacity of the station (183L/s).
- On-site servicing was reviewed and design criteria provided which provides guidance for future draft plan applications. A preliminary trunk wastewater sewer network was designed based on the Demonstration Plan to confirm feasibility of servicing the KNUEA. Based on the land uses provided in the Demonstration Plan, flow rates were calculated and the total flow for the KNUEA is calculated to be 182.2 L/s.
- A servicing evaluation was completed and is summarized to document the results using the criteria and indicators as shown in Section 6.6.1.3 on the preferred sanitary servicing solution.
- An analysis was completed to understand the effects on the downstream infrastructure and any upgrades that may be required. It was confirmed that downstream upgrades will be required and details are provided in Section 6.6.2.

- An HGL analysis was also completed on the BRPS to ensure that, when the future lands are added to the system, there are no negative impacts to the existing developments. This analysis concluded that an overflow outlet (at elevation of 67.50) will be able to provide relief to the existing trunk sewer along the rail corridor and not raise the HGL in the existing sanitary sewers tributary to the BRPS.
- A sensitivity analysis was completed and concluded that residual capacity exists in the wastewater network which permits design flexibility for a moderate degree of intensification within KNUEA and suggests the system can readily accommodate moderate change and minor adjustments to the land use plan are readily accommodated.

Water Distribution

- The Kanata North Urban Expansion should be serviced entirely from the Zone 2Ww pressure zone due to topography and location.
- Site grading should not exceed 93m to maintain minimum pressures greater than 40 psi.
- Services installed in areas where the grade is less than 74m will need pressure reducing valves to keep the maximum pressure below 80 psi.
- A secondary connection from Old Carp Road is the preferred secondary connection over the Celtic Ridge connection. However, either connection will adequately service the development.
- It is recommended that both secondary connections be completed prior to full build out of the KNUEA. As an interim measure, a second watermain within the March Road ROW could be provided.
- A servicing evaluation was completed and is summarized to document the results using the criteria and indicators as shown in Section 7.4 on the preferred water servicing solution.

Utility Infrastructure

- Each utility company (Hydro Ottawa, Enbridge Gas, Bell Canada, Rogers Ottawa) has confirmed their plant is in reasonable proximity to the KNUEA, and that this future development can be serviced.

The MSS component of the Kanata North CDP satisfies the requirements of Phases 1 and 2 of the Municipal Class EA Process. Infrastructure projects that will be undertaken in concert with development of the KNUEA and their schedule classification are outlined in detail in the report

In conclusion, the development reflected in the KNCDP Preferred Land Use Plan can be adequately serviced by extending existing municipal water and wastewater infrastructure and constructing three stormwater facilities to service the development.

1.0 Introduction

This Master Servicing Study (MSS) has been prepared as a component of the Community Design Plan (CDP) for Kanata North. The CDP will establish a community-wide land-use framework for the Kanata North Urban Expansion Area (KNUEA) that reflects the principles, objectives and policies for community development as directed by the Official Plan. The purpose of a CDP is to provide a level of direction between Official Plan policy and development approval to enable development to occur incrementally over time in an optimum and coordinated manner. Community design plans are used as a guide to the preparation and review of future applications for development.

The Master Servicing Study includes a comprehensive analysis to evaluate the water and wastewater infrastructure, on-site stormwater drainage, and utility infrastructure for the KNUEA. The primary objectives of the Master Servicing Study are to:

- Inventory and analyze existing infrastructure to understand existing conditions, opportunities and constraints;
- Develop reasonable servicing alternatives (both on-site and off-site);
- Evaluate the servicing alternatives including impacts on existing infrastructure and the environment (social, fiscal and natural);
- Selection of a preferred servicing alternative;
- Further detailed evaluation of the preferred alternative and consideration for all impacts and provide mitigations.
- Provide design criteria for use during detailed design phase of development.

1.1 Kanata North Urban Expansion Area

The Kanata North Urban Expansion Area (KNUEA) is approximately 181 hectares in area (447.6 acres) located north of the established urban communities of Morgan's Grant, Briarbrook, and Brookside and adjacent to a number of rural estate subdivisions including Hillview Estates Subdivision to the north, and the Marchbrook Circle and Panandrick subdivisions to the west. The abandoned CN railway corridor forms the KNUEA boundary to the east. For the purposes of this report, March Road is considered to run north/south.

As shown on **Figure 1**, the KNUEA extends north from the urban portion of Kanata along both sides of March Road. The area is predominantly rural but also includes existing development such as St. Isidore Roman Catholic Church and St. Isidore Catholic School (Ottawa Catholic School Board) as well as several other existing rural residential and commercial uses along the west side of March Road.

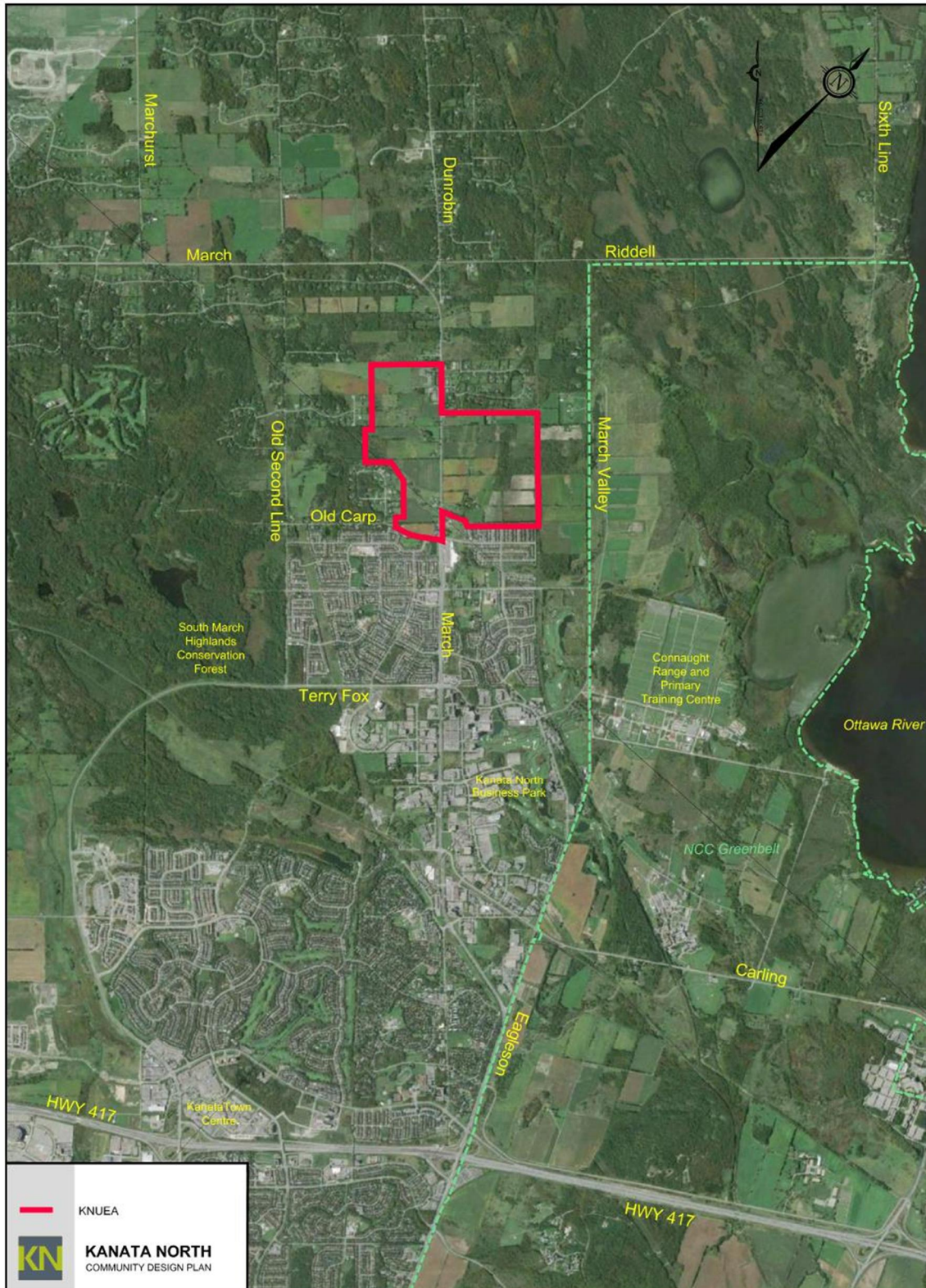


Figure 1 – Kanata North Urban Expansion Area (KNUEA) Context and Location

1.2 Background

When the City's Official Plan was reviewed in 2009, City Council and the Ontario Municipal Board approved a number of urban expansion areas to support projected population growth to 2031. The Kanata North Urban Expansion Area (KNUEA) was one of several areas amended from a %General Rural+ designation to %Urban Expansion Study Area+ through Official Plan Amendment 76 (OPA 76).

