APPENDIX F – WATER BODY AND WATER ASSESSMENT REPORTS

Nation Rise Wind Farm
Water Body Assessment

Prepared for:
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Project No. 1756 l August 2017

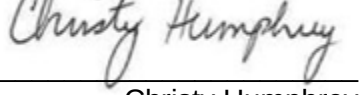
NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Nation Rise Wind Farm
Water Body Assessment

Project Team:

Staff	Role
Andrew Ryckman	Project Advisor
Christy Humphrey	Project Manager/Biologist
Nyssa Hardie	Stream Corridor & Environmental Analyst
Ashley Cantwell	Biologist
Blair Baldwin	Biologist
James Barber	Biologist

Report submitted on August 2, 2017



Christy Humphrey
Terrestrial & Wetland Biologist

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1.0 Project Description

Natural Resource Solutions Inc. (NRSI) was retained in April 2016 by DNVGL, on behalf of Nation Rise Wind Farm Limited Partnership (the Proponent) to conduct a Water Body Assessment (WBA) and Water Body Report (WBR) in accordance with the Renewable Energy Approval (REA) Regulation, Ontario Regulation (O. Reg.) 359/09. The WBA includes a records review and site investigation, while the WBR, which is provided under a separate cover, includes a complete assessment of impacts to any water bodies which may occur at the proposed wind energy generating facility of up to 33 permitted wind turbines, with a nameplate capacity of approximately 100 megawatts (MW).

The Nation Rise Wind Farm (Nation Rise WF or Project) is being proposed by Nation Rise Wind Farm Limited Partnership, a wholly-owned subsidiary of EDP Renewables Canada Ltd. (EDPR), and is located in the Township of North Stormont, Ontario. The Nation Rise Wind Farm is located in eastern Ontario, within the Township of North Stormont and the United Counties of Stormont, Dundas and Glengarry, Ontario. More specifically, the Project is located in the western portion of North Stormont bounded to the south by the Township of South Stormont and to the west by the boundary of the Township of North Dundas. The north portion of the Project is delimited by the municipality boundaries of Russell and The Nation. Courville Road and MacMillan Road are the east boundaries of the Project.

According to O. Reg. 359/09, as amended, and as per the Technical Guide to Renewable Energy Approvals (MOE 2013), the Project Location is defined as "...*a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project*". As described therein, the Project Location boundary is the outer limit of where site preparation and construction activities will occur (i.e. construction disturbance areas described below) and where permanent infrastructure will be located, including the air space occupied by turbine blades.

Construction disturbance areas surrounding various Project components have been identified; such areas correspond to the outer limits of the "Project Location" boundaries on the maps. These areas denote zones where temporary disturbance during the

construction phase may occur such as temporary Project component laydown and storage areas.

For the purposes of this report, NRSI will refer to the areas within 120m of the Project Location as the 'Project Area'. This includes areas within 120m of proposed wind turbines, measured from blade tip, as well as within 120m of any areas that may be used as temporary lay-down areas, crane pads, access roads, electrical collector lines, substation, and meteorological towers.

This report has been prepared in accordance with the REA Regulation, O. Reg. 359/09.

2.0 REA Requirements

The REA Regulation, O. Reg. 359/09 – *Renewable Energy Approvals* under *Part V.0.1 of the Act* (herein referred to as the REA Regulation), made under the *Environmental Protection Act* (*EPA*), identifies the requirements for the development of renewable energy projects in Ontario. In accordance with the REA Regulation the Project is classified as a Class 4 wind facility and is required to complete a REA submission.

Section 29 of the REA Regulation requires proponents of Class 4 wind projects to undertake a water body assessment which involves a records review to identify whether the Project Location is:

1. in a water body;
2. within 120m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity;
3. within 300 meters of the average annual high water mark of a lake trout lake that is at or above development capacity;
4. within 120 meters of the average annual high water mark of a permanent or intermittent stream; or
5. within 120 meters of a seepage area.

Section 39, subsection (1) of the REA Regulation states, in relation to Class 4 wind facilities with no turbines or transformers within 30m of a water body, that "no person shall construct, install or expand a renewable energy generation facility as part of a renewable energy project at a project location that is in any of the following locations":

1. A lake or within 30 meters of the average annual high water mark of a lake.
2. A permanent or intermittent stream or within 30 meters of the average annual high water mark or a permanent or intermittent stream.
3. A seepage area or within 30 meters of a seepage area.

Section 40, subsection (1) of the REA Regulation states, in relation to any proposed facility, that "no person shall construct, install or expand a renewable energy generation facility as part of a renewable energy project at a project location that is in any of the following locations":

1. within 120 meters of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity;
2. within 300 meters of the average annual high water mark of a lake trout lake that is at or above development capacity;
3. within 120 meters of the average annual high water mark of a permanent or intermittent stream; or
4. within 120 meters of a seepage area.

However, Sections 39(1) and 40(1) do not apply if the applicant submits a report that:

1. identifies and assesses any negative environmental effects of the project on a water body referred to in paragraphs 1 to 3 of Section 39 (1) and 1 to 4 of Section 40 (1) (above) and on land within 30 meters of the water body;
2. identifies mitigation measures in respect of any negative environmental effects mentioned in clause (i);
3. describes how the environmental effects monitoring plan addresses any negative environmental effects mentioned in clause (i); and describes how the construction plan report prepared in accordance with Table 1 of the REA Regulation addresses any negative environmental effects mentioned in clause (i).

Section 1.1 of the REA Regulations defines a “water body” as a lake, a permanent stream, an intermittent stream, and a seepage area but does not include:

a) grassed waterways;
b) temporary channels for surface drainage, such as furrows or shallow channels that can be tilled and driven through;
c) rock chutes and spillways;
d) roadside ditches that do not contain a permanent or intermittent stream;
e) temporary ponded areas that are normally farmed;
f) dugout ponds; and
g) artificial bodies of water intended for storage, treatment or recirculation of runoff from animal yards, manure storage facilities and sites and outdoor confinement areas.

Subsection 2 of Section 30 of the REA Regulation requires the proponent to prepare a report “setting out a summary of the records searched and the results of the analysis” (O. Reg. 359/09). This WBA has been prepared for the Project to meet these requirements.

Section 31 (1) subject to subsection (2) of the REA Regulation requires proponents of Class 4 wind projects to undertake a water body site investigation for the purpose of determining:

a) whether the results of the analysis summarized in the report prepared under subsection 30(2) are correct or require correction, and identifying any required corrections;
b) whether any additional water bodies exist, other than those identified in the records review;
c) the boundaries, located within 120m of the project location, of any water body that was identified in the records review or the site investigation; and
d) the distance from the project location to the boundaries determined under clause (c).

Subsection (4) of Section 31 of the REA Regulation requires the proponent to prepare a report setting out the following:

1. A summary of any corrections to the report prepared under subsection 30 (2) and the determinations made as a result of conducting the site investigation under subsection (1).
2. Information relating to each water body identified in the records review and in the site investigation, including the type of water body, plant and animal composition and the ecosystem of the land and water investigated.
3. A map showing
   i. The boundaries mentioned in clause (1) (c) or (2) (c) and (d),
   ii. The location and type of each water body identified in relation to the project location, and
   iii. The distances mentioned in clause (1) (d) or (2) (e).
4. The dates and times of the beginning and completion of the site investigation.
5. The duration of the site investigation.
6. The weather conditions during the site investigation.
7. A summary of methods used to make observations for the purpose of the site investigation.
8. The name and qualifications of any person conducting the site investigation.
9. Field notes kept by the person conducting the site investigation.

The site investigation details and results have been included in this WBA to meet the REA requirements. A discussion of any negative environmental impacts on water bodies within the Project Area, and a summary of the applicable components of the *Design and Operations Report* (DNV-GL 2017a), the *Construction Plan Report* (DNV-GL 2017b), and the *Decommissioning Report* (DNV-GL 2017c) which have been prepared by DNV-GL, are available in the WBR (NRSI 2017a) which has been prepared under a separate cover. The proposed monitoring program in the WBR has been used to develop the Environmental Effects Monitoring Plan included in the *Design and Operations Report* (DNV-GL 2017a).

As part of this project, all aspects relating to provincially Threatened and Endangered species, Species of Conservation Concern, and other aquatic species and their habitats are addressed through a separate permitting process under the *Fisheries Act* (1985), the *Endangered Species Act* (2007), and/or *Development, Interference of Wetlands and Alterations to Shorelines and Watercourses* (O. Reg. 170/06) under the *Conservation Authorities Act* (R.S.O. 1990). Therefore, they have not been discussed within the WBA or WBR. These species will be addressed in full detail, including a description and results of field assessments, potential impacts, and recommended mitigation measures,

as part of a separate reporting process to be addressed with Fisheries and Oceans Canada (DFO), the Ministry of Natural Resources and Forestry (MNRF), and the South Nation Conservation Authority (SNC), as required.

3.0 Staff Roles

The requirements of the REA Regulation indicate that the name and qualifications of key staff participating in the site investigation should be included, and are thus provided below.

Andrew G. Ryckman, B.Sc.
Andrew is a Senior Terrestrial and Wetland Biologist at NRSI with more than 11 years of experience working on a variety of environmental projects. He has considerable experience managing Environmental Assessments, Natural Heritage Assessments (NHAs), and WBAs for proposed wind project developments across Canada, including experience with project management, report generation, data analysis, and considerable field monitoring. Andrew has coordinated the environmental monitoring on more than 120 proposed, or operational, wind energy facilities across Canada, overseeing the field assessments, data analysis, impact assessments, and recommendation of mitigation measures for projects in a wide range of landscapes, and relative to a variety of species and species groups.

Andrew's role in this project was to act as the project advisor, overseeing all aspects of the WBA, including all associated field work and reporting.

Christy Humphrey, B.E.S.
Christy is a Terrestrial and Wetland Biologist with more than eight years of experience in biological monitoring and conducts environmental impact assessments on a variety of project types. Her areas of expertise are in bats, as well as vegetation mapping and floral inventories. Christy has managed a variety of environmental projects, and has conducted and coordinated numerous types of surveys, including vegetation community delineations, wetland evaluations, bat surveys, mammal studies, breeding bird surveys and herpetofauna studies. Christy is certified in ELC for southern (2010) and northeastern Ontario (2010), and in the Ontario Wetland Evaluation System (OWES; 2012). Christy has managed biological monitoring programs and reporting for a number of wind power projects throughout Ontario and Manitoba, and has extensive experience with client and agency liaison through her project management role on similar projects.

Christy's role in this project was to act as the project manager, overseeing all aspects of the WBA. Christy completed a water body site investigation, was the main contact point for agency staff, and assisted with the review of this WBA.

Nyssa Hardie, M.Sc, E.Pt.
Nyssa is a Stream Corridor and Environmental Analyst with more than six years of experience in the environmental field. Her areas of expertise include the assessment of headwater drainage features, municipal drains, watercourses, and stream corridors. She is experienced in identifying the function and connectivity of surface water drainage features with other environmental features such as wetlands, woodlands, and seepage areas. Nyssa frequently assesses watercourses and identifies flow regime, as well as identifies impacts to surface

drainage features including changes in water balance due to land use change. She is certified in the Ontario Stream Assessment Protocol (OSAP) headwater drainage feature and stream barriers assessment modules, and has participated in workshops for headwater identification, assessment and classification. Nyssa is a member of the Ontario Headwater Steering Committee and frequently gives presentations on the implementation of headwater assessments and field surveys. Nyssa has experience conducting water body assessments for numerous wind projects in Ontario.

Nyssa's role in this project was to act as the water body coordinator. She was responsible for overseeing all aspects of the water body records review, site investigation, data analysis, and report preparation, as well as all technical components of this report.

Ashley Cantwell, B.Sc.
Ashley is a Terrestrial and Aquatic Biologist with three years of experience in the environmental field. She has experience with fish community assessments, benthic invertebrate sampling, and wildlife and fish salvages. Ashley has been trained in the Ontario Stream Assessment Protocol (2015) and the Ontario Benthos Biomonitoring Network Certificate (2013). She also has experience conducting field assessments, including aquatic characterization, water body determinations, and habitat assessments for Species at Risk (SAR) and a variety of wildlife species.

Ashley was responsible for conducting water body site investigations and data compilation and analysis, and assisted with the preparation of this report.

Blair Baldwin, B.Sc.
Blair has over five years of experience as an Aquatic Biologist. His areas of expertise include fish habitat surveys, habitat mapping, fish community assessments, and species identification. He has experience conducting benthic invertebrate surveys and species identification. Blair is certified in freshwater mussel identification (2014) through Fisheries and Oceans Canada (DFO), and benthic invertebrate identification (2013) through the Society of Freshwater Science. He has also completed the fish (2012) and Species at Risk (2013) identification courses through the Royal Ontario Museum. Blair has extensive experience conducting water body site investigations for numerous wind projects across Ontario.

Blair was responsible for conducting water body site investigations and data compilation for this report.

James Barber, B.Sc.
James Barber is a Biologist with a Bachelor of Science degree in Earth Science from University of Waterloo. He has extensive field experience, both volunteer and professional, including habitat assessments and wildlife monitoring programs. James has six years of professional experience in the environmental sector, with a focus on environmental baseline surveys for the renewable energy and mining sectors. James has also worked several fisheries contracts with the MNRF involving Creel surveys, Index netting, and Fish sampling. In addition,

James has experience with hydrology, surveying, soil and sediment sampling, and water sampling.

James was responsible for collecting water body measurements and taking photographs of drainage features within the Project Area for review by aquatic staff and the water body coordinator.

4.0 Records Review

NRSI biologists completed a thorough records review for the proposed Project. Information sources reviewed, records obtained, and a summary of the findings are provided in the following sections of this report.

4.1 Information Sources

In accordance with the REA Regulation, NRSI biologists consulted several information sources and agencies for the purposes of assessing water bodies within 120m (and 300m for Lake Trout lakes) of the Project Location. The results of this consultation process have been documented throughout the following report, and have been summarized in Table 1 below.

Table 1. Summary of Information Sources Consulted for the Project Area

Information Source	Consultation Date(s)	Consultation Type	Relevant Water Body Records Reviewed/Received
Fisheries and Oceans Canada (DFO)	September 7, 2016	Email Request	• No records received as of the date of this report
Ministry of Natural Resources and Forestry, Kemptville District	September 13, 2016	Email Request	• Thermal regime data • In-water works timing windows
Ministry of Natural Resources and Forestry	November 9, 2016	Document Review	• Inland Ontario Lakes Designated for Lake Trout Management (2015)
The United Counties of Stormont, Dundas, and Glengarry	May 4, 2016	Document Review	• Official Plan for the United Counties of Stormont, Dundas, and Glengarry (2009)
South Nation Conservation Authority (SNC)	September 7, 2016	Email Request	• No records received as of the date of this report
South Nation Conservation Authority: State of the Nation Watershed Report (SNCA 2014)	January 23, 2017	Document Review	• Water quality data summary • Riparian cover review • Physiography • Watershed and subwatershed characterization
South Nation Conservation Authority: Assessment Report South Nation Source Protection Area (SNCA 2016)	January 23, 2017	Document Review	• Thermal regime • Municipal drain classifications • Areas of significant groundwater discharge

Information Source	Consultation Date(s)	Consultation Type	Relevant Water Body Records Reviewed/Received
Ministry of Natural Resources and Forestry, Land Information Ontario (LIO)	November 25, 2016	GIS Mapping Layer Review	• Aerial photography • Watercourse mapping • Constructed Drains • Municipal Drains

4.2 Results

For the purpose of the records review reporting, NRSI has used available resources, including agency consultation and a variety of available mapping layers (satellite imagery, aerial photographs, and MNRF and SNC watercourse and drainage mapping), to identify any lakes, intermittent or permanent watercourses (including agricultural drains), and seepage areas within 120m of the Project Location, as well as Lake Trout lakes within 300m of the Project Location. All potential water bodies identified during the records review are shown on Maps 2-1 to 2-12. Site-specific information obtained relating to identified water bodies is detailed in Section 5.2.

4.2.1 Lakes

NRSI biologists reviewed available background information to identify potential lakes within the Project Area. Findings of this review indicate that no lakes are located within the Project Area. The nearest lake, Loch Gerry, is located approximately 27km east of the Project Area, near Alexandria, Ontario.

4.2.2 Lake Trout Lakes

NRSI biologists have reviewed available background information, including the Inland Ontario Lakes Designated for Lake Trout Management (MNRF 2015), and have confirmed that two natural Lake Trout lakes are present within the jurisdiction of the Kemptville District MNRF. The nearest Lake Trout lake is approximately 90km west of the Project Area, in the municipal township of Rideau Lakes, Ontario.

4.2.3 Permanent or Intermittent Watercourses

NRSI biologists have used available resources and background information to identify the presence of potential intermittent and/or permanent watercourses (including agricultural drains) within the Project Area. Findings of this review indicate that 104 potential water bodies, including 11 small ponds, are located within the Project Area.

These features are situated within the Middle South Nation River watershed, and can be sub-divided into six major drainage areas; South Nation River, Unnamed Creek A, Whissell Creek, Moffatt Creek, Payne River, and Duff Creek. Each of these major drainage areas encompass features that are within 120m of, and sometimes overlapping, the Project Location.

The potential water bodies have been divided into their respective drainage areas and are discussed in detail in Section 5.2 of this report. A description of each drainage area with map references is provided in Table 2.

Table 2. Summary of Potential Permanent or Intermittent Drainage Features Identified in the Project Area during the Records Review

Watershed	Drainage Area	Details	Overlaps the Project Location	Within 120m of the Project Location	Map(s)
Middle South Nation River	South Nation River	The South Nation River flows in a northeasterly direction through the Project Area and drains into the Ottawa River. It originates from groundwater discharge areas and wetlands north of Brockville (SNC 2014), approximately 60km southwest of the Project Area. The river is a large natural system with minimal riparian vegetation along its banks, and it is the major drainage system for the Project Area. The river collects water from all of the rivers, creeks, agricultural drains and roadside ditches that drain the Project Area.	Yes (29 potential water bodies)	Yes (19 potential water bodies)	2-1 2-2 2-3 2-4 2-5 2-6 2-7 2-8 2-11
Middle South Nation River	Unnamed Creek A	The Unnamed Creek A is a highly sinuous natural watercourse that flows in a northwesterly direction through the Project Area. The watercourse gathers water from many agricultural drains and roadside ditches within the Project Area and travels 4.2km to its confluence with the South Nation River. The lower half of the watercourse meanders through a well vegetated riparian area that averages 100m in total width.	Yes (16 potential water bodies)	Yes (11 potential water bodies)	2-5 2-8 2-9 2-11 2-12
Middle South Nation River	Whissell Creek	Whissell Creek flows north through the Project Area, turning east to join the South Nation River north of the Town of St-Albert. The watercourse originates as municipal drains and roadside ditches within the Project Area. The majority of the watercourse consists of straightened channels with limited to no riparian vegetation. The last 2.5km of the watercourse is characterized by a naturalized channel that meanders through a riparian corridor that averages 75m wide.	Yes (7 potential water bodies)	Yes (7 potential water bodies)	2-1 2-2 2-3 2-4

Watershed	Drainage Area	Details	Overlaps the Project Location	Within 120m of the Project Location	Map(s)
Middle South Nation River	Moffatt Creek	Moffatt Creek flows in a northeasterly direction and drains into the South Nation River near the Trans-Canada Highway. Its headwaters are located in Morewood Bog to the west of the Project Area and north of Chesterville, Ontario. Several agricultural drains located at the north end of the Project Area contribute water to Moffatt Creek.	Yes (3 potential water bodies)	Yes (3 potential water bodies)	2-1 2-2 2-3
Middle South Nation River	Payne River	The Payne River is the second largest watercourse within the Project Area. It flows north through the Project Area and joins the South Nation River northeast of the Town of Crysler. The Payne River originates as agricultural drains in the till plains and wetlands near the Towns of Newington and Avonmore, southeast of the Project Area.	Yes (4 potential water bodies)	Yes (2 potential water bodies)	2-6 2-7 2-10 2-12
Middle South Nation River	Duff Creek	Duff Creek flows north through the Project Area and empties into the Payne River northeast of the Town of Berwick. The watercourse originates within several large wetlands located southeast of the Project Area and is also fed by several agricultural drains. The majority of the watercourse consists of natural channels with wide riparian corridors (i.e. wetlands and forests). Through the Project Area the main channel is a highly sinuous watercourse through a forested riparian corridor. The tributaries to Duff Creek which are found in the Project Area are characterized by straightened agricultural drains with limited to no riparian vegetation.	Yes (2 potential water bodies)	Yes (2 potential water bodies)	2-7 2-10

The Project Area is located within the Middle South Nation River watershed, which is a portion of the larger South Nation River watershed. The South Nation River empties into the Ottawa River near the Town of Wendover, Ontario. All of the drainage features within the Project Area are within the SNC jurisdiction. Based on aerial photograph interpretation and a review of available mapping, the drainage features within the Project Area consist of a combination of agricultural drains and natural watercourses. In addition, several ponds are located throughout the Project Area.

The South Nation Conservation State of the Nation Report (2014) indicates that surface water quality throughout the SNC jurisdiction is considered fair. Based on the *South Nation Source Protection Area Assessment Report* (SNC 2016), the majority of the agricultural drains and watercourses within the Project Area are intermittent features, followed by permanent warmwater, and some coldwater features as well (SNC and RRCA 2016, DFO 1999).

4.3 Seepage Areas

NRSI biologists reviewed a variety of available background resources, including online resources, surficial geology mapping, elevation data, and digital aerial photography. No known seepage areas were identified in the Project Area through the comprehensive records review for the Project. Based on an examination of background documents, conditions may be appropriate for the creation of seepage areas. This will be further examined during the site investigation phase of this WBA (Section 5.0).

4.4 Summary

In accordance with the REA Regulation, NRSI has completed a comprehensive water body records review for the proposed Project. The Project Area was examined to ensure all drainage features within 120m of the Project Location were assessed. This records review included information requests sent to federal and provincial agency staff, conservation authority staff, and a review of available online and published resources. The results of this records review have been summarized in Table 3 below.

Table 3. Summary of Records Review for the Project

Criteria	Associated Potential Water Bodies
i. In a water body	The records review has identified 61 potential water bodies as overlapping the Project Location, within the following drainage areas: • South Nation River (n=29) • Unnamed Creek A (n=16) • Whissell Creek (n=7) • Moffatt Creek (n=3) • Payne River (n=4) • Duff Creek (n=2) These potential overlaps represent proposed crossing locations for access roads, collection lines, and/or construction disturbance areas. All of these potential water bodies may represent permanent or intermittent watercourses, drainage features or ponds.
ii. Within 120m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity	None
iii. Within 300m of the average annual high water mark of a lake trout lake that is at or above development capacity	None
iv. Within 120m of the average annual high water mark of a permanent or intermittent stream	The records review has identified 44 potential water bodies within 120m of, but not overlapping, the Project Location, within the following drainage areas: • South Nation River (n=19) • Unnamed Creek A (n=11) • Whissell Creek (n=7) • Moffatt Creek (n=3) • Payne River (n=2) • Duff Creek (n=2) All of these water bodies represent potential permanent or intermittent watercourses, including drainage features and ponds.
v. Within 120m of a seepage area	None

5.0 Site Investigation

5.1 Methods

In accordance with the REA Regulation, a comprehensive site investigation was carried out within the Project Area. The site investigation focused on confirming the presence, absence and extent of potential water bodies identified during the records review, identifying any corrections that need to be made to water body mapping, including the identification of any previously unidentified water bodies, and characterizing site-specific conditions of all confirmed water bodies to inform the WBR. The results of this site investigation will be used to identify proximity of water bodies to project components, requirements for mitigation, and to conduct an impact assessment.

5.1.1 Survey Dates

In accordance with the REA Regulation, NRSI recorded dates, times, duration, and weather conditions during each site investigation. This information has been summarized in Table 4 below. Additional weather conditions including precipitation, and precipitation within the last 48 hours, were also recorded and can be found in the field data summary table (Appendix I). The St. Albert meteorological station (Government of Canada 2016) was used to identify the amount of precipitation that occurred over a 48-hour period prior to field surveys. Detailed descriptions of staff roles and qualifications can be found in Section 3.0 of this report.

Table 4. Site Investigation Survey Details

Staff Name(s)	Date	Duration (hrs)	Weather Conditions		
			Temp. (°C)	Beaufort Wind	Cloud Cover (%)
Christy Humphrey	June 2, 2016	0.5	18	3	20
Blair Baldwin	December 5, 2016	1.0	-3	0	100
Blair Baldwin	December 6, 2016	9.0	-1 to -6	0	0-20
Blair Baldwin	December 7, 2016	9.5	-2 to -1	2	100
Blair Baldwin	December 8, 2016*	9.5	-1 to 0	1-3	100
Blair Baldwin	December 9, 2016	4.0	-6	2	20
Nyssa Hardie	January 20, 2017*	0.25	N/A Desktop assessment completed		
Nyssa Hardie	January 25, 2017*	1.5	N/A Desktop assessment completed		
Ashley Cantwell	January 31, 2017	3.5	-20 to -9	0-2	0-10
Ashley Cantwell	February 2, 2017	1.5	-7 to -6	1	50-100
Ashley Cantwell	February 3, 2017	5.0	-9 to -6	1-3	30-80
Ashley Cantwell	February 4, 2017*	0.75	-8	3	100
James Barber	February 11, 2017*	0.75	-12	3	100
Nyssa Hardie	February 23, 2017*	1.5	N/A Desktop assessment completed		
James Barber	February 27, 2017	2	3	3	90
Nyssa Hardie	February 28, 2017*	0.25	N/A Desktop assessment completed		
Nyssa Hardie	March 1, 2017*	1	N/A Desktop assessment completed		
Nyssa Hardie	March 2, 2017*	0.25	N/A Desktop assessment completed		

* Alternative site investigations occurred on this date. See tables in Section 5.2.2 for specific water bodies where alternative site investigations were conducted.

Legend
Beaufort Wind Scale: 0 Calm; 1 Smoke drifts; 2 Wind felt on face; 3 Leaves in motion; 4 Small branches move; 5 Small trees sway; 6 Large branches move; 7 Whole trees in motion; 8 Twigs break off, hard to walk; 9 Light structural damage

5.1.2 Alternative Site Investigations

As identified in Section 31 (3) of the REA Regulation, an alternative site investigation may be conducted if the applicant determines that it is not reasonable to visit a site to conduct a site investigation. The denial of site access by adjacent landowners and unsafe site conditions, such as natural hazards, steep slopes and unstable soils, and/or high water conditions, are examples of suitable situations where conducting a site investigation would not be reasonable.

Several alternative site investigations were required for drainage features and ponds within the Project Area. Where possible, information for these locations was collected from the closest vantage point (e.g. roadside, neighbouring properties where access was granted). In addition, access was granted for several properties after a reasonable time period to complete site investigations. As such, desktop assessments were completed and a conservative approach was taken to assessing the permanence of these drainage features. Where it was unclear if the feature was a water body based on the REA Regulation, it was identified as an intermittent feature, and therefore as a water body.

Features where alternative site investigations were conducted are identified in Tables 5-17. The photographic inventory (Appendix II) identifies these features by the ID used throughout this report and indicates that no photographs are available.

5.1.3 Lakes and Lake Trout Lakes

Prior to the site investigation, no potential lakes and Lake Trout lakes were identified through review of all available natural features mapping as part of the records review. The site investigation was focused on confirming the absence of these features as well as identifying any features that were not identified during the records review.

5.1.4 Permanent and Intermittent Watercourses

The site investigation was focused on confirming the presence/absence of drainage features, identifying any additional watercourses or drainage features that were not shown on existing mapping, and documenting the characteristics of these features. Drainage features that were assessed during the site investigation are identified on Maps 2-1 to 2-12 with a water body (WB) or non-water body (NWB) number and a survey location point, as determined through a comparison of site conditions and the REA criteria for a water body. In addition, ponds that were identified during the records review were investigated to determine if they met the definition of a water body. The REA Regulation indicates that temporary ponded areas, dugout ponds or artificial bodies of water intended for the storage, treatment or recirculation of runoff for agriculture are considered non-water bodies.

All features identified during the site investigation were assessed thoroughly, by walking the entire extent of each feature (where site access permitted) that was identified within the Project Area. The mapped survey points identify a single location along a length of the drainage feature that was considered representative of the surveyed reach and therefore assessed for site-specific characteristics of the feature. Where a non-water body point is identified upstream of a water body point, the non-water body point identifies the location, within the Project Area, where the feature changes to a non-water body.

Measurements to the Project components included in Tables 5-17 of this report are taken from the closest distance of each component to the annual high water mark (i.e. bankfull level or top of bank) of a water body, and not necessarily from the mapped survey points. These measurements therefore represent the closest distance of the project component to the water body at any location.

Once a watercourse, drainage feature or pond was identified during the site investigation, it was further assessed to determine if it met the definition of a "water body" within the REA Regulation. Under this definition, a water body includes intermittent/permanent watercourses, but does not include grassed waterways, temporary channels for surface drainage (such as furrows or shallow channels that can be tilled and driven through), rock chutes and spillways, or roadside ditches that do not contain a permanent or intermittent stream.

If the drainage feature was identified as a permanent or intermittent watercourse or agricultural drain, or natural pond, specific water body data were collected. For each feature, NRSI biologists collected a wide range of field information, including (but not limited to):

- flow conditions (high, medium, low, or freshet),
- water temperature and turbidity level,
- average wetted width and depth,
- average bankfull width and depth,
- substrate composition,
- in-stream vegetation and habitat features present,
- bank vegetation,
- presence of hydric soils, and
- groundwater indicators, such as Watercress (*Nasturtium officinale*) or iron staining.

At each survey location, photographs and UTM coordinates were taken to assist in visually locating and characterizing each drainage feature. UTM coordinates identify a point along a section of channel that was surveyed; however, an area of the feature is surveyed both upstream and downstream of the UTM coordinates, the length of which is dependent on site access and visibility. The typical distance surveyed upstream and downstream of the UTM coordinates is 40m, but is largely dependent on site access. For potential water bodies where site access could not be granted, biologists collected as much information as possible from the next closest vantage point, such as a property

line or municipal road, or through a comprehensive desktop analysis. Alternative site investigations occurred for 31 potential water bodies, five of which are ponds and 26 of which are drainage features.

5.1.5 Seepage Areas

No seepage areas were identified as part of the records review. In conjunction with water body site investigations and extensive field assessments that are required for the NHA process, area searches were conducted for seepage areas to confirm the results of the records review.

Assessments for seepage areas were completed in June and December 2016 during the water body site investigation (see Table 4) and site investigations conducted for the NHA. Observations of groundwater upwelling, groundwater indicator plants (e.g. Watercress, dense patches of Jewelweed (*Impatiens* spp.), Scouring Rush (*Equisetum hyemale* ssp. *affine)* and Skunk Cabbage (*Symplocarpus foetidus*)), and iron staining of soils or substrate within the channel or along the banks were recorded, if present.

5.2 Results

NRSI biologists completed a comprehensive site investigation of potential water bodies within the Project Area. These surveys have been completed in accordance with the REA Regulation and the results have been summarized below. A water body is confirmed based on the results of the site investigation and in accordance with the definition of a water body under Section 1.1 of the REA Regulation. A confirmed water body that overlaps with, or is present within 30m of a Project Location triggered the need for an assessment of impacts. The WBR, under separate cover, addressed potential negative effects, mitigation measures, and monitoring for these water bodies (NRSI 2017a).

5.2.1 Lakes and Lake Trout Lakes

Site investigations confirmed the absence of any lakes within 300m of the Project Area. As such, it has been confirmed that no Lake Trout lakes are present within 300m of the Project Area. MNRF mapping of Lake Trout lakes (MNRF 2015) indicates that the closest Lake Trout lake is approximately 90km west of the Project Area.

5.2.2 Permanent or Intermittent Drainage Features

NRSI biologists have identified 61 confirmed permanent or intermittent water bodies that are located within the Project Area, 39 of which have been identified as overlapping the Project Location. The Project Location overlaps these 39 water bodies at 63 locations. The additional 22 permanent or intermittent water bodies occur within 120m of the Project Location at least once along their length, without any direct overlap with Project components at any point along the water body. For the purposes of this report, these water bodies have been further discussed based on their respective drainage areas, including South Nation River, Unnamed Creek A, Whissell Creek, Moffatt Creek, Payne River, and Duff Creek. Where specific assessment locations are discussed, a unique identifier ('WB' for a confirmed water body and 'NWB' for a confirmed non-water body) has been assigned. The identified water bodies, non-water bodies, and assessment locations are shown on Maps 2-1 to 2-12.

During the site investigation, 11 ponds were assessed. Alternative site investigations were conducted at five of the 11 ponds due to site access restrictions and site access being granted to some areas after a reasonable time period to complete site investigation. Based on the alternative site investigations, one of these ponds was found to be a natural feature and therefore considered a water body; two were determined to be dugout, man-made features for agricultural purposes and therefore are considered a non-water body. The alternative site investigations at the remaining two ponds found that no feature was present at either location. Of the 11 ponds that were assessed as part of the site investigation, two were determined to meet the definition of a water body based on the REA Regulation. These two ponds are included in the 61 confirmed water bodies within the Project Area.

The detailed field data collected during the site investigation is provided in Appendix I. As the majority of site investigation field data were collected digitally (using tablets), field notes are not available and as such are not appended to this report. All field data collected during the site investigation are presented in Appendix I. Field notes that are available are provided in Appendix III.

South Nation River Drainage Area

NRSI biologists conducted site investigations at 77 locations along the 47 potential water bodies that were identified within the South Nation River drainage area during the records review. In addition, site investigations were conducted at three locations along three drainage features that were not included in base mapping and were not visible on aerial photographs. Alternative site investigations occurred at 17 of the 80 survey locations.

NRSI biologists have confirmed that portions of 28 of these drainage features have characteristics that warrant designation as a water body, as defined by the REA Regulation. A summary of the drainage features considered as part of the site investigation, including the closest distance from the water body to the Project Location, is provided in Table 5 (confirmed water bodies) and Table 6 (non-water bodies) below. Maps 2-1 to 2-12 show drainage features identified as part of the records review and the site investigation.

Table 5. Site Investigations Summary for Confirmed Water Bodies at the Nation Rise Wind Farm – South Nation River Drainage Area.