OPA 76 also added Section 3.11 of the Official Plan which sets out a process for further amending the %Urban Expansion Study Area+ to %General Urban Area+ and other land use designations appropriate for urban development. The preparation of a CDP, including satisfying Environmental Assessment and Official Plan Amendment requirements, is a necessary component of this process and must be completed before the City will consider development applications for the area.

The major landowners in the KNUEA, known collectively as the %Kanata North Land Owners Group+(KNLOG), initiated a Community Design Plan process to fulfill the requirements of the Official Plan. Collectively, the sponsoring land owners represent approximately 87% of the land within the KNUEA. The CDP, while funded by the KNLOG, has been balanced and shaped in accordance with the goals, objectives and policy directives of the City of Ottawa Official Plan.

The Sponsoring Landowners include:

- Metcalfe Realty Company Ltd.;
- Brigil (3223701 Canada Inc.);
- Valecraft (8409706 Canada Inc.)/JG Rivard Ltd.; and
- Junic/Multivesco (7089121 Canada Inc.).

Early in the process formal invitations were sent to other landowners to participate; however, none other than the group listed above chose to join the KNLOG. Non-participating landowners have been involved in the CDP process through consultation and opportunities to comment as the plan evolved.

Figure 2 provides a map showing the ownership of lands within the KNUEA. Adjacent properties owned by members of the KNLOG are also shown. For clarity, the KNUEA is sometimes referred to as being divided into quadrants, east and west of March Road and north and south roughly based on property ownership. The quadrants are labeled on **Figure 2**.

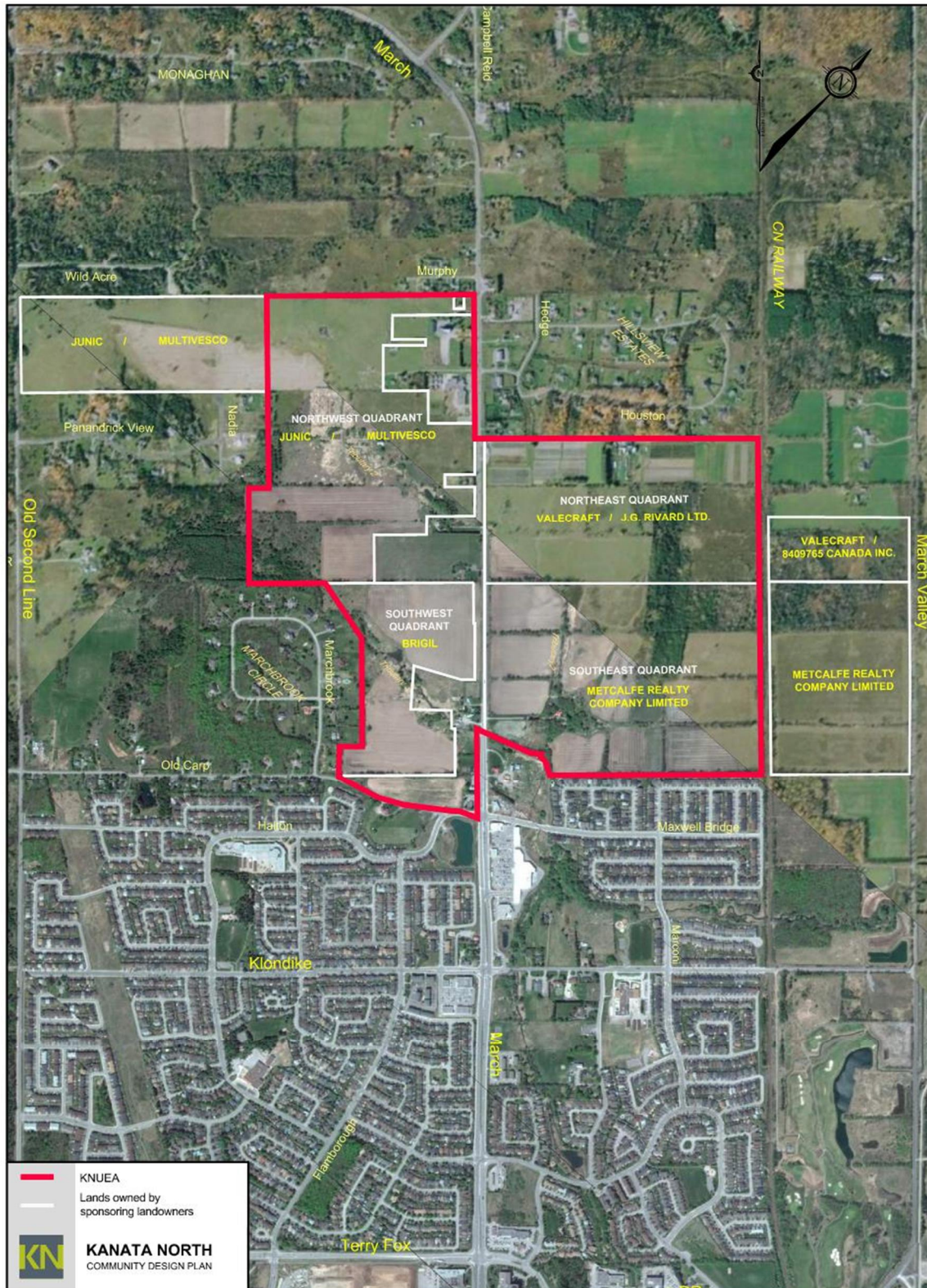


Figure 2 - KNUEA Boundaries and Properties of Sponsoring Landowners

1.3 Integrated Planning Process

A critical element of completing a successful planning exercise is the integration of the CDP and Official Plan Amendment (OPA) process with the Municipal Class Environmental Assessment (Class EA) processes for associated infrastructure projects. The objective of the integrated process is to create a set of guiding documents that will shape the development of Kanata North as a healthy, vibrant, liveable community. The guiding documents are as follows:

- a Community Design Plan (CDP) to determine the location of land uses and provide direction for future development in the KNUFA;
- an Environmental Management Plan (EMP) to address the management of the Natural Heritage System;
- a Transportation Master Plan (TMP) to provide an integrated and sustainable transportation network; and
- a Master Servicing Study (MSS) to inform the design and implementation of sanitary, water, and stormwater management infrastructure.

The Planning Act process to implement the CDP will be an Official Plan Amendment approved by City Council, implementing the recommendations set out in the EMP, TMP, MSS and CDP.

The Master Plans set out a network of roads and municipal infrastructure including water, sanitary and stormwater management system(s). These facilities will ultimately be turned over to the City of Ottawa as municipal infrastructure through the subdivision approvals process. The Province of Ontario's Environmental Assessment Act requires an Environmental Assessment for any major public sector undertaking which includes public roads, transit, water, sanitary and stormwater installations. Meeting requirements of the Environmental Assessment Act is a requirement of Section 3.11 of the Official Plan.

Combining the CDP process with the Class EA creates an opportunity to co-ordinate the approval requirements of the Environmental Assessment Act and the Planning Act and provides an integrated approach to the planning and development of all aspects of the community. For example, an integrated planning process means that background studies and existing conditions reports can be shared between the two processes, stakeholders and advisory committees are able to consider all aspects of planning and servicing, and the public review and approval processes can be consolidated and simplified. The Master Plan and CDP process was integrated in accordance with Approach #4 as outlined in the Class EA.

A figure showing the integration of the Class EA process and the Community Design Plan/Official Plan Amendment process is provided as **Figure 3**.

KANATA NORTH URBAN EXPANSION STUDY AREA CDP

Class EA and Planning Act Processes

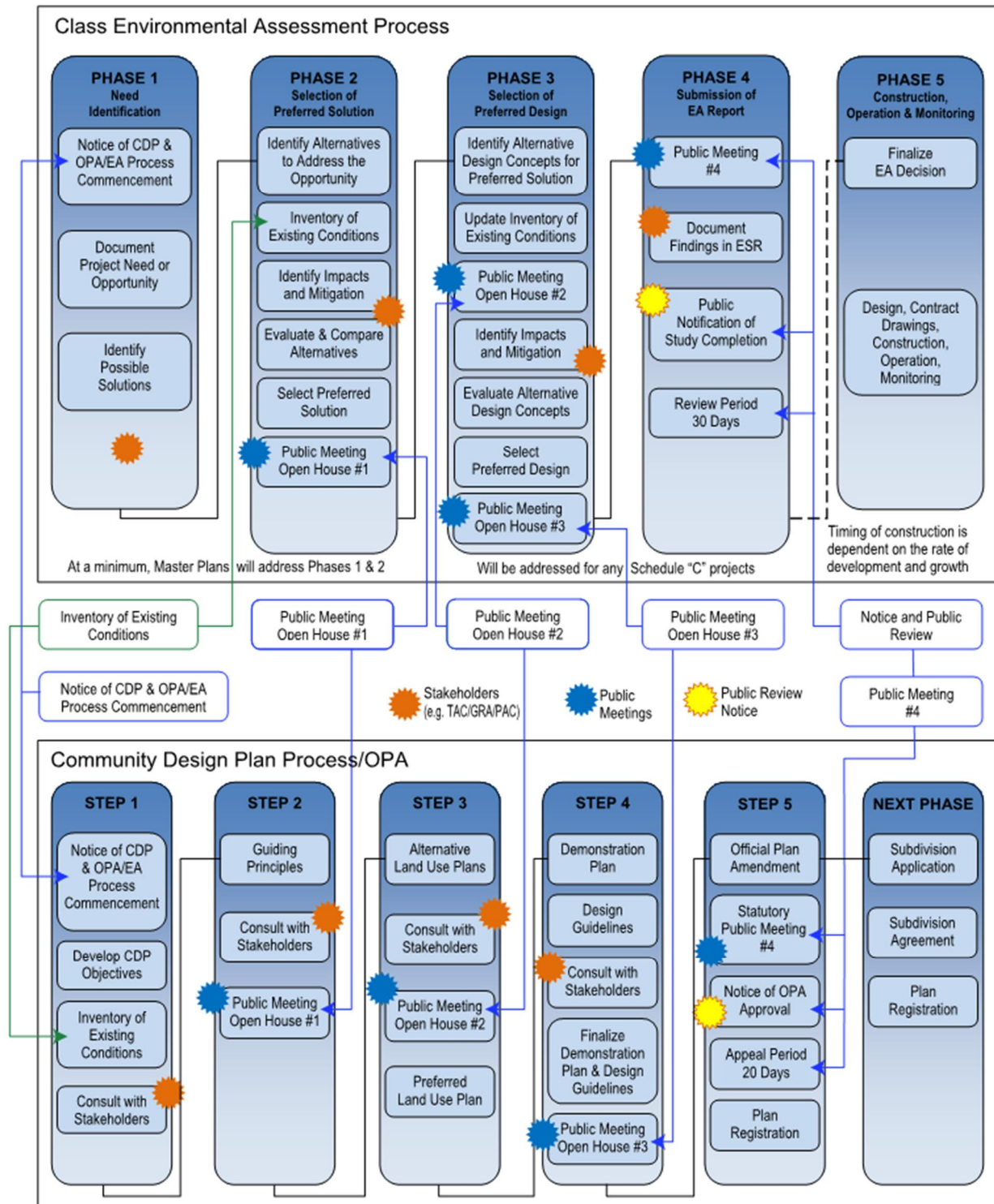


Figure 3 - Integrated Class EA and CDP Planning Framework

1.4 Consultation Process

1.4.1 Public Meetings and Workshop

Both the CDP and Environment Assessment processes include an important component of public consultation that gives the public and community stakeholders meaningful opportunities to be involved in shaping the community.

A Consultation Plan was developed as part of the initial Terms of Reference for the Kanata North CDP and three public open houses and a workshop session were held in Kanata between the summer of 2013 and spring of 2016. The first two open houses and workshop led to the development of the preferred options for land use, transportation, infrastructure and environmental management. The third open house presented the preferred land use plan and supporting master plans to the community. A fourth and final public meeting was held in June 2016 to present the CDP, Official Plan Amendment and Master Plans to Planning Committee.

Additional information about the public consultation process is available in the Kanata North Community Design Plan and in the Kanata North Public Consultation Report prepared by Morrison Hershfield.

Project Team

The preparation of the CDP included the participation of a number of committees or teams created to enable a collaborative study process encompassing a range of stakeholders.

Core Project Team (CPT)

The Core Project Team (CPT) was established to lead the CDP process. The CPT was comprised of the Kanata North Land Owners Group, the Consultant Team, and City of Ottawa staff from the Department of Planning and Growth Management. The primary function of the CPT was to review reports, resolve issues and achieve consensus at each step of the CDP work program.

Novatech was retained by the KNLOG as Project Managers to lead the Consulting Team. Novatech was also responsible for Land Use Planning, Urban Design, the Master Servicing Study, Transportation Master Plan, and the Environmental Management Plan. The City of Ottawa provided an internal project manager for coordination and guidance. The CPT had representation from the following organizations:

City of Ottawa

- City of Ottawa staff from the Planning and Growth Management Department;

Kanata North Land Owners Group

- Metcalfe Realty Company Ltd.;
- Brigil (3223701 Canada Inc.);
- Valecraft (8409706 Canada Inc.)/JG Rivard Ltd.; and
- Junic/Multivesco (7089121 Canada Inc.).

Consulting Team

- Land Use Planning and Urban Design . Novatech;
- Integrated Environmental Assessment . Morrison Hershfield;
- Master Servicing Study . Novatech;

- Transportation Master Plan . Novatech;
- Environmental Management Plan . Novatech;
- Geotechnical . Paterson Group Inc.;
- Hydrogeology . Paterson Group Inc.;
- Natural Heritage and Species at Risk (Environment) - Muncaster Environmental Planning Inc., DST, Bowfin Environmental, McKinley Environmental Solutions;
- Fluvial Geomorphology . Matrix Solutions and Parish Geomorphics;
- Archaeology . Paterson Group Inc.; and
- Potable Water Assessment . Stantec.

Technical Advisory Committee (TAC)

The Technical Advisory Committee (TAC) was created to provide guidance and review critical deliverables on an as-needed basis. Specifically, TAC Meetings were held to discuss the evolving land use plan and information related to the preparation of the Transportation Master Plan, Master Servicing Study and Environmental Management Plan. In addition, as needed, the members of the TAC were available to provide input throughout the CDP process. Representatives of the following organizations were invited to participate:

- CPT Members (as needed);
- City of Ottawa Planning and Growth Management Department;
- City of Ottawa Traffic Services;
- City of Ottawa Parks and Recreation Branch;
- City of Ottawa Infrastructure Approvals;
- City of Ottawa Transit Services;
- Ottawa Public Health;
- Ottawa Public Library;
- Ottawa Carleton District School Board (OCDSB);
- [Conseil des écoles publiques de l'Est de l'Ontario](#) (CEPEO);
- Ottawa Catholic School Board (OCSB);
- [Conseil des écoles catholiques du Centre-Est](#) (CECCE); and
- Hydro Ottawa.

Government Review Agencies (GRA) are specific agencies with an interest in land use and development. The GRA were provided with copies of all notices prepared for the project and requested to provide input and comments. Representatives were invited to sit as regular members of the TAC and depending on the agency were involved to provide technical input at various stages from the initial steps to reviewing the details of alternative designs. The level of participation was at the discretion of the agency/representative and some agencies were involved throughout the process while others were consulted primarily to acknowledge they will have a role in future subdivision applications. Individual meetings were held with GRA as required and TAC meeting agendas were distributed in advance to assist in determining if attendance/participation was required. Government Review Agencies consulted included:

- Ontario Ministry of the Environment and Climate Change (Environment);
- Ontario Ministry of Natural Resources and Forestry (Environment);
- Ontario Ministry of Tourism, Culture and Sport (Archaeology);
- Ontario Ministry of Aboriginal Affairs (Heritage);
- Mississippi Valley Conservation Authority (Environment/Floodplain);
- National Capital Commission (Adjacent landowner); and
- Department of Fisheries and Oceans Canada (Fish habitat);

Public Advisory Committee (PAC)

The varied interests of the surrounding community (i.e., community associations, local residents, and special interest groups) were represented through a Public Advisory Committee (PAC). The PAC met with members of the project team on a regular basis to:

- Identify any community issues early in the CDP process;
- Review technical analyses;
- Provide direct input to the establishment of the guiding principles of the CDP;
- Review land use alternatives; and
- Provide meaningful feedback on all study activities and work-in-progress.

The composition of the PAC was determined through consultation with the Ward Councillors and City of Ottawa staff and included:

- City Councillors from Wards 4 (Kanata North) and 5 (West Carleton-March)
- Residents and representatives of the March Rural Community Association and the Briarbrook, Brookside and Morgan's Grant Community Association
- A representative from the Kanata Chamber of Commerce

2.0 MASTER SERVICING STUDY PROCESS

This section outlines the process that was followed to prepare this report.

The initial step in this process was a review of existing conditions for the KNUEA. This included: topography, geotechnical information, and existing infrastructure information for watermain, wastewater and storm sewers and utilities. This information was compiled into a report prepared by Novatech titled ~~Existing~~ Existing Conditions Report Municipal Infrastructure (dated November 2013). A copy of the report is included in **Appendix A** for reference.

As part of the development of the Environmental Management Plan (EMP), natural features were identified through field investigation and evaluated. This included: terrestrial and aquatic natural features, geotechnical conditions, and watercourse erosion thresholds. The EMP's evaluation determined what factors directly impacted the development of the Preferred Land Use Plan and Demonstration Plan and the options for infrastructure servicing.