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Confirmed Permanent Water Bodies		
Bazinet Municipal Drain	WB-121	WT- >120 AR- >0.1[2] CL- Overlapping CA- Overlapping SI- >120
Foley Municipal Drain	WB-057 WB-058 WB-059 WB-060 WB-061 WB-066 WB-067 WB-068 WB-069	WT- 40 AR- Overlapping CL- Overlapping CA- Overlapping SI- >120
Geo. S. Johnston Municipal Drain	WB-046	WT- >120 AR- >120 CL- 10 CA- 10 SI- >120

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Grady Municipal Drain	WB-128[1] WB-129[1]	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Johnstone Municipal Drain	WB-029 WB-030 WB-031	WT- >120 AR- Overlapping CL- Overlapping CA- Overlapping SI- 36
South Nation River	WB-052 WB-112	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Unnamed Tributary of South Nation River	WB-123	WT- >120 AR- >120 CL- 15 CA- 15 SI- >120
Watson Ouderkirk Municipal Drain	WB-053	WT- >120 AR- >120 CL- 25 CA- 25 SI- >120
Confirmed Intermittent Water Bodies		
Byers Municipal Drain	WB-014	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Genier Extension Municipal Drain	WB-019	WT- >120 AR- >120 CL- >120 CA- 80 SI- >120
Genier Municipal Drain	WB-016 WB-017 WB-018	WT- 96 AR- Overlapping CL- Overlapping CA- Overlapping SI- >120
Geo. S. Johnston Municipal Drain	WB-045	WT- >120 AR- 30 CL- >120 CA- 30 SI- >120
J. P. Grady Municipal Drain	WB-050 WB-051	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Landy Municipal Drain	WB-047 WB-048	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Moriarity Municipal Drain	WB-064 WB-065	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
R. Stevens Municipal Drain	WB-015	WT- >120 AR- 30 CL- >0.1[2] CA- >0.1[2] SI- >120
Smirle McConnell Municipal Drain	WB-023	WT- >120 AR- 55 CL- Overlapping CA- Overlapping SI- >120
Tributary 1 of Foley Municipal Drain	WB-062 WB-063	WT- >120 AR- >120 CL- >0.1[2] CA- >0.1[2] SI- >120
Tributary 2 of Foley Municipal Drain	WB-070	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Tributary 3 of Foley Municipal Drain	WB-108	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Tributary 1 of Geo. S. Johnston Municipal Drain	WB-131[1]	WT- 41 AR- 89 CL- >120 CA- 26 SI- >120
Tributary 1 of R. Stevens Municipal Drain	WB-110	WT- >120 AR- >120 CL- 10 CA- 10 SI- >120
Tributary 3 of R. Stevens Municipal Drain	WB-111	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Tributary 4 of R. Stevens Municipal Drain	WB-130[1]	WT- >120 AR- >120 CL- 71 CA- 71 SI- >120
Tributary 1 of Smirle McConnell Municipal Drain	WB-021	WT- >120 AR- 20 CL- Overlapping CA- Overlapping SI- >120
Tributary 3 of Grady Municipal Drain	WB-127[1]	WT- >120 AR- >120 CL- >0.1[2] CA- >0.1[2] SI- >120
Tributary 4 of Grady Municipal Drain	WB-126[1]	WT- 80 AR- >120 CL- >120 CA- 50 SI- >120
Tributary 3 of South Nation River	WB-049	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Tributary 5 of Johnstone Municipal Drain	WB-032 WB-033	WT- 70 AR- 10 CL- 100 CA- 10 SI- 40
Watson Ouderkirk Municipal Drain	WB-055 WB-056	WT- >120 AR- Overlapping CL- Overlapping CA- Overlapping SI- >120

[1]*Alternative site investigation conducted for the survey location.*
[2]*On the mapping, this watercourse appears to be overlapped; however, all Project components, including the disturbance area, will be located adjacent to the watercourse (>0.1m)*

Legend
WT: Wind Turbine
AR: Access Road
CL: Collection Line
CA: Construction Activity/Temporary Infrastructure/Balance of Operations
SI: Supporting Infrastructure - Building/Substation/Meteorological Tower/Point of Interconnect

Table 6. Site Investigations Summary for Non-Water Bodies at the Nation Rise Wind Farm – South Nation River Drainage Area.

Drainage Feature Name	Survey Location(s)	Rationale
Confirmed Non-Water Bodies		
Bachler Municipal Drain	NWB-044[1]	• No feature present based on review of current and historic aerial photography
Fourges Municipal Drain	NWB-047	• No feature present
Furney Municipal Drain	NWB-004	• Ephemeral • Terrestrial grasses throughout
Geo. S. Johnston Municipal Drain	NWB-067[1]	• No feature present based on review of current and historic aerial photography
J. P. Grady Municipal Drain	NWB-063[1]	• No feature present based on review of current and historic aerial photography
Lafleche Municipal Drain	NWB-048	• No feature present • No evidence of ditch, low area, swale, or water flow
Landy Municipal Drain	NWB-050[1]	• No feature present based on review of current and historic aerial photography
Pond G	NWB-015	• No feature present
Pond I	NWB-062[1]	• Dugout pond for agricultural purposes
Tributary 1 of Fourges Municipal Drain	NWB-073[1]	• No feature present based on review of current and historic aerial photography
Tributary 1 of Genier Extension Municipal Drain	NWB-072	• No feature present • No evidence of water flow
Tributary 1 of Grady Municipal Drain	NWB-058[1]	• No feature present based on review of current and historic aerial photography
Tributary 2 of Grady Municipal Drain	NWB-059	• No feature present based on review of current and historic aerial photography flow
Tributary 4 of Grady Municipal Drain	NWB-068	• Ephemeral • Channelized drain with poor channel definition
Tributary 1 of J.P. Grady Municipal Drain	NWB-012	• Ephemeral • Channelized drain • No evidence of water flow
Tributary 1 of MacCadden Municipal Drain	NWB-060[1]	• No feature present based on review of current and historic aerial photography
Tributary 2 of MacCadden Municipal Drain	NWB-061[1]	• No feature present based on review of current and historic aerial photography

Drainage Feature Name	Survey Location(s)	Rationale
Tributary 1 of Moriarity Municipal Drain	NWB-017	• Ephemeral • Historically channelized drain, but currently has minimal channel definition • Heavy leaf litter on bed
Tributary 1 of R. Stevens Municipal Drain	NWB-037	• No feature present • No evidence of water flow
Tributary 2 of R. Stevens Municipal Drain	NWB-045	• No feature present • No evidence of water flow
Tributary 1 of South Nation River	NWB-014	• No feature present • No evidence of water flow
Tributary 2 of South Nation River	NWB-013	• No feature present • No evidence of water flow
Tributary 2 of Foley Municipal Drain	NWB-066	• No feature present • No evidence of water flow
Tributary 4 of Foley Municipal Drain	NWB-018	• No feature present • No evidence of water flow
Tributary 5 of Foley Municipal Drain	NWB-054[1]	• No feature present based on review of current and historic aerial photography
Tributary 3 of Johnstone Municipal Drain	NWB-005	• No feature present • No evidence of water flow
Tributary 4 of Johnstone Municipal Drain	NWB-006	• No feature present • No evidence of water flow
Tributary 6 of Johnstone Municipal Drain	NWB-007 NWB-008	• No feature present • No evidence of water flow
Whetters Sanders Branch of Foley Municipal Drain	NWB-053[1]	• No feature present based on review of current and historic aerial photography

[1]*Alternative site investigation conducted for the survey location.*

Unnamed Creek A Drainage Area

NRSI biologists conducted site investigations at 44 locations along the 26 potential water bodies that were identified within the Unnamed Creek A drainage area during the records review. One additional potential drainage feature was identified during the site investigation that was not previously identified through background information. A site investigation was conducted at one location along this additional potential drainage feature. Alternative site investigations occurred at eight of the 46 survey locations.

NRSI biologists have confirmed that portions of 12 of these drainage features have characteristics that warrant designation as a water body, as defined by the REA Regulation. A general summary of the drainage features considered as part of the site investigation, including the closest distance from the water body to the Project Location,

is provided in Table 7 (water bodies) and Table 8 (non-water bodies) below. Maps 2-1 to 2-12 show drainage features identified as part of the records review and the site investigation.

Table 7. Site Investigations Summary for Confirmed Water Bodies at the Nation Rise Wind Power – Unnamed Creek A Drainage Area.

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Confirmed Permanent Water Bodies		
Campbell Municipal Drain	WB-076	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Dunbar Campbell Adams Municipal Drain	WB-072 WB-073 WB-074	WT- >120 AR- Overlapping CL- Overlapping CA- Overlapping SI- >120
Fetterly Municipal Drain	WB-086 WB-087	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Pond C	WB-089[1]	WT- >120 AR- >120 CL- >120 CA- 70 SI- >120
Tributary 2 of Dunbar Campbell Adams Municipal Drain	WB-071	WT- >120 AR- Overlapping CL- >120 CA- Overlapping SI- >120
Unnamed Creek A	WB-077 WB-079 WB-080 WB-107	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Confirmed Intermittent Water Bodies		
Branch of Dirven Municipal Drain	WB-105	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Dunbar Campbell Adams Municipal Drain	WB-081	WT- 31 AR- 22 CL- >120 CA- >0.1[2] SI- 37

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Fetterly Municipal Drain	WB-083 WB-085	WT- 110 AR- Overlapping CL- Overlapping CA- Overlapping SI- >120
Gilles Municipal Drain	WB-102 WB-103 WB-104	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
J. Boggart Municipal Drain	WB-093 WB-094	WT- >120 AR- Overlapping CL- Overlapping CA- Overlapping SI- >120
Ray McLeod Municipal Drain	WB-090 WB-091 WB-092 WB-125[1]	WT- >120 AR- 25 CL- Overlapping CA- Overlapping SI- >120
Tributary 2 of Unnamed Creek A	WB-124	WT- >120 AR- >120 CL- 30 CA- 30 SI- >120
Tributary 3 of Dunbar Campbell Adams Municipal Drain	WB-116	WT- >120 AR- >0.1 CL- >0.1[2] CA- >0.1[2] SI- >120

[1] *Alternative site investigation conducted for the survey location.*
[2] *On the mapping, this watercourse appears to be overlapped; however, all Project components, including the disturbance area, will be located adjacent to the watercourse (>0.1m)*

Legend
WT: Wind Turbine
AR: Access Road
CL: Collection Line
CA: Construction Activity/Temporary Infrastructure/Balance of Operations
SI: Supporting Infrastructure - Building/Substation/Meteorological Tower/Point of Interconnect

Table 8. Site Investigations Summary for Non-Water Bodies at the Nation Rise Wind Project – Unnamed Creek A Drainage Area.

Drainage Feature Name	Survey Location(s)	Rationale
Confirmed Non-Water Bodies		
Denis McMahon Municipal Drain	NWB-055[1]	• No feature present based on review of current and historic aerial photography
Dirven Municipal Drain	NWB-052[1]	• No feature present based on review of current and historic aerial photography
Duff Sanders Municipal Drain	NWB-026 NWB-027	• Ephemeral • Channelized drain Terrestrial grasses throughout
Pond J	NWB-064	• No feature present • No evidence of water present
Pond K	NWB-069[1]	• No feature present based on review of current and historic aerial photography • No evidence of water
Pond L	NWB-074[1]	• No feature present based on review of current and historic aerial photography • No evidence of water
Pond M	NWB-076[1]	• Dug-out pond
Tributary 1 of Fetterly Municipal Drain	NWB-019	• No feature present • Tilled through with row crop
Tributary 1 of Gilles Municipal Drain	NWB-042	• Ephemeral • Roadside drain • Terrestrial grasses throughout feature • No evidence of channel forming processes
Tributary 2 of Gilles Municipal Drain	NWB-041	• Ephemeral • Roadside drain • Terrestrial grasses throughout feature • No evidence of channel forming processes
Tributary 1 of Ray McLeod Municipal Drain	NWB-028	• Ephemeral • No channel definition or evidence of water flow
Tributary 2 of Ray McLeod Municipal Drain	NWB-051[1]	• No feature present based on review of current and historic aerial photography
Tributary 3 of Ray McLeod Municipal Drain	NWB-075	• Ephemeral • No evidence of water flow
Tributary 1 of Unnamed Creek A	NWB-030 NWB-031 NWB-056	• Ephemeral • Channelized drain • No evidence of water flow

Drainage Feature Name	Survey Location(s)	Rationale
Tributary 3 of Unnamed Creek A	NWB-029	• No feature present • No evidence of water flow
Tributary 3 of Dunbar Campbell Adams Municipal Drain	NWB-039	• Ephemeral • No evidence of channel forming processes • Terrestrial grasses throughout feature

[1]*Alternative site investigation conducted for the survey location.*

Whissell Creek Drainage Area

NRSI biologists conducted site investigations at 21 locations along the 14 potential water bodies that were identified within the Whissell Creek drainage area during the records review. No additional drainage features were identified during site investigations. Of the 21 survey locations, alternative site investigations occurred at two locations.

NRSI biologists have confirmed that portions of 10 drainage features have characteristics that are consistent with the designation of a water body as defined by the REA Regulation. A summary of site conditions associated with all drainage features considered during the site investigation, including distances from a water body to the Project Location, is provided in Table 9 (confirmed water bodies) and Table 10 (non-water bodies) below. Maps 2-1 to 2-12 show drainage features identified as part of the records review and the site investigation.

Table 9. Site Investigations Summary for Confirmed Water Bodies at the Nation Rise Wind Project – Whissell Creek Drainage Area.

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Confirmed Permanent Water Bodies		
Whissell Creek	WB-013	WT- 33 AR- 90 CL- >120 CA- 17 SI- >120
Whissell Creek Municipal Drain	WB-037 WB-038 WB-039 WB-118	WT- 80 AR- 70 CL- Overlapping CA- Overlapping SI- >120
Confirmed Intermittent Water Bodies		
Donald Shane Municipal Drain	WB-040	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Farley Branch of Whissell Creek Municipal Drain	WB-042	WT- >120 AR- Overlapping CL- >120 CA- Overlapping SI- >120
Parent Municipal Drain	WB-012	WT- >120 AR- 40 CL- Overlapping CA- Overlapping SI- >120
Pond A	WB-044	WT- >120 AR- 110 CL- >120 CA- 110 SI- >120
Tributary 1 of Whissell Creek	WB-043	WT- >120 AR- 90 CL- 90 CA- 90 SI- >120
Tributary 1 of Whissell Creek Municipal Drain	WB-109	WT- >120 AR- Overlapping CL- >120 CA- Overlapping SI- >120
Tributary 2 of Whissell Creek Municipal Drain	WB-041	WT- >120 AR- >120 CL- >0.1^2 CA- >0.1^2 SI- >120

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Tributary 5 of Whissell Creek Municipal Drain	WB-034	WT- >120 AR- 110 CL- >120 CA- 110 SI- >120
Whissell Creek Municipal Drain	WB-035 WB-036	WT- >120 AR- 10 CL- Overlapping CA- Overlapping SI- >120

[1]*Alternative site investigation conducted for the survey location.*
[2]*On the mapping, this watercourse appears to be overlapped; however, all Project components, including the disturbance area, will be located adjacent to the watercourse (>0.1m)*

Legend
WT: Wind Turbine
AR: Access Road
CL: Collection Line
CA: Construction Activity/Temporary Infrastructure/Balance of Operations
SI: Supporting Infrastructure - Building/Substation/Meteorological Tower/Point of Interconnect

Table 10. Site Investigations Summary for Non-Water Bodies at the Nation Rise Wind Project – Whissell Creek Drainage Area.

Drainage Feature Name	Survey Location(s)	Rationale
Confirmed Non-Water Bodies		
Pond E	NWB-011	• No feature present • No evidence of water present
Tributary 2 of Parent Municipal Drain	NWB-070[1]	• No feature present based on review of current and historic aerial photography
Tributary 3 of Parent Municipal Drain	NWB-071	• No feature present • No evidence of water flow
Tributary 2 of Whissell Creek	NWB-003	• No feature present • No evidence of water flow
Tributary 3 of Whissell Creek Municipal Drain	NWB-038	• Ephemeral • Tile drain outlet
Whissell Creek Municipal Drain	NWB-046[1]	• No feature present based on review of current and historic aerial photography

[1]*Alternative site investigation conducted for the survey location.*

Moffatt Creek Drainage Area

NRSI biologists conducted site investigations at 12 locations along six potential water bodies within the Moffatt Creek drainage area that were identified within the Moffatt Creek drainage area during the records review. One additional potential drainage feature was identified during the site investigation that was not included in base mapping and was not visible on aerial photographs. Alternative site investigation occurred at two locations.

NRSI biologists have confirmed that portions of four of these drainage features have characteristics that warrant designation as a water body, as defined by the REA Regulation, and based on a conservative approach. A summary of the drainage features considered as part of the site investigation, including the closest distance from the water body to the Project Location, is provided in Table 11 (confirmed water bodies) and Table 12 (non-water bodies). Maps 2-1 to 2-12 show drainage features identified as part of the records review and the site investigation.

Table 11. Site Investigations Summary for Confirmed Water Bodies at the Nation Rise Wind Project – Moffatt Creek Drainage Area.

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Confirmed Permanent Water Bodies		
Stephenson Municipal Drain	WB-119	WT- >120 AR- >120 CL- >120 CA- 96 SI- >120
Confirmed Intermittent Water Bodies		
McConnell Steven Municipal Drain	WB-003 WB-005 WB-006 WB-114[1]	WT- 40 AR- 5 CL- >120 CA- >0.1[2] SI- 42
Paquette McMahon Municipal Drain	WB-007 WB-008 WB-009 WB-010	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Tributary 3 of Paquette McMahon Municipal Drain	WB-011	WT- >120 AR- >120 CL- Overlapping CA- 5 SI- >120

[1]*Alternative site investigation conducted for the survey location.*
[2]*On the mapping, this watercourse appears to be overlapped; however, all Project components, including the disturbance area, will be located adjacent to the watercourse (>0.1m)*

Legend
WT: Wind Turbine
AR: Access Road
CL: Collection Line
CA: Construction Activity/Temporary Infrastructure/Balance of Operations
SI: Supporting Infrastructure - Building/Substation/Meteorological Tower/Point of Interconnect

Table 12. Site Investigations Summary for Non-Water Bodies at the Nation Rise Wind Project – Moffatt Creek Drainage Area.

Drainage Feature Name	Survey Location(s)	Rationale
Confirmed Non-Water Bodies		
McConnell Steven Municipal Drain	NWB-043	• Ephemeral • No channel definition
Tributary 1 of Paquette McMahon Municipal Drain	NWB-001	• Ephemeral • Poorly defined low area adjacent to agricultural field • Row crop and terrestrial grasses throughout feature
Tributary 2 of Paquette McMahon Municipal Drain	NWB-002	• Ephemeral • Poorly defined low area adjacent to agricultural field • Row crop and terrestrial grasses throughout feature
Tributary 1 of Stephenson Municipal Drain	NWB-065[1]	• No feature present based on review of current and historic aerial photography

[1]*Alternative site investigation conducted for the survey location.*

Payne River Drainage Area

NRSI biologists conducted site investigations at eight locations along six potential water bodies within the Payne River drainage area. An alternative site investigation occurred at one of the eight survey locations. No additional drainage features were identified during site investigations.

NRSI biologists have confirmed that portions of four of these drainage features have characteristics that warrant designation as a water body, as defined by the REA Regulation, and based on a conservative approach. A summary of the drainage features considered as part of the site investigation, including the closest distance from the water body to the Project Location, is provided in Table 13 (confirmed water bodies) and Table 14 (non-water bodies). Maps 2-1 to 2-12 show drainage features identified as part of the records review and the site investigation.

Table 13. Site Investigations Summary for Confirmed Water Bodies at the Nation Rise Wind Project – Payne River Drainage Area.

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Confirmed Permanent Water Bodies		
Payne River	WB-095	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Confirmed Intermittent Water Bodies		
Alex Rutley Municipal Drain	WB-096 WB-113 WB-122	WT- 40 AR- Overlapping CL- >0.1 CA- Overlapping SI- >120
Don Smirl Municipal Drain	WB-106	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Stark and Branches Municipal Drain	WB-117[1]	WT- >120 AR- >120 CL- >120 CA- >0.1 SI- >120

[1]*Alternative site investigation conducted for the survey location.*

Legend
WT: Wind Turbine
AR: Access Road
CL: Collection Line
CA: Construction Activity/Temporary Infrastructure/Balance of Operations
SI: Supporting Infrastructure - Building/Substation/Meteorological Tower/Point of Interconnect

Table 14. Site Investigations Summary for Non-Water Bodies at the Nation Rise Wind Project – Payne River Drainage Area.

Drainage Feature Name	Survey Location(s)	Rationale
Confirmed Non-Water Bodies		
Pond D	NWB-033	• Ephemeral • Seasonally ponded water in field
Tributary 2 of McIntyre Lagrove Municipal Drain	NWB-034	• Ephemeral • Channelized drain Terrestrial grasses throughout

Duff Creek Drainage Area

NRSI biologists conducted site investigations at seven locations along four potential water bodies within the Duff Creek drainage area. No additional drainage features were identified during site investigations and no alternative site investigations were conducted within this drainage area.

NRSI biologists have confirmed that portions of three of these drainage features have characteristics that warrant designation as a water body, as defined by the REA Regulation, and based on a conservative approach. A summary of the drainage features considered as part of the site investigation, including the closest distance from the water body to the Project Location, is provided in Table 15 (confirmed water bodies) and Table 16 (non-water bodies). Maps 2-1 to 2-12 show drainage features identified as part of the records review and the site investigation.

Table 15. Site Investigations Summary for Confirmed Water Bodies at the Nation Rise Wind Project – Duff Creek Drainage Area.

Drainage Feature Name	Survey Location(s)	Closest Distance to Project Component (m)
Confirmed Permanent Water Bodies		
Duff Creek	WB-101	WT- >120 AR- Overlapping CL- >120 CA- Overlapping SI- >120
Confirmed Intermittent Water Bodies		
McIntryre Lagrove Municipal Drain	WB-098 WB-099 WB-100	WT- >120 AR- >120 CL- Overlapping CA- Overlapping SI- >120
Tributary 1 of McIntyre Lagrove Municipal Drain	WB-097	WT- 55 AR- >120 CL- >120 CA- 25 SI- >120

Legend
WT: Wind Turbine
AR: Access Road
CL: Collection Line
CA: Construction Activity/Temporary Infrastructure/Balance of Operations
SI: Supporting Infrastructure - Building/Substation/Meteorological Tower/Point of Interconnect

Table 16. Site Investigations Summary for Non-Water Bodies at the Nation Rise Wind Project – Duff Creek Drainage Area.

Drainage Feature Name	Survey Location(s)	Rationale
Confirmed Non-Water Bodies		
Pond F	NWB-036	• No feature present • No evidence of water present
Tributary 1 of McIntyre Lagrove Municipal Drain	NWB-035	• Ephemeral • Channelized drain Terrestrial grasses throughout

5.2.3 Seepage Areas

During the site investigations, one seepage area was identified within the Project Area. The seepage is identified as Seepage Area 1 and represented by survey location WB-115 (see Map 2-3). This seepage area is located within a Green Ash Mineral Deciduous Swamp Type (SWDM2-2), located within the headwaters of Furney Municipal Drain (NRSI 2017b). The seepage was first identified on June 6, 2016 during a site investigation for the NHA. A dense patch of Jewelweed (*Impatiens capensis*) was observed within an identified depression, along with Lake-bank Sedge (*Carex lacustris*). The depression was surrounded by Speckled Alder (*Alnus incana* spp. *rugosa*) and other wetland plant species. The surrounding topography and the shape of the seepage area indicate that, in most years, ephemeral outflow occurs southward from the east side of the seepage area through a channelized trough, rather than eastward via a historical water body shown in the Records Review. This historical water body (which is located >120m from the Project Location) no longer exists as it has been cleared and tilled through for agricultural purposes. During the site investigation, the seepage area was dry; however, it was identified as an intermittent feature since the spring of 2016 was particularly dry. The seepage area is approximately 0.15ha.

Table 17. Site Investigations Summary for Confirmed Seepage Areas at the Nation Rise Wind Farm – South Nation River Drainage Area.

Seepage Area Name	Survey Location(s)	Closest Distance to Project Component (m)
Seepage Area 1	WB-115	WT- 104 AR- >120 CL- >120 CA- 99 SI- >120

Legend
WT: Wind Turbine
AR: Access Road
CL: Collection Line
CA: Construction Activity/Temporary Infrastructure/Balance of Operations
SI: Supporting Infrastructure - Building/Substation/Meteorological Tower/Point of Interconnect

5.3 Modifications to the Records Review

Results of the site investigation led to the classification of several aquatic features based on the site-specific conditions observed during site investigations. The modifications to the records review results are discussed further in Table 13.

Table 18. Modifications to the Records Review Based on Site Investigation Results

Criteria	Result from Records Review	Corrections Based on Site Investigations
i. In a water body	The records review has identified 61 potential water bodies as overlapping the Project Location, within the following drainage areas: • South Nation River (n=29) • Unnamed Creek A (n=16) • Whissell Creek (n=7) • Moffatt Creek (n=3) • Payne River (n=4) • Duff Creek (n=2) These potential overlaps represent proposed crossing locations for access roads, collection lines, and/or construction disturbance areas. All of these potential water bodies may represent permanent or intermittent watercourses, drainage features or ponds.	Site investigations identified 39 confirmed water bodies to be overlapping the Project Location, within each drainage areas as follows: • South Nation River (n=18) • Unnamed Creek A (n=9) • Whissell Creek (n=5) • Moffatt Creek (n=2) • Payne River (n=3) • Duff Creek (n=2) All of these water bodies represent permanent or intermittent drainage features. All locations (63 in total) where the water bodies overlap the Project Location represent proposed crossing locations for access roads, collection lines, and/or construction disturbance areas.
ii. Within 120m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity	None	No corrections.
iii. Within 300m of the average annual high water mark of a lake trout lake that is at or above development capacity	None	No corrections.

Criteria	Result from Records Review	Corrections Based on Site Investigations
iv. Within 120m of the average annual high water mark of a permanent or intermittent stream	The records review has identified 44 potential water bodies within 120m of, but not overlapping, the Project Location, within the following drainage areas: • South Nation River (n=19) • Unnamed Creek A (n=11) • Whissell Creek (n=7) • Moffatt Creek (n=3) • Payne River (n=2) • Duff Creek (n=2) All of these water bodies represent potential permanent or intermittent watercourses, drainage features or ponds.	The site investigations identified 22 confirmed water bodies located within 120m of, but not overlapping, the Project Location, within each of the drainage areas, as follows: • South Nation River (n=10) • Unnamed Creek A (n=3) • Whissell Creek (n=5) • Moffatt Creek (n=2) • Payne River (n=1) • Duff Creek (n=1) All of these water bodies represent permanent or intermittent drainage features.
v. Within 120m of a seepage area	None	The site investigations identified one seepage area located within 120m of, but not overlapping, the Project Location within the South Nation drainage area.

5.4 Summary

In accordance with the REA Regulation, NRSI has completed a water body records review and site investigations for the proposed Project Area. Site investigations were conducted to confirm the presence, absence and extent of water bodies that were identified during the records review, determine any corrections to potential water bodies identified during the records review, and document any new water bodies that were not previously identified. Site investigations also focused on the characterization of each drainage feature identified in the records review, as well as additional drainage features identified in the field. This characterization was completed in order to determine whether each drainage feature satisfies the criteria to be identified as a water body.

The water bodies that were identified during the site investigation and confirmed as water bodies as per the REA definition will be carried forward to the Water Body Report, where the potential impacts and mitigation measures to these water bodies will be discussed in relation to the phases of the Project.

6.0 References

Publications

DNV-GL. 2017a. Nation Rise Wind Farm Design and Operations Report. August 2017.

DNV-GL. 2017b. Nation Rise Wind Farm Construction Plan Report. August 2017.

DNV-GL. 2017c. Nation Rise Wind Farm Decommissioning Plan Report. August 2017.

Ministry of the Environment. 2013. Technical Guide to Renewable Energy Approvals.

Ministry of the Environment. 2011. Renewable Energy Approvals Technical Bulletin – Guidance for Preparing the Water Assessment and Water Body Reports.

Ministry of Natural Resources and Forestry (MNRF). 2015. Inland Ontario Lakes Designated for Lake Trout Management. July 2015.

Natural Resource Solutions Inc. (NRSI). 2017a. Nation Rise Wind Farm – Water Body Report. August 2017.

Natural Resource Solutions Inc. (NRSI). 2017b. Nation Rise Wind Farm – Natural Heritage Site Investigation Report. June 2017.

Internet Sources

Fisheries and Oceans Canada (DFO). 1999. A Class Authorization System for Agricultural Municipal Drains in Southern Ontario Region. Fact Sheet # 2. November, 1999

Government of Canada. 2016. Historic Weather Record for St. Albert Ontario. Available at: http://climate.weather.gc.ca/historical_data/search_historic_data_e.html (Accessed February 27, 2017).

South Nation Conservation (SNC). 2014. State of the Nation Report. June 2014.

South Nation Conservation (SNC) and Raisin Region Conservation Authority (RRCA). 2016. Assessment Report: South Nation Source Protection Area. September 1, 2016.

Personal Communication

MNRF Staff, pers. comm. 2016. Email correspondence to C. Humphrey. September 23, 2016. Ministry of Natural Resources and Forestry (MNFR), Kemptville District, Information Request Services.

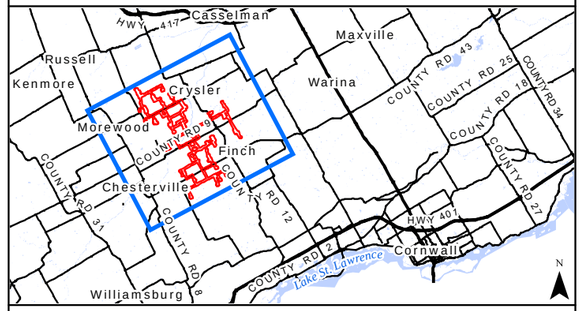
SNC Staff, pers. comm. 2016. Email and telephone correspondence to C. Humphrey. September 12, 2016. Watershed Planner, South Nation Conservation Authority. Finch, Ontario.

Map 1
Key Map

Map 1

Nation Rise Wind Farm

Key Map



Legend

- Map Extent
- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Intermittent Watercourse (LIO)
- Open Water (LIO)
- Wooded Area (LIO)
- Municipal Boundary

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Temporary Access Road for Construction
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road
- Proposed Substation

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Project: 1756 Date: July 5, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:68,000**

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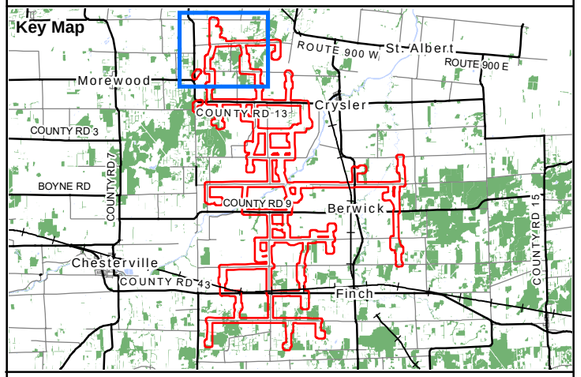
Maps 2-1 to 2-12
Water Body Assessment

Map 2 - 1

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Temporary Access Road for Construction
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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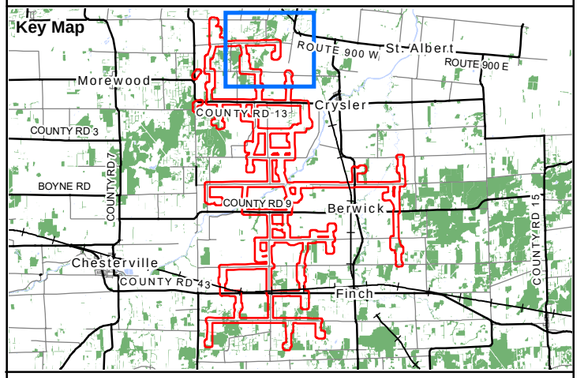
Map 2 - 2

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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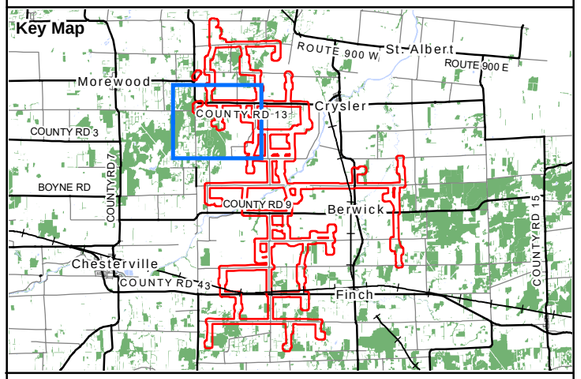
Map 2 - 3

Nation Rise Wind Farm

Water Body Assessment



Legend

- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)
- Seepage Area

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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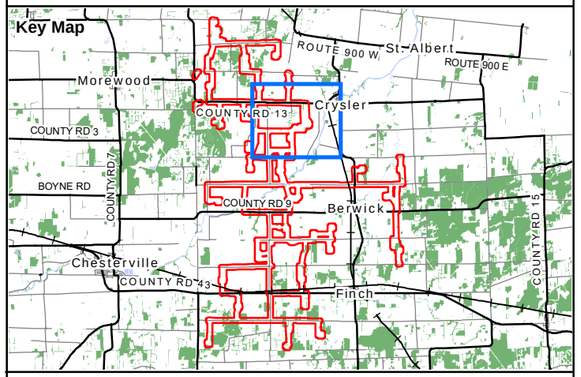
Map 2 - 4

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road
- Proposed Substation

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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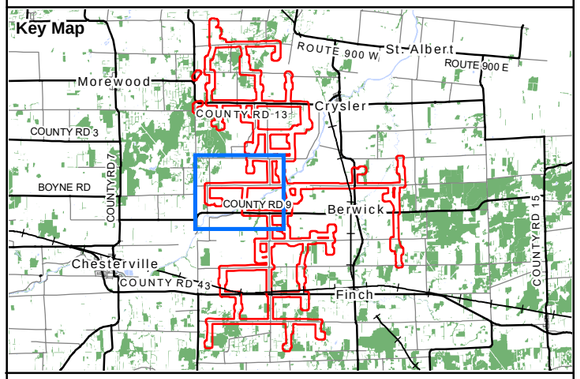
Map 2 - 5

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Porposed Temporary Turning Radii
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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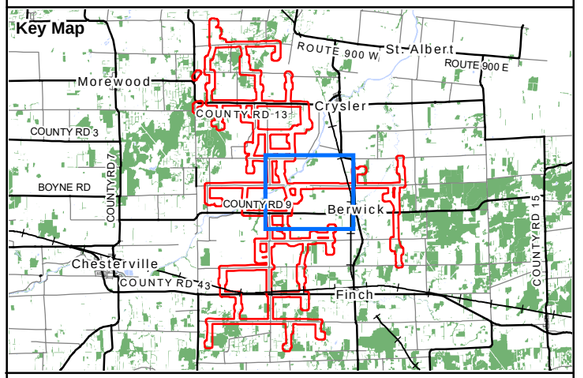
Map 2 - 6

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Porposed Temporary Turning Radii
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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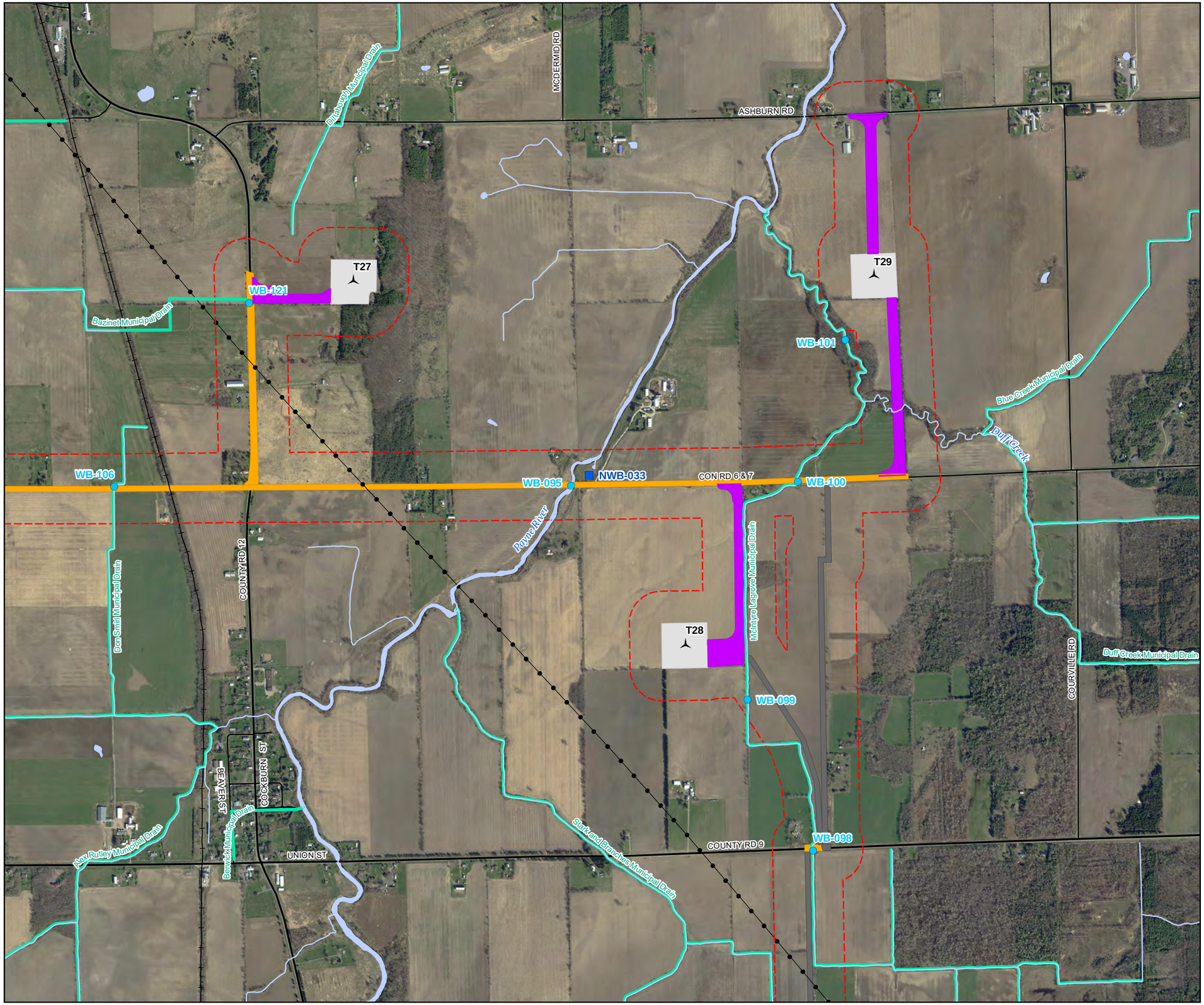
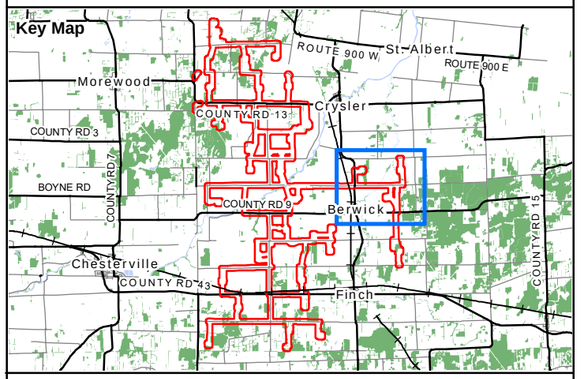
Map 2 - 7

Nation Rise Wind Farm

Water Body Assessment





Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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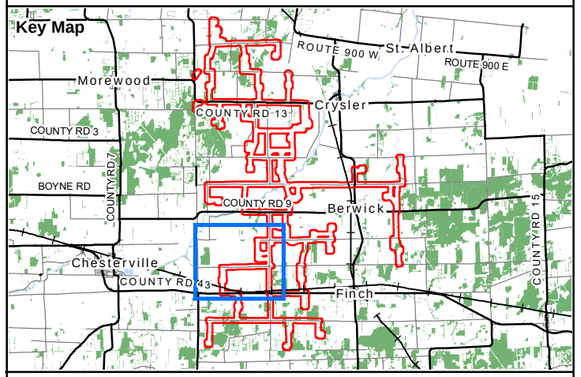
Map 2 - 8

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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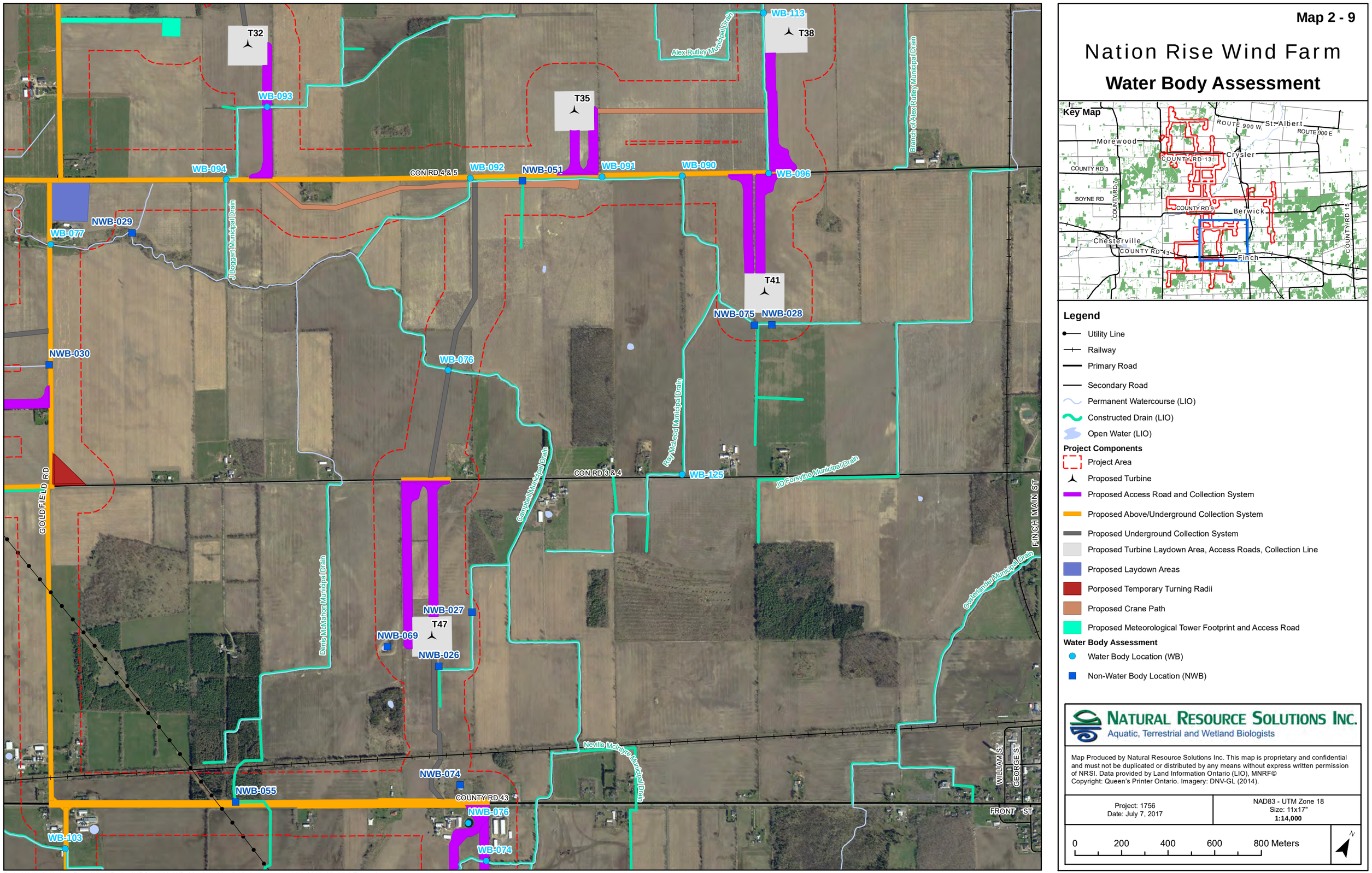
Map 2 - 9

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

0 200 400 600 800 Meters

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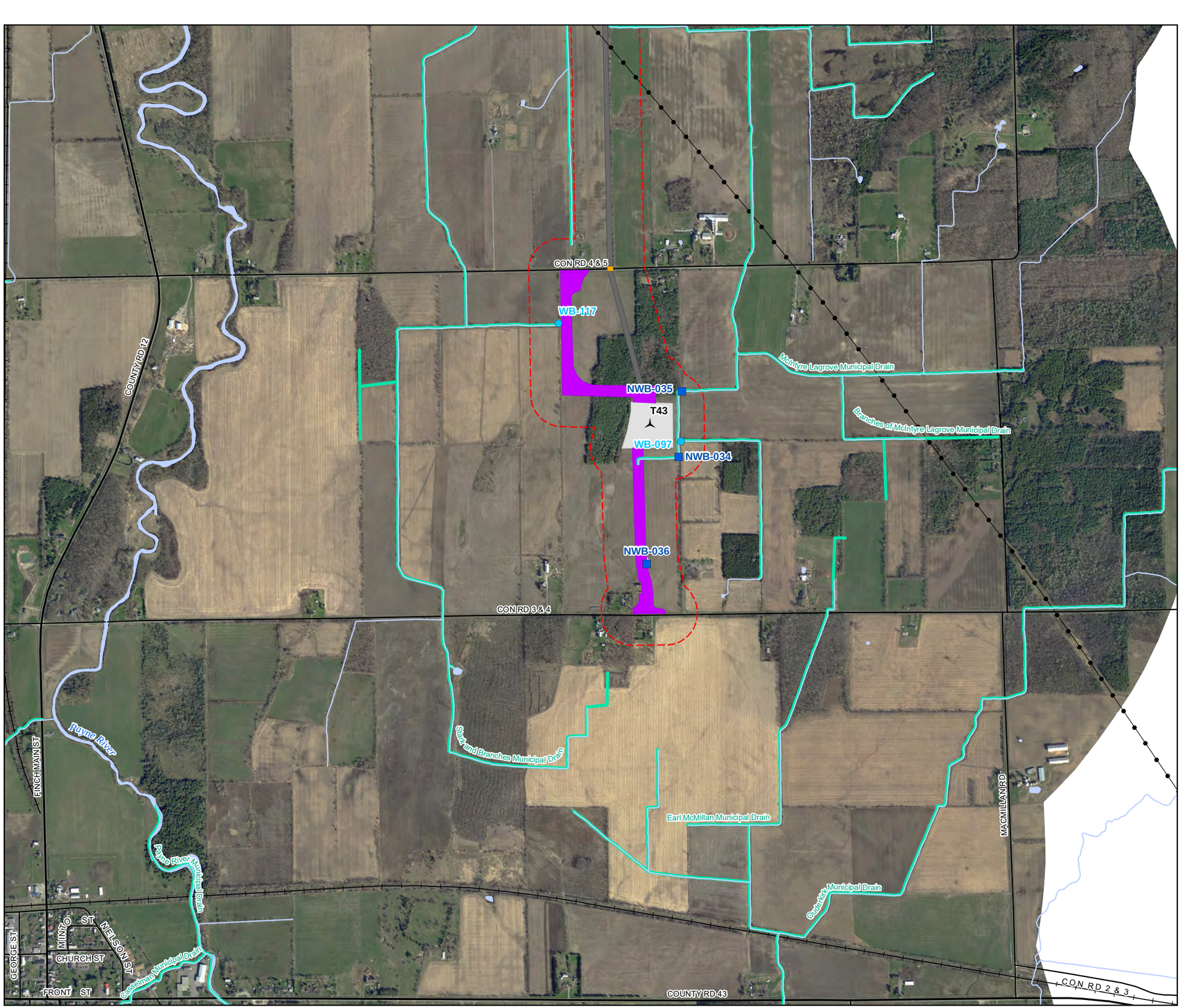
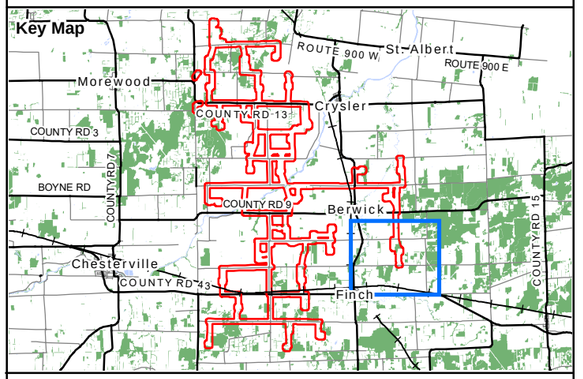
Nation Rise Wind Farm

Water Body Assessment





Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

0 200 400 600 800 Meters

N

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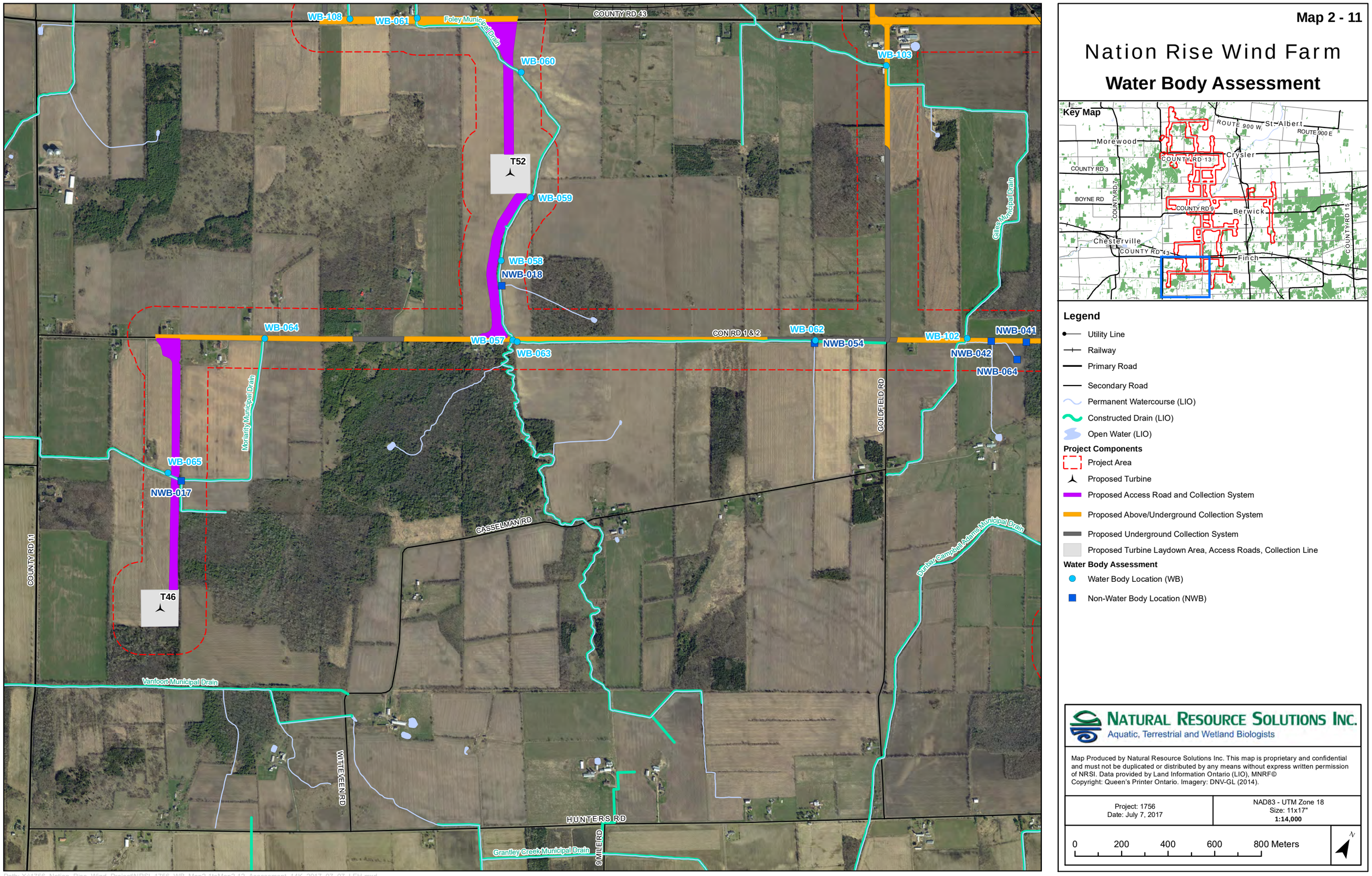
Map 2 - 11

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

0 200 400 600 800 Meters

N

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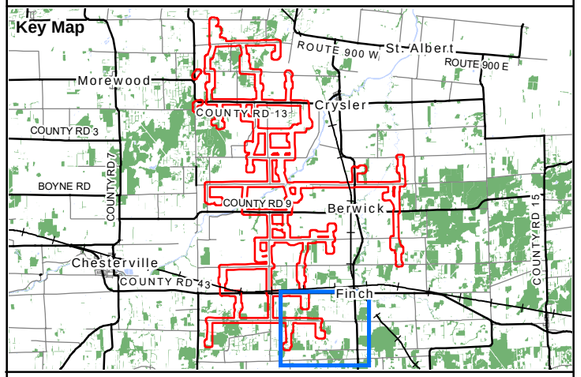
Map 2 - 12

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

0 200 400 600 800 Meters

N

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Appendix I
Site Investigation Field Data Summary Table

Watershed	Drainage Area	Drainage Feature Name	Report ID	UTM Coordinates (18T)		Site Investigation Date	Precip. in Prior 48hrs (mm)	Wind	Cloud Cover (%)	Air Temp. (°C)	Precip. at Time of Survey	Straight or Meandering (H/M/L)	Channel Definition	Flow Conditions (H/M/L Freshet)	Avg. Wetted Width (m)	Avg. Bankfull Width (m)	Max Pool Depth (m)	Avg. Water Depth (m)	Avg. Bankfull Depth (m)	Substrate Composition	Bank vegetation	Bank Slope & Stability	Gradient (H/M/L)	Habitat Features (Woody debris, undercutting etc.)	Instream Vegetation (% and Dominance)	Water Temp. (°C)	Turbidity (L/M/H)	Colour	Hydric soils	Leaf Litter within Feature	Seepage Areas or Groundwater Indicators	Algae, Fish, Crayfish, Shellfish, Aquatic Invert Larvae, or Evidence	Water Body (Y/N)	Flow Regime Based on Field Observations	Culvert Observations	Feature Description
Middle South Nation River	Duff Creek	Trib 1 of McIntyre Lagrove Municipal Drain	NWB-035	494325	5002007	08/Dec/16	2	1	100	0	None	Straight	Poorly defined	H	Dry	2.2	Dry	Dry	0.5	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	Dry	Dry	Dry	None visible	None observed	None observed	None observed	N	Ephemeral	None	Dry drainage ditch completely lined with terrestrial grasses, no signs of water flow
		Pond F	NWB-036	494514	5001365	06/Dec/16	12	0	10	-3	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 1 of McIntyre Lagrove Municipal Drain	WB-097	494411	5001838	08/Dec/16	2	1	100	0	None	Straight	Poorly defined	H	3.0	4.1	0.2	0.3	1.1	Silt	Terrestrial grasses and deciduous shrubs and trees	High Slope, Low Stability	L	Terrestrial grasses and woody debris throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	1	H	Brown	None visible	Terrestrial grasses and minimal leaf litter throughout	None observed	None observed	Y	Intermittent	None	Channelized drain with abundant Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions, downstream feature is NWB, feature may enter a tile drain, may flow into a karst area, or flow towards a different drain
		McIntyre Lagrove Municipal Drain	WB-098	493228	5003476	05/Dec/16	12	0	100	-3	None	Meandering L	Defined	H	1.3	1.8	0.3	0.2	0.7	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Moderate Slope, Low Stability	L	Overhanging vegetation, some coarse substrate, undercut banks, minor woody debris	None	1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	2.5m CSP	Defined drain with slight meander, bank erosion an no instream vegetation
		McIntyre Lagrove Municipal Drain	WB-099	492749	5003857	07/Dec/16	4	2	100	-2	None	Straight	Defined	H	2.7	3.8	0.2	0.2	0.8	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses along toe of banks, minor woody debris	50% terrestrial grasses and 50% Broad-leaved Cattail	1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	None	Channelized drain with some cattails Broad-leaved Cattail a degree of permanence , some bank erosion
		McIntyre Lagrove Municipal Drain	WB-100	492533	5004662	07/Dec/16	4	2	100	-1	None	Meandering M	Defined	H	2.4	3.2	0.3	0.2	0.7	Silt	Terrestrial grasses	Moderate Slope, Low Stability	L	Terrestrial grasses along toe of banks with some cattails, minor woody debris, undercut banks, overhanging vegetation	90% terrestrial grasses and 10% Broad-leaved Cattail	1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	2.5m CSP in loose boulder	Broad-leaved Cattail and coarse substrate indicates flows sufficiently high enough to transport coarse material, some bank erosion
		Duff Creek	WB-101	492441	5005212	07/Dec/16	4	2	100	-2	None	Meandering H	Defined	H	5.5	7.0	0.5	0.3	1.8	Silt/Cobble with some boulder	Terrestrial grasses and deciduous trees through woodlot	High Slope, Low Stability	L	Terrestrial grasses and cattails along toe of banks, woody debris through woodlot, undercut banks, overhanging vegetation and trees	50% terrestrial grasses and 50% Broad-leaved Cattail	3	H	Brown	None visible	None observed	None observed	Filamentous algae throughout	Y	Permanent	None	Well defined natural channel with some bank erosion and build up of filamentous algae
	Moffatt Creek	Trib 1 of Paquette McMahon Municipal Drain	NWB-001	482608	5006865	06/Dec/16	12	0	0	-6	None	Straight	Poorly defined	H	1.7	2.0	0.3	0.2	0.5	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Moderate Slope, Low Stability	L	None observed	90% row crop 10% terrestrial grasses	Frozen	Frozen	Frozen	None visible	None observed	None observed	None observed	N	Ephemeral	None	Poorly defined low area adjacent to agricultural field, frozen with minimal water present
		Trib 2 of Paquette McMahon Municipal Drain	NWB-002	482565	5006963	06/Dec/16	12	0	0	-5	None	Straight	Poorly defined	H	1.8	2.0	0.4	0.2	0.5	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Moderate Slope, Low Stability	L	None observed	90% row crop 10% terrestrial grasses	Frozen	Frozen	Frozen	None visible	None observed	None observed	None observed	N	Ephemeral	None	Poorly defined low area adjacent to agricultural field, frozen with minimal water present
		McConnell Steven Municipal Drain	NWB-043	481314	5005954	20/Jan/17	0.6	2	100	2	None	Straight	Poorly defined	M	N/A	N/A	Dry	Dry	N/A	N/A	Deciduous trees through woodlot	Low Slope, High Stability	L	None observed	None	Dry	Dry	Dry	None visible	Substantial leaf litter on woodlot floor	None observed	None observed	N	Ephemeral	None	Upstream extent of feature, some flow may occur in early spring, some snow melt occurring during survey and no flow present, no defined channel present
		Trib 1 of Stephenson Municipal Drain	NWB-065	481739	5003673	23/Feb/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		McConnell Steven Municipal Drain	WB-003	481102	5006210	06/Dec/16	12	0	10	-3	None	Straight	Poorly defined	H	1.3	1.5	0.2	0.2	0.7	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Moderate Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	2	L	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	Filamentous algae throughout	Y	Intermittent	None	Channelized drain with filamentous algae suggests a degree of permanence, however terrestrial grasses throughout stream bed suggests periods of dry conditions
		McConnell Steven Municipal Drain	WB-005	480623	5007361	06/Dec/16	12	0	0	-5	None	Straight	Poorly defined	H	3.5	4.3	0.3	0.3	0.5	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Low Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	3	M	Green	None visible	Terrestrial grasses and leaf litter throughout	None observed	Filamentous algae throughout	Y	Intermittent	None	Channelized drain, flow conditions, size and presence of aquatic veg suggest a degree of permanence , presence of terrestrial grasses on stream bed suggests period of dry conditions
		McConnell Steven Municipal Drain	WB-006	480468	5007642	06/Dec/16	12	0	0	-5	None	Straight	Poorly defined	H	3.8	4.5	0.3	0.3	0.8	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Low Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	3	M	Green	None visible	Terrestrial grasses and leaf litter throughout	None observed	Filamentous algae throughout	Y	Intermittent	2.5m CSP in boulder rubble	Channelized drain, flow conditions, size and presence of aquatic vegetation suggests a degree of permanence, presence of terrestrial grasses on stream bed suggests periods of dry conditions
		Paquette McMahon Municipal Drain	WB-007	482991	5007663	06/Dec/16	12	0	0	-6	None	Meandering L	Poorly defined	H	2.5	3.0	0.1	0.1	0.5	Silt	Terrestrial grasses and deciduous trees	Moderate Slope, Low Stability	L	Isolated patches of cattails and woody debris throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	Leaf litter present on streambed	None observed	None observed	Y	Intermittent	0.8m CSP	Poorly defined drain through woodlot, presence of Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests dry periods
		Paquette McMahon Municipal Drain	WB-008	482593	5006938	06/Dec/16	12	0	0	-6	None	Straight	Poorly defined	H	2.5	3.5	0.1	0.1	0.5	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Moderate Slope, Low Stability	L	Isolated patches of cattails and woody debris throughout	70% terrestrial grasses and 30% Broad-leaved Cattail	2	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	None	Poorly defined drain through woodlot, presence of Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests dry periods
		Paquette McMahon Municipal Drain	WB-009	481779	5006978	06/Dec/16	12	0	0	-5	None	Meandering L	Poorly defined	H	1.4	3.5	0.3	0.2	0.6	Silt	Terrestrial grasses and deciduous trees	Low Slope, Low Stability	L	Isolated patches of terrestrial grasses and woody debris throughout	100% terrestrial grasses	2	L	Brown	None visible	Leaf litter present on streambed	None observed	None observed	Y	Intermittent	4.5m concrete open box culvert	Poorly defined drain through woodlot, flow condition suggests a degree of permanence, terrestrial grasses on stream bed suggest dry periods
		Paquette McMahon Municipal Drain	WB-010	481702	5006954	06/Dec/16	12	0	0	-5	None	Meandering L	Defined	H	1.4	3.5	0.3	0.2	0.6	Silt	Terrestrial grasses and deciduous trees	Low Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	2	L	Brown	None visible	Leaf litter present on streambed	None observed	None observed	Y	Intermittent	None	Poorly defined feature with lack of bank and instream vegetation, terrestrial grasses suggests dry periods
		Trib 3 of Paquette McMahon Municipal Drain	WB-011	481428	5006766	06/Dec/16	12	0	0	-5	None	Straight	Poorly defined	H	2.0	3.0	0.3	0.3	0.7	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Low Slope, Low Stability	L	Terrestrial grasses throughout	90% terrestrial grasses 10% Broad-leaved Cattail	Frozen	Frozen	Frozen	None visible	None observed	None observed	None observed	Y	Intermittent	1.0m CSP	Poorly defined drain, presence of Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests period of dry conditions
		McConnell Steven Municipal Drain	WB-114	481240	5005958	20/Jan/17	0.6	2	100	2	None	Straight	Poorly defined	H	1.3	1.5	0.2	0.2	0.7	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Moderate Slope, Low Stability	L	Terrestrial grasses throughout, some coarse substrate, algae present	100% Terrestrial grasses	Unknown	L	Brown	None visible	None observed	None observed	Filamentous algae throughout	Y	Intermittent	None	Channelized drain, lack of leaf litter, coarse sediments and filamentous algae suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions, feature begins at tile drain outlet, upstream feature is through woodlot
		Stephenson Municipal Drain	WB-119	481253	5005107	31/Jan/17	3	1	5	-9	None	Straight	Defined	L	2.0	3.3	Unknown	Unknown	Unknown	Unknown	Terrestrial grasses and deciduous trees within hedgerow	High Slope, Low Stability	L	Terrestrial grasses and cattails throughout, overhanging deciduous trees	60% Cattail and 40% terrestrial grasses	Frozen	L	Frozen	None visible	None observed	None observed	None observed	Y	Permanent	2.0m CSP	Well defined channelized drain with Broad-leaved Cattail visible under ice cover and evidence of frequent flow, suggests degree of permanence
	Payne River	Pond D	NWB-033	491836	5004318	07/Dec/16	4	2	100	-1	None	N/A	N/A	H	5 x 7	N/A	N/A	N/A	N/A	N/A	N/A	Low Slope, High Stability	L	None observed	100% terrestrial grasses	Frozen	Frozen	Frozen	None visible	None observed	None observed	None observed	N	Ephemeral	None	Ponded water in field
		Trib 2 of McIntyre Lagrove Municipal Drain	NWB-034	494432	5001781	08/Dec/16	2	1	100	0	None	Straight	Poorly defined	H	2.5	4.1	0.2	0.3	0.8	Silt	Terrestrial grasses and deciduous trees within hedge row	High Slope, Low Stability	L	Terrestrial grasses and woody debris throughout	90% terrestrial grasses 10% Broad-leaved Cattail	1	H	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	N	Ephemeral	None	Channelized drain, cattails suggest a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions, no channel within agricultural field
		Payne River	WB-095	491793	5004253	07/Dec/16	4	2	100	-1	None	Meandering M	Defined	H	18.6	25.8	0.8	0.5	3.5	Silt/Cobble with some boulder	Terrestrial grasses and deciduous trees	High Slope, Low Stability	L	Minor overhanging vegetation, coarse substrate, minor woody debris	100% Broad-leaved Cattail	3	H	Brown	None visible	None observed	None observed	Filamentous algae throughout	Y	Permanent	25m span bridge	Well defined natural channel with some bank erosion and build up of filamentous algae, large exposed pipe forming weir at road crossing
		Alex Rutley Municipal Drain	WB-096	490957	5000670	07/Dec/16	4	2	100	-1	None	Straight	Poorly defined	H	4.3	5.8	0.5	0.2	0.8	Silt	Terrestrial grasses and deciduous trees within hedgerow	Moderate Slope, Low Stability	L	Terrestrial grasses and cattails throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	1	L	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	0.8m CSP	Channelized drain with abundant Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses throughout stream bed suggests periods of dry conditions
		Don Smirl Municipal Drain	WB-106	490294	5003450	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	3.5	5.2	0.2	0.2	1.1	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout and minor woody debris	50% terrestrial grasses and 50% Broad-leaved Cattail	1	L	Green	None visible	None observed	None observed	None observed	Y	Intermittent	0.5m CSP	Channelized drain with abundant Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Alex Rutley Municipal Drain	WB-113	490614	5001267	03/Feb/17	0	1	40	-8	None	Straight	Poorly defined	L	2.0	4.0	Unknown	Unknown	Unknown	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, High Stability	L	Broad-leaved cattails and grasses throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	0.5	L	Green	None visible	None observed	None observed	Duckweed sp.	Y	Intermittent	None	Channelized drain with Broad-leaved Cattail throughout and Duckweed sp. at the downstream extent suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Stark and Branches Municipal Drain	WB-117	493791	5002015	11/Feb/17	5	3	100	-12	None	Straight	Defined	L	0.3	2.5	15.3	15.3	1.8	Unknown	Terrestrial grasses, cattails, deciduous trees and shrubs	Moderate Slope, High Stability	L	Cattail throughout reach	80% Broad-leaved Cattail and 20% terrestrial grasses	Unknown	L	Clear	Unknown	Unknown	Unknown	None observed	Y	Intermittent	None	Channelized drain originating at a tile drain outlet, some terrestrial grasses observed, mainly Broad-leaved Cattail visible beneath the snowpack, open water present at tile drain outlet, feature becomes frozen and snow covered several meters downstream of the outlet
		Alex Rutley Municipal Drain	WB-122	490689	5001434	03/Feb/17	0	2	50	-8	None	Straight	Poorly defined	L	2.5	4.0	Unknown	Unknown	Unknown	Silt	Terrestrial grasses, deciduous shrubs, and broad leaved cattails	Moderate Slope, Moderate Stability	L	Terrestrial grasses and broad leaved cattails throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	0.5	L	Brown	None visible	None observed, most of the surface is frozen	None observed	Duckweed sp.	Y	Intermittent	1.0m CSP north of point (downstream)	Channelized drain with Duckweed sp. and Broad-leaved Cattail suggests a degree of permanence, while terrestrial grasses on stream bed suggests periods of dry conditions
	South Nation River	Furney Municipal Drain	NWB-004	483416	5002954	07/Dec/16	4	2	100	-2	Light snow	Straight	Poorly defined	H	Snow covered	1.5	Unknown	Unknown	0.5	Clay	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	Snow covered	Snow covered	Snow covered	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	N	Ephemeral	None	Ephemeral feature with limited water depth, no indication of continuous flow
		Trib 3 of Johnstone Municipal Drain	NWB-005	485121	5003621	07/Dec/16	4	2	100	-2	Light snow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 4 of Johnstone Municipal Drain	NWB-006	486583	5004342	07/Dec/16	4	2	100	-2	Light snow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 6 of Johnstone Municipal Drain	NWB-007	486800	5005632	06/Dec/16	12	0	20	-1	None	Straight	No channel definition	H	N/A	N/A	N/A	N/A	N/A	Silt	Terrestrial grasses and deciduous shrubs	N/A	L	Dense terrestrial grasses, debris throughout	100% terrestrial grasses	Dry	Dry	Dry	None visible	None observed	None observed	None observed	N	N/A	None	Grassed hedgerow, no channel definition or indication of water flow