Existing infrastructure was reviewed in more detail to understand available capacities with respect to estimated flows from the development area. Multiple servicing options were prepared and analyzed to evaluate the impact on off-site municipal infrastructure and identify servicing constraints. Evaluation criteria were established to rate alternatives. Cost estimates were also prepared for the servicing options. A preferred off-site servicing alternative was selected and, based on the Demonstration Plan; internal site servicing was established for the water, wastewater and storm sewer systems. The purpose of this exercise was to demonstrate the feasibility of servicing the property for a potential development layout. Each of these steps is discussed in more detail in subsequent sections of this report.

3.0 EXISTING CONDITIONS

Existing conditions and existing infrastructure were reviewed in order to prepare and assess proposed servicing options for the Kanata North Urban Expansion Area. A summary of the existing conditions is as follows:

Ownership - Figure 3.1 shows the various land owners within KNUEA. The major land owners are outlined in red and the minor land owners are outlined in yellow. The major land owners formed the Kanata North Land Owners Group (KNLOG). This group is comprised of the following landowners: Metcalfe Realty Company Limited, J.G. Rivard Ltd. and 8409706 Canada Inc. (Valecraft Homes), 3223701 Canada Inc. (Brigil) and 7089121 Canada Inc. (Junic/Multivesco).

Topography - Figure 3.2 is a colour coded contour map of the study area. Lower elevations to the east are shown in light brown (70m) and higher ground to the west is shown in purple and red (90+m). There is a 24m grade elevation change from the northwest to southeast corner of the property. There is also a ridge (approx. 9m in height) located on the east side of the property that runs in a north south direction.

Geotechnical - Figure 3.3 shows test pits locations from the various geotechnical investigations completed to date. Ground elevations and rock elevations are also noted where possible. The majority of the property has soils profile of topsoil, stiff silty clay underlain by glacial till and/or bedrock. The depth to bedrock ranges from 0 to 10m over the site with the shallowest bedrock located in the western portion of the site. The depth to groundwater also ranges over the site from 0.7m to 3.9m below surface. Numerous test pits were dry upon excavation. There is also a maximum permissible grade raise over most of the site that ranges from 1.5 to 3.0m as shown on Figure 3.3.

Existing Surface Drainage - Figure 3.4 shows existing drainage channels within the KNUEA and surrounding area and their drainage boundaries. The property is within the Shirley Brook subwatershed and there are three tributaries to Shirley Brook that run through the property.

Existing Environmental Inventory – Figure 3.5 shows the environmental features within the KNUEA. These include existing drainage channels and creek corridors/setbacks, existing rail corridor, existing floodplain limits, and existing natural areas to be retained.

Stormwater Infrastructure – Figure 3.6 shows existing storm infrastructure. There are no existing storm sewer systems within the KNUEA. Storm drainage consists of surface drainage through existing ditches with culverts for March Road crossings. Refer to the Environmental Master Plan for additional information on existing storm drainage and infrastructure.

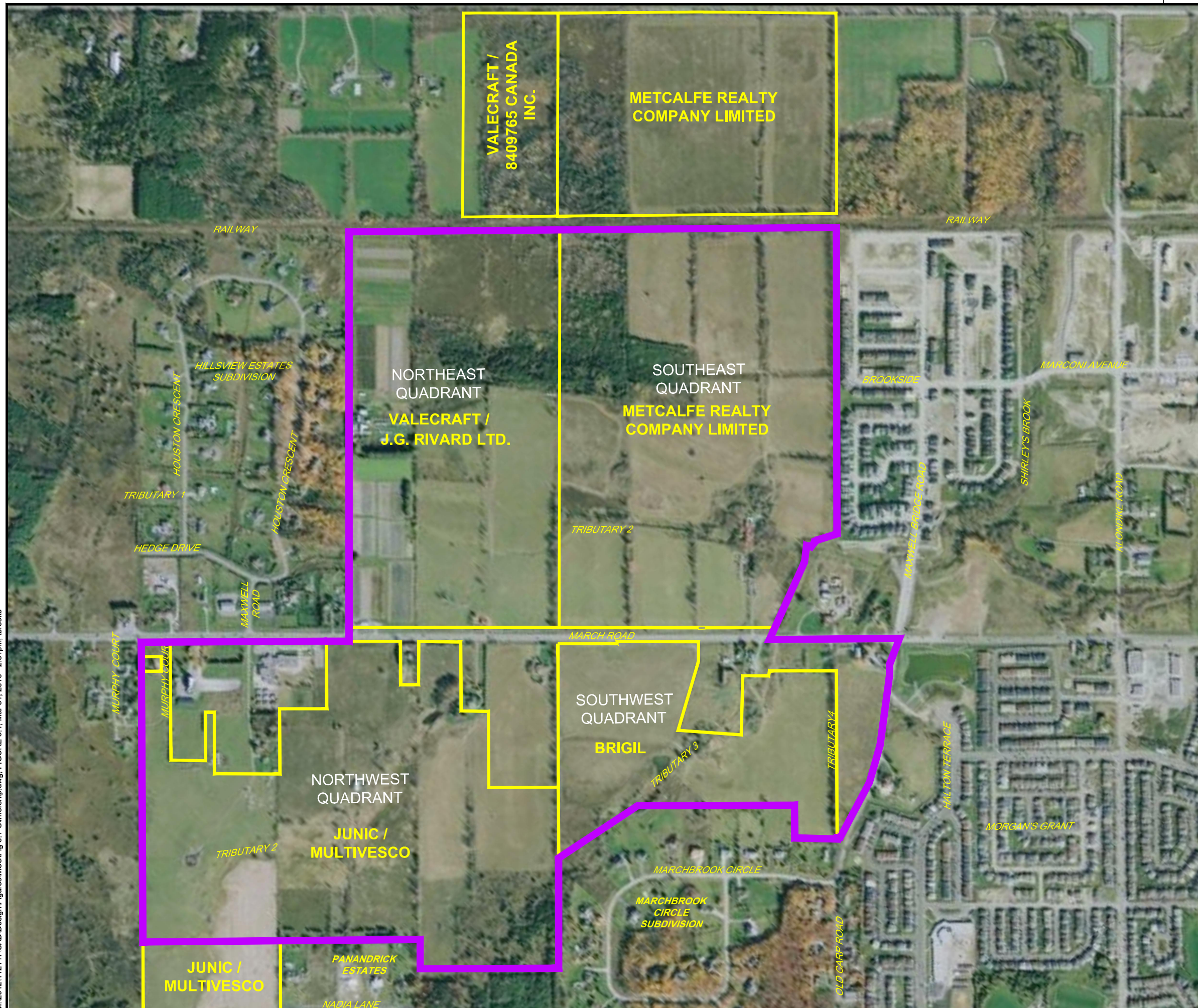
Wastewater Infrastructure – Figure 3.7 shows the wastewater infrastructure in the surrounding area. The City of Ottawa West Urban Community (former City of Kanata) sanitary collection network consists of separated gravity sewers and local pumping stations. These facilities discharge into a regional trunk system that carries sewage flow to the Robert O. Pickard Environmental Centre in eastern Ottawa for treatment of wastewater.

Water Infrastructure – Figure 3.8 shows the watermain infrastructure in the surrounding area. The KNUFA is located at the north end of Kanata in the West Urban Community (WUC). The Britannia Filtration Plant and Pumping Station service this community from a large diameter feedermain routed through Bells Corners.

Utility Infrastructure – Figure 3.9 shows the utility infrastructure in the surrounding area. Utility infrastructure, including hydro, gas, bell and cable, currently exist along the March Road right-of-way through the subject property.

Combined Existing Infrastructure Plan – Figure 3.10 shows all the existing infrastructure in one plan.