Watershed	Drainage Area	Drainage Feature Name	Report ID	UTM Coordinates (18T)		Site Investigation Date	Precip. in Prior 48hrs (mm)	Wind	Cloud Cover (%)	Air Temp. (°C)	Precip. at Time of Survey	Straight or Meandering (H/M/L)	Channel Definition	Flow Conditions (H/M/L Freshet)	Avg. Wetted Width (m)	Avg. Bankfull Width (m)	Max Pool Depth (m)	Avg. Water Depth (m)	Avg. Bankfull Depth (m)	Substrate Composition	Bank vegetation	Bank Slope & Stability	Gradient (H/M/L)	Habitat Features (Woody debris, undercutting etc.)	Instream Vegetation (% and Dominance)	Water Temp. (°C)	Turbidity (L/M/H)	Colour	Hydric soils	Leaf Litter within Feature	Seepage Areas or Groundwater Indicators	Algae, Fish, Crayfish, Shellfish, Aquatic Invert Larvae, or Evidence	Water Body (Y/N)	Flow Regime Based on Field Observations	Culvert Observations	Feature Description
		Trib 6 of Johnstone Municipal Drain	NWB-008	487008	5005261	06/Dec/16	12	0	20	-1	None	Straight	No channel definition	H	N/A	N/A	N/A	N/A	N/A	Silt	Terrestrial grasses and deciduous shrubs	N/A	L	Dense terrestrial grasses, debris throughout	100% terrestrial grasses	Dry	Dry	Dry	None visible	None observed	None observed	None observed	N	N/A	None	Grassed hedgerow, no channel definition or indication of water flow
		Trib 1 of J.P. Grady Municipal Drain	NWB-012	485815	5001100	07/Dec/16	4	2	100	-2	None	Straight	No channel definition	H	N/A	N/A	N/A	N/A	N/A	Silt	Terrestrial grasses and deciduous shrubs	Low Slope, High Stability	L	None observed	100% terrestrial grasses	Dry	Dry	Dry	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	N	Ephemeral	None	No defined channel or signs of water flow
		Trib 2 of South Nation River	NWB-013	487216	5002547	07/Dec/16	4	2	100	-2	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 1 of South Nation River	NWB-014	487439	5002239	07/Dec/16	4	2	100	-2	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Pond G	NWB-015	487796	5000675	07/Dec/16	4	2	100	-2	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 1 of Moriarity Municipal Drain	NWB-017	487815	4993695	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	0.8	1.8	0.1	0.1	0.5	Silt	Deciduous trees within hedgerow	Moderate Slope, Low Stability	L	Woody debris and overhanging trees	None	1	L	Brown	None visible	Substantial leaf litter	None observed	None observed	N	Ephemeral	None	Historically channelized, minimal channel definition, no coarse substrates, and heavy leaf litter on bed
		Trib 4 of Foley Municipal Drain	NWB-018	488637	4995081	08/Dec/16	2	3	100	0	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 1 of R. Stevens Municipal Drain	NWB-037	482143	5004330	06/Dec/16	12	0	10	-3	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Bachler Municipal Drain	NWB-044	486734	5003117	25/Jan/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 2 of R. Stevens Municipal Drain	NWB-045	482019	5004545	06/Dec/16	12	0	10	-1	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Fourges Municipal Drain	NWB-047	485297	5003871	25/Jan/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Lafleche Municipal Drain	NWB-048	485985	5004228	11/Feb/17	5	3	100	-12	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present, fence line in corn field. No evidence of ditch, low area, swale, or water at the surveyed point or within the north-south and east-west hedgerows located to the northeast
		Landy Municipal Drain	NWB-050	486107	5003037	25/Jan/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Whetters Snaders Branch of Foley Municipal Drain	NWB-053	487302	4997162	25/Jan/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 5 of Foley Municipal Drain	NWB-054	489939	4995494	25/Jan/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 1 of Grady Municipal Drain	NWB-058	485010	4999795	23/Feb/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 2 of Grady Municipal Drain	NWB-059	485174	4999822	23/Feb/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 1 of MacCadden Municipal Drain	NWB-060	484367	4999805	23/Feb/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 2 of MacCadden Municipal Drain	NWB-061	484204	4999895	23/Feb/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Pond I	NWB-062	484798	5000487	23/Feb/17	N/A	N/A	N/A	N/A	None	N/A	N/A	H	20 x 150	N/A	N/A	N/A	N/A	N/A	N/A	Moderate Slope, Moderate Stability	L	None observed	None	Frozen	Frozen	Frozen	None visible	None observed	None observed	None observed	N	N/A	None	Feature is a dugout pond
		J.P. Grady Municipal Drain	NWB-063	485353	5000849	23/Feb/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 2 of Foley Municipal Drain	NWB-066	487212	4996580	07/Dec/16	4	2	100	-2	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Geo. S. Johnston Municipal Drain	NWB-067	485076	5002624	23/Feb/17	N/A	3	90	2	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 4 of Grady Municipal Drain	NWB-068	485211	4999755	23/Feb/17	0.2	3	90	2	None	Straight	Poorly defined	L	Snow covered	Snow covered	Unknown	Unknown	Unknown	Unknown	Terrestrial grasses, and deciduous trees, snow back obscures bank vegetation	Moderate Slope, High Stability	L	None observed	100% terrestrial grasses	Frozen	Frozen	Frozen	None visible	None observed	None observed	None observed	N	Ephemeral	None	Channelized drain within agricultural field, snow cover obscures the feature, however, no evidence of aquatic vegetation within the feature. May contribute seasonally to downstream features
		Trib 1 of Genier Extension Municipal Drain	NWB-072	482902	5003457	03/Feb/17						N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 1 of Fourges Municipal Drain	NWB-073	485044	5004029	01/Mar/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
Middle South Nation River	South Nation River	Byers Municipal Drain	WB-014	483013	5004302	06/Dec/16	12	0	10	-1	None	Straight	Defined	H	2.5	4.0	0.3	0.3	0.8	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	1.5m CSP	Channelized drain, presence of aquatic vegetation suggests a degree of permanence, terrestrial grasses on stream bed suggest periods of dry conditions
		R. Stevens Municipal Drain	WB-015	482870	5004227	06/Dec/16	12	0	10	-1	None	Straight	Defined	H	3.5	4.5	0.3	0.3	0.8	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	Encrusting algae throughout	Y	Intermittent	0.5 m CSP	Channelized drain, presence of aquatic vegetation suggests a degree of permanence, terrestrial grasses on stream bed suggest periods of dry conditions
		Genier Municipal Drain	WB-016	482499	5004044	06/Dec/16	12	0	10	-1	None	Straight	Defined	H	Snow covered	1.0	Unknown	Unknown	0.6	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	Snow covered	Snow covered	Snow covered	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	1.0m CSP	Aquatic vegetation observed downstream suggests a degree of permanence, terrestrial grasses on stream bed suggest periods of dry conditions
		Genier Municipal Drain	WB-017	483030	5003633	07/Dec/16 and 31/Jan/17	4	2	100	-2	Light snow	Straight	Poorly defined	L	4.1	5.0	0.5	0.3	0.8	Silt	Terrestrial grasses, and broad leaved cattails, snow pack obscures bank vegetation	High Slope, Moderate Stability	L	Terrestrial grasses and broad leaved cattails throughout	80% terrestrial grasses and 20% Broad-leaved Cattail	1	L	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	None	Channelized drain with some Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggest periods of dry conditions
		Genier Municipal Drain	WB-018	482965	5003774	07/Dec/16	4	2	100	-2	Light snow	Straight	Poorly defined	H	4.2	5.5	0.5	0.3	0.8	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Moderate Stability	L	Dense terrestrial grasses, debris throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	1	L	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggest periods of dry conditions
		Genier Extension Municipal Drain	WB-019	482904	5003462	07/Dec/16 and 03/Feb/17	4	2	100	-2	Light snow	Straight	Poorly defined	H	3.8	4.8	0.5	0.3	0.8	Silt	Terrestrial grasses and deciduous and coniferous trees, snow pack obscures bank vegetation	High Slope, Moderate Stability	L	Terrestrial grasses and woody debris throughout	100% aquatic grasses	1	L	Brown	None visible	Leaf litter present on streambed	None observed	None observed	Y	Intermittent	None	Channelized drain, aquatic grasses on stream bed suggests a degree of permanence, while presence of leaf litter on bed suggests minimal flow and periods of dry conditions
		Trib 1 of Smirle McConnell Municipal Drain	WB-021	483138	5006097	06/Dec/16	12	0	0	-5	None	Meandering L	Poorly defined	H	0.8	1.8	0.1	0.1	0.7	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Moderate Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	3	M	Green	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	1.0m CSP	Channelized drain, flow condition and size suggests a degree of permanence, terrestrial grasses on stream bed suggest periods of dry conditions
		Smirle McConnell Municipal Drain	WB-023	483760	5004701	06/Dec/16	12	0	10	-1	None	Meandering L	Poorly defined	H	3.0	3.8	0.3	0.2	0.8	Silt/Gravel	Terrestrial grasses and deciduous trees, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	2	L	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	Encrusting algae throughout	Y	Intermittent	1.75m CSP	Channelized drain with encrusting algae suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions, bank stabilization through downstream past residential property suggests erosion issues
		Johnstone Municipal Drain	WB-029	485653	5003913	08/Dec/16	2	3	100	0	None	Straight	Defined	H	3.6	5.8	0.3	0.2	0.8	Silt/Gravel with cobble	Terrestrial grasses and deciduous shrubs within hedgerow	High Slope, Low Stability	L	Terrestrial grasses along toe of banks in soft sediments	100% terrestrial grasses	1	L	Brown	None visible	Terrestrial grasses along toe of banks and leaf litter on bed	None observed	Filamentous algae throughout	Y	Permanent	2 x 2m CSP in loose boulders	Channelized drain with algae, very steep banks with minor erosion evident, vegetation growing on soft sediments along toe of banks
		Johnstone Municipal Drain	WB-030	486413	5004287	09/Dec/16	2	2	20	-6	None	Straight	Defined	H	4.1	5.2	0.2	0.2	1.1	Silt	Terrestrial grasses and deciduous shrubs within hedgerow	High Slope, Low Stability	L	Terrestrial grasses along toe of banks in soft sediments	100% terrestrial grasses	1	L	Brown	None visible	Terrestrial grasses along toe of banks and leaf litter on bed	None observed	None observed	Y	Permanent	None	Channelized drain, algae present upstream, very steep banks
		Johnstone Municipal Drain	WB-031	487220	5004906	06/Dec/16	12	0	20	-1	None	Meandering L	Defined	H	5.5	7.0	0.7	0.3	1.2	Sand/Gravel with cobble	Terrestrial grasses within deciduous tree hedgerow, snow pack obscures bank vegetation	High Slope, Moderate Stability	L	Terrestrial grasses along toe of banks, some bank erosion and undercut banks, overhanging trees and minor woody debris	100% terrestrial grasses	3	M	Brown	None visible	None observed	None observed	Filamentous algae throughout	Y	Permanent	None	Well defined natural channel with some bank erosion and build up of filamentous algae
		Trib 5 of Johnstone Municipal Drain	WB-032	487040	5004812	06/Dec/16	12	0	20	-1	None	Straight	Defined	H	3.5	5.0	0.3	0.2	0.8	Sand/Gravel	Terrestrial grasses within deciduous shrubs and trees within hedgerow, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses along toe of banks, some leaf litter, undercut banks, minor woody debris and overhanging veg	100% terrestrial grasses	2	L	Green	None visible	Terrestrial grasses and minimal leaf litter	None observed	Filamentous algae throughout	Y	Intermittent	None	Defined drain with filamentous algae suggests a degree of permanence
		Trib 5 of Johnstone Municipal Drain	WB-033	487198	5004898	06/Dec/16	12	0	20	-1	None	Straight	Defined	H	3.5	5.0	0.3	0.2	0.8	Silt	Terrestrial grasses within deciduous shrubs and trees within hedgerow, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses along toe of banks, some leaf litter, undercut banks, minor woody debris and overhanging veg	100% terrestrial grasses	2	L	Green	None visible	Terrestrial grasses and minimal leaf litter	None observed	Filamentous algae throughout	Y	Intermittent	None	Defined drain with filamentous algae suggests a degree of permanence
		Geo. S. Johnston Municipal Drain	WB-045	485854	5001881	06/Dec/16 and 02/Feb/17	12	0	10	-1	None	Straight	Poorly defined	H	4.0	5.0	0.3	0.2	0.7	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Moderate Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	2	L	Green	None visible	None observed	None observed	None observed	Y	Intermittent	None	Channelized drain, aquatic vegetation present downstream, size of feature, and depth of water during second site visit suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions

Watershed	Drainage Area	Drainage Feature Name	Report ID	UTM Coordinates (18T)		Site Investigation Date	Precip. in Prior 48hrs (mm)	Wind	Cloud Cover (%)	Air Temp. (°C)	Precip. at Time of Survey	Straight or Meandering (H/M/L)	Channel Definition	Flow Conditions (H/M/L Freshet)	Avg. Wetted Width (m)	Avg. Bankfull Width (m)	Max Pool Depth (m)	Avg. Water Depth (m)	Avg. Bankfull Depth (m)	Substrate Composition	Bank vegetation	Bank Slope & Stability	Gradient (H/M/L)	Habitat Features (Woody debris, undercutting etc.)	Instream Vegetation (% and Dominance)	Water Temp. (°C)	Turbidity (L/M/H)	Colour	Hydric soils	Leaf Litter within Feature	Seepage Areas or Groundwater Indicators	Algae, Fish, Crayfish, Shellfish, Aquatic Invert Larvae, or Evidence	Water Body (Y/N)	Flow Regime Based on Field Observations	Culvert Observations	Feature Description
		Geo. S. Johnston Municipal Drain	WB-046	486956	5001709	07/Dec/16	4	2	100	-2	None	Meandering L	Defined	H	2.7	4.1	0.5	0.2	0.7	Silt/Gravel	Terrestrial grasses, overhanging deciduous trees and shrubs	High Slope, Moderate Stability	L	Terrestrial grasses along toe of banks in soft sediments	100% terrestrial grasses	2	L	Green	None visible	None observed	None observed	None observed	Y	Permanent	4.5m concrete open box culvert	Substrate sorting and slight meander through channelized corridor indicates flows sufficient to move small coarse material and shape the channel, presence of aquatic vegetation further upstream suggests permanence
		Landy Municipal Drain	WB-047	486201	5002876	06/Dec/16	12	0	10	-1	None	Straight	Poorly defined	H	2.3	4.1	0.2	0.2	0.8	Silt	Terrestrial grasses, deciduous trees, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses and cattails throughout, overhanging deciduous trees	90% terrestrial grasses 10% Broad-leaved Cattail	3	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	None	Presence of some Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Landy Municipal Drain	WB-048	486170	5002807	06/Dec/16	12	0	10	-1	None	Straight	Poorly defined	H	4.5	5.0	0.3	0.1	0.8	Silt	Terrestrial grasses, deciduous trees and shrubs, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses and cattails throughout, overhanging deciduous trees and shrubs	50% terrestrial grasses and 50% Broad-leaved Cattail	3	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	2.5m CSP	Abundant Broad-leaved Cattail suggest a degree of permanence, terrestrial grasses on stream bed suggest periods of dry conditions
		Trib 3 of South Nation River	WB-049	486288	5001341	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	4.3	5.0	0.3	0.3	0.5	Silt	Terrestrial grasses, row crop, snow pack obscures bank vegetation	High Slope, Moderate Stability	L	Terrestrial grasses and cattails throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	1.0m CSP	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		J.P. Grady Municipal Drain	WB-050	485750	5001055	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	3.8	4.5	0.3	0.3	0.9	Silt	Terrestrial grasses and deciduous shrubs	Low Slope, High Stability	L	Terrestrial grasses and cattails throughout	90% terrestrial grasses 10% Broad-leaved Cattail	2	L	Green	None visible	None observed	None observed	None observed	Y	Intermittent	1.0m CSP in concrete rubble	Channelized drain with some Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions, minor bank erosion near road crossing
		J.P. Grady Municipal Drain	WB-051	486087	5000425	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	3.8	7.8	0.3	0.3	0.9	Silt	Terrestrial grasses and deciduous shrubs	Low Slope, High Stability	L	Terrestrial grasses and cattails throughout, overhanging deciduous shrubs	90% terrestrial grasses 10% Broad-leaved Cattail	2	L	Green	None visible	None observed	None observed	None observed	Y	Intermittent	None	Channelized drain with some Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		South Nation River	WB-052	486132	5000378	07/Dec/16	4	2	100	-2	None	Meandering M	Defined	H	85.0	95.0	Unknown	Unknown	Unknown	Unknown	Terrestrial grasses, deciduous shrubs, and deciduous trees	High Slope, Moderate Stability	L	Terrestrial grasses and cattails present along toe of banks, woody debris, riffles and pools	50% terrestrial grasses and 50% Broad-leaved Cattail	3	H	Brown	None visible	Water level too high to observe channel bed, expected that none present due to flow rate and size of watercourse	None observed	Filamentous algae along banks	Y	Permanent	None	Well defined natural channel with some bank erosion, build up of filamentous algae in shoal areas, riffles and pools, and minor woody debris along banks
		Watson Ouderkirk Municipal Drain	WB-053	487774	5002138	08/Dec/16 and 03/Feb/17	2	3	100	0	None	Straight	Poorly defined	M	2.8	4.8	0.5	0.3	0.8	Silt/Gravel with some cobble	Terrestrial grasses and deciduous shrubs within hedgerow	High Slope, Low Stability	L	Terrestrial grasses and cattails, woody debris throughout	None	2	H	Brown	None visible	Minimal leaf litter	None observed	Filamentous algae throughout	Y	Permanent	None	Well defined channelized drain with build up filamentous algae throughout, and significant bank erosion
		Watson Ouderkirk Municipal Drain	WB-055	488867	5002679	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	1.5	3.8	0.2	0.1	1.2	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	None observed	None	1	L	Brown	None visible	None observed - recently cleaned out	None observed	Filamentous algae throughout	Y	Intermittent	None	Channelized drain with abundant algae suggests a degree of permanence, drain has recently been cleaned out, no instream vegetation and limited bank vegetation
		Watson Ouderkirk Municipal Drain	WB-056	488845	5002667	07/Dec/16	4	2	100	-2	None	Straight	Defined	H	3.0	4.1	0.3	0.3	0.7	Silt	Terrestrial grasses, deciduous trees and shrubs	High Slope, Low Stability	L	Patches of terrestrial grasses on banks, overhanging deciduous trees and shrubs, woody debris throughout	None	1	H	Brown	None visible	None observed - recently cleaned out	None observed	None observed	Y	Intermittent	None	Channelized drain, recently cleaned out, size and water depth suggests a degree of permanence, upstream channel is intermittent
		Foley Municipal Drain	WB-057	488788	4994897	08/Dec/16	2	3	100	0	None	Meandering M	Defined	H	1.7	5.2	0.2	0.2	0.8	Silt/Gravel	Terrestrial grasses, deciduous shrubs and trees	Low Slope, High Stability	L	Isolated patches of terrestrial grasses, cattails, some coarse sediment, overhanging grasses, deciduous trees and shrubs	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Brown	None visible	Minimal leaf litter	None observed	None observed	Y	Permanent	2.5m concrete open box culvert	Naturalized drain with some Broad-leaved Cattail suggests a degree of permanence, minor bank erosion and some coarse sediment, terrestrial grasses on stream bed along bank toe suggests periods of dry conditions
		Foley Municipal Drain	WB-058	488585	4995175	08/Dec/16	2	3	100	0	None	Meandering L	Defined	H	2.8	4.1	0.4	0.3	0.9	Silt	Terrestrial grasses and deciduous trees within hedgerow	Low Slope, High Stability	L	Some coarse substrate, overhanging trees, undercut banks	None	1	L	Brown	None visible	Minimal leaf litter	None observed	None observed	Y	Permanent	None	Channelized drain with some coarse sediment and leaf litter, some bank erosion, water depth and lack of instream vegetation on stream bed suggests a degree of permanence
		Foley Municipal Drain	WB-059	488569	4995473	08/Dec/16	2	3	100	0	None	Meandering L	Defined	H	3.1	4.2	0.4	0.3	0.9	Silt	Terrestrial grasses and deciduous trees within hedgerow	Low Slope, High Stability	L	Some coarse substrate, overhanging trees	None	1	L	Brown	None visible	Minimal leaf litter	None observed	None observed	Y	Permanent	None	Channelized drain with some coarse sediment and leaf litter, some bank erosion, water depth and lack of instream vegetation on stream bed suggests a degree of permanence
Middle South Nation River	South Nation River	Foley Municipal Drain	WB-060	488281	4995929	07/Dec/16	4	2	100	-2	None	Straight	Defined	H	3.2	7.5	0.3	0.3	1.2	Silt	Terrestrial grasses, deciduous shrubs and trees	Low Slope, High Stability	L	Terrestrial grasses, undercut banks, some coarse substrate, over hanging grasses and trees	100% terrestrial grasses	1	L	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Permanent	None	Channelized drain with some coarse sediment, undercut banks and some bank erosion, terrestrial grasses on stream bed suggests periods of dry conditions
		Foley Municipal Drain	WB-061	487778	4995925	07/Dec/16	4	2	100	-2	None	Straight	Defined	H	3.8	5.0	0.3	0.3	0.9	Silt	Terrestrial grasses, deciduous trees	Low Slope, High Stability	L	Terrestrial grasses along toe of banks, cattails, and minor woody debris, minimal coarse sediment, overhanging trees	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Brown	None visible	Minimal leaf litter	None observed	None observed	Y	Permanent	4.5m concrete open box culvert	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Trib 1 of Foley Municipal Drain	WB-062	489937	4995506	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	1.2	3.7	0.1	0.1	0.8	Silt	Terrestrial grasses and deciduous shrubs	High Slope, Low Stability	L	Patches of terrestrial grasses and minor woody debris, overhanging vegetation	90% terrestrial grasses 10% Broad-leaved Cattail	2	H	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Intermittent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests dry periods
		Trib 1 of Foley Municipal Drain	WB-063	488809	4994900	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	1.8	3.7	0.1	0.1	0.8	Silt	Terrestrial grasses and deciduous shrubs	High Slope, Low Stability	L	Patches of terrestrial grasses and minor woody debris, overhanging vegetation	90% terrestrial grasses 10% Broad-leaved Cattail	2	H	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Intermittent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests dry periods
		Moriarity Municipal Drain	WB-064	487845	4994403	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	0.7	1.4	0.1	0.1	0.5	Silt	Terrestrial grasses and deciduous shrubs	Low Slope, High Stability	L	Terrestrial grasses along toe of banks in soft sediments	100% terrestrial grasses	1	L	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Intermittent	0.75m CSP in loose boulder	Channelized drain with terrestrial grasses along toe of banks, silty sandy substrate, lack of instream vegetation on stream bed suggests a degree of permanence
		Moriarity Municipal Drain	WB-065	487748	4993699	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	1.2	2.3	0.1	0.1	0.5	Silt	Terrestrial grasses, deciduous shrubs and trees	Low Slope, High Stability	L	Terrestrial grasses and cattails, overhanging vegetation and trees, some bank erosion	70% terrestrial grasses 30% Broad-leaved Cattail	1	L	Brown	None visible	Terrestrial grasses and Broad-leaved Cattail, minimal leaf litter	None observed	None observed	Y	Intermittent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Foley Municipal Drain	WB-066	487203	4996393	07/Dec/16	4	2	100	-2	None	Straight	Defined	H	3.5	5.1	0.2	0.1	1.2	Silt	Terrestrial grasses, deciduous shrubs	Low Slope, High Stability	L	Terrestrial grasses and cattails throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Permanent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Foley Municipal Drain	WB-067	486969	4996496	07/Dec/16	4	2	100	-2	None	Straight	Defined	H	3.8	4.5	0.2	0.1	0.5	Silt	Terrestrial grasses, deciduous shrubs	Low Slope, High Stability	L	Terrestrial grasses and cattails along toe of banks	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	Minimal leaf litter - recently cleaned out	None observed	None observed	Y	Permanent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, recently cleaned out
		Foley Municipal Drain	WB-068	486779	4996863	07/Dec/16	4	2	100	-2	None	Straight	Defined	H	4.1	7.0	0.3	0.3	0.8	Silt	Terrestrial grasses, deciduous shrubs and trees	Low Slope, High Stability	L	Terrestrial grasses along toe of banks in soft sediments, overhanging grasses and trees, some coarse sediment	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Permanent	1.0m CSP in loose boulders	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Foley Municipal Drain	WB-069	487112	4996522	07/Dec/16	4	2	100	-2	None	Straight	Defined	H	3.9	4.2	0.2	0.1	0.5	Silt	Terrestrial grasses, deciduous shrubs	Low Slope, High Stability	L	Terrestrial grasses throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Permanent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Trib 2 of Foley Municipal Drain	WB-070	487038	4997008	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	4.3	5.8	0.3	0.3	0.8	Silt	Terrestrial grasses, deciduous shrubs and trees	Low Slope, High Stability	L	Terrestrial grasses throughout, overhanging grasses and trees	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	0.8m CSP	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Trib 3 of Foley Municipal Drain	WB-108	487524	4995786	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	2.3	4.1	0.3	0.3	0.9	Silt	Terrestrial grasses and deciduous shrubs	Low Slope, High Stability	L	Terrestrial grasses and cattails throughout	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Intermittent	2.5m concrete open box culvert	Channelized drain with Broad-leaved Cattail suggest a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions

Watershed	Drainage Area	Drainage Feature Name	Report ID	UTM Coordinates (18T)		Site Investigation Date	Precip. in Prior 48hrs (mm)	Wind	Cloud Cover (%)	Air Temp. (°C)	Precip. at Time of Survey	Straight or Meandering (H/M/L)	Channel Definition	Flow Conditions (H/M/L Freshet)	Avg. Wetted Width (m)	Avg. Bankfull Width (m)	Max Pool Depth (m)	Avg. Water Depth (m)	Avg. Bankfull Depth (m)	Substrate Composition	Bank vegetation	Bank Slope & Stability	Gradient (H/M/L)	Habitat Features (Woody debris, undercutting etc.)	Instream Vegetation (% and Dominance)	Water Temp. (°C)	Turbidity (L/M/H)	Colour	Hydric soils	Leaf Litter within Feature	Seepage Areas or Groundwater Indicators	Algae, Fish, Crayfish, Shellfish, Aquatic Invert Larvae, or Evidence	Water Body (Y/N)	Flow Regime Based on Field Observations	Culvert Observations	Feature Description
		Trib 1 of R. Stevens Municipal Drain	WB-110	482243	5003947	06/Dec/16	12	0	10	-1	None	Straight	Poorly defined	H	0.5	1.5	0.2	0.2	0.5	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses and cattails throughout	50% terrestrial grasses and 50% Narrow-leaved Cattail	1	L	Green	None visible	None observed	None observed	None observed	Y	Intermittent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests period of dry conditions, very limited signs of flow
		Trib 3 of R. Stevens Municipal Drain	WB-111	482130	5004341	06/Dec/16	12	0	10	-1	None	Straight	Defined	H	1.3	1.5	0.2	0.2	0.5	Silt	Terrestrial grasses and deciduous trees upstream	High Slope, Low Stability	L	Terrestrial grasses and cattails throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests period of dry conditions, very limited signs of flow
	South Nation River	South Nation River	WB-112	487699	5002152	08/Dec/16	2	3	100	0	None	Meandering M	Defined	H	75.0	80.0	Unknown	Unknown	Unknown	Unknown	Terrestrial grasses and deciduous shrubs	High Slope, Moderate Stability	L	Dense terrestrial grasses, debris throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	3	H	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	Filamentous algae throughout	Y	Permanent	None	Well defined natural channel with bank erosion and dense build up of filamentous algae, provides substantial fish habitat
		Seepage Area 1	WB-115	483447	5003011	06/Jun/16	22.2	3	20	18	None	N/A	N/A	L	Dry	N/A	Dry	Dry	N/A	Mineral soils	Speckled Alder, Lake-bank Sedge	Moderate Slope, High Stability	L	None observed	100% Jewelweed	Dry	N/A	N/A	Yes	None observed	Seepage Area	None observed	Y	Intermittent	None	Intermittent seepage area that was dry during the site investigation in June. A distinct depression with a dense patch of Jewelweed present surrounded by Lake-bank Sedge and Speckled Alder. The seepage is connected to the Furney Municipal Drain.
		Bazinet Municipal Drain	WB-121	490416	5004290	03/Feb/17	0	1	80	-9	None	Straight	Defined	L	1.5	3.3	0.2	0.1	0.4	Silt with some sand	Terrestrial grasses and deciduous trees and shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses throughout, woody debris, minor undercutting	50% terrestrial grasses and 50% aquatic grasses	0.5	L	Green	None visible	None observed	None observed	Attached algae on instream vegetation	Y	Permanent	0.7m CSP	Defined channelized drain with presence of aquatic grasses and algae growth suggests a degree of permanence, while terrestrial grasses on stream bed along periphery suggests periods of low flow
		Unnamed Trib of South Nation River	WB-123	487685	5001982	03/Feb/17	0	1	30	-6	None	Meandering M	Defined	L	0.4	3.0	0.4	0.1	0.3	Silt	Terrestrial grasses and deciduous shrubs and trees	Moderate Slope, High Stability	H	Confluences with South Nation River, abundant woody debris, some exposed roots, and beaver evidence along riparian habitat	None	2	L	Brown	None visible	Minimal leaf litter	None observed	Filamentous algae throughout	Y	Permanent	2 x 0.2m CSP (perched 1.5m)	Defined meandering channel originating from two tile drain outlets. Channel confluences with the South Nation River with algae present throughout
		Trib 4 of Grady Municipal Drain	WB-126	485203	4999770	23/Feb/17	0.2	3	80	2	None	Straight	Poorly defined	M	1.2	3.0	Unknown	0.2	Unknown	Silt	Terrestrial grasses	High Slope, Low Stability	L	None observed	60% Broad-leaved Cattail and 40% terrestrial grasses	0.1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	0.5m CSP	Channelized drain with Broad-leaved Cattail suggests a degree of permanence
		Trib 3 of Grady Municipal Drain	WB-127	484370	5000318	23/Feb/17	0.2	3	90	2	None	Straight	Poorly defined	M	1.3	2.5	Unknown	0.2	Unknown	Silt with some gravel at culvert	Terrestrial grasses and deciduous shrubs	Moderate Slope, High Stability	L	None observed	100% terrestrial grasses	0.1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	0.3m CSP	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Grady Municipal Drain	WB-128	484740	5000521	23/Feb/17	0.2	3	90	2	None	Straight	Defined	H	2.0	3.8	Unknown	0.6	Unknown	Silt	Terrestrial grasses	Moderate Slope, Moderate Stability	L	None observed	70% terrestrial grasses and 30% Broad-leaved Cattail	0.1	M	Brown	None visible	None observed	None observed	None observed	Y	Permanent	1.0m CSP	Defined channelized drain with Broad-leaved Cattail and absence of instream vegetation suggests permanence
		Grady Municipal Drain	WB-129	484982	5000649	23/Feb/17	0.2	3	90	3	None	Straight	Defined	H	1.6	2.5	Unknown	0.5	Unknown	Gravel with some cobble (silt downstream)	Terrestrial grasses and small deciduous trees	Moderate Slope, Moderate Stability	L	None observed	80% terrestrial grasses and 20% Broad-leaved Cattail	0.1	L	Brown	None visible	None observed	None observed	None observed	Y	Permanent	1.0m concrete open box culvert	Defined channelized drain with Broad-leaved Cattail and absence of instream vegetation suggests permanence
		Trib 4 of R. Stevens Municipal Drain	WB-130	482190	5004014	1-Mar-17	N/A	N/A	N/A	N/A	None	Straight	N/A	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Y	Intermittent	Unknown	Channelized drain through an agricultural field, feature form is similar to WB-110
		Trib 1 of Geo. S. Johnston Municipal Drain	WB-131	485657	5001785	1-Mar-17	N/A	N/A	N/A	N/A	None	Straight	N/A	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Y	Intermittent	Unknown	Channelized drain through an agricultural field, joins WB-045
		Trib 1 of Fetterly Municipal Drain	NWB-019	491690	4996401	08/Dec/16	2	3	100	0	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present, area tilled through with row crop
		Duff Sanders Municipal Drain	NWB-026	490701	4998135	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	N/A	Dry	2.2	Dry	Dry	0.5	Silt	Terrestrial grasses and corn stubble	Moderate Slope, Low Stability	L	None observed	100% terrestrial grasses	Snow covered	Snow covered	Snow covered	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Duff Sanders Municipal Drain	NWB-027	490717	4998407	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	L	3.0	3.5	0.2	0.1	0.5	Silt	Terrestrial grasses	Moderate Slope, Low Stability	L	Dense terrestrial grasses throughout	100% terrestrial grasses	1	L	Brown	None visible	None observed	None observed	None observed	N	Ephemeral	None	Channelized drain, standing water and dense terrestrial grasses throughout suggests long periods of dry conditions
		Trib 1 of Ray McLeod Municipal Drain	NWB-028	491274	5000102	07/Dec/16	4	2	100	-1	None	Straight	Poorly defined	H	Dry	2.2	Dry	Dry	0.5	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	Dry	Dry	Dry	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	N	Ephemeral	None	No defined channel or signs of water flow
		Trib 3 of Unnamed Creek A	NWB-029	488663	4999160	07/Dec/16	4	2	100	-1	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 1 of Unnamed Creek A	NWB-030	488616	4998493	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	Dry	2.5	Dry	Dry	0.5	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	Snow covered	Snow covered	Snow covered	None visible	None observed	None observed	None observed	N	Ephemeral	None	Channelized drain, no signs of water flow under snow pack, no road crossing at observation point
		Trib 1 of Unnamed Creek A	NWB-031	488338	4998372	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	Dry	2.0	Dry	Dry	0.5	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	Snow covered	Snow covered	Snow covered	None visible	None observed	None observed	None observed	N	Ephemeral	None	Channelized drain, no signs of water flow under snow pack
Middle South Nation River		Trib 3 of Dunbar Campbell Adams Municipal Drain	NWB-039	491057	4995956	08/Dec/16	2	3	100	-1	None	Straight	Poorly defined	H	0.5	1.3	0.1	0.1	0.5	Silt	Terrestrial grasses and deciduous trees within hedgerow, snow pack obscures bank vegetation	High Slope, Low Stability	L	None observed	100% terrestrial grasses	2	H	Brown	None visible	Terrestrial grasses and substantial leaf litter throughout	None observed	None observed	N	Ephemeral	None	No defined channel, dense terrestrial grasses throughout feature, substantial leaf litter
		Trib 2 of Gilles Municipal Drain	NWB-041	490739	4995925	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	Dry	0.8	Dry	Dry	0.5	Silt	Terrestrial grasses and deciduous shrubs	Low Slope, High Stability	L	None observed	100% terrestrial grasses	Dry	Dry	Dry	None visible	None observed	None observed	None observed	N	Ephemeral	None	Dry roadside ditch with no defined channel or signs of water flow, no road crossing, wet spot in field to the south is not a pond nor is it surficially connected to the ditch
		Trib 1 of Gilles Municipal Drain	NWB-042	490605	4995857	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	Dry	0.3	Dry	Dry	0.2	Silt	Terrestrial grasses and deciduous shrubs	Low Slope, High Stability	L	None observed	100% terrestrial grasses	Dry	Dry	Dry	None visible	None observed	None observed	None observed	N	Ephemeral	None	Roadside ditch with no defined channel or signs of water flow, no road crossing
		Trib 2 of Ray McLeod Municipal Drain	NWB-051	490039	5000145	25/Jan/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Dirven Municipal Drain	NWB-052	488343	4997708	25/Jan/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Denis McMahon Municipal Drain	NWB-055	490204	4997211	25/Jan/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 1 of Unnamed Creek A	NWB-056	487984	4999051	04/Feb/17	0	3	100	-8	None	Straight	Poorly defined	L	Snow covered	Snow covered	Unknown	Unknown	Unknown	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, Moderate Stability	M	None observed	60% grasses and 40% deciduous shrubs	N/A	N/A	NA	None visible	None observed	None observed	None observed	N	Ephemeral	1.0m CSP for path along main creek (where it converges)	Channelized drain adjacent road and within agricultural field, no evidence of channel forming processes, no evidence of aquatic vegetation, or flow
	Unnamed Creek A	Pond J	NWB-064	490741	4995840	08/Dec/16	2	3	100	0	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	Temporary ponded area
		Pond K	NWB-069	490467	4998106	28/Feb/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Pond L	NWB-074	491020	4997727	01/Mar/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 3 of Ray McLeod Municipal Drain	NWB-075	491208	5000065	01/Mar/17	N/A	N/A	N/A	N/A	None	Straight	Poorly defined	N/A	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Unknown	Unknown	Unknown	Unknown	Unknown	None visible	Unknown	None observed	None observed	N	Ephemeral	None	No defined channel or signs of water flow, form and condition similar to NWB-028
		Pond M	NWB-076	491128	4997601	02/Mar/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	38 x 38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	100% Duckweed	N/A	N/A	N/A	None visible	None observed	None observed	Duckweed sp.	N	Permanent	None	Feature is a dugout pond
		Trib 2 of Dunbar Campbell Adams Municipal Drain	WB-071	491501	4995370	08/Dec/16	2	3	100	-1	None	Straight	Defined	H	3.0	4.0	0.3	0.2	0.5	Silt/Gravel with some cobble	Terrestrial grasses and deciduous trees	High Slope, Low Stability	L	Patches of terrestrial grasses, some woody debris, coarse substrates, undercut banks, some overhanging trees	100% terrestrial grasses	2	H	Green	None visible	Terrestrial grasses and leaf litter along toe of banks	None observed	Filamentous algae throughout	Y	Permanent	None	Channelized drain with dense filamentous algae, bank erosion and undercut banks, presence of coarse sediment, and lack of instream vegetation on stream bed suggest permanence
		Dunbar Campbell Adams Municipal Drain	WB-072	491576	4995294	08/Dec/16	2	3	100	-1	None	Straight	Defined	H	2.8	4.1	0.3	0.2	0.8	Silt/Cobble with some boulders	Terrestrial grasses, deciduous trees through hedgerow	Moderate Slope, Low Stability	L	Terrestrial grasses along toe of banks, minor woody debris, overhanging trees	90% terrestrial grasses 10% Broad-leaved Cattail	4	H	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	Filamentous algae throughout	Y	Permanent	None	Well defined natural channel with some bank erosion, coarse sediments, and a dense build up of filamentous algae
		Dunbar Campbell Adams Municipal Drain	WB-073	491126	4996145	08/Dec/16	2	3	100	-1	None	Straight	Defined	H	5.1	6.2	0.5	0.3	1.2	Silt/Cobble with some boulders	Terrestrial grasses and deciduous trees through hedgerow	Moderate Slope, Low Stability	L	Terrestrial grasses and cattails along toe of banks, coarse sediment, overhanging trees	90% terrestrial grasses 10% Broad-leaved Cattail	4	H	Brown	None visible	None observed	None observed	Filamentous algae throughout	Y	Permanent	2.5m concrete open box culvert in concrete rubble	Well defined natural channel with some bank erosion, coarse sediments, and build up of filamentous algae
		Dunbar Campbell Adams Municipal Drain	WB-074	491273	4997493	08/Dec/16	2	1	100	0	None	Meandering L	Defined	H	4.1	6.2	0.5	0.3	1.2	Silt/Cobble with some boulder	Terrestrial grasses and deciduous trees through hedgerow	Moderate Slope, Low Stability	L	Coarse substrate, overhanging trees, minor woody debris	90% terrestrial grasses 10% Broad-leaved Cattail	4	H	Brown	None visible	Minimal Leaf litter	None observed	Filamentous algae throughout	Y	Permanent	None	Well defined natural channel with some bank erosion, coarse substrates, and build up of filamentous algae

Watershed	Drainage Area	Drainage Feature Name	Report ID	UTM Coordinates (18T)		Site Investigation Date	Precip. in Prior 48hrs (mm)	Wind	Cloud Cover (%)	Air Temp. (°C)	Precip. at Time of Survey	Straight or Meandering (H/M/L)	Channel Definition	Flow Conditions (H/M/L Freshet)	Avg. Wetted Width (m)	Avg. Bankfull Width (m)	Max Pool Depth (m)	Avg. Water Depth (m)	Avg. Bankfull Depth (m)	Substrate Composition	Bank vegetation	Bank Slope & Stability	Gradient (H/M/L)	Habitat Features (Woody debris, undercutting etc.)	Instream Vegetation (% and Dominance)	Water Temp. (°C)	Turbidity (L/M/H)	Colour	Hydric soils	Leaf Litter within Feature	Seepage Areas or Groundwater Indicators	Algae, Fish, Crayfish, Shellfish, Aquatic Invert Larvae, or Evidence	Water Body (Y/N)	Flow Regime Based on Field Observations	Culvert Observations	Feature Description
		Campbell Municipal Drain	WB-076	490139	4999277	08/Dec/16	2	3	100	0	None	Meandering L	Defined	H	3.8	4.8	0.8	0.5	2.0	Silt/Cobble	Terrestrial grasses and deciduous trees	High Slope, Low Stability	L	Minor woody debris, coarse sediment, riffles and pools, and overhanging trees	None	3	H	Brown	None visible	Minimal leaf litter along toe of banks	None observed	Filamentous algae throughout	Y	Permanent	None	Well defined natural channel with some bank erosion and build up of filamentous algae
		Unnamed Creek A	WB-077	488377	4998953	07/Dec/16	4	2	100	-2	None	Meandering H	Defined	H	15.5	20.0	0.8	0.7	1.5	Silt/Cobble	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses and cattails along toe of banks and in floodplain, some coarse sediment, overhanging vegetation, backwater area upstream of crossing	50% terrestrial grasses and 50% Broad-leaved Cattail	3	H	Brown	None visible	Terrestrial grasses along toe of banks and minimal leaf litter	None observed	Filamentous algae throughout	Y	Permanent	2 x 3.5m CSP bridge at road crossing	Well defined natural channel with some bank erosion and build up of filamentous algae
		Unnamed Creek A	WB-079	488008	4999078	07/Dec/16	4	2	100	-2	None	Meandering M	Defined	H	12.1	18.0	0.8	0.7	1.5	Silt/Cobble	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses at toe of banks, coarse substrate, riffles and pools	50% terrestrial grasses and 50% Broad-leaved Cattail	3	H	Brown	None visible	Terrestrial grasses and minimal leaf litter along toe of banks	None observed	Filamentous algae throughout	Y	Permanent	2 x 3.5m CSP bridge at road crossing	Well defined natural channel with some bank erosion, coarse substrates, and build up of filamentous algae
		Unnamed Creek A	WB-080	487136	5000212	07/Dec/16	4	2	100	-2	None	Meandering H	Defined	H	8.5	13.7	0.8	0.5	2.0	Silt/Cobble with some boulders	Terrestrial grasses and deciduous trees through woodlot/wetland	High Slope, Low Stability	L	Woody debris, riffles and pools, variety of substrate sizes, and overhanging trees	None	3	H	Brown	None visible	None observed	None observed	Filamentous algae throughout	Y	Permanent	15m span bridge	Well defined natural channel with bank erosion and filamentous algae, substrate sorting, riffles and pools
		Dunbar Campbell Adams Municipal Drain	WB-081	491672	4994874	08/Dec/16	2	3	100	-1	None	Straight	Defined	H	3.3	4.2	0.2	0.2	0.5	Silt/Gravel with some cobble	Terrestrial grasses and deciduous trees	High Slope, Low Stability	L	Patches of terrestrial grasses, overhanging vegetation and some coarse substrate	100% terrestrial grasses	2	H	Green	None visible	Terrestrial grasses and leaf litter along toe of banks	None observed	Filamentous algae throughout	Y	Intermittent	None	Channelized drain with filamentous algae suggests a degree of permanence, terrestrial grasses on stream bed suggests dry periods
		Fetterly Municipal Drain	WB-083	492979	4996269	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	1.5	3.0	0.1	0.1	0.5	Silt	Terrestrial grasses and row crop	High Slope, Low Stability	L	Patches of terrestrial grasses and woody debris throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	H	Green	None visible	None observed	None observed	None observed	Y	Intermittent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests dry periods, minimal water depth
		Fetterly Municipal Drain	WB-085	492310	4996737	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	3.3	4.5	0.2	0.2	0.5	Silt	Terrestrial grasses and deciduous trees	High Slope, Low Stability	L	Patches of terrestrial grasses and woody debris throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	H	Green	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	None	Channelized drain, presence of Broad-leaved Cattail suggest a degree of permanence, terrestrial grasses on stream bed suggests dry periods
		Fetterly Municipal Drain	WB-086	492105	4996632	08/Dec/16	2	3	100	0	None	Straight	Defined	H	4.8	6.6	0.4	0.3	1.0	Silt/Cobble	Terrestrial grasses and deciduous trees, snow pack obscures bank vegetation	High Slope, Low Stability	L	Patches of terrestrial grasses and woody debris throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	H	Green	None visible	Terrestrial grasses and leaf litter throughout	None observed	Encrusting algae throughout	Y	Permanent	None	Channelized drain, abundant Broad-leaved Cattail and algae, coarse substrates, minor erosion and sediment deposition suggest permanence
		Fetterly Municipal Drain	WB-087	491841	4996512	08/Dec/16	2	3	100	-1	None	Meandering L	Defined	H	3.8	5.2	0.7	0.3	1.5	Silt/Cobble with some gravel	Terrestrial grasses and deciduous trees through hedgerow	High Slope, Low Stability	L	Woody debris, overhanging trees, coarse substrates	90% terrestrial grasses 10% Broad-leaved Cattail	4	H	Brown	None visible	Minimal leaf litter	None observed	Filamentous algae throughout	Y	Permanent	1.0m CSP in loose cobble/boulder embankments	Well defined natural channel with some bank erosion, build up of filamentous algae, lack of instream vegetation on stream bed
		Pond C	WB-089	491574	4997068	08/Dec/16	2	3	100	0	None	N/A	N/A	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	None visible	Unknown	None observed	None observed	Y	Permanent	None	Unknown, site access was not granted
		Ray McLeod Municipal Drain	WB-090	490635	5000486	07/Dec/16	4	2	100	-1	None	Straight	Poorly defined	H	3.8	5.0	0.2	0.2	0.8	Silt	Terrestrial grasses and deciduous trees	Moderate Slope, Low Stability	L	Terrestrial grasses and cattail throughout	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	None	Channelized drain with some Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Ray McLeod Municipal Drain	WB-091	490331	5000321	07/Dec/16	4	2	100	-1	None	Straight	Poorly defined	H	3.8	6.0	0.2	0.2	0.8	Silt	Terrestrial grasses, deciduous shrubs and trees	Moderate Slope, Low Stability	L	Terrestrial grasses and cattail throughout	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	1.0m CSP	Channelized drain with some Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
	Unnamed Creek A	Ray McLeod Municipal Drain	WB-092	489835	5000051	07/Dec/16	4	2	100	-1	None	Straight	Poorly defined	H	4.2	6.5	0.2	0.2	0.8	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses and cattails throughout	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Intermittent	4.5m open box culvert	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		J. Boggart Municipal Drain	WB-093	488921	4999911	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	1.7	2.4	0.1	0.1	0.5	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses and cattails throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	None	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		J. Boggart Municipal Drain	WB-094	488913	4999553	07/Dec/16	4	2	100	-1	None	Straight	Defined	H	1.5	2.1	0.1	0.1	0.5	Silt	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Terrestrial grasses, cattails, some coarse substrate, some overhanging trees	50% terrestrial grasses and 50% Broad-leaved Cattail	1	L	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Intermittent	1.0m CSP	Channelized drain, presence Broad-leaved Cattail along toe of banks and algae suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Gilles Municipal Drain	WB-102	490508	4995819	08/Dec/16	2	3	100	0	None	Straight	Poorly defined	H	2.1	3.8	0.2	0.2	0.8	Silt	Terrestrial grasses and deciduous trees within hedgerow, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses, overhanging vegetation	50% terrestrial grasses and 50% Broad-leaved Cattail	2	H	Brown	None visible	Terrestrial grasses and leaf litter	None observed	None observed	Y	Intermittent	1.0m CSP in loose cobble/boulder embankments	Channelized drain with Broad-leaved Cattail suggest a degree of permanence, terrestrial grasses on stream bed suggests dry periods
Middle South Nation River		Gilles Municipal Drain	WB-103	489652	4996691	08/Dec/16	2	1	100	0	None	Straight	Defined	H	3.5	5.0	0.3	0.3	0.8	Silt	Terrestrial grasses and deciduous trees within hedgerow	High Slope, Low Stability	L	Patches of terrestrial grasses, minor woody debris, some coarse substrate, overhanging trees	90% terrestrial grasses 10% Broad-leaved Cattail	2	H	Green	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Intermittent	2.0m CSP	Channelized drain with some Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Gilles Municipal Drain	WB-104	487804	4997438	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	5.1	6.8	0.3	0.3	1.2	Silt	Terrestrial grasses, deciduous and coniferous trees	Low Slope, High Stability	L	Terrestrial grasses, overhanging vegetation and some trees	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	2.5m CSP	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Branch of Dirven Municipal Drain	WB-105	488077	4997594	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	4.2	6.8	0.3	0.3	1.2	Silt	Terrestrial grasses and deciduous trees	Low Slope, High Stability	L	Terrestrial grasses throughout	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Intermittent	1.5m CSP	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Unnamed Creek A	WB-107	488057	4999066	07/Dec/16	4	2	100	-2	None	Meandering L	Defined	H	10.1	15.5	0.8	0.7	1.5	Silt/Cobble with traces of boulder	Terrestrial grasses and deciduous shrubs	Moderate Slope, Low Stability	L	Dense terrestrial grasses, debris throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	3	H	Brown	None visible	Terrestrial grasses and leaf litter throughout	None observed	Filamentous algae throughout	Y	Permanent	None	Well defined natural channel with some bank erosion and build up of filamentous algae
		Trib 3 of Dunbar Campbell Adams Municipal Drain	WB-116	491017	4996041	08/Dec/16	2	3	100	-1	None	Straight	Poorly defined	H	0.3	1.0	0.1	0.1	0.5	Silt	Terrestrial grasses and deciduous trees within hedgerow, snow pack obscures bank vegetation	High Slope, Low Stability	L	Patches of terrestrial grasses and minor woody debris	100% terrestrial grasses	2	H	Brown	None visible	Terrestrial grasses and minimal leaf litter	None observed	None observed	Y	Intermittent	None	Channelized drain with terrestrial grasses along stream bed, overall size suggests a degree of permanence
		Trib 2 of Unnamed Creek A	WB-124	487986	4999106	03/Feb/17	0	3	30	-6	None	Straight	Poorly defined	L	1.3	3.0	Unknown	0.2	1.0	Silt	Terrestrial grasses and deciduous shrubs and trees	High Slope, Low Stability	L	Confluences with Unnamed Creek A, some woody debris and cattails	60% Broad-leaved Cattail and 40% terrestrial grasses	3	L	Brown	None visible	None observed	None observed	Filamentous algae through upstream portion	Y	Intermittent	0.3m CPP	Channelized drain with algae present through upstream portion and Broad-leaved Cattail throughout suggests a degree of permanence, while terrestrial grasses on stream bed suggests periods of dry conditions
		Ray McLeod Municipal Drain	WB-125	491235	4999353	04/Feb/17	0	3	100	-8	None	Straight	Poorly defined	L	1.5	3.3	Unknown	Unknown	Unknown	Unknown	Terrestrial grasses and deciduous shrubs and trees	Moderate Slope, Moderate Stability	L	None observed	50% terrestrial grasses and 50% Broad-leaved Cattail	Frozen	Frozen	Frozen	None visible	None observed	None observed	None observed	Y	Intermittent	1.2m CSP on the upstream end of reach	Channelized drain with Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Trib 2 of Whissell Creek	NWB-003	484221	5007756	06/Dec/16	12	0	0	-6	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Pond E	NWB-011	484631	5004603	06/Dec/16	12	0	20	-1	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 3 of Whissell Creek Municipal Drain	NWB-038	484607	5005123	06/Dec/16	12	0	10	-1	None	Straight	Poorly defined	H	2.0	3.7	0.2	0.2	0.8	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses and cattails through downstream resulting from backwater of WB-035, feature is a tile drain outlet	50% terrestrial grasses and 50% Broad-leaved Cattail	3	L	Brown	None visible	None observed	None observed	None observed	N	Ephemeral	1.0m CSP	Tile drain outlet, cattails present on downstream side of road due to backwater effect of WB-035
		Trib 4 of Whissell Creek Municipal Drain	NWB-046	484350	5004986	25/Jan/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
		Trib 2 of Parent Municipal Drain	NWB-070	483277	5006521	01/Mar/17	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None observed	None	N/A	N/A	N/A	None visible	None observed	None observed	None observed	N	N/A	None	No feature present
	Whissell Creek	Trib 3 of Parent Municipal Drain	NWB-071	483315	5006353	06/Dec/16	12	0	10	-1	None	Straight	Poorly defined	L	1.8	2.5	0.2	0.1	1.0	Silt	Terrestrial gasses, deciduous shrubs and trees, snow pack obscures bank vegetation	Low Slope, Moderate Stability	L	Overhanging deciduous trees and shrubs	100% terrestrial grasses	Unknown	L	Brown	None visible	Leaf litter throughout	None observed	None observed	N	Ephemeral	None	Feature is a channelized drain with limited definition and leaf litter present throughout. No evidence of aquatic vegetation within feature and terrestrial grasses present on bed.
		Parent Municipal Drain	WB-012	483354	5006222	06/Dec/16	12	0	0	-5	None	Meandering L	Poorly defined	H	Snow covered	Snow covered	Unknown	Unknown	Unknown	Silt	Terrestrial grasses and deciduous trees	Low Slope, High Stability	L	Terrestrial grasses throughout	100% terrestrial grasses	1	L	Green	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	0.25m CSP	Poorly defined, extends through woodlot, snow pack obscures channel

Watershed	Drainage Area	Drainage Feature Name	Report ID	UTM Coordinates (18T)		Site Investigation Date	Precip. in Prior 48hrs (mm)	Wind	Cloud Cover (%)	Air Temp. (°C)	Precip. at Time of Survey	Straight or Meandering (H/M/L)	Channel Definition	Flow Conditions (H/M/L Freshet)	Avg. Wetted Width (m)	Avg. Bankfull Width (m)	Max Pool Depth (m)	Avg. Water Depth (m)	Avg. Bankfull Depth (m)	Substrate Composition	Bank vegetation	Bank Slope & Stability	Gradient (H/M/L)	Habitat Features (Woody debris, undercutting etc.)	Instream Vegetation (% and Dominance)	Water Temp. (°C)	Turbidity (L/M/H)	Colour	Hydric soils	Leaf Litter within Feature	Seepage Areas or Groundwater Indicators	Algae, Fish, Crayfish, Shellfish, Aquatic Invert Larvae, or Evidence	Water Body (Y/N)	Flow Regime Based on Field Observations	Culvert Observations	Feature Description
		Whissell Creek	WB-013	484308	5007528	06/Dec/16	12	0	0	-6	None	Straight	Poorly defined	H	3.0	3.8	0.3	0.2	0.9	Silt	Terrestrial grasses, snow pack obscures bank vegetation	Moderate Slope, Low Stability	L	Isolated patches of cattails and woody debris throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Brown	None visible	None observed	None observed	None observed	Y	Permanent	None	Channelized drain with dense Broad-leaved Cattail, high flow suggests permanence
		Trib 5 of Whissell Creek Municipal Drain	WB-034	484022	5005643	06/Dec/16	12	0	10	-1	None	Straight	Poorly defined	H	1.3	2.8	0.2	0.2	0.2	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout	90% terrestrial grasses 10% Broad-leaved Cattail	Frozen	Frozen	Frozen	None visible	Minimal leaf litter, feature is frozen	None observed	None observed	Y	Intermittent	None	Aquatic vegetation observed downstream suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions, no channel upstream
		Whissell Creek Municipal Drain	WB-035	484350	5004991	06/Dec/16 and 31/Jan/17	12	0	10	-1	None	Straight	Poorly defined	M	2.0	2.5	Unknown	Unknown	0.6	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses and cattails throughout	50% terrestrial grasses and 50% Narrow-leaved Cattail	2	Frozen	Frozen	None visible	Minimal leaf litter	None observed	None observed	Y	Intermittent	1.0m CSP	Presence of Narrow-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions. North of the road water was heard running under the snowpack, a small tile drain/pipe (0.2m) was observed on the north side of the feature
		Whissell Creek Municipal Drain	WB-036	484446	5005497	06/Dec/16	12	0	10	-1	None	Straight	Defined	H	Snow covered	2.1	Unknown	Unknown	0.8	Silt	Terrestrial grasses within deciduous tree hedgerow, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout	90% terrestrial grasses 10% Broad-leaved Cattail	Snow covered	Snow covered	Snow covered	None visible	Leaf litter present on streambed	None observed	None observed	Y	Intermittent	None	Presence of Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
Middle South Nation River	Whissell Creek	Whissell Creek Municipal Drain	WB-037	485649	5006265	07/Dec/16	4	2	100	-2	None	Straight	Defined	H	5.5	7.1	0.5	0.3	0.8	Silt	Terrestrial grasses, deciduous shrubs	High Slope, Moderate Stability	L	Terrestrial grasses throughout, overhanging vegetation and shrubs	40% Broad-leaved Cattail, 30% terrestrial grasses, and 30% Duckweed sp.	2	L	Green	None visible	None observed	None observed	None observed	Y	Permanent	None	Defined channelized drain with abundant aquatic vegetation, presence of both Broad-leaved Cattail and Duckweed sp. suggests permanence
		Whissell Creek Municipal Drain	WB-038	485459	5006854	07/Dec/16	4	2	100	-2	Light snow	Straight	Defined	H	4.5	6.5	0.5	0.3	0.8	Silt	Terrestrial grasses, overhanging deciduous trees	High Slope, Moderate Stability	L	Terrestrial grasses throughout, overhanging deciduous trees	40% Broad-leaved Cattail, 30% terrestrial grasses, and 30% Duckweed sp.	2	L	Green	None visible	Minimal leaf litter	None observed	None observed	Y	Permanent	None	Defined channelized drain with abundant vegetation, presence of both Broad-leaved Cattail and Duckweed sp. suggests permanence
		Whissell Creek Municipal Drain	WB-039	485339	5007064	06/Dec/16	12	0	10	-3	None	Straight	Defined	H	4.8	5.5	0.5	0.4	0.8	Silt	Terrestrial grasses, deciduous trees and shrubs, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses and cattails throughout, overhanging deciduous trees and shrubs	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Green	None visible	Minimal leaf litter	None observed	Encrusting algae throughout	Y	Permanent	2.5m CSP	Defined channelized drain with algae and terrestrial grasses present, upstream channel is permanent, and lack of vegetation on stream bed suggests permanence
		Donald Shane Municipal Drain	WB-040	485204	5005434	07/Dec/16	4	2	100	-2	Light snow	Straight	Poorly defined	H	2.8	3.5	0.2	0.2	0.6	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	1	L	Brown	None visible	None observed	None observed	Filamentous algae throughout	Y	Intermittent	1.5m CSP	Channelized drain with abundant aquatic vegetation suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Trib 2 of Whissell Creek Municipal Drain	WB-041	485610	5005646	07/Dec/16	4	2	100	-2	None	Straight	Poorly defined	H	1.5	2.8	0.2	0.2	0.5	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses throughout	90% terrestrial grasses 10% Broad-leaved Cattail	1	L	Brown	None visible	None observed	None observed	None observed	Y	Intermittent	1.0m CSP	Channelized drain with some Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Farley Branch of Whissell Creek Municipal Drain	WB-042	485086	5007091	06/Dec/16 and 31/Jan/17	12	0	10	-3	None	Straight	Poorly defined	H	1.5	3.5	Unknown	Unknown	0.5	Silt	Terrestrial grasses and cattails, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses and cattails throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	1	Snow covered	Snow covered	None visible	None observed	None observed	None observed	Y	Intermittent	None	Snow covered dry roadside drainage ditch presence of aquatic vegetation suggests a degree of permanence, terrestrial grasses on stream bed suggest periods of dry conditions
		Trib 1 of Whissell Creek	WB-043	483899	5006478	06/Dec/16	12	0	10	-3	None	Straight	Poorly defined	H	Dry	1.0	Dry	Dry	0.6	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Low Stability	L	Terrestrial grasses and cattails throughout, overhanging deciduous trees	50% terrestrial grasses and 50% Broad-leaved Cattail	Dry	Dry	Dry	None visible	Minimal leaf litter	None observed	None observed	Y	Intermittent	None	Snow covered dry roadside drainage ditch, presence of aquatic vegetation suggests a degree of permanence
		Pond A	WB-044	483961	5006334	06/Dec/16	12	0	0	-5	None	N/A	N/A	H	4 x 8	Snow covered	Unknown	Unknown under snowpack	Unknown	Unknown	Terrestrial grasses, snow pack obscures bank vegetation	Low Slope, High Stability	L	Terrestrial grasses and cattails throughout, some overhanging deciduous trees	50% terrestrial grasses and 50% Broad-leaved Cattail	Frozen	Frozen	Frozen	None visible	None observed	None observed	None observed	Y	Intermittent	None	Natural unconnected pond, poor bank definition no connection to other watercourses
		Trib 1 of Whissell Creek Municipal Drain	WB-109	485366	5006967	07/Dec/16	4	2	100	-2	Light rain	Straight	Defined	H	2.1	4.5	0.2	0.2	0.7	Silt	Terrestrial grasses, snow pack obscures bank vegetation	High Slope, Moderate Stability	L	Terrestrial grasses throughout	50% terrestrial grasses and 50% Broad-leaved Cattail	2	L	Green	None visible	Terrestrial grasses and leaf litter throughout	None observed	None observed	Y	Intermittent	None	Channelized drain with abundant Broad-leaved Cattail suggests a degree of permanence, terrestrial grasses on stream bed suggests periods of dry conditions
		Whissell Creek Municipal Drain	WB-118	483954	5005754	31/Jan/17	3	0	0	-20	None	Straight	Defined	L	1.3	2.5	0.3	0.2	0.6	Silt	Terrestrial grasses and forbs within deciduous woodlot	High Slope, Low Stability	L	Terrestrial grasses, woody debris and pools	100% Terrestrial grasses	4	L	Brown	None visible	Abundant leaf litter	None observed	Filamentous and encrusting algae throughout	Y	Permanent	0.2m CPP	Filamentous and encrusting algae throughout, abundant leaf litter layer, water was flowing from a tile drain outlet at the upstream extent

Appendix II
Site Investigation Photographs

MIDDLE SOUTH NATION RIVER WATERSHED

Duff Creek Drainage Area

Drainage Feature	Water Body Point	Description	Photographs
Duff Creek	WB-101	Downstream, Looking North-West	
		Upstream, Looking South-East	
McIntyre Lagrove Municipal Drain	WB-098	Downstream, Looking North West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
McIntyre Lagrove Municipal Drain	WB-099	Downstream, Looking North-West	
		Upstream, Looking South-East	
	WB-100	Downstream, Looking North	
		Upstream, Looking South	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 1 of McIntyre Lagrove Municipal Drain	NWB-035	Downstream, Looking North-West	
		Upstream, Looking South-West	
	WB-097	Downstream, Looking South-West	
		Upstream, Looking South-East	
Pond F	NWB-036	No Photographs Available	

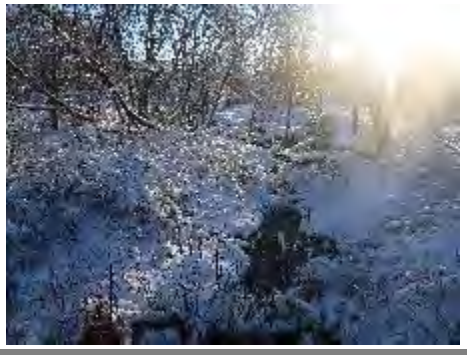
MIDDLE SOUTH NATION RIVER WATERSHED

Moffatt Creek Drainage Area

Drainage Feature	Water Body Point	Description	Photographs
McConnell Steven Municipal Drain	WB-003	Downstream, Looking North-West	
		Upstream, Looking South-East	
McConnell Steven Municipal Drain	WB-005	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
McConnell Steven Municipal Drain	WB-006	Downstream, Looking South-West	
		Upstream, Looking South-East	
	NWB-043	Downstream, Looking South-West	
		Upstream, Looking North-East	

Drainage Feature	Water Body Point	Description	Photographs
McConnell Steven Municipal Drain	WB-114	Downstream, Looking North-West	
		Upstream, Looking South-East	
Paquette McMahon Municipal Drain	WB-007	Downstream, Looking North	
		Upstream, Looking South	

Drainage Feature	Water Body Point	Description	Photographs
Paquette McMahon Municipal Drain	WB-008	Downstream, Looking North-East	
		Upstream, Looking South-West	
	WB-009	Downstream, Looking North-East	
		Upstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Paquette McMahon Municipal Drain	WB-010	Downstream, Looking North-East	
		Upstream, Looking North-West	
Tributary 1 of Paquette McMahon Municipal Drain	NWB-001	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 2 of Paquette McMahon Municipal Drain	NWB-002	Downstream, Looking South-East	
		Upstream, Looking North-West	
Tributary 3 of Paquette McMahon Municipal Drain	WB-011	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Stephenson Municipal Drain	WB-119	Downstream, Looking North	
		Upstream, Looking South	

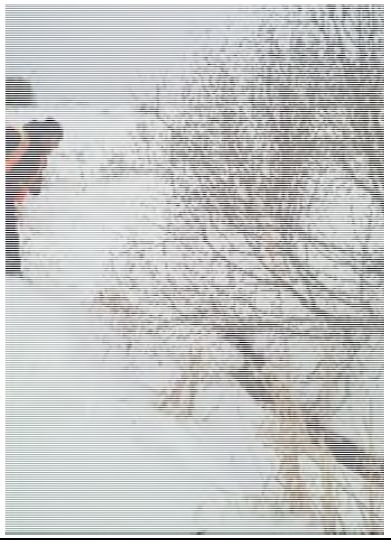
MIDDLE SOUTH NATION RIVER WATERSHED

Payne River Drainage Area

Drainage Feature	Water Body Point	Description	Photographs
Alex Rutley Municipal Drain	WB-096	Downstream, Looking North-West	
		Upstream, Looking South-East	
	WB-113	Downstream, Looking North-West	
		Upstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Alex Rutley Municipal Drain	WB-122	Downstream, Looking North-West	
		Upstream, Looking South-West	
Don Smirl Municipal Drain	WB-106	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 2 of McIntyre Lagrove Municipal Drain	NWB-034	Downstream, Looking North-East	
		Upstream, Looking South-West	
Payne River	WB-095	Downstream, Looking North	
		Upstream, Looking South	

Drainage Feature	Water Body Point	Description	Photographs
Pond D	NWB-033	Looking North	
Stark and Branches Municipal Drain	WB-117	Downstream, Looking West	
		Upstream, Looking East	
Watson Ouderkirk Municipal Drain	NWB-057	No Photographs Available	

MIDDLE SOUTH NATION RIVER WATERSHED

South Nation River Drainage Area

Drainage Feature	Water Body Point	Description	Photographs
Bachler Municipal Drain	NWB-044	No Photographs Available	
Bazinet Municipal Drain	WB-121	Downstream, Looking South-West	
		Upstream, Looking North-East	
Bayers Municipal Drain	WB-014	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Foley Municipal Drain	WB-057	Downstream, Looking North-West	
		Upstream, Looking South-East	
	WB-058	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Foley Municipal Drain	WB-059	Downstream, Looking North	
		Upstream, Looking South	
	WB-060	Downstream, Looking West	
		Upstream, Looking East	

Drainage Feature	Water Body Point	Description	Photographs
Foley Municipal Drain	WB-061	Downstream, Looking North-West	
		Upstream, Looking North-East	
	WB-066	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Foley Municipal Drain	WB-067	Downstream, Looking North-West	
		Upstream, Looking South-East	
	WB-068	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Foley Municipal Drain	WB-069	Downstream, Looking North-West	
		Upstream, Looking South-East	
Tributary 1 of Foley Municipal Drain	WB-062	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 1 of Foley Municipal Drain	WB-063	Downstream, Looking North-West	
		Upstream, Looking South-East	
Tributary 2 of Foley Municipal Drain	NWB-066	No Photographs Available	
	WB-070	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 3 of Foley Municipal Drain	WB-108	Downstream, Looking North-West	
		Upstream, Looking South-East	
Tributary 4 of Foley Municipal Drain	NWB-018	No Photographs Available	
Tributary 5 of Foley Municipal Drain	NWB-054	No Photographs Available	
Fourges Municipal Drain	NWB-047	No Photographs Available	
Tributary 1 of Fourges Municipal Drain	NWB-073	No Photographs Available	
Furney Municipal Drain	NWB-004	Downstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Furney Municipal Drain	NWB-004	Upstream, Looking North-West	
Genier Municipal Drain	WB-016	Downstream, Looking South-East	
		Upstream, Looking North	
	WB-017	Downstream, Looking South-west	

Drainage Feature	Water Body Point	Description	Photographs
Genier Municipal Drain	WB-017	Upstream, Looking North-West	
	WB-018	Downstream, Looking South-East	
		Upstream, Looking North-East	
Genier Extension Municipal Drain	WB-019	Downstream, Looking North-West	

Drainage Feature	Water Body Point	Description	Photographs
Genier Extension Municipal Drain	WB-019	Upstream, Looking South-East	
Tributary 1 of Genier Extension Municipal Drain	NWB-072	No Photographs Available	
Geo. S. Johnston Municipal Drain	WB-045	Downstream, Looking North-East	
		Upstream, Looking South-West	
	WB-046	Downstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Geo. S. Johnston Municipal Drain	WB-046	Upstream, Looking North-West	
	NWB-067	No Photographs Available	
Tributary 1 of Geo. S. Johnston Municipal Drain	WB-131	No Photographs Available	
Grady Municipal Drain	WB-128	Downstream, Looking North-East	
		Upstream, Looking North-West	
	WB-129	Downstream, Looking North-East	