M:\2012\112117\CAD\Design\Figures\MSS\Fig 3.1-Ownership.dwg, FIGURE 3.1, Mar 31, 2016 - 2:31pm, tbrooks



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KANATA NORTH URBAN
EXPANSION AREA (KNUEA)

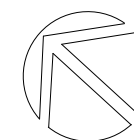


LAND OWNED BY
SPONSORING LANDOWNERS



KANATA NORTH COMMUNITY DESIGN PLAN

FIGURE NO. 3.1 OWNERSHIP PLAN



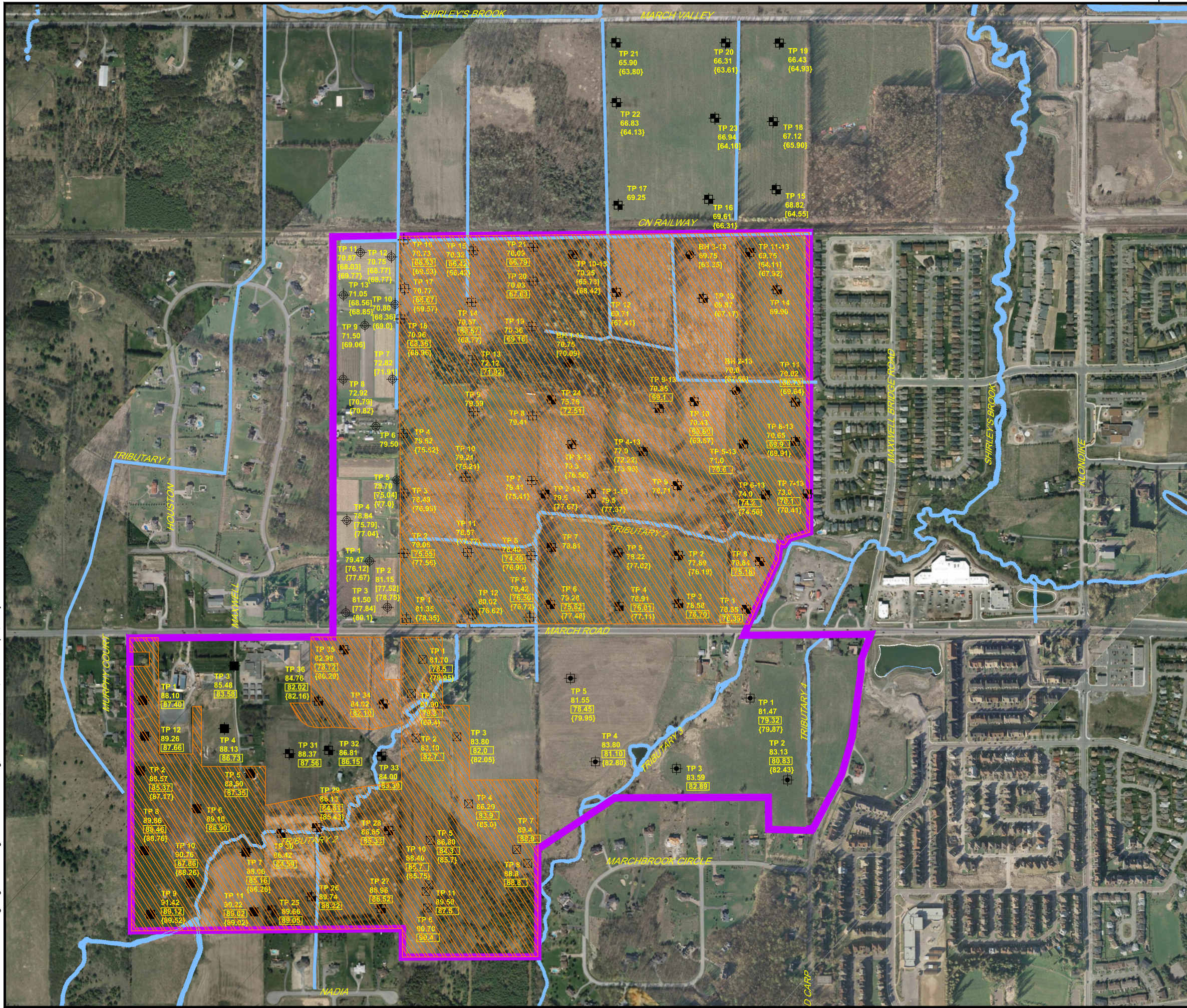
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M:\2012\112117\CAD\Design\Figures\MSS\Fig 3.3-Geotechnical.dwg, FIGURE 3.3, Mar 30, 2016 - 2:29pm, Isely



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- KANATA NORTH URBAN EXPANSION AREA (KNUA)
- EXISTING DRAINAGE CHANNEL
- IDENTIFIED MAXIMUM PERMISSIBLE GRADE RAISE LESS THAN 1.5m TO 3.0m
- TEST PIT LOCATION, CURRENT INVESTIGATION PATTERSON GROUP REPORT PG2878
- TEST PIT LOCATION, PREVIOUS INVESTIGATION PATERSON GROUP REPORT PG2256, 2011
- TEST PIT LOCATION, PREVIOUS INVESTIGATION PATERSON GROUP REPORT PG1823, 2009
- TEST PIT LOCATION, PREVIOUS INVESTIGATION PATERSON GROUP REPORT PG1716, 2008
- TEST PIT LOCATION, PREVIOUS INVESTIGATION PATERSON GROUP REPORT PG1626, 2008
- TEST PIT LOCATION BY OTHERS
- 78.55 GROUND ELEVATION (m)
- [76.39] BEDROCK ELEVATION (m)
- [64.10] PRACTICAL REFUSAL TO EXCAVATION ELEV. (m)
- {76.19} GROUNDWATER ELEVATION (m)