Drainage Feature	Water Body Point	Description	Photographs
Grady Municipal Drain	WB-129	Upstream, Looking South-West	
Tributary 1 of Grady Municipal Drain	NWB-058	No Photographs Available	
Tributary 2 of Grady Municipal Drain	NWB-059	No Photographs Available	
Tributary 3 of Grady Municipal Drain	WB-127	Upstream, Looking North-West	
Tributary 4 of Grady Municipal Drain	WB-126	Downstream, Looking South-East	
		Upstream, Looking North-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 4 of Grady Municipal Drain	NWB-068	Upstream, Looking South-East	
J.P. Grady Municipal Drain	WB-050	Downstream, Looking South-East	
		Upstream, Looking North-West	
	WB-051	Downstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
J.P. Grady Municipal Drain	WB-051	Upstream, Looking North-West	
	NWB-063	No Photographs Available	
Tributary 1 of J.P. Grady Municipal Drain	NWB-012	Downstream, Looking South-West	
		Upstream, Looking North-East	
Johnstone Municipal Drain	WB-030	Downstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Johnstone Municipal Drain	WB-030	Upstream, Looking North-East	
	WB-031	Downstream, Looking South-West	
		Upstream, Looking North-East	
Tributary 3 of Johnston Municipal Drain	NWB-005	No Photographs Available	
Tributary 4 of Johnston Municipal Drain	NWB-006	No Photographs Available	
Tributary 5 of Johnston Municipal Drain	WB-032	Downstream, Looking North-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 5 of Johnston Municipal Drain	WB-032	Upstream, Looking South-West	
	WB-033	Downstream, Looking North-East	
		Upstream, Looking South-West	
Tributary 6 of Johnstone Municipal Drain	NWB-007	Downstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 6 of Johnstone Municipal Drain	NWB-007	Upstream, Looking North-West	
	NWB-008	Downstream, Looking South-East	
		Upstream, Looking North-West	
Lafleche Municipal Drain	NWB-048	Downstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Lafleche Municipal Drain	NWB-048	Upstream, Looking North-West	
Landy Municipal Drain	WB-047	Downstream, Looking South-East	
		Upstream, Looking North-West	
	WB-048	Downstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Landy Municipal Drain	WB-048	Upstream, Looking North-East	
	NWB-050	No Photographs Available	
Moriarity Municipal Drain	WB-064	Downstream, Looking South-East	
		Upstream, Looking North-West	
	WB-065	Downstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Moriarity Municipal Drain	WB-065	Upstream, Looking North-East	
Tributary 1 of Moriarity Municipal Drain	NWB-017	Downstream, Looking North-West	
		Upstream, Looking South-East	
Pond G	NWB-015	No Photographs Available	
Pond I	NWB-062	Looking North-East	

Drainage Feature	Water Body Point	Description	Photographs
R. Stevens Municipal Drain	WB-015	Downstream, Looking South-East	
		Upstream, Looking North-West	
Tributary 1 of R. Stevens Municipal Drain	WB-110	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 1 of R. Stevens Municipal Drain	WB-111	Downstream, Looking North-West	
		Upstream, Looking South-East	
	NWB-037	Looking East	
		Looking North-East	
Tributary 2 of R. Stevens Municipal Drain	NWB-045	No Photographs Available	
Tributary 4 of R. Stevens Municipal Drain	WB-130	No Photographs Available	
Seepage Area 1	WB-115	No Photographs	

Drainage Feature	Water Body Point	Description	Photographs
		Available	
Smirle McConnell Municipal Drain	WB-023	Downstream, Looking North-West	
		Upstream, Looking South-East	
Tributary 1 of Smirle McConnel Municipal Drain	WB-021	Downstream, Looking South-East	
		Upstream, Looking North-West	

Drainage Feature	Water Body Point	Description	Photographs
South Nation River	WB-029	Downstream, Looking North-West	
		Upstream, Looking South-East	
	WB-052	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
South Nation River	WB-112	Downstream, Looking North-West	
		Upstream, Looking South-East	
Tributary 1 of South Nation River	NWB-014	No Photographs available	
Tributary 2 of South Nation River	NWB-013	No Photographs available	
Tributary 3 of South Nation River	WB-049	Downstream, Looking South-East	
		Upstream, Looking North-West	
Tributary 1 of	NWB-060	No Photographs	

Drainage Feature	Water Body Point	Description	Photographs
MacCadden Municipal Drain		Available	
Tributary 2 of MacCadden Municipal Drain	NWB-061	No Photographs Available	
Tributary 1 of Stephenson Municipal Drain	NWB-065	No Photographs Available	
Unnamed Tributary of South Nation River	WB-123	Downstream, Looking North-West	
		Upstream, Looking South-East	
Watson Ouderkirk Municipal Drain	WB-056	Downstream, Looking North-East	

Drainage Feature	Water Body Point	Description	Photographs
Watson Ouderkirk Municipal Drain	WB-056	Upstream, Looking South-West	
	WB-053	Downstream, Looking South-West	
		Upstream, Looking North-East	
	WB-055	Downstream, Looking North-West	

Drainage Feature	Water Body Point	Description	Photographs
Watson Ouderkirk Municipal Drain	WB-055	Upstream, Looking South-East	
Whetters Snaders Branch of Foley Municipal Drain	NWB-053	No Photographs available	

MIDDLE SOUTH NATION RIVER WATERSHED

Unnamed Creek A Drainage Area

Drainage Feature	Water Body Point	Description	Photographs
Branch of Dirven Municipal Drain	WB-105	Downstream, Looking North-West	
		Upstream, Looking South-East	
Campbell Municipal Drain	WB-076	Downstream, Looking West	
		Upstream, Looking East	
Denis McMahon Municipal Drain	NWB-055	No Photographs Available	
Dirven Municipal Drain	NWB-052	No Photographs Available	

Drainage Feature	Water Body Point	Description	Photographs
Duff Sanders Municipal Drain	NWB-026	Downstream, Looking North-West	
		Upstream, Looking South-East	
	NWB-027	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Dunbar Campbell Adams Municipal Drain	WB-072	Downstream, Looking North-West	
		Upstream, Looking South-East	
	WB-073	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Dunbar Campbell Adams Municipal Drain	WB-074	Downstream, Looking North-East	
		Upstream, Looking South-West	
	WB-081	Downstream, Looking North-East	
		Upstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 2 of Dunbar Campbell Adams Municipal Drain	WB-071	Downstream, Looking North-East	
		Upstream, Looking South-West	
Tributary 3 of Dunbar Campbell Adams Municipal Drain	NWB-039	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 3 of Dunbar Campbell Adams Municipal Drain	WB-116	Downstream, Looking North-West	
		Upstream, Looking South-East	
Fetterly Municipal Drain	WB-083	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Fetterly Municipal Drain	WB-085	Downstream, Looking South-West	
		Upstream, Looking North-East	
	WB-086	Downstream, Looking South-West	
		Upstream, Looking North-East	

Drainage Feature	Water Body Point	Description	Photographs
Fetterly Municipal Drain	WB-087	Downstream, Looking North-West	
		Upstream, Looking South-East	
Tributary 1 of Fetterly Municipal Drain	NWB-019	No Photographs Available	
Gilles Municipal Drain	WB-104	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Gilles Municipal Drain	WB-102	Downstream, Looking North-West	
		Upstream, Looking South-East	
	WB-103	Downstream, Looking South-West	
		Upstream, Looking North-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 1 of Gilles Municipal Drain	NWB-042	Downstream, Looking South-West	
		Upstream, Looking South-East	
Tributary 2 of Gilles Municipal Drain	NWB-041	Downstream, Looking South-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
J. Boggart Municipal Drain	WB-094	Downstream, Looking North-West	
		Upstream, Looking South-East	
	WB-093	Downstream, Looking South-West	
		Upstream, Looking North-East	
Pond C	WB-089	No Photographs Available	
Pond J	NWB-064	No Photographs Available	
Pond K	NWB-069	No Photographs Available	

Drainage Feature	Water Body Point	Description	Photographs
Pond L	NWB-074	No Photographs Available	
Pond M	NWB-076	No Photographs Available	
Ray McLeod Municipal Drain	WB-090	Downstream, Looking South-East	
		Upstream, Looking South-West	
	WB-091	Downstream, Looking North-East	
		Upstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Ray McLeod Municipal Drain	WB-092	Downstream, Looking North-East	
		Upstream, Looking South-East	
	WB-125	Downstream, Looking North-East	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 1 of Ray McLeod Municipal Drain	NWB-028	Downstream, Looking South-West	
		Upstream, Looking North-East	
Tributary 2 of Ray McLeod Municipal Drain	NWB-051	No Photographs Available	
Tributary 3 of Ray McLeod Municipal Drain	NWB-075	No Photographs Available	
Unnamed Creek A	WB-077	Downstream, Looking North-East	
		Upstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Unnamed Creek A	WB-079	Downstream, Looking West	
		Upstream, Looking East	
	WB-080	Downstream, Looking North-West	
		Upstream, Looking South-East	

Drainage Feature	Water Body Point	Description	Photographs
Unnamed Creek A	WB-107	Downstream, Looking North-West	
		Upstream, Looking South-East	
Tributary 1 of Unnamed Creek A	NWB-030	Downstream, Looking North-East	
		Upstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 1 of Unnamed Creek A	NWB-031	Downstream, Looking North-West	
		Upstream, Looking South-East	
	NWB-056	Downstream, Looking North-East	
		Upstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 2 of Unnamed Creek	WB-124	Downstream, Looking South	
		Upstream, Looking North-West	
Tributary 3 of Unnamed Creek	NWB-029	No Photographs Available	

MIDDLE SOUTH NATION RIVER WATERSHED

Whissell Creek Drainage Area

Drainage Feature	Water Body Point	Description	Photographs
Donald Shane Municipal Drain	WB-040	Downstream, Looking North-West	
		Upstream, Looking South-East	
Farley Branch of Whissell Creek Municipal Drain	WB-042	Downstream, Looking North-East	
		Upstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Parent Municipal Drain	WB-012	Downstream, Looking North-West	
		Upstream, Looking South-East	
Tributary 2 of Parent Municipal Drain	NWB-070	No Photographs Available	
Tributary 3 of Parent Municipal Drain	NWB-071	Upstream, Looking East	
Pond A	WB-044	Looking South	

Drainage Feature	Water Body Point	Description	Photographs
Pond A	WB-044	Looking South-East	
Pond E	NWB-011	No Photographs Available	
Whistle Creek	WB-013	Downstream, Looking North-East	
		Upstream, Looking South-West	
Tributary 1 of Whissell Creek	WB-043	Downstream, Looking North-East	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 1 of Whissell Creek	WB-043	Upstream, Looking South-West	
Tributary 2 of Whissell Creek	NWB-003	Downstream, Looking North-West	
		Upstream, Looking South-East	
Whissell Creek Municipal Drain	WB-035	Downstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Whissell Creek Municipal Drain	WB-035	Upstream, Looking North-East	
	WB-036	Downstream, Looking North-East	
		Upstream, Looking South-East	
	WB-037	Downstream, Looking North	

Drainage Feature	Water Body Point	Description	Photographs
Whissell Creek Municipal Drain	WB-037	Upstream, Looking South	
	WB-038	Downstream, Looking North-West	
		Upstream, Looking South-East	
	WB-039	Downstream, Looking North-West	

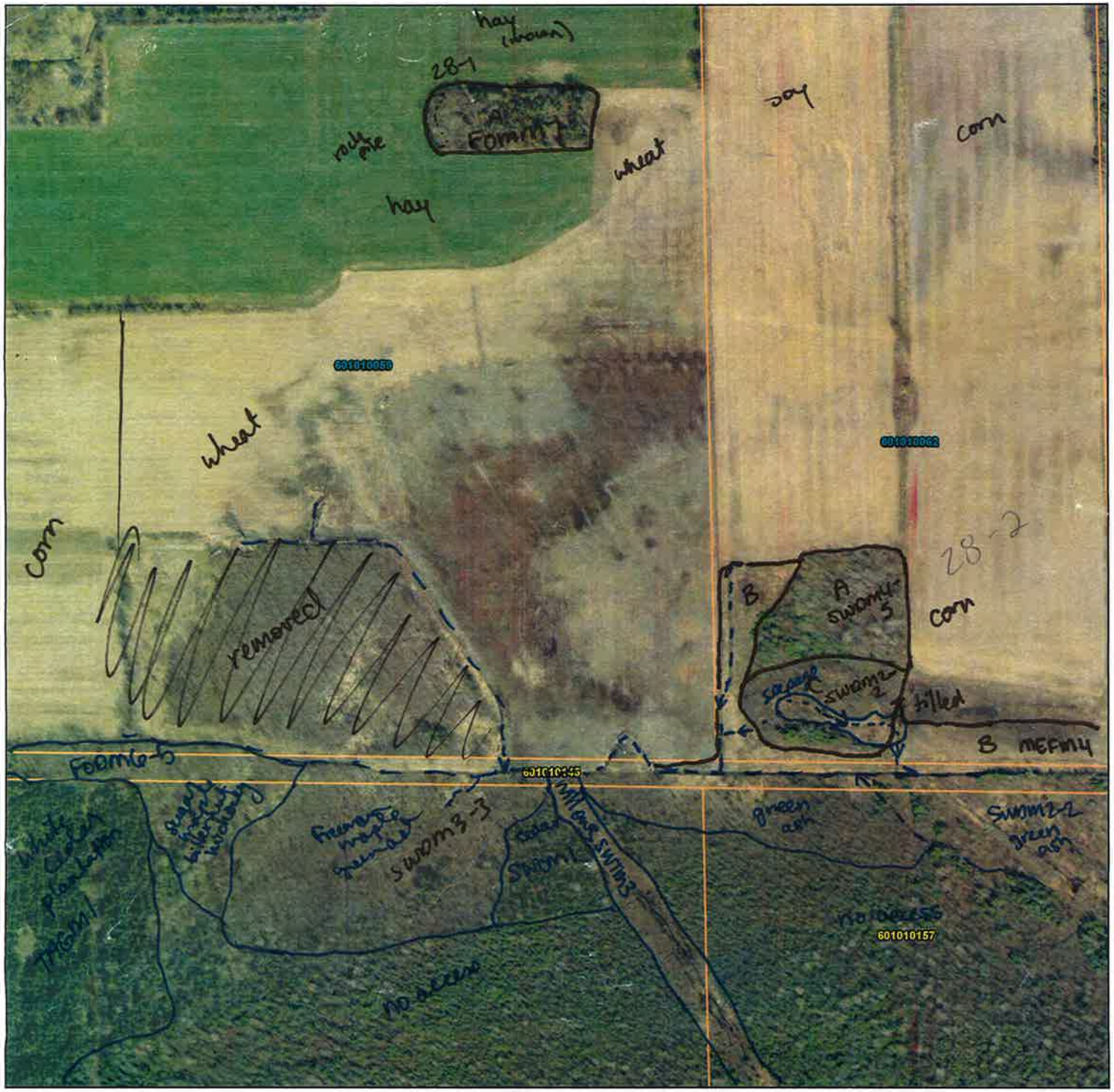
Drainage Feature	Water Body Point	Description	Photographs
Whissell Creek Municipal Drain	WB-039	Upstream, Looking South-East	
	WB-118	Downstream, Looking South-West	
		Upstream, Looking North-East	
	NWB-046	No Photographs Available	
Tributary 1 of Whissell Creek Municipal Drain	WB-034	Downstream, Looking South-West	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 1 of Whissell Creek Municipal Drain	WB-034	Upstream, Looking North-East	
	WB-109	Downstream, Looking North-East	
		Upstream, Looking South-West	
Tributary 2 of Whissell Creek Municipal Drain	WB-041	Downstream, Looking North-West	

Drainage Feature	Water Body Point	Description	Photographs
Tributary 2 of Whissell Creek Municipal Drain	WB-041	Upstream, Looking South-East	
Tributary 3 of Whissell Creek Municipal Drain	NWB-038	Downstream, Looking North-West	
		Upstream, Looking South-East	

Appendix III
Site Investigation Field Notes

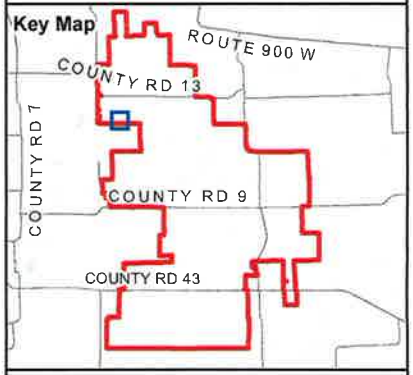
Christy Humphrey, Carlene Perkin
June 6 2016



Nation Rise Wind Project

Natural Features Field Map

Area 28 + 29



Legend

- Land Parcel
- Parcel with Access
- Parcel without Access

(air photo interpret →)

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1756 Date: May 13, 2016	NAD83 - UTM Zone 18 Size: 8.5 x 11" 1:4,000

0 50 100 150 Meters

NATURAL RESOURCE SOLUTIONS INC

Modified ELC Community Description

Page __ of __

WOD - 017

Site: Nation Rise	1756
Polygon: Area 28-3 A	6010106 2
UTM:	
Date: June 6 2016	**Time:** 12:00-12:49, 13:25-14:50
Surveyor(s): Christy Humphrey, Carlene Perkin	
Weather: 13°C, Wind 4, CC 100%	

Community Classification

Vegetation Type:	SWDM4-5 Poplar Mineral Deciduous Swamp Type
[x] Inclusion:	SWCM1-1 White Cedar Mineral Coniferous Swamp
[ ] Complex:	

Polygon Description

System
- [ ] Terrestrial
- [x] Wetland
- [ ] Aquatic

History
- [x] Natural
- [ ] Cultural

Cover
- [ ] Open
- [ ] Shrub
- [x] Treed

Substrate
- [ ] Organic
- [x] Mineral Soil
- [ ] Parent Min
- [ ] Acidic Bedrock
- [ ] Basic Bedrock
- [ ] Carb. Bedrock

Site
- [ ] Open Water
- [ ] Shallow Water
- [x] Surficial Dep
- [ ] Bedrock

Topo Feature
- [ ] Lacustrine
- [ ] Riverine
- [ ] Bottomland
- [ ] Terrace
- [ ] Valley Slope
- [x] Tableland
- [ ] Roll. Upland
- [ ] Cliff
- [ ] Talus
- [ ] Crevice/Cave
- [ ] Alvar
- [ ] Rockland
- [ ] Beach/Bar
- [ ] Sand Dune
- [ ] Bluff

Plant Form
- [ ] Plankton
- [ ] Submerged
- [ ] Floating-Lvd
- [ ] Graminoid
- [ ] Forb
- [ ] Lichen
- [ ] Bryophyte
- [x] Deciduous
- [ ] Coniferous
- [ ] Mixed

Community
- [ ] Lake
- [ ] Pond
- [ ] River
- [ ] Stream
- [ ] Marsh
- [x] Swamp
- [ ] Fen
- [ ] Bog
- [ ] Barren
- [ ] Meadow
- [ ] Prairie
- [ ] Thicket
- [ ] Savannah
- [ ] Woodland
- [ ] Forest
- [ ] Plantation

Stand Description

Layer	HT	Cover	Species
• Super-canopy	1	0	—
1 Canopy	2	4	Trembling Aspen >> White Elm > Green Ash > White Birch
2 Sub-canopy	3	3	Common Buckthorn > White Elm > Green Ash > Hawthorn sp.
3 Understorey	4/5	2	Common Buckthorn > Green Ash > Trembling Aspen > Choke Cherry
4 Groundcover	6/7	4	Common Buckthorn > Dandelion > Toxicodendron radicans > Virginia Creeper

HT Codes: 1: >25m 2: 25 - 10m 3: 10 - 2m 4: 2 - 1m 5: 1 - 0.5m 6: 0.5 - 0.2m 7: <0.2m

Cover Codes: 0:none 1: 0 - 10% 2: 10 - 25 3: 25 - 60% 4: >60%

Size Class Analysis	O	< 10	O	10 - 24	O	25 - 50	N	> 50
Snags	O	< 10	O	10 - 24	R	25 - 50	N	> 50
Deadfall/Logs	O	< 10	O	10 - 24	R	25 - 50	N	> 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	[ ] Pioneer	[x] Young	[x] Mid-age	[ ] Mature	[ ] Old Growth

NATURAL RESOURCE SOLUTIONS INC

Modified ELC Community Description

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PLANT SPECIES LIST

Site:	
Polygon:	
UTM:	
Date:	**Time:**
Surveyor(s):	
Weather:	

Layers: 1=canopy (>10) 2=sub-canopy (2-10) 3=understorey (0.5-2) 4=ground layer (0.5)

Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer 1	Layer 2	Layer 3	Layer 4	Sample
Balsam Poplar		R			
E. Cottonwood			R		
Green Ash	O				
Red Pine		O			
White Birch	O				
Trembling Aspen	A		O		
White Cedar		R		O	
White Elm	O	O			
White Spruce			O	R	
Basswood				O	
Red Maple		R			
Staghorn Sumac		R			
Amelanchier sp.		R			
Speckled Alder		R			
Nannyberry			R		
Hawthorn sp.		O	O		
Riverbank Grape				O	
Prickly Gooseberry				O	
Choke Cherry			O		
Swamp Raspberry				O	
Common Buckthorn		A	O	A	
Red Osier				R	
Virginia Creeper				O	

Common Apple R

Species	Layer 1	Layer 2	Layer 3	Layer 4	Sample
Dandelion				O	
Toxicodendron radicans				O	
Galium triflorum				O	
Baneberry sp.				O	
Woodland Agrimony				R	
Arctium sp.				R	
Carex arctata			O		
Lonicera tatarica			O		
Wild Sarsaparilla (Snakeroot)				O	
Fragaria virginiana				O	
Symphyotrichum lateriflorum				R	
Daisy Fleabane				O	
Ox-eye Daisy				R	
Virgin's Bower				O	
Valeriana officinalis				O	
Poa pratensis				R	
Wild Parsnip				R	
Galium mollugo				O	
Spreading Dogbane				O	
Alsike Clover				O	
Smooth Rose			R		
Carex intumescens				R	
N. Prickly-Ash			R		

Alder-leaved Buckthorn O

Wildlife and Other Notes

A upslope grade Slope difference ~2m h, +5.15

Sanicula odorata

NATURAL RESOURCE SOLUTIONS INC

Modified ELC Community Description

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WOD-017

Site: Nahan Rise WP	1756
Polygon: Area 28-2 C	60101062
UTM:	
Date: June 6, 2016	Time: 1300 - 13:25
Surveyor(s): Christy Humphrey, Carlene Perkin	
Weather: 18°C, Wind 4, CC 30 - 100%, No precip	

Community Classification

Vegetation Type:	SWDM2-2 Green Ash Mineral Deciduous Swamp Type
Inclusion:	
Complex:	

Polygon Description

System	Substrate	Topo Feature		Community	
Terrestrial	Organic	Lacustrine	Talus	Lake	Barren
[X] Wetland	[X] Mineral Soil	Riverine	Crevice/Cave	Pond	Meadow
Aquatic	Parent Min	[X] Bottomland	Alvar	River	Prairie
	Acidic Bedrock	Terrace	Rockland	Stream	Thicket
History	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah
[X] Natural	Carb. Bedrock	Tableland	Sand Dune	[X] Swamp	Woodland
Cultural		Roll. Upland	Bluff	Fen	Forest
	Site	Cliff		Bog	Plantation

Cover	Site	Plant Form		
Open	Open Water	Plankton	Forb	Coniferous
Shrub	Shallow Water	Submerged	Lichen	Mixed
[X] Treed	[X] Surficial Dep	Floating-Lvd	Bryophyte	
	Bedrock	Graminoid	[X] Deciduous	

Stand Description

Layer	HT	Cover	Species
• Super-canopy	1	0	—
1 Canopy	2	3	Green Ash > White Elm
2 Sub-canopy	3	4	Speckled Alder > Green Ash > White Birch > Black Ash
3 Understorey	3/4	1	Goldenrod Sp. > Lakebank Sedge > Common Buckthorn > Tartarian Honeysuckle
4 Groundcover	6/7	3	Spotted Jewelweed > Leersia oryzoides > Fragaria vesca > Purple-stem Aster

HT Codes: 1: >25m 2: 25 - 10m 3: 10 - 2m 4: 2 - 1m 5: 1 - 0.5m 6: 0.5 - 0.2m 7: <0.2m

Cover Codes: 0:none 1: 0 - 10% 2: 10 - 25 3: 25 - 60% 4: >60%

Size Class Analysis	O	< 10	O	10 - 24	R	25 - 50	N	> 50
Snags	O	< 10	O	10 - 24	N	25 - 50	N	> 50
Deadfall/Logs	R	< 10	O	10 - 24	N	25 - 50	N	> 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age		Pioneer	[X]	Young	[X]	Mid-age		Mature		Old Growth

NATURAL RESOURCE SOLUTIONS INC

Modified ELC Community Description

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PLANT SPECIES LIST

Site:	
Polygon:	
UTM:	
Date:	Time:
Surveyor(s):	
Weather:	

Layers: 1=canopy (>10) 2=sub-canopy (2-10) 3=understorey (0.5-2) 4=ground layer (<0.5)

Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer 1	Layer 2	Layer 3	Layer 4	Sample	Species	Layer 1	Layer 2	Layer 3	Layer 4	Sample
Green Ash	6	O	O			Ranunculus [illegible]				O	
Black Ash		O				Purple-stemmed Aster				O	
White Birch		R				Spotted Jewelweed				A	
White Cedar		R				Carex sp. (Lurid, Lakebank)					
White Elm	Q	O				Leersia oryzoides				O	
						Carex stipata			R		
						Fragaria vesca				O	
						Urtica dioica				O	
						Reed Canary			R		
						Galium trifolium				O	
						Solidago sp.			O		
						Virgin's Bower				O	
						Sensitive Fern				O	
						[illegible]				O	
Common Buckthorn		O	O			Carex [illegible]				O	
Bittersweet Nightshade				O		Spotted Joe-Pye Weed			R		
Salix petiolaris			R			Boneset				O	
Red Raspberry				O		Lycopus americanus				O	
Willow sp.		R									
Speckled Alder		O									
Tartarian Honeysuckle			O								
Virginia Creeper				O							
Meadowsweet			O								

Wildlife and Other Notes

[illegible] Seepage area [illegible]

Nation Rise Wind Project
Water Body Report

Prepared for:
DNV-GL - Energy
4100 Rue Molson, Suite 100
Montréal, QC
H1Y 3N1

Project No. 1756C l August 2017

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Nation Rise Wind Project
Water Body Report

Project Team:

Staff	Role
Andrew Ryckman	Project Advisor
Christy Humphrey	Project Manager/Biologist
Nyssa Hardie	Stream Corridor and Environmental Analyst

Report submitted on August 2, 2017

Christy Humphrey

Christy Humphrey
Terrestrial & Wetland Biologist

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1.0 Project Description

Natural Resource Solutions Inc. (NRSI) was retained in April 2016 by DNVGL, on behalf of Nation Rise Wind Farm Limited Partnership (the Proponent) to conduct a Water Body Assessment (WBA) and Water Body Report (WBR) in accordance with the Renewable Energy Approval (REA) Regulation, Ontario Regulation (O. Reg.) 359/09. The WBA includes a records review and site investigation, while the WBR, which is provided under a separate cover, includes a complete assessment of impacts to any water bodies which may occur at the proposed wind energy generating facility of up to 33 permitted wind turbines, with a nameplate capacity of approximately 100 megawatts (MW).

The Nation Rise Wind Farm (Nation Rise WF or Project) is being proposed by Nation Rise Wind Farm Limited Partnership, a wholly-owned subsidiary of EDP Renewables Canada Ltd. (EDPR), and is located in the Township of North Stormont, Ontario. The Nation Rise Wind Farm is located in eastern Ontario, within the Township of North Stormont and the United Counties of Stormont, Dundas and Glengarry, Ontario. More specifically, the Project is located in the western portion of North Stormont bounded to the south by the Township of South Stormont and to the west by the boundary of the Township of North Dundas. The north portion of the Project is delimited by the municipality boundaries of Russell and The Nation. Courville Road and MacMillan Road are the east boundaries of the Project.

According to O. Reg. 359/09, as amended, and as per the Technical Guide to Renewable Energy Approvals (MOE 2013), the Project Location is defined as "...*a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project*". As described therein, the Project Location boundary is the outer limit of where site preparation and construction activities will occur (i.e. construction disturbance areas described below) and where permanent infrastructure will be located, including the air space occupied by turbine blades.

Construction disturbance areas surrounding various Project components have been identified; such areas correspond to the outer limits of the "Project Location" boundaries on the maps. These areas denote zones where temporary disturbance during the

construction phase may occur such as temporary Project component laydown and storage areas.

For the purposes of this report, NRSI will refer to the areas within 120m of the Project Location as the 'Project Area'. This includes areas within 120m of proposed wind turbines, measured from blade tip, as well as within 120m of any areas that may be used as temporary lay-down areas, construction staging areas, crane pads, access roads, meteorological towers, substation and electrical collector lines. Junction boxes may also be installed below or above ground where more than one circuit must be connected together.

In accordance with Sections 39 and 40 of the REA Regulation, O. Reg 359/09, NRSI conducted a thorough records review and site investigation to identify and characterize water bodies (lakes, seepage areas, permanent/intermittent watercourses) within 120m, or lake trout lakes within 300m, of the Project Location, the results of which are provided in the *Nation Rise Wind Farm: Water Body Assessment* (NRSI 2017). Based on a review of these results and the proposed Project layout and construction plans, an impact assessment was conducted to identify any potential impacts to water bodies located within the Project Area. The results of the impact assessment are provided in this report.

2.0 REA Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals* under *Part V.0.1 of the Act* (herein referred to as the REA Regulation), made under the *Environmental Protection Act*, identifies the requirements for the development of renewable energy projects in Ontario. In accordance with the REA Regulation, the proposed Project, classified as a Class 4 wind facility, is required to obtain a REA.

Section 39, subsection (1) of the REA Regulation states, in relation to Class 4 wind facilities with no turbines or transformers within 30m of a water body, that "no person shall construct, install or expand a renewable energy generation facility as part of a renewable energy project at a project location that is in any of the following locations":

1. A lake or within 30 meters of the average annual high water mark of a lake.
2. A permanent or intermittent stream or within 30 meters of the average annual high water mark or a permanent or intermittent stream.
3. A seepage area or within 30 meters of a seepage area.

Section 40, subsection (1) of the REA Regulation states, in relation to any proposed facility, that "no person shall construct, install or expand a renewable energy generation facility as part of a renewable energy project at a project location that is in any of the following locations":

1. within 120 meters of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity;
2. within 300 meters of the average annual high water mark of a lake trout lake that is at or above development capacity;
3. within 120 meters of the average annual high water mark of a permanent or intermittent stream; or
4. within 120 meters of a seepage area.

However, Sections 39(1) and 40(1) do not apply if the applicant submits a report that:

1. identifies and assesses any negative environmental effects of the project on a water body referred to in paragraphs 1 to 3 of Section 39 (1) and 1 to 4 of Section 40 (1) (above) and on land within 30 meters of the water body;
2. identifies mitigation measures in respect of any negative environmental effects mentioned in clause (i);
3. describes how the environmental effects monitoring plan addresses any negative environmental effects mentioned in clause (i); and describes how the construction plan report prepared in accordance with Table 1 of the REA Regulation addresses any negative environmental effects mentioned in clause (i).

In accordance with Section 39 and 40 of the REA Regulation, this report has been prepared to identify and assess any negative environmental effects on water bodies located within 30m of the Project Location and on land within 30m of a water body (Section 6). Tables 4 to 6 of this report identify mitigation measures that are recommended to protect the identified water bodies from potential environmental impacts that might arise from the construction and operation of the Project.

Additional information relating to the development of this Project, including detailed descriptions of the construction activities, has been provided in the *Construction Plan Report* (DNV-GL 2017a). This document provides construction details and potential environmental impacts associated with the construction of the Project. Additional information relating to the operation and decommissioning of this Project has been provided in the *Design and Operations Report* (DNV-GL 2017b) and *Decommissioning Plan Report* (DNV-GL 2017c). A summary of the potential environmental effects, proposed mitigation measures, and monitoring programs that will be implemented during the construction and operational phases of the Project is also provided in Table 6-1 of the *Construction Plan Report* (DNV-GL 2017a) and Table 11-1 of the *Design and Operations Report* (DNV-GL 2017b) to satisfy the requirements as outlined in the REA Regulation. The content of this *Water Body Report* has also been used to develop the Environmental Effects Monitoring Plan included in the *Design and Operations Report* (DNV-GL 2017b), which has been completed by DNV-GL under separate cover.

As part of this Project, all aspects relating to provincially Threatened and Endangered species, Species of Conservation Concern, and other aquatic species and their habitats are addressed through a separate permitting process under the *Fisheries Act* (1985), *Endangered Species Act* (2007), and/or *Development, Interference of Wetlands and Alterations to Shorelines and Watercourses* (O.Reg. 170/06) under the *Conservation Authorities Act* (R.S.O. 1990). Therefore, they have not been discussed within the WBA or WBR. These species will be addressed in full detail, including a description and results of field assessments, potential impacts, and recommended mitigation measures, as part of a separate reporting process to be addressed with Fisheries and Oceans Canada (DFO), the Ministry of Natural Resources and Forestry (MNRF), and the South Nation Conservation Authority (SNC), as required.

3.0 Summary of Records Review

In accordance with the REA Regulation, a thorough records review for the proposed Project was completed (NRSI 2017). This records review included requested information from regional, federal and provincial agency staff, and a review of several available online and published resources. The results of this records review have been summarized in Table 1 below. For more detail, refer to the *Nation Rise Wind Farm Water Body Assessment* (NRSI 2017).

Table 1. Summary of Records Review for the Project

Criteria	Associated Potential Water Bodies
i. In a water body	The records review has identified 61 potential water bodies as overlapping the Project Location, within the following drainage areas: • South Nation River (n=29) • Unnamed Creek A (n=16) • Whissell Creek (n=7) • Moffatt Creek (n=3) • Payne River (n=4) • Duff Creek (n=2) These potential overlaps represent proposed crossing locations for access roads, collection lines, and/or construction disturbance areas. All of these potential water bodies may represent permanent or intermittent watercourses, drainage features or ponds.
ii. Within 120m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity	None
iii. Within 300m of the average annual high water mark of a lake trout lake that is at or above development capacity	None

Criteria	Associated Potential Water Bodies
iv. Within 120m of the average annual high water mark of a permanent or intermittent stream	The records review has identified 44 potential water bodies within 120m of, but not overlapping, the Project Location, within the following drainage areas: • South Nation River (n=19) • Unnamed Creek A (n=11) • Whissell Creek (n=7) • Moffatt Creek (n=3) • Payne River (n=2) • Duff Creek (n=2) All of these water bodies represent potential permanent or intermittent watercourses, including drainage features and ponds.
v. Within 120m of a seepage area	None

4.0 Summary of Site Investigation

A comprehensive site investigation was conducted for the Project on several dates in 2016 and 2017 (NRSI 2017). The site investigation included site-specific assessments of potential water bodies throughout the Project Area. The site investigation was focused on confirming the presence, absence and extent of potential water bodies within the Project Area identified during the records review. A total of 104 potential water bodies were assessed as part of the site investigation, 61 of which were confirmed as water bodies based on the O. Reg 359/09 definition of a water body. A confirmed seepage area was also identified within 120m of the Project Location as part of the site investigation. No lakes or lake trout lakes were identified within the Project Area. A summary of the site investigation results is provided in Table 2 below.

Table 2. Modifications to the Records Review Based on Site Investigation Results

Criteria	Result from Records Review	Corrections Based on Site Investigations
i. In a water body	The records review has identified 61 potential water bodies as overlapping the Project Location, within the following drainage areas: • South Nation River (n=29) • Unnamed Creek A (n=16) • Whissell Creek (n=7) • Moffatt Creek (n=3) • Payne River (n=4) • Duff Creek (n=2) These potential overlaps represent proposed crossing locations for access roads, collection lines, and/or construction disturbance areas. All of these potential water bodies may represent permanent or intermittent watercourses, drainage features or ponds.	Site investigations identified 39 confirmed water bodies to be overlapping the Project Location, within each drainage area as follows: • South Nation River (n=18) • Unnamed Creek A (n=9) • Whissell Creek (n=5) • Moffatt Creek (n=2) • Payne River (n=3) • Duff Creek (n=2) All of these water bodies represent permanent or intermittent drainage features. All locations (63 in total) where the water bodies overlap the Project Location represent proposed crossing locations for access roads, collection lines, and/or construction disturbance areas.
ii. Within 120m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity	None	No corrections.

Criteria	Result from Records Review	Corrections Based on Site Investigations
iii. Within 300m of the average annual high water mark of a lake trout lake that is at or above development capacity	None	No corrections.
iv. Within 120m of the average annual high water mark of a permanent or intermittent stream	The records review has identified 44 potential water bodies within 120m of, but not overlapping, the Project Location, within the following drainage areas: • South Nation River (n=19) • Unnamed Creek A (n=11) • Whissell Creek (n=7) • Moffatt Creek (n=3) • Payne River (n=2) • Duff Creek (n=2) All of these water bodies represent potential permanent or intermittent watercourses, drainage features or ponds.	The site investigations identified 22 confirmed water bodies located within 120m of, but not overlapping, the Project Location, within each of the drainage areas, as follows: • South Nation River (n=10) • Unnamed Creek A (n=3) • Whissell Creek (n=5) • Moffatt Creek (n=2) • Payne River (n=1) • Duff Creek (n=1) All of these water bodies represent permanent or intermittent drainage features.
v. Within 120m of a seepage area	None	The site investigations identified one seepage area located within 120m of, but not overlapping, the Project Location within the South Nation drainage area.

The results of this site investigation will be used, in conjunction with the records review, to identify potential impacts associated with the proposed development activities of the Project.

5.0 Description of the Proposed Undertaking

The following sections provide information pertaining to the design, construction, operation, and decommissioning activities associated with the proposed undertaking for the Project. Although relevant information has been summarized in the following section, detailed information for each phase of the Project can be found in the following reports:

- *Nation Rise Wind Farm Construction Plan Report* (DNV-GL 2017a)
- *Nation Rise Wind Farm Design and Operations Report* (DNV-GL 2017b)
- *Nation Rise Wind Farm Decommissioning Plan Report* (DNV-GL 2017c)

The construction phase of the Project will involve the installation of up to 33 of the permitted wind turbine locations, as well as all supporting infrastructure.

The Project will be made up of the following main components:

- Wind turbines;
- Meteorological towers;
- Access roads and crane pads;
- Electrical collector lines, substation and switchyard, which may include a control building; and
- Construction staging and laydown areas (including temporary staging areas).

The details of these construction activities and potential negative effects that may be associated with each activity are outlined in Table 3.

The REA Regulation sets clear guidelines as to where wind development is acceptable. In the case of Class 4 wind facilities, such as the proposed Project, the development of turbines and transformer stations is prohibited in, and within 30m of, all water bodies. The location of project components for the Project is in accordance with the established water body setbacks as set out in the REA Regulation.

The operational phase of the Project will include the operation of up to 33 wind turbines, as well as all associated regular maintenance activities. The potential negative effects of this facility during the operational phase of the Project are summarized in Table 3.

The decommissioning phase of the Project will include the disassembly and removal of the Project infrastructure associated with this Project. The details of this project phase, along with potential negative effects, are provided in Table 3.

6.0 Impact Assessment

6.1 Approach to Impact Assessment

For the purpose of this report, the analysis of potential impacts focuses on water bodies within 30m of the Project Location, as per the REA Regulation, and has been divided into two main categories including water bodies that are overlapped by the Project Location, those that are located >0.1-30m from the Project Location, and those that are 30-120m from the Project Location. The REA Regulation also requires that negative environmental effects be identified and assessed for land within 30m of a water body.

The following sections address negative environmental effects for water bodies within 30m of the Project Location and on land within 30m of water bodies (i.e. the riparian zone). Potential impacts on water bodies related to each Project phase including construction, operation, and decommissioning will be presented and discussed. These impacts are grouped by water body type, as identified by the REA Regulation, Section 30, and include permanent or intermittent watercourses and seepage areas. The Water Body Assessment (NRSI 2017) confirmed that no lakes or lake trout lakes are present within 120m or 300m of the project location, respectively. As a result, they will not be discussed further within this report.

All identified impacts are discussed in this section assuming no mitigation measures are applied, and are therefore treated conservatively with respect to potential impacts on water bodies, in absence of any mitigation measures. Table 5 and Table 6 discuss the detailed mitigation measures to be applied during the construction, operation, and decommissioning phases of the Project that will be implemented to minimize, or avoid altogether, the identified potential impacts. An overview of monitoring requirements is discussed in Section 6.3.

6.2 Project Phase Impacts

Project development, construction, operation, and decommissioning activities, if not mitigated appropriately, have the potential to affect water bodies. These impacts have the potential to affect surface water quality and quantity, and general stream hydrology. These impacts range in degree from temporary disturbance to permanent loss or impairment. Impacts associated with each Project phase are outlined below in Table 3.

6.2.1 Construction

Potential impacts identified for the construction phase (Table 3) of the Project are based on the understanding of Project activities as outlined in Section 5.0, and the details provided in the *Construction Plan Report* (DNV-GL 2017a).

The Project layout dictates which water bodies will be directly impacted based on the orientation of project components (e.g. access roads that cross a water body), and the level of risk associated with the impact based on the proximity of the project component to the water body. The greater the distance a water body is from a Project component, the lower the risk of potential impact to the feature from the proposed construction activities. Table 3 and Table 4 summarize the potential negative effects of the construction activities associated with the Project components that are located in, or within 30m of, water bodies, and on land within 30m of waterbodies. In addition to distance, other factors that determine the level of risk associated with potential impacts to a water body include local topography, the permeability of soils, and the density of vegetation and/or ground litter (i.e. dead grass, leaves, twigs and logs) surrounding the water body.

Potential negative effects of construction activities for water bodies located in or within 30m of Project components, including the riparian zone (i.e. land within 30m of waterbodies), are summarized in Table 3. Individual water bodies that have the potential to be negatively affected by the construction phase are identified in Table 4, along with a summary of potential negative effects. Details of the mitigation measures, performance objectives, monitoring commitments, and contingency plans are provided in Table 5. A summary of the likelihood, significance, and duration of construction impacts following the application of recommended mitigation measures is also provided in Table 5.

6.2.2 Operation

Potential impacts identified for the operational phase of the Project are based on the understanding of Project activities as outlined in Section 5.0, and the details provided in the *Design and Operations Report* (DNV-GL 2017b).

During the operational phase of the project, it is anticipated that potential impacts to water bodies will be negligible, if any at all. Potential operational phase impacts are

associated with ongoing maintenance activities, including the maintenance of vegetation near above ground electrical collector lines. The potential risks related to these activities include contaminant spills, and increases in erosion and sedimentation from maintenance activities (i.e. removal of vegetation). These potential impacts may result in the degradation of surface water quality within receiving water bodies, and deterioration of the land within 30m of these water bodies.

Potential negative effects of operational activities for water bodies located in or within 30m of Project components, including the riparian zone (i.e. land within 30m of waterbodies), are summarized in Table 3 below. Individual water bodies that have the potential to be negatively affected by the operational phase are identified in Table 4, along with a summary of potential negative effects. Details of the mitigation measures, performance objectives, monitoring commitments, and contingency plans are provided in Table 6. A summary of the likelihood, significance, and duration of operational impacts following the application of recommended mitigation measures is also provided in Table 6.

6.2.3 Decommissioning

Potential impacts identified for the decommissioning phase of the Project are based on the understanding of Project activities as outlined in Section 5.0, and the details provided in the *Decommissioning Plan Report* (DNV-GL 2017c).

The potential decommissioning phase impacts are essentially the same as the construction phase, and have been included below in Table 3. However, there is the potential for impacts during the decommissioning phase to occur to a lesser extent than during the construction phase. This is due to water body crossing structures which may remain in place if landowners request that access roads remain.

If a decision is made to discontinue the operation of the Project, removal of all turbines and associated infrastructure will occur. It is recommended that all water body crossing structures remain in place following decommissioning of the Project, provided they continue to function properly. Leaving structures in place will eliminate the need for additional in-water work and will reduce the potential for sedimentation and contaminant spills, and therefore minimize the potential physical impacts to drainage feature

morphology and habitat commonly associated with this type of work. Additionally, this will minimize the necessary remediation activities that are required to rehabilitate the site following the destruction and alteration of riparian vegetation and in-stream aquatic habitat.

If a decision is made to remove all crossing structures upon decommissioning of the Project, it is recommended that a management plan be prepared prior to the commencement of any activities. This plan will include the required steps for removing structures and creating the lowest collective footprint of impact on the site. Consultation with the appropriate agencies (e.g. SNC, MNRF, DFO) should occur prior to decommissioning activities to address any required in-water work. All in-water work will follow the timing windows provided by the Kemptville District MNRF, or will otherwise be discussed with the MNRF.

Potential negative effects of decommissioning activities for water bodies located in, or within 30m of Project components, including the riparian zone (i.e. land within 30m of waterbodies), are summarized below in Table 3. Individual water bodies that have the potential to be negatively affected by the decommissioning phase are identified in Table 4, along with a summary of potential negative effects. Details of the mitigation measures, performance objectives, monitoring commitments, and contingency plans are provided in Table 5. A summary of the likelihood, significance, and duration of decommissioning impacts following the application of recommended mitigation measures is also provided in Table 5.

Table 3. Summary of Construction, Operation, and Decommissioning Activities and Potential Negative Environmental Effects Within the Project Area

Project Activity	Extent of Effect	Overlapping Confirmed Water Bodies	Within 30m of Confirmed Water Bodies	Potential Negative Effects within 30m of Confirmed Water Bodies
Construction				
Ancillary Facility Construction	Two types of supporting facilities may be associated with the Project. These include a substation, and up to three meteorological towers. The power generated at each of the wind turbines will be transported through 34.5kV underground or overhead cables to the Project's substation. After the power is transformed to a transmission voltage (230 kV) at the substation, power will be fed into the existing Hydro One Network Inc. (HONI) transmission system adjacent to the Project substation. An access road to the substation will be required and will be designed and constructed as described in this table. Of the six meteorological towers permitted for the Project, up to three will be constructed. Access roads to the towers will also be required and will be designed and constructed as described in this table.	No	No	No infrastructure is placed within 30m of a water body, and therefore no potential negative effects are expected.
Turbine Foundation and Turbine Erection	A total of 33 proposed turbine locations will be permitted for the Project. The total number of turbines will depend on the nominal turbine power rating of each turbine. As part of the turbine erection, laydown areas and crane pads will be placed around the base of the turbine. The crane pads, measuring approximately 0.2ha, will require the removal of topsoil and crane pad locations will be filled with	No	Yes *Temporary construction activities only. All turbines are >30m from water bodies.*	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Reduced water quality (i.e. increased turbidity) • Fugitive dust emission • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies • Decreased infiltration • Changes in surface water drainage

Project Activity	Extent of Effect	Overlapping Confirmed Water Bodies	Within 30m of Confirmed Water Bodies	Potential Negative Effects within 30m of Confirmed Water Bodies
	clean compacted crushed gravel, which will be imported as needed. Following the erection of wind turbines, the portions of the crane pad areas not required during the operations phase will be restored to a state similar to pre-existing conditions. It is possible that during excavation for turbine foundations, groundwater or precipitation entering the excavation will require pumping. Blasting of bedrock for installation of turbine foundations is possible, but not expected. Groundwater pumping and rock blasting will both be located >30m from water bodies. Discharge of pumped water may affect water bodies. Relatively minor grading activities are expected to occur throughout the Project Area. Grading is important to ensure crane pads, staging areas, and other construction areas are level.			If discharge of water from excavated wind turbine foundations is required, impacts to receiving water body(ies): • Increased water temperatures • Reduced water quality (i.e. increased turbidity) • Increased water quantity
Access Road Construction	Access roads will be constructed to be up to 20m wide. Areas adjacent to the access road within the larger construction disturbance area may be utilized during the construction phase in order to accommodate cranes, transportation equipment and other construction activities. After construction, these roads may be reduced in size to approximately 5-6m in width, to allow access to turbines and associated infrastructure for maintenance and repairs. Relatively minor grading activities are expected to occur throughout the Project	Yes	Yes	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Fugitive dust emission • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies • Changes in surface water drainage • Decreased infiltration

Project Activity	Extent of Effect	Overlapping Confirmed Water Bodies	Within 30m of Confirmed Water Bodies	Potential Negative Effects within 30m of Confirmed Water Bodies
	Area. Grading is important to ensure crane pads, staging areas, and other construction areas are level.			
Electrical Collector Line Installation (Overhead or Underground)	Underground and overhead electrical collector lines are proposed for this Project. The power generated at each of the wind turbines will be transported through 34.5kV underground or overhead cables to the Project's substation. Electrical collector lines will generally follow public road allowances to reach the Project substation. Junction boxes will also be installed below or above ground in instances where more than one circuit must be connected together. Most of the underground cabling system will be buried at a depth of 1 to 1.5m by way of open cut trenches or plowing. Blasting may be required for collector lines. Horizontal directional drilling will also be required within the Project. Directional drilling will be used in some locations to extend electrical collector lines beneath natural features, wildlife habitats, or water bodies without direct impact. Although the exact locations of directional drilling are currently unknown, impacts associated with this construction activity have been considered as part of this impact study. Trenching, sawing, or hammering of bedrock for installation of underground collection line is possible, particularly in areas where bedrock is within 2m of the surface. This is specific to six areas, including: 1) cabling between T2 and T4 (including	Yes	Yes	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Fugitive dust emission • Decreased infiltration • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies • Reduced water quality (i.e. increased turbidity) • Loss of shading and bank stabilization resulting from vegetation removal If dewatering of excavated trenches for underground electrical collector lines is required: • Reduced groundwater discharge • Reduced stream baseflow and upwelling • Increased water temperatures • Reduced water quality (i.e. increased turbidity) • Increased water quantity to receiving area or water body If blasting for collector lines is required: • Fugitive dust and debris emission

Project Activity	Extent of Effect	Overlapping Confirmed Water Bodies	Within 30m of Confirmed Water Bodies	Potential Negative Effects within 30m of Confirmed Water Bodies
	along Concession Road 11/12); 2) cabling between T4 and T5 (including along Concession Road 11/12); 3) cabling between T4 and T7 (including along Concession Road 10/11); 4) cabling between T25 and T32 (including along County Road 9); 5) cabling between T27 and T28 (including along County Road 12 and Concession Road 6/7); and 6) cabling between T47 and T48 (including along County Road 43). Construction constraints or municipal recommendations for public road allowances may require the electrical collector lines be installed in conduits or overhead on wooden poles similar to the distribution lines in the area. Overhead electrical collector lines may be used in some locations to extend electrical collector lines above natural features, wildlife habitats, or water bodies without direct impact. Although the exact locations of overhead electrical collector lines are currently unknown, the potential impacts associated with both underground and overhead electrical collector lines have been considered throughout this impact study. Where possible, underground and overhead electrical collector lines will be installed within the access road construction disturbance area and/or will follow public road allowances in order to minimize the area of disturbed land.			

Project Activity	Extent of Effect	Overlapping Confirmed Water Bodies	Within 30m of Confirmed Water Bodies	Potential Negative Effects within 30m of Confirmed Water Bodies
Temporary Construction Staging Areas and Laydown Areas	Up to three temporary construction staging areas will be located within the Project Area and will be approximately 5-7ha in size each. In addition, a temporary area of approximately 3ha around each wind turbine will be constructed for the laydown and assembly of wind turbine components. Topsoil will be stripped, stockpiled, and reused to the extent possible for site landscaping and reclamation. Gravel will be laid and compacted. The depth of the graveled areas will vary and will be dependent on conditions encountered during the time of construction. Following construction, the temporary construction staging and laydown areas will be restored to pre-existing conditions to allow agricultural or prior activities to resume, at the discretion of landowners.	No*	Yes	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies • Changes in surface water drainage • Decreased infiltration
Operation				
Turbine Operation	A total of 33 proposed turbine locations will be permitted for the Project. The total number of turbines will depend on the nominal turbine power rating of each turbine.	No	No	• N/A
Turbine Maintenance	Regular maintenance activities will occur at all of the operational turbines at the Project. In addition to regularly scheduled maintenance, occasional unscheduled maintenance activities may be required.	No	No	• Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies
Vegetation Maintenance Along Overhead Electrical Collector Lines	Routine vegetation removal, including tree removal or pruning, may be required for clearance of overhead electrical collector lines during operations.	Yes	Yes	• Accidental vegetation removal • Increased erosion, sedimentation and turbidity • Reduced water quality (i.e. increased turbidity)

Project Activity	Extent of Effect	Overlapping Confirmed Water Bodies	Within 30m of Confirmed Water Bodies	Potential Negative Effects within 30m of Confirmed Water Bodies
				• Spills and leaks (oil, gas, etc.), and contamination of nearby water bodies
Decommissioning				
Removal of Ancillary Facilities	Two types of supporting facilities may be associated with the Project. These include a substation, which may include a control building, and up to three meteorological towers (six meteorological towers will be permitted). The substation, which may include a control building, as well as all associated above-ground infrastructure, will be dismantled and removed from the Project Area. Any concrete foundations will be removed to at least 1m below original grade or to the depth originally installed if less than 1m below original grade. The area will be graded, contoured, and restored to land use similar to what was present prior to foundation installation, to allow for prior activities to resume. Up to three meteorological towers will be built during construction and will be removed unless otherwise requested by the Township of North Stormont or local aviation groups (and agreed to by the Proponent and the property owner) for it to remain in place. Any concrete foundations would be removed to at least 1m below original grade or to the depth originally installed if less than 1m below original grade. The area will be graded, contoured, and restored to land use similar to what was present prior to foundation installation, to allow for prior activities to resume.	No	No	No infrastructure is placed within 30m of a water body, and therefore no potential negative effects are expected.

Project Activity	Extent of Effect	Overlapping Confirmed Water Bodies	Within 30m of Confirmed Water Bodies	Potential Negative Effects within 30m of Confirmed Water Bodies
Removal of Turbine Infrastructure	Up to 33 wind turbines will be constructed for the Project. All constructed turbines will be removed as per the decommissioning plan. A crane pad and wind turbine laydown area will be constructed at each turbine location to accommodate the dismantling of the wind turbines. Following the removal of turbines, crane pads will be removed and the land will be restored to land use similar to what was present prior to turbine installation, to allow for agricultural activities or prior activities to resume. Removal of turbine components will also include the removal of 1m of the underground foundation below the original elevation (prior to construction). Excavated foundation areas will be backfilled with clean fill and stockpiled topsoil to match the original elevation, and the area will be graded, contoured, and restored to land use similar to what was present prior to foundation installation, to allow for prior activities to resume.	No	Yes *Temporary decommissioning activities only*	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Reduced water quality (i.e. increased turbidity) • Fugitive dust emission • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies • Changes in surface water drainage
Removal of Access Roads	Access road removal will be dependent on the requirements and agreements in place with the individual landowner. Impacted lands will be restored to land use prior to access road construction, at the discretion of landowners.	Yes	Yes	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Fugitive dust emission • Changes in surface water drainage • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies

Project Activity	Extent of Effect	Overlapping Confirmed Water Bodies	Within 30m of Confirmed Water Bodies	Potential Negative Effects within 30m of Confirmed Water Bodies
Removal of Electrical Collector Lines (Overhead or Underground)	Underground and overhead electrical collector lines are proposed for this Project. Underground electrical collector lines are expected to remain in place at the end of the Project life; however, at their connection points in the substation or in junction boxes, where the underground electrical collector lines come to the surface, the electrical collector lines will be cut to a depth of approximately 1m below original grade. Overhead electrical collector lines are expected to be removed at the end of the Project life; however, the poles on which the collector lines will be installed that are not shared with HONI will be cut to a depth of approximately 1m below original grade or may be completely removed from the ground, where feasible. Any electrical collector lines located at directionally drilled watercourse crossings or underneath significant natural features and wildlife habitats will also remain in place; however, the connection point will be severed at a point located outside of the South Nation Conservation Authority (SNCA) Regulation Area, where possible, and outside of significant natural features and/or wildlife habitats.	Yes	Yes	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Fugitive dust emission • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies • Loss of shading and bank stabilization resulting from vegetation

Project Activity	Extent of Effect	Overlapping Confirmed Water Bodies	Within 30m of Confirmed Water Bodies	Potential Negative Effects within 30m of Confirmed Water Bodies
Removal of Staging Area	Upon decommissioning of the Project, temporary staging and laydown areas will be constructed and appropriate decommissioning activities will be carried out within these designated areas. After completion of the decommissioning, temporary staging areas and any associated temporary decommissioning improvements (e.g., temporary construction trailer) used during the decommissioning phase will be removed. Any foundations associated with these facilities will be removed to a depth of at least 1m below original grade or to the depth originally installed if less than 1m below original grade. The area will be graded, contoured, and restored to land use similar to what was present prior to foundation installation, to allow for prior activities to resume.	Yes	Yes	• Increased erosion, sedimentation, and turbidity • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies

*All Temporary Construction Staging Areas and Laydown Areas and associated Construction Disturbance Areas will be placed >0.1m from the average annual high water mark of confirmed water bodies

Potential negative effects and proposed mitigation measures for each of the Project phases, including construction, operation, and decommissioning of project components can be found in Table 4 below.

Table 4. Potential Negative Effects and Mitigation Measures for Confirmed Water Bodies within the Project Area

Distance to Project Location*	Water Body ID	Potential Negative Effects	Mitigation Measures
Wind Turbines (WT)			
Overlapping	N/A	• N/A	• N/A
0.1m - 30m (Construction-related activities specific to the discharge of water from dewatering of turbine foundation excavations)	WB-005 WB-006 WB-013 WB-017 WB-032 WB-038 WB-059 WB-066 WB-069 WB-081 WB-083 WB-097 WB-113 WB-115 WB-126 WB-131	• Reduced water quality (i.e. increased turbidity) • Reduced groundwater discharge • Increased water temperatures • Increased water quantity to receiving area or water body	• Minimize Impacts to Surface Water Quality and Quantity • Minimize Impacts to Groundwater Discharge
>30m - 120m (Turbine locations and foundation	WB-005 WB-006 WB-013 WB-017 WB-032 WB-038 WB-059 WB-066 WB-069 WB-081 WB-083 WB-097 WB-113 WB-115 WB-126 WB-131	• Any potential negative effects have been mitigated by locating the project location more than 30m from the annual high water mark of these water bodies	• N/A
Access Road (AR)			
Overlapping	WB-018 WB-030 WB-042 WB-055 WB-060 WB-067 WB-069 WB-071 WB-074 WB-085	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Fugitive dust emission • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies • Changes in surface water drainage • Decreased infiltration	• Avoid Disturbance to Water Body Banks • Minimize Impacts to Infiltration • Minimize Erosion and Sedimentation • Minimize Fugitive Dust Emissions • Minimize Spills

Distance to Project Location*	Water Body ID	Potential Negative Effects	Mitigation Measures
	WB-093 WB-096 WB-101 WB-109		• Minimize Impacts to Surface Water Quality and Quantity
0.1m - 30m	WB-005 WB-006 WB-015 WB-017 WB-021 WB-031 WB-032 WB-033 WB-035 WB-045 WB-056 WB-057 WB-058 WB-059 WB-066 WB-068 WB-073 WB-081 WB-091 WB-113 WB-116 WB-121 WB-131		
>30m - 120m	WB-012 WB-013 WB-023 WB-034 WB-036 WB-039 WB-043 WB-044 WB-072 WB-094 WB-118 WB-125	• Any potential negative effects have been mitigated by locating the project location more than 30m from the annual high water mark of this water body	• N/A
Collection Lines (CL)			
Overlapping	WB-007 WB-008 WB-009 WB-011 WB-012 WB-014 WB-016 WB-021 WB-023 WB-029 WB-030 WB-035 WB-037 WB-040 WB-046 WB-048	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Fugitive dust emission • Decreased infiltration • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies • Reduced water quality (i.e. increased turbidity) • Reduced groundwater discharge • Loss of shading and bank stabilization resulting from vegetation removal If dewatering of excavated trenches for	• Avoid Disturbance to Water Body Banks • Minimize Erosion and Sedimentation • Minimize Fugitive Dust Emission • Minimize Spills • Minimize Impacts to Infiltration • Minimize Impacts to Surface Water Quality and Quantity • Minimize Impacts to Groundwater Discharge

Distance to Project Location*	Water Body ID	Potential Negative Effects	Mitigation Measures
	WB-049 WB-050 WB-052 WB-055 WB-056 WB-057 WB-061 WB-064 WB-065 WB-068 WB-070 WB-073 WB-076 WB-077 WB-079 WB-080 WB-085 WB-086 WB-087 WB-092 WB-094 WB-095 WB-098 WB-099 WB-100 WB-102 WB-103 WB-104 WB-105 WB-106 WB-108 WB-111 WB-112 WB-121 WB-129	underground electrical collector lines is required: • Reduced groundwater discharge • Reduced stream baseflow and upwelling • Increased water temperatures • Increased water quantity to receiving area or water body	
0.1m - 30m	WB-010 WB-015 WB-041 WB-047 WB-053 WB-062 WB-063 WB-090 WB-091 WB-096 WB-107 WB-110 WB-116 WB-123 WB-124 WB-127 WB-128		

Distance to Project Location*	Water Body ID	Potential Negative Effects	Mitigation Measures
>30m - 120m	WB-032 WB-043 WB-051 WB-066 WB-130	• Any potential negative effects have been mitigated by locating the project location more than 30m from the annual high water mark of these water bodies	• N/A
Temporary Staging Areas, including Turbine Laydown Areas and Crane Paths			
Overlapping	N/A	• N/A	• N/A
0.1m - 30m	WB-003 WB-011 WB-013 WB-017 WB-045 WB-059 WB-081 WB-097 WB-113 WB-114 WB-131	• Accidental vegetation removal • Increased erosion, sedimentation, and turbidity • Reduced water quality (i.e. increased turbidity) • Fugitive dust emission • Spills and leaks (oil, gas, frac-out, etc.), and contamination of nearby water bodies • Decreased infiltration • Changes in surface water drainage	• Avoid Disturbance to Water Body Banks • Minimize Erosion and Sedimentation • Minimize Fugitive Dust Emission • Minimize Spills • Minimize Impacts to Infiltration • Minimize Impacts to Surface Water Quality and Quantity
>30m - 120m	WB-005 WB-006 WB-019 WB-030 WB-031 WB-032 WB-033 WB-034 WB-038 WB-066 WB-069 WB-077 WB-083 WB-089 WB-101 WB-115 WB-119 WB-122 WB-126	• Any potential negative effects have been mitigated by locating the project location more than 30m from the annual high water mark of these water bodies	• N/A
Supporting Infrastructure (SI)			
Overlapping	N/A	• N/A	• N/A
0.1m - 30m	N/A		
>30m - 120m	WB-005 WB-031 WB-032 WB-033 WB-081 WB-120	• Any potential negative effects have been mitigated by locating the project location more than 30m from the annual high water mark of these water bodies	• N/A

* Distance is measured from the closest point of the Project Location to the average annual high water mark of each water body.

Detailed information relating to mitigation measures, performance objectives, monitoring commitments and contingency plans for the construction and decommissioning phases can be found in Table 5 below. Table 5 also includes a summary of the likelihood, duration and significance of construction and decommissioning related impacts following the application of recommended mitigation measures. The majority of impacts are highly unlikely and represent very rare events.

Table 5. Detailed Mitigation Measures, Performance Objectives, Monitoring Commitments, and Contingency Plans Recommended During the Construction and Decommissioning Phases of the Project

Mitigation Measure	Details of Proposed Mitigation Measure	Performance Objective(s)	Monitoring Commitment(s)	Contingency Plan(s)	Duration and Significance of Impacts
Minimize Disturbance to Water Body Banks	• Clearly delineate work area using erosion fencing or other suitable barrier to avoid accidental damage to water body banks, including damage to or removal of riparian vegetation. • Place the erosion fencing, or other barrier, as far away as practical from the water body, and where possible from the average annual high water mark of the water body (e.g. bankfull level or top of bank), or at the limit of natural vegetation surrounding the water body (i.e. natural riparian vegetation). • The on-site environmental monitor may also consider substituting other demarcating types for fencing, such as staking and flagging, where it is determined that there is no apparent risk to water bodies. • Locate directional drilling entry/exit shafts, if applicable, beyond the top of bank at a distance that allows the minimum depth, as established by geotechnical studies, to be reached while below the water body. This distance should be agreed upon with regulatory agencies. • Operate construction equipment (i.e., cranes, back hoes etc.) in a manner that minimizes disturbance to the water body banks and natural vegetation within the riparian zone (i.e. natural vegetation on land within 30m of a water body) and stays outside of the water body and bank area. • Implement riparian planting after construction, as soon as weather permits, to stabilize water body banks and encourage rapid re-vegetation of disturbed soils. This will aid in preventing bank collapse and erosion, which, in turn, will minimize sedimentation and protect sensitive ecological functions that occur in water bodies. • If insufficient time is available in the growing season to establish vegetative cover, overwintering treatments should be applied, such as erosion control blankets, fiber matting, rock (i.e. large, clean angular rocks) reinforcement/armoring or equivalent to contain the site over the winter period. Plant vegetative cover as soon as is feasible in the next growing season, followed by maintenance and inspection.	To avoid accidental damage to water body banks or removal of riparian vegetation adjacent to water bodies.	• Undertake regular monitoring of the work delineation fencing at a minimum frequency of once per month to ensure damage has not occurred to the fencing, and boundaries are clearly delineated and respected when construction is occurring within 30m of a water body.	• Accidental damage to riparian vegetation may require re-planting of similar, native species, depending on the extent of damage incurred.	• Unlikely • Highly localized • Temporary • Not significant*
Minimize Spills	• Clearly delineate the work area and place the fencing/barriers, as far away as practical from the average annual high water mark of the water body (e.g. bankfull level or top of bank). • Locate directional drilling entry/exit shafts, if applicable, beyond the top of bank, at a distance that allows the minimum depth, as established by geotechnical studies, to be reached while below the water body. This distance should be agreed upon with regulatory agencies. • Develop a Spill Response Plan (SRP) prior to commencement of construction and train staff on appropriate procedures. • Keep emergency spill kits on site at all times. • Keep contact information for the MOECC (Ministry of the Environment and Climate Change) Spills Action Centre in a designated area on-site. • Dispose of waste material by authorized and approved off-site vendors. • Securely store fuel, hazardous materials, and other construction related materials more than 30m from the average annual high water mark of water bodies (e.g. bankfull level for intermittent/permanent watercourses). • Locate all vehicle refueling or washing stations a minimum of 30m from any water body. • Develop and implement an emergency 'frac-out' response plan including steps to contain, monitor and clean-up in response to the event.	To prevent contamination of water bodies, minimize spills	• Regular environmental monitoring will occur at least once every two weeks during the construction and decommissioning phase to ensure vehicle refueling and storage of chemicals is occurring more than 30m from any water body. • An on-site environmental monitor will be present when active directional drilling is occurring within 30m of a water body to identify frac-out, if it occurs.	• In the event of a spill, notify the MOECC Spills Action Centre as required by O. Reg. 675/98, immediately stop work, and ensure all efforts are made to completely remediate affected areas, especially prior to rain events. • If a spill occurs within a water body, the on-site environmental monitor will be notified and a follow-up site inspection will be conducted to document extent of degradation of the features, if any. • If degradation of a water body occurs as a result of the spill, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of banks and/or riparian areas in permanently damaged areas, depending on the extent of degradation incurred. • If 'frac-out' occurs, immediately implement 'frac-out' contingency plan,	• Highly unlikely • Highly localized • Temporary • Not significant*