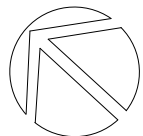
KANATA NORTH COMMUNITY DESIGN PLAN

FIGURE NO. 3.3 GEOTECHNICAL INFORMATION

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FEB 2016

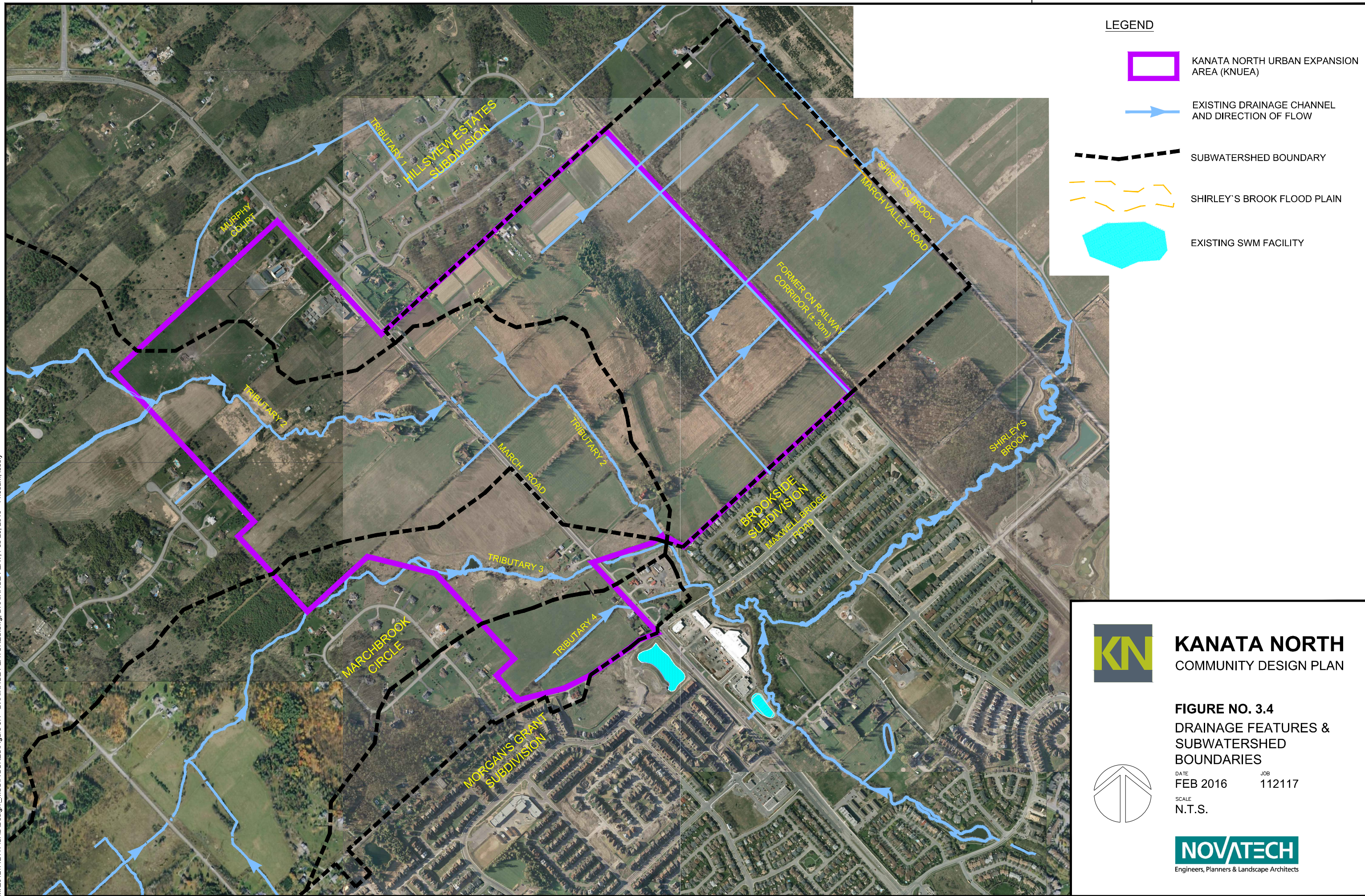
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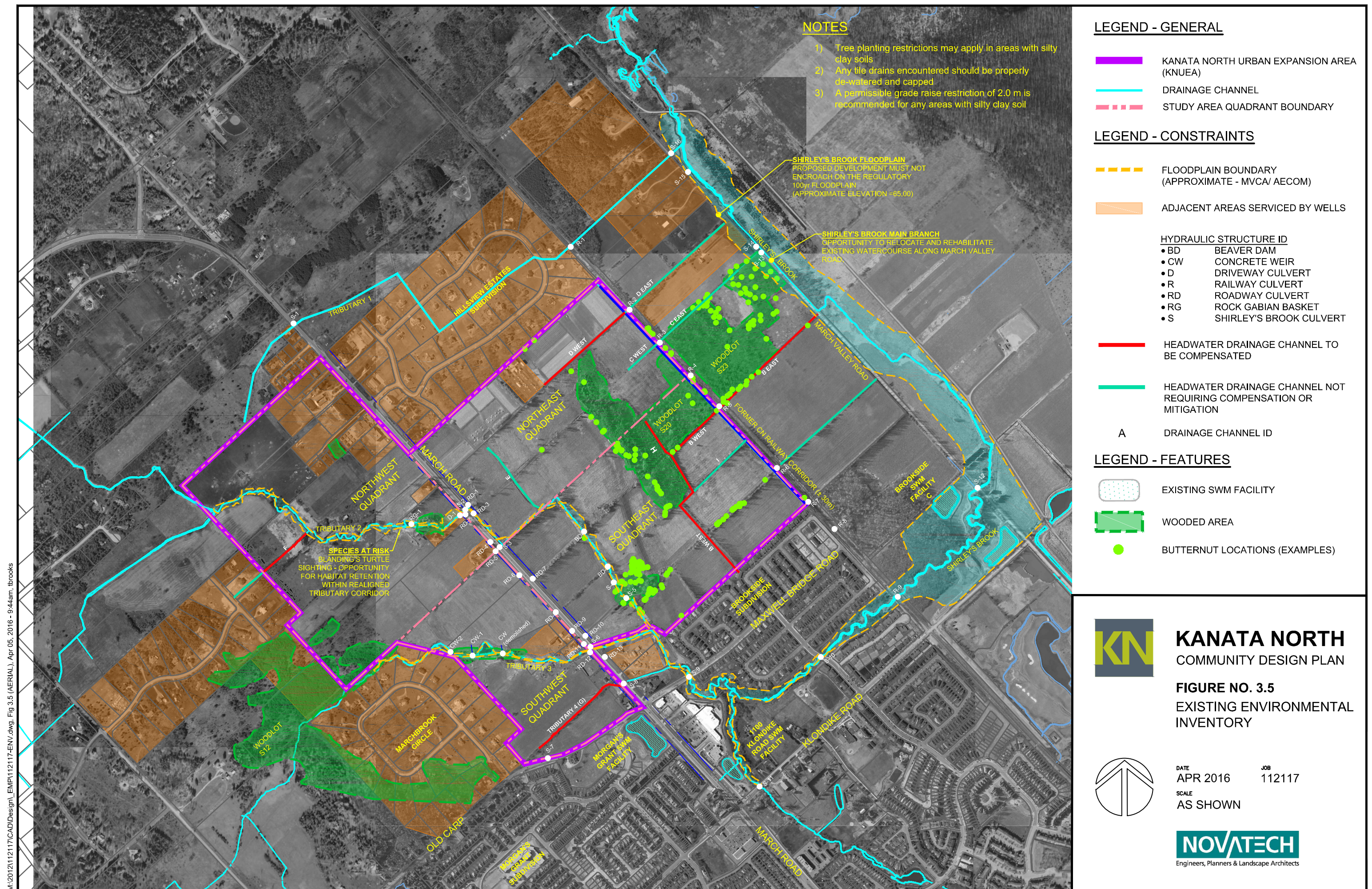
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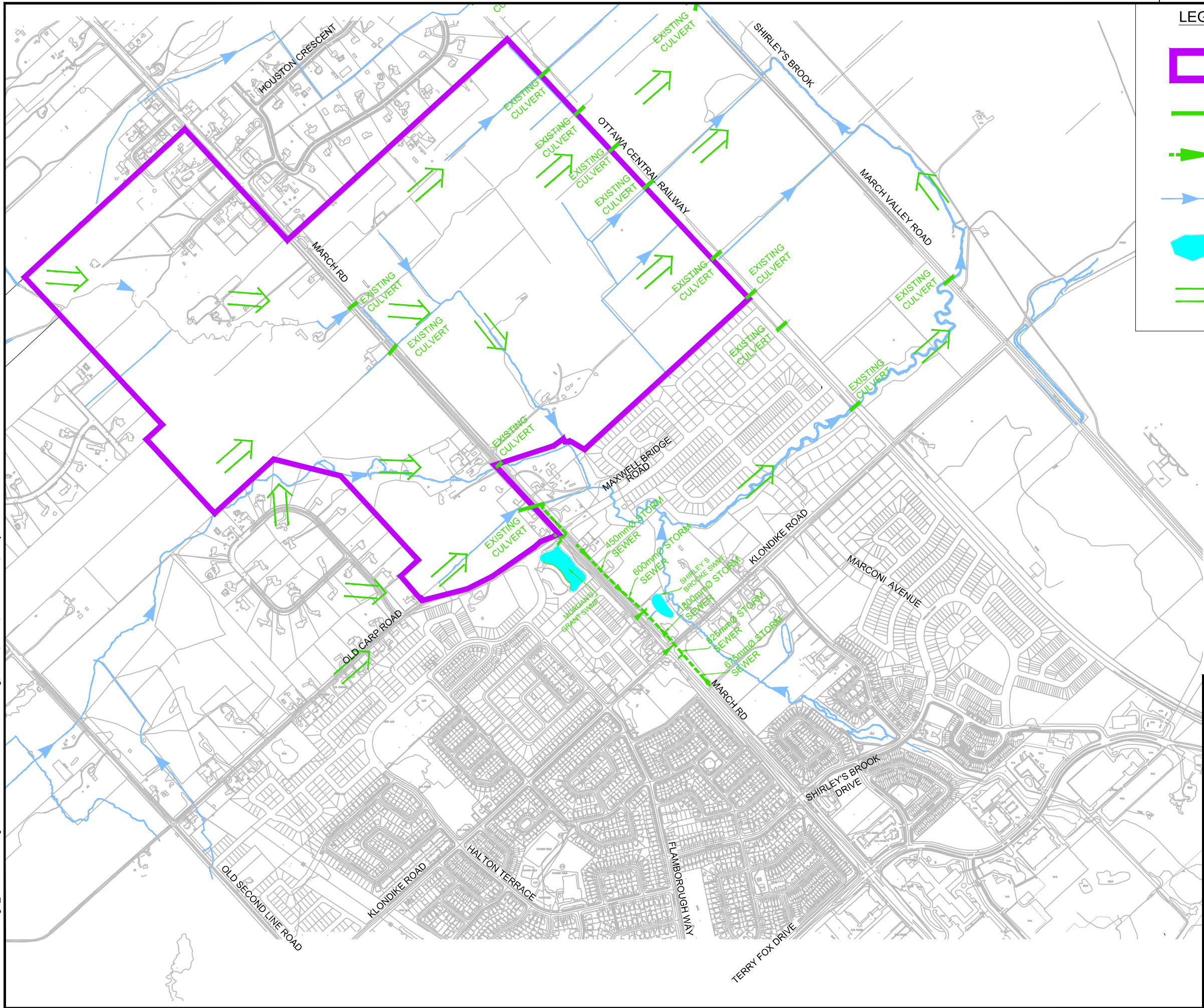
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M:\2012\112117\CAD\Design\1. MSS\FIGURES\Figure 3.4 - DRAINAGE FEATURES.dwg, DRAINAGE FEAT, Feb 23, 2016 - 11:38am, lseely






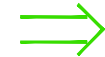




M:\2012\112117\CAD\Design\ MSSI\FIGURES\Figure 3.6-STORM INFRASTRUCTURE.dwg, FIG 3-6, Feb 23, 2016 - 10:04am, lseely



LEGEND

-  KANATA NORTH URBAN EXPANSION AREA (KNUEA)
-  EXISTING CULVERTS
-  EXISTING MAINLINE STORM SEWER
-  EXISTING DRAINAGE CHANNELS
-  EXISTING SWM FACILITY
-  MAJOR OVERLAND FLOW



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 3.6
EXISTING CONDITIONS
- STORM INFRASTRUCTURE



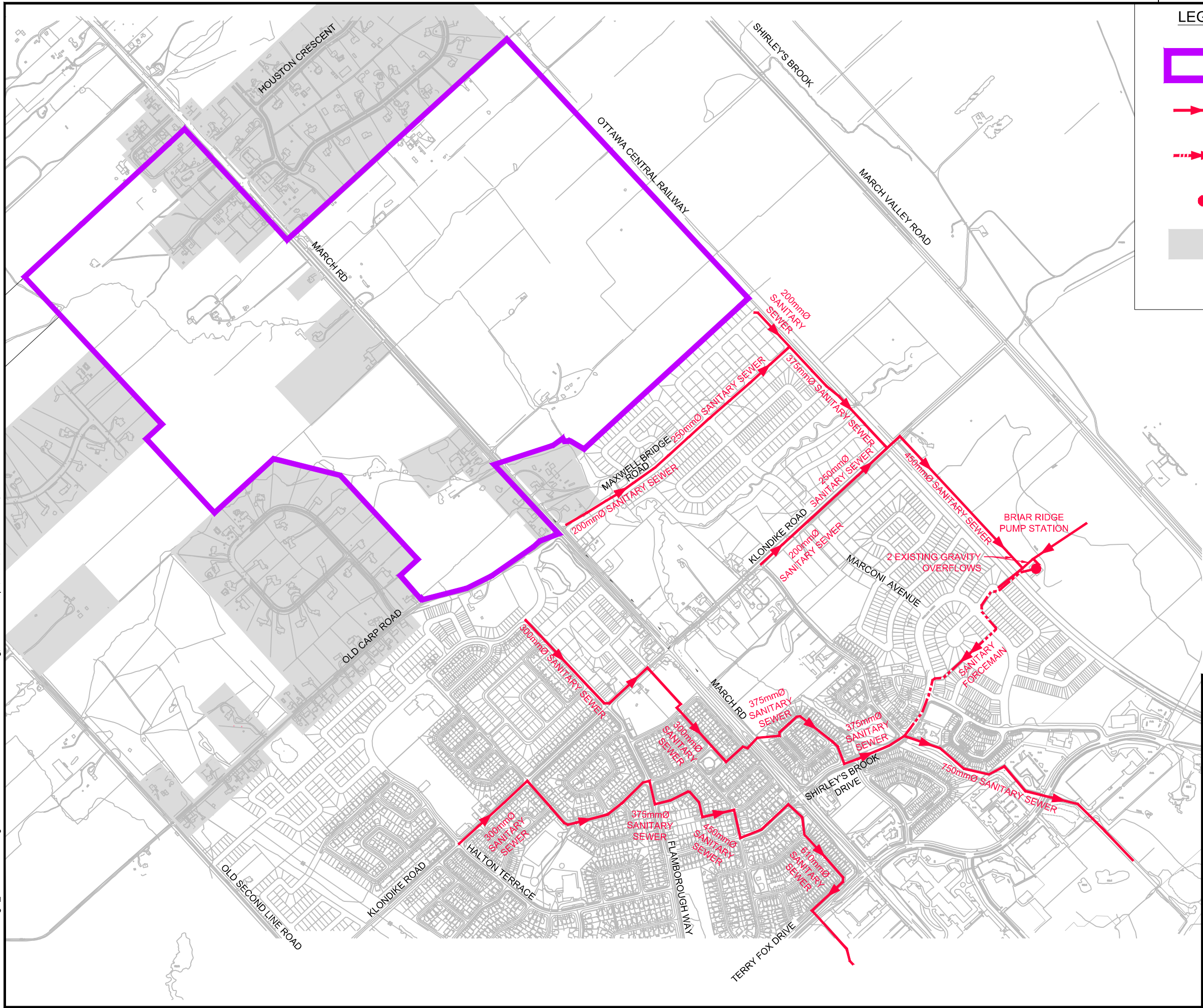
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M:\2012\112117\CAD\Design\ MSSF\FIGURES\Figure 3.7-WASTEWATER INFRASTRUCTURE.dwg, 11x17 Landscape, Feb 18, 2016 - 9:30am, tbrooks



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KANATA NORTH URBAN EXPANSION AREA (KNUEA)



EXISTING MAINLINE SANITARY SEWER



EXISTING SANITARY FORCEMAIN



EXISTING SANITARY PUMP STATION



EXISTING PROPERTIES SERVICED BY WELLS AND SEPTIC SYSTEMS



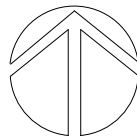
KANATA NORTH COMMUNITY DESIGN PLAN

FIGURE NO. 3.7 EXISTING CONDITIONS - WASTEWATER INFRASTRUCTURE

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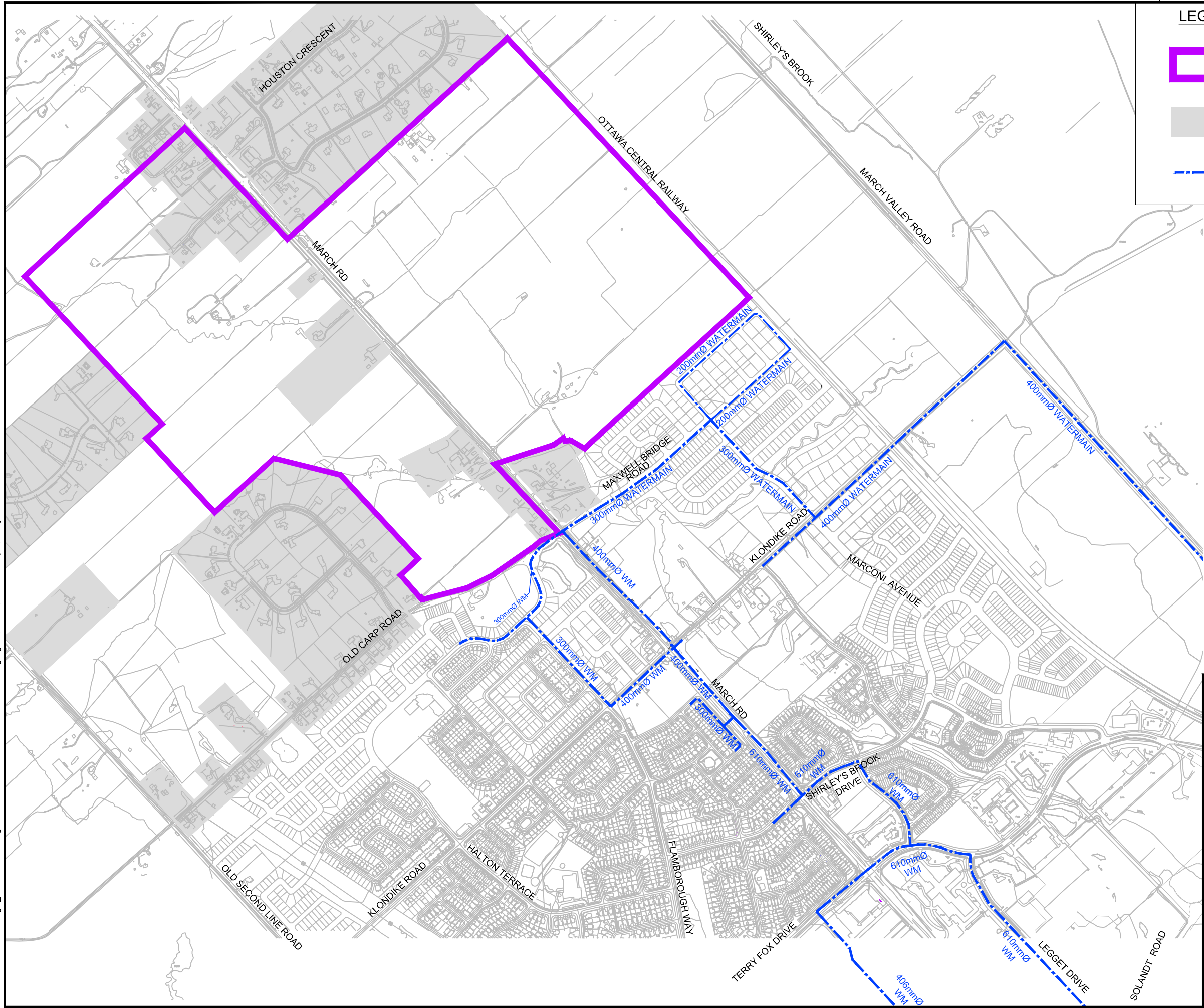
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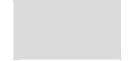
M:\2012\112117\CAD\Design\ MSSI\FIGURES\Figure 3.8-WATERMAIN INFRASTRUCTURE.dwg, fig 3.8, Feb 23, 2016 - 12:29pm, leely



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KANATA NORTH URBAN EXPANSION AREA (KNUEA)



EXISTING PROPERTIES SERVICED BY WELLS AND SEPTIC SYSTEMS



EXISTING MAINLINE WATERMAIN

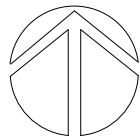


KANATA NORTH COMMUNITY DESIGN PLAN

FIGURE NO. 3.8 EXISTING CONDITIONS - WATERMAIN INFRASTRUCTURE

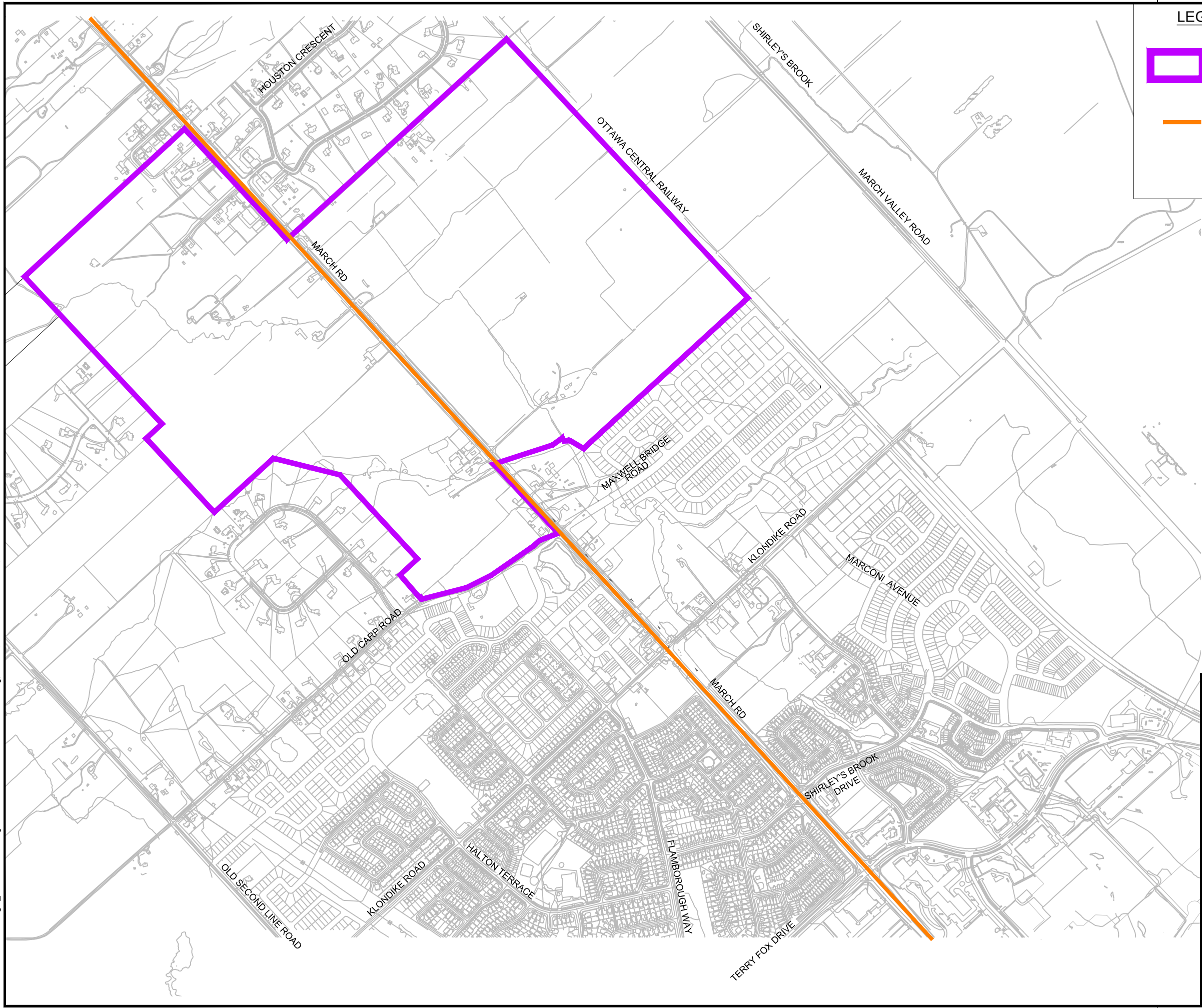
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M:\2012\112117\CAD\Design\ MSSI\FIGURES\Figure 3.9-UTILITY INFRASTRUCTURE.dwg, FIG 3-9, Feb 19, 2016 - 9:35am, tbrooks



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KANATA NORTH URBAN EXPANSION AREA (KNUEA)



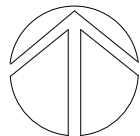
EXISTING UTILITIES

- HYDRO OTTAWA 27KV LINE
- 6" HIGH PRESSURE GAS MAIN
- BELL FIBRE OPTIC & ROGERS CABLE



KANATA NORTH COMMUNITY DESIGN PLAN

FIGURE NO. 3.9 EXISTING CONDITIONS - UTILITY INFRASTRUCTURE



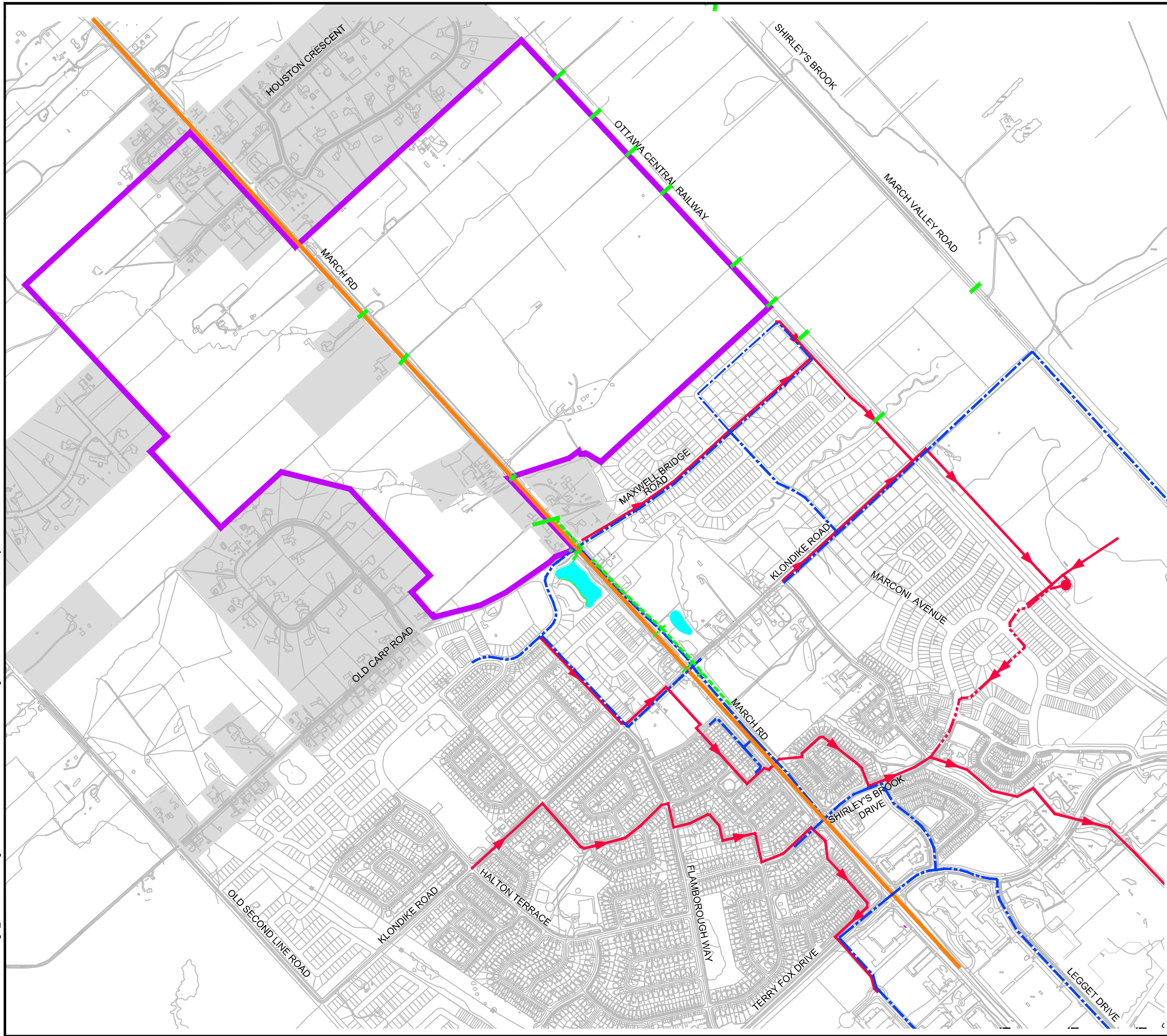
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-  KANATA NORTH URBAN EXPANSION AREA (KNUEA)
-  EXISTING CULVERTS
-  EXISTING MAINLINE STORM SEWER
-  EXISTING MAINLINE WATERMAIN
-  EXISTING UTILITIES
-  EXISTING MAINLINE SANITARY SEWER
-  EXISTING SANITARY FORCEMAIN
- EXISTING SANITARY PUMP STATION
-  EXISTING SWM FACILITY
-  EXISTING PROPERTIES SERVICED BY WELLS AND SEPTIC SYSTEMS



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 3.10
EXISTING CONDITIONS
- COMBINED
INFRASTRUCTURE

DATE APR 2016 JOB 112117

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