Mitigation Measure	Details of Proposed Mitigation Measure	Performance Objective(s)	Monitoring Commitment(s)	Contingency Plan(s)	Duration and Significance of Impacts
				identified within the 'frac-out' response plan.	
Minimize Impacts to Infiltration	• Minimize the use of impervious surfaces, where practical, such as utilizing and contouring permeable surface material (i.e. gravel) to increase infiltration, and reduce surface water runoff. • Minimize vehicle traffic on exposed soils during site clearing, grubbing, grading and topsoil removal. • Confine construction equipment to designated, controlled vehicle access routes to minimize the potential for soil compaction. • Clearly delineate work area using erosion fencing or other suitable barrier to avoid accidental damage to water body banks or removal of riparian vegetation. • Place the erosion fencing, or other barrier, as far away as practical from the water body from the average annual high water mark of the water body (e.g. bankfull level or top of bank), or at the limit of natural vegetation surrounding the water body (i.e. natural riparian vegetation). • Avoid construction during high volume rain events and substantial snow melt/thaw events, where possible, to avoid risk of soil compaction.	To minimize impacts to infiltration and changes in surface drainage patterns and run-off	• Undertake regular monitoring of the work delineation fencing at a minimum frequency of once per month to ensure damage has not occurred to the fencing, and boundaries are clearly delineated and respected when construction is occurring within 30m of a water body. • Regular environmental monitoring will occur during the construction and decommissioning phase.	• No contingency plan required.	• Likely minimal • Localized • Temporary • Not significant*
Minimize Erosion and Sedimentation	• Develop and implement an erosion and sediment control (ESC) plan. • Install, monitor, and maintain ESC measures (e.g. erosion fencing, blankets, straw bales etc.) around the Project Location for the duration of the construction or decommissioning activities, as identified within the ESC plan. • Clearly delineate work area using erosion fencing or other suitable barrier to avoid accidental damage or removal of retained species. • Erect erosion fencing, or other barrier, to correspond to the construction disturbance area limits and as far away as practical from the average annual high water mark of the water body (e.g. bankfull level or top of bank), or at the limit of natural vegetation surrounding the water body (i.e. natural riparian vegetation). • Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the on-site environmental monitor may consider substituting other types of fencing or erosion and sediment control materials, when appropriate. • Utilize erosion blankets, silt fencing, straw bales, etc.to prevent erosion and sediment from entering nearby water bodies. • Store any stockpiled material more than 30m from the average annual high water mark of water bodies (e.g. bankfull level for intermittent/permanent watercourses). • Schedule grading to avoid times of high runoff volumes, wherever possible. • Where possible, time clearing, grubbing, and grading activities to avoid seasonally wet periods (i.e., spring and fall). • Collect directional drill cuttings as they are generated and placed in a soil bin or bag for off-site disposal. • Re-vegetate areas adjacent to water bodies, and directional drill entry/exit pits, to pre-construction conditions as soon as practical after construction activities are complete. • Schedule construction activities within 30m of a water body to occur within the low flow period of the late summer months, where possible, to avoid or minimize impacts. • Remove construction debris from the site and stabilize stockpiles, where practical, to prevent debris from entering the nearby water bodies. • Develop a Flood Response Plan (FRP) to deal with on-site flooding in order to mitigate any possible effects to the aquatic environment.	To avoid sedimentation or erosion of water bodies.	• Undertake regular monitoring and routine inspections to ensure proper installation of erosion control measures are in place. • Monitor sediment and erosion control measures, such as erosion fencing, and check dams daily in areas where work is taking place, and prior to, during, and after any storm events or significant snowmelt events. • During extended rain or snowmelt periods, monitor erosion control measures daily. • Monitor sediment and erosion control measures monthly in areas where active construction is not occurring until the construction phase is complete. • Undertake regular monitoring of the work delineation fencing at a minimum frequency of once per month to ensure damage has not occurred to the fencing, and boundaries are clearly delineated and respected when construction is occurring within 30m of a water body.	• If deficiencies in sediment and erosion control measures are noted, the on-site environmental monitor will notify the general contractor and the Proponent and recommend remedial actions. • Silt fencing, or other applicable sediment and erosion control measures, that is not working properly will be corrected. • If sedimentation and erosion control measures fail and/or degradation of a water body occurs, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, water body clean out and/or bank stabilization, depending on the extent of degradation incurred. • Repair or replace any damaged fencing immediately upon discovering an issue.	• Highly unlikely • Localized • Temporary • Not significant*

Mitigation Measure	Details of Proposed Mitigation Measure	Performance Objective(s)	Monitoring Commitment(s)	Contingency Plan(s)	Duration and Significance of Impacts
Minimize Impacts to Groundwater Discharge	• Monitor rate of water pumping and timing to meet requirement of less than 50,000L per foundation site per day. If a volume of 50,000L/day per foundation site is surpassed but is less than 400,000L/day per foundation site, then registration on the MOECC's Environmental Activity and Sector registry (EASR) for Water Taking may be required. If the Project encounters extraordinary conditions (i.e. an infrequent storm event) that necessitate additional water takings (i.e. construction dewatering) beyond 400,000L/day per foundation site, the local MOECC District Office will be contacted and consulted on direction on how to address the situation to allow the Project to proceed in a timely manner while maintaining environmental protection. • Restrict taking of groundwater and surface water during extreme low flow time periods. • Control quantity and quality of stormwater discharge using best management practices, and avoid direct discharge into wetlands, SWHs, and Generalized SWHs. • When discharging to a water body follow the ESC Plan and implement best management practices to avoid degradation of the water body. • If discharging to a municipal storm sewer system, ensure that water quality meets the objectives of the municipal storm sewer by-law prior to discharge. • Obtain water quality and turbidity samples prior to discharge to ensure the quality is suitable for discharge and will not result in an impact to the receiving water body. If the water quality is not suitable for discharge, identify alternate disposal locations or undertake all practical measures to upgrade water quality prior to discharge.	To minimize direct impacts to water quantity/quality in water bodies.	• Monitor water levels of adjacent water body during groundwater dewatering activities to determine if activities are resulting in alteration of water levels within the water body. • Adhere to MOECC water quality Policy 1 and 2 Standards for discharging to water bodies. • Monitor end point of dewatering discharge for water quality and erosion (if dewatering). • Conduct daily erosion checks during discharge of water. • Monitor water quality (turbidity) prior to discharge, once a week thereafter or as described by agencies.	• If impacts to groundwater discharge occur as a result of construction activities, the MNRF will be notified of appropriate contingency measures that will be implemented.	• Highly unlikely • Temporary • Not significant*
Minimize Impacts to Surface Water Quality and Quantity	• Clearly delineate work area using erosion fencing, or other barrier, to minimize potential impacts to water quality which may result from loss of riparian vegetation. • Erect erosion fencing, or other barrier, to correspond to the disturbance area limits. • Place the erosion fencing, or other barrier, as far away as practical from the average annual high water mark of the water body (e.g. bankfull level or top of bank), or at the limit of natural vegetation surrounding the water body (i.e. natural riparian vegetation). • Locate directional drilling entry/exit shafts, if applicable, beyond the top of bank, at a distance that allows the minimum depth, as established by geotechnical studies, to be reached while below the water body. This distance should be agreed upon with regulatory agencies. • On site speed limits will be clearly posted, applied, and followed by construction staff to reduce fugitive dust. • Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the on-site environmental monitor and general contractor. Application frequency will vary, but will be determined by site-specific weather conditions, including recent precipitation, temperatures, and wind speeds. • Install wind fences, where determined to be necessary by the on-site environmental monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent of surrounding natural wind breaks. • Restrict taking of groundwater and surface water during extreme low flow time periods. • If in-water work is required (e.g. for culvert installation and/or electrical collector line installation), adhere to required timing windows confirmed through consultation with regulatory agencies, including the MNRF. • If required, perform in-water work in dry conditions, where possible. • Where work in dry-conditions is not possible, short-term, isolated surface water dewatering is required.	To prevent degradation of surface water quality and changes in water quantity related to construction activities.	• Follow the ESC Plan monitoring commitments. • Monitor surface water quality for turbidity prior to conducting in-water work or surface water dewatering. • Pre-construction sampling should occur immediately prior to beginning work and during the same season in which work will be conducted, where possible. • Pre-construction monitoring stations should be located upstream of construction area to provide baseline conditions. • Monitor surface water turbidity during the construction activity at a frequency relative to the proximity to the water body, duration of the construction activity, and type of construction activity, as determined by the Environmental Construction Monitor. • Obtain water quality and turbidity samples prior to discharge to ensure the quality is suitable for discharge and will not result in an impact to the receiving water body. • When discharging to a different drainage feature, monitor general water quality parameters as required to meet MOECC Policy 1 and 2 standards for discharging to a water body. In addition, measure turbidity levels of water to be discharged. If the water quality is not suitable for discharge, identify alternate disposal locations or undertake all practical	• If reduced water quality (i.e. increased turbidity) as a result of construction activities is observed, the MNRF will be notified of appropriate contingency measures that will be implemented. • Repair or replace any damaged fencing immediately upon discovering an issue.	• Unlikely • Localized • Temporary • Not significant*

Mitigation Measure	Details of Proposed Mitigation Measure	Performance Objective(s)	Monitoring Commitment(s)	Contingency Plan(s)	Duration and Significance of Impacts
	• Prior to dewatering, isolate the work area with the installation of a temporary water containment structure. The structure should form an impermeable enclosure that will prevent debris and sediment from escaping into the surrounding water body. • Construct a by-pass channel to maintain flow through the water body and prevent back flooding, which could ultimately overtop the water containment structure. • Obtain applicable permits, where required, for surface water dewatering. • Prior to surface water dewatering, obtain a Fish Salvage Plan, prepared by a qualified fisheries biologist and relocate fish to a suitable location, preferably downstream and away from the construction area, as detailed in the plan. • Install an in-stream sediment filter (e.g. Siltsoxx or Filtersoxx) downstream of water containment structure. Dewatering discharge should be dissipated (i.e. splash pads, sand bags, hay bales etc.) and may require splitting discharge to more than one location. • Dewatering discharge rates should be evaluated to ensure they do not result in erosion and sedimentation to the receiving water body. • If discharging to a municipal storm sewer system, ensure that water quality meets the objectives of the municipal storm sewer by-law prior to discharge. • Re-vegetate disturbed area adjacent to water bodies as soon as practical after construction activities are complete.		measures to upgrade water quality prior to discharge. • Monitor water levels immediately before and during dewatering activities, to determine if dewatering activities are resulting in alteration of water levels within the water body. • Monitor the discharge location for dewatering activities to ensure erosion and sedimentation of the receiving water body is not occurring. • Monitor erosion and sediment control systems frequently for effectiveness at a minimum of once daily during discharge activities. Repair deficient controls in a timely manner and using an adaptive management approach when deemed appropriate. • Monitor by-pass channel (if applicable) daily to ensure it is functioning appropriately and water is flowing through as designed. • Undertake regular monitoring of the work delineation fencing at a minimum frequency of once per month to ensure damage has not occurred to the fencing, and boundaries are clearly delineated and respected when construction is occurring within 30m of a water body.		
Minimize Fugitive Dust Emission	• On-site speed limits will be clearly posted, applied, and followed by construction staff. • Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the on-site environmental monitor and the general contractor. Application frequency will vary, but will be determined by site specific weather conditions, including recent precipitation, temperatures, and wind speeds. • Re-vegetate cleared areas as soon as reasonably practical after construction activities are complete. Install wind fences, where determined to be necessary by the on-site environmental monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent of surrounding natural wind breaks.	To minimize fugitive dust deposits within water bodies.	• Undertake regular monitoring and routine inspections to ensure proper fugitive dust control measures are in place. • Monitor dust control measures at a minimum weekly frequency in areas where work is taking place. • Monitor dust control measures at a minimum monthly frequency in areas where active construction is not occurring until the construction phase is complete.	• If fugitive dust is noted, the on-site environmental monitor will notify the general contractor and the Proponent and recommend remedial actions, if necessary. • If fugitive dust control measures fail and degradation of water bodies occurs, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, and/or seeding of permanently damaged areas depending on the extent of degradation incurred.	• Likely minimal • Area of impact depends on direction and speed of winds • Temporary • Not significant*****

**Assuming all mitigation recommendations, monitoring commitments and contingency plans are applied*

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Detailed information relating to mitigation measures, performance objectives, monitoring commitments and contingency plans for the operational phase can be found in Table 6 below. Table 6 also includes a summary of the likelihood, duration and significance of operation related impacts following the application of recommended mitigation measures. The majority of impacts are highly unlikely and represent very rare events.

Table 6. Detailed Mitigation Measures, Performance Objectives, Monitoring Commitments, and Contingency Plans Recommended During the Operational Phase of the Project

Mitigation Measure	Details of Proposed Mitigation Measure	Performance Objective(s)	Monitoring Commitment(s)	Contingency Plan(s)	Duration and Significance of Impacts
Minimize Erosion and Sedimentation	• Schedule grading to avoid times of high runoff volumes, wherever possible. • Where possible, time vegetation clearing or maintenance activities to avoid seasonally wet periods (i.e., spring and fall) and to avoid times of high runoff volumes, wherever practical.	Minimize potential impacts associated with erosion and sedimentation of water bodies.	• No monitoring plan required.	• Accidental damage to riparian vegetation may require re-planting of similar, native species, depending on the extent of damage incurred.	• Highly unlikely • Localized • Temporary • Not significant*
Minimize Spills	• Develop a Spill Response Plan (SPRP) prior to commencement of construction and train staff on appropriate procedures. • Keep emergency spill kits on site at all times. • Keep contact information for the MOECC Spills Action Centre in a designated area on-site. • Dispose of waste material by authorized and approved off-site vendors. • Store hazardous materials in designated areas. • Locate all maintenance activities, vehicle refueling or washing, as well as the storage of chemicals and heavy equipment a minimum of 30m away from water bodies.	Prevent contamination of water bodies. Minimize spills near water bodies.	• No monitoring plan required.	• In the event of a spill, notify the MOECC Spills Action Centre as required by O. Reg. 675/98, immediately stop work, and ensure all efforts are made to completely remediate affected areas, especially prior to rain events. • If degradation of a water body occurs as a result of the spill, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of banks and/or riparian areas in permanently damaged areas depending on the extent of degradation incurred.	• Highly unlikely • Highly localized • Temporary • Not significant*

**Assuming all mitigation recommendations, monitoring commitments and contingency plans are applied.*

6.3 Summary of Monitoring Activities

An adaptive management approach to the protection of water bodies requires regular site inspections and monitoring by a designated on-site Environmental Monitor(s) (EM). Understanding the condition of the natural ecosystem throughout all phases of the Project will form the basis upon which to consider altering construction methods, environmental protection measures, and monitoring programs. Ultimately, any determination related to the application of mitigation and contingency measures will be informed by ongoing analyses of monitoring data, and rely on the experience and judgment of the on-site EM in consultation with the SNC, MNRF, Ministry of the Environment and Climate Change and Fisheries and Oceans Canada as regulatory agencies.

Active construction monitoring will be required at all locations where drainage features and water bodies are located within 120m of the Project Location. Post-construction monitoring may also be required to certify that proper restoration, stabilization, and overall quality of runoff is returned to pre-construction conditions, as assessed by the EM, as well as to satisfy regulatory permitting and/or authorizations.

General recommended monitoring activities are summarized above in Table 5 for construction-related impacts and Table 6 for operation-related impacts.

7.0 Summary and Conclusions

A detailed assessment of the water bodies within and adjacent to the proposed Project occurred through a detailed records review and site investigation conducted by NRSI biologists and presented in the Water Body Assessment (NRSI 2017).

Through the completion of site-specific assessments, NRSI confirmed the presence of 61 water bodies within the Project Area, which were identified as permanent or intermittent drainage features. A confirmed seepage area was also identified within 120m of the Project Location. Of these 61 water bodies, the Project Location will cross 39 water bodies at 63 separate locations. Each of the crossing locations involves at least one type of project component, but may involve multiple project components (i.e. access road and underground or overhead electrical collector lines). Of the remaining water bodies, 14 are found within 30m and 8 are found between 31-120m of the Project Location at their closest point, without specifically overlapping the Project Location. In addition, the one seepage area known from the Project Area is located between 31-120m of the Project Location without specifically overlapping the Project Location.

No lakes or lake trout lakes were identified within the Project Area.

If recommended mitigation measures are employed as described in this report, no significant impacts are anticipated on the identified water bodies as a result of the development of the Project.

8.0 References

DNV-GL. 2017a. Nation Rise Wind Farm Construction Plan Report. August 2017.

DNV-GL. 2017b. Nation Rise Wind Farm Design and Operations Report. August 2017.

DNV-GL. 2017c. Nation Rise Wind Farm Decommissioning Plan Report. August 2017.

Ministry of the Environment. 2013. Technical Guide to Renewable Energy Approvals. Ontario Ministry of the Environment. 267pp. Available at: https://www.ontario.ca/document/technical-guide-renewable-energy-approvals

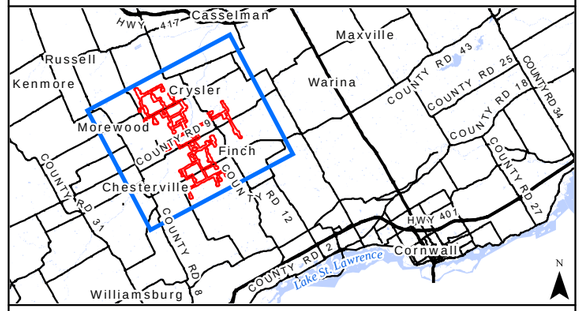
Natural Resource Solutions Inc. (NRSI). 2017. Nation Rise Wind Farm Water Body Assessment. August 2017.

Map 1
Key Map

Map 1

Nation Rise Wind Farm

Key Map



Legend

- Map Extent
- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Intermittent Watercourse (LIO)
- Open Water (LIO)
- Wooded Area (LIO)
- Municipal Boundary

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Temporary Access Road for Construction
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road
- Proposed Substation

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Project: 1756 Date: July 5, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:68,000**

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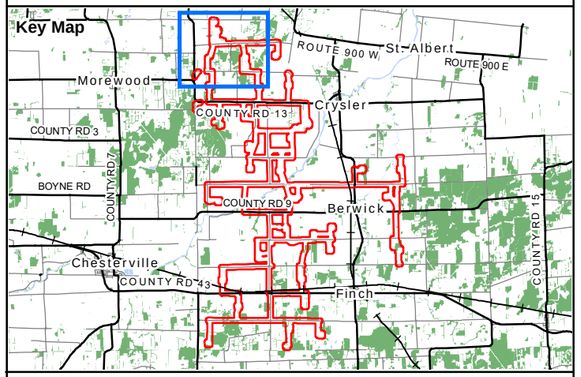
Maps 2-1 to 2-12
Water Body Assessment

Map 2 - 1

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Temporary Access Road for Construction
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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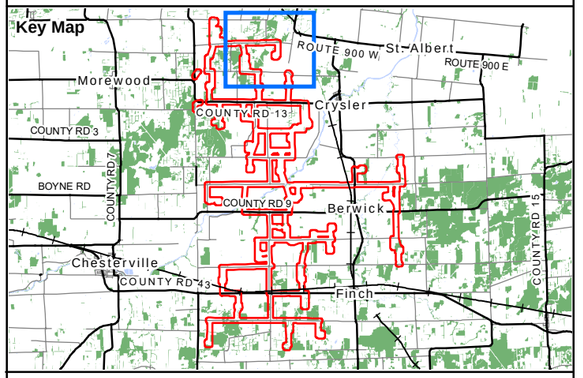
Map 2 - 2

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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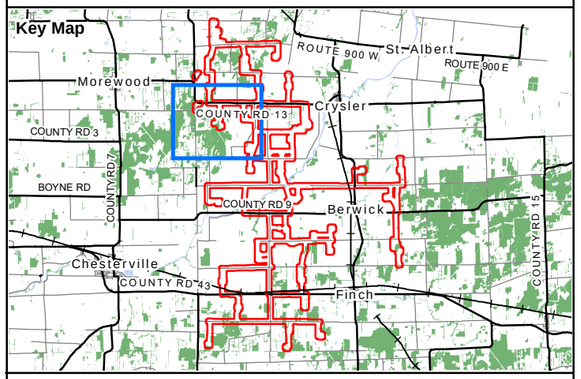
Map 2 - 3

Nation Rise Wind Farm

Water Body Assessment



Legend

- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)
- Seepage Area

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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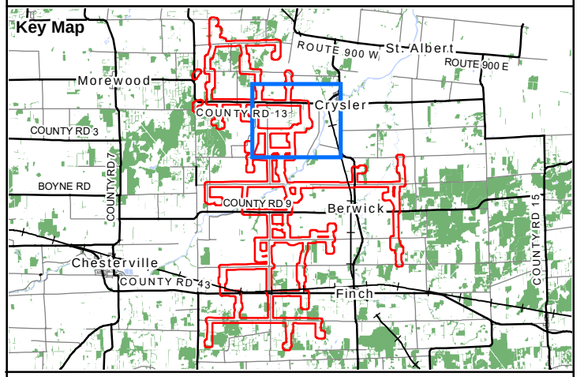
Map 2 - 4

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road
- Proposed Substation

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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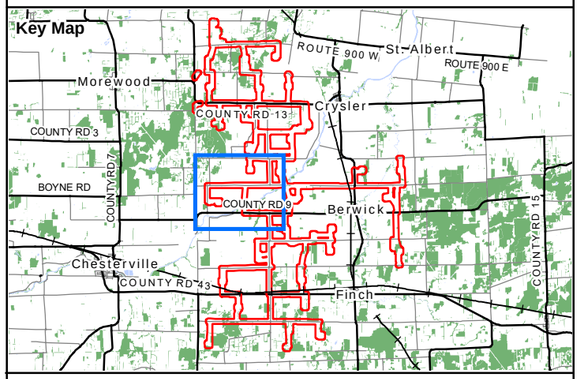
Map 2 - 5

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Porposed Temporary Turning Radii
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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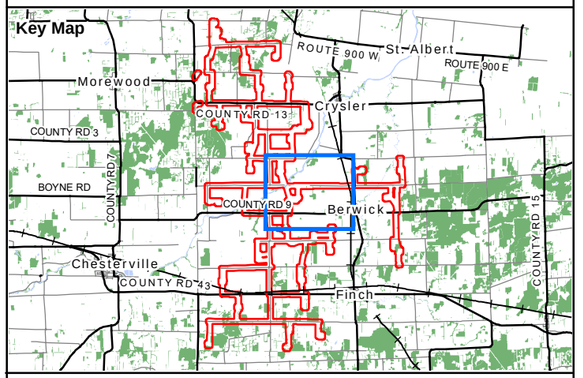
Map 2 - 6

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
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- Porposed Temporary Turning Radii
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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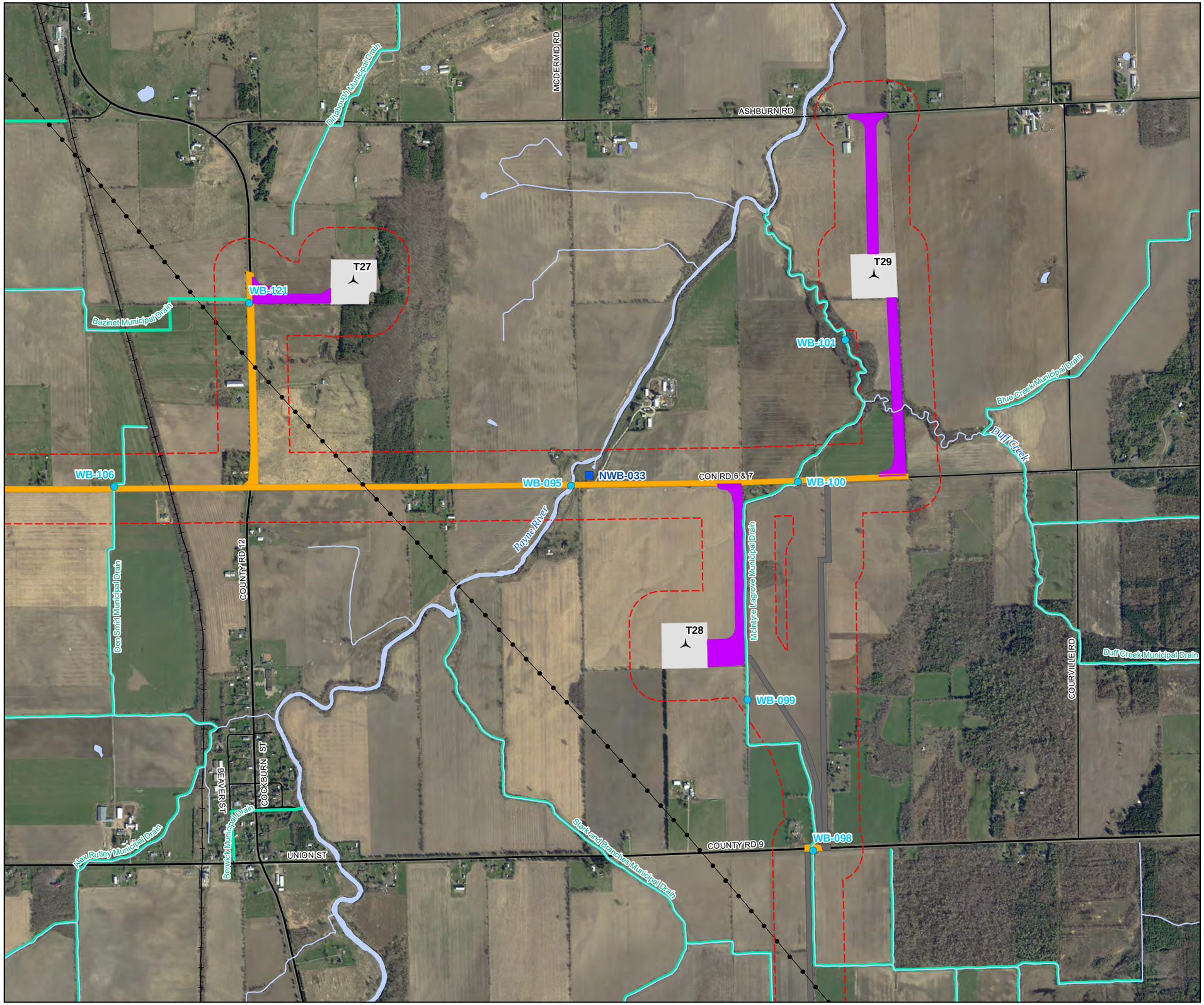
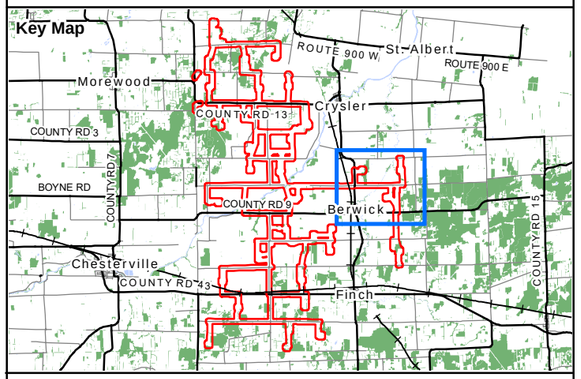
Map 2 - 7

Nation Rise Wind Farm

Water Body Assessment





Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

0 200 400 600 800 Meters

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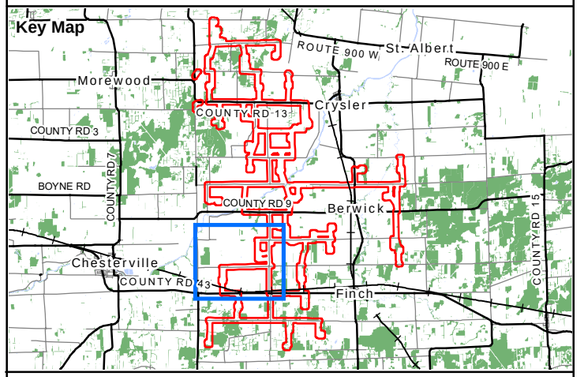
Map 2 - 8

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
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- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Aquatic, Terrestrial and Wetland Biologists

Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

0 200 400 600 800 Meters

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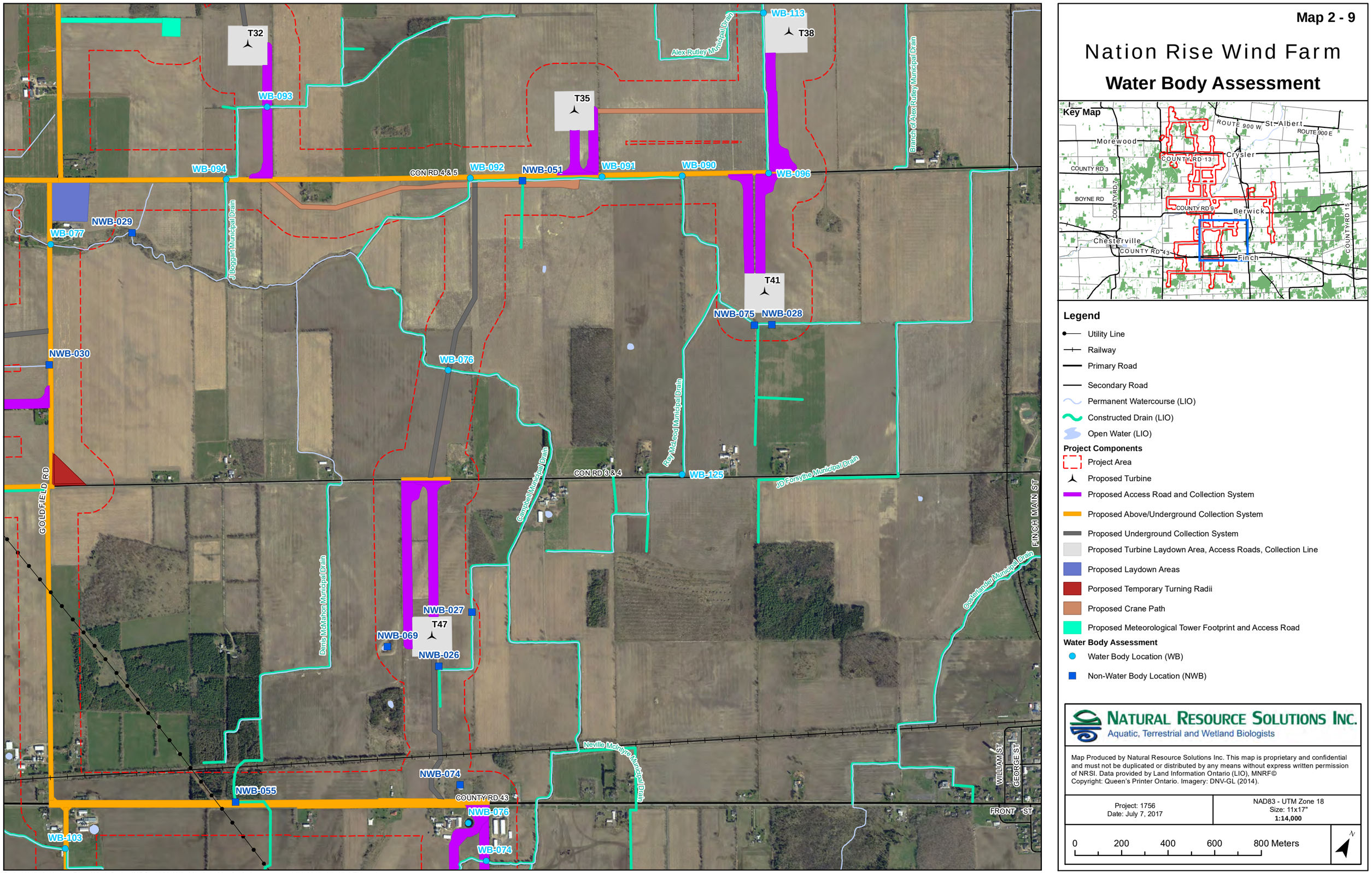
Map 2 - 9

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

0 200 400 600 800 Meters

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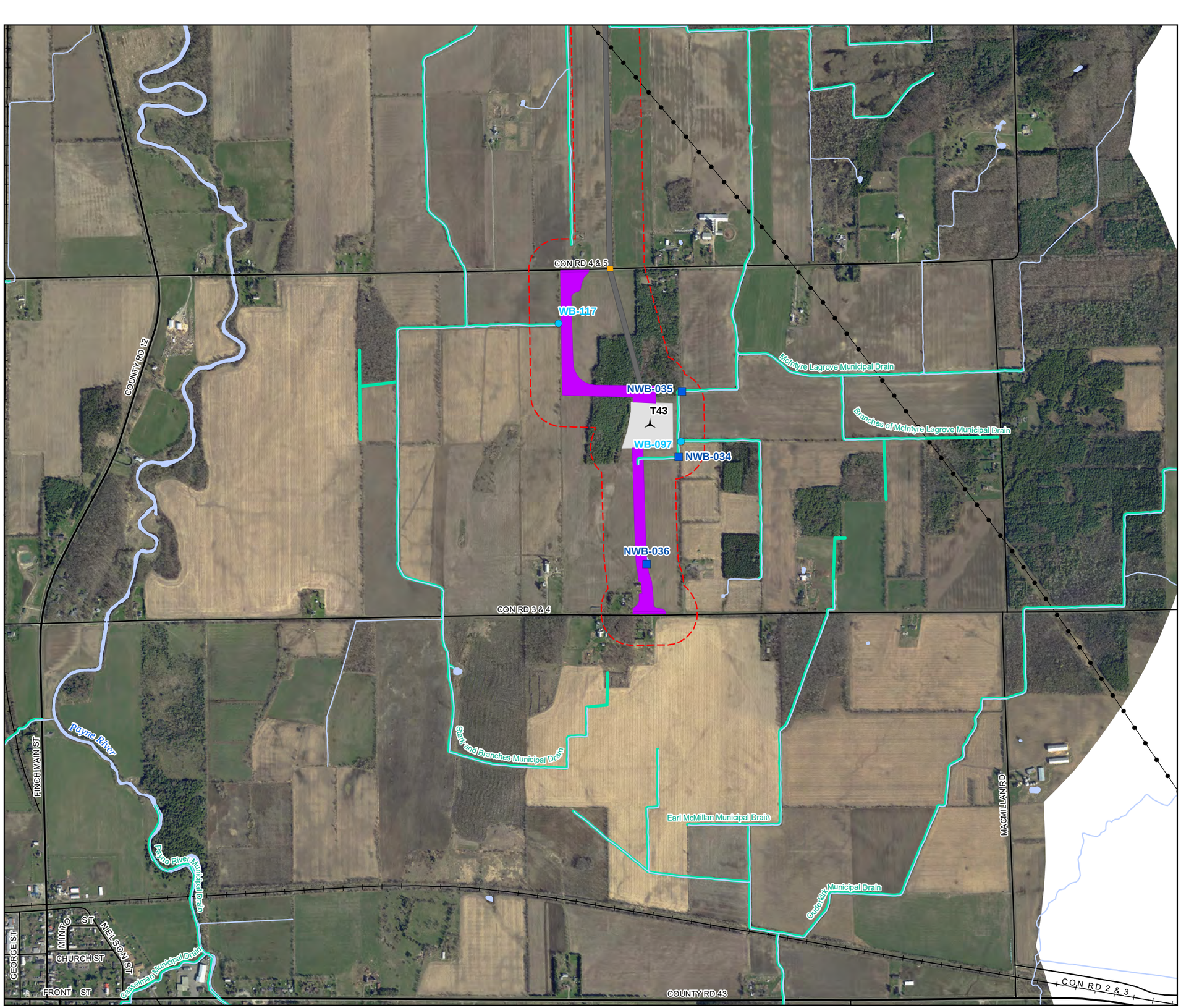
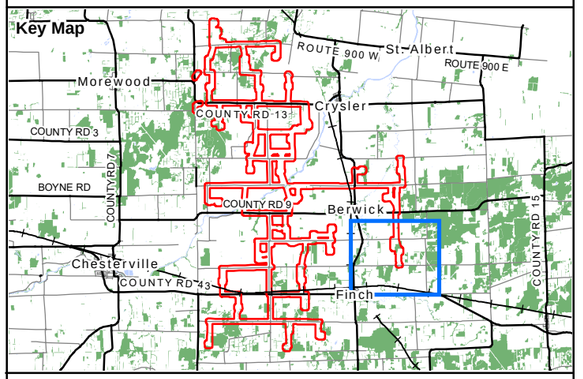
Nation Rise Wind Farm

Water Body Assessment





Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

0 200 400 600 800 Meters

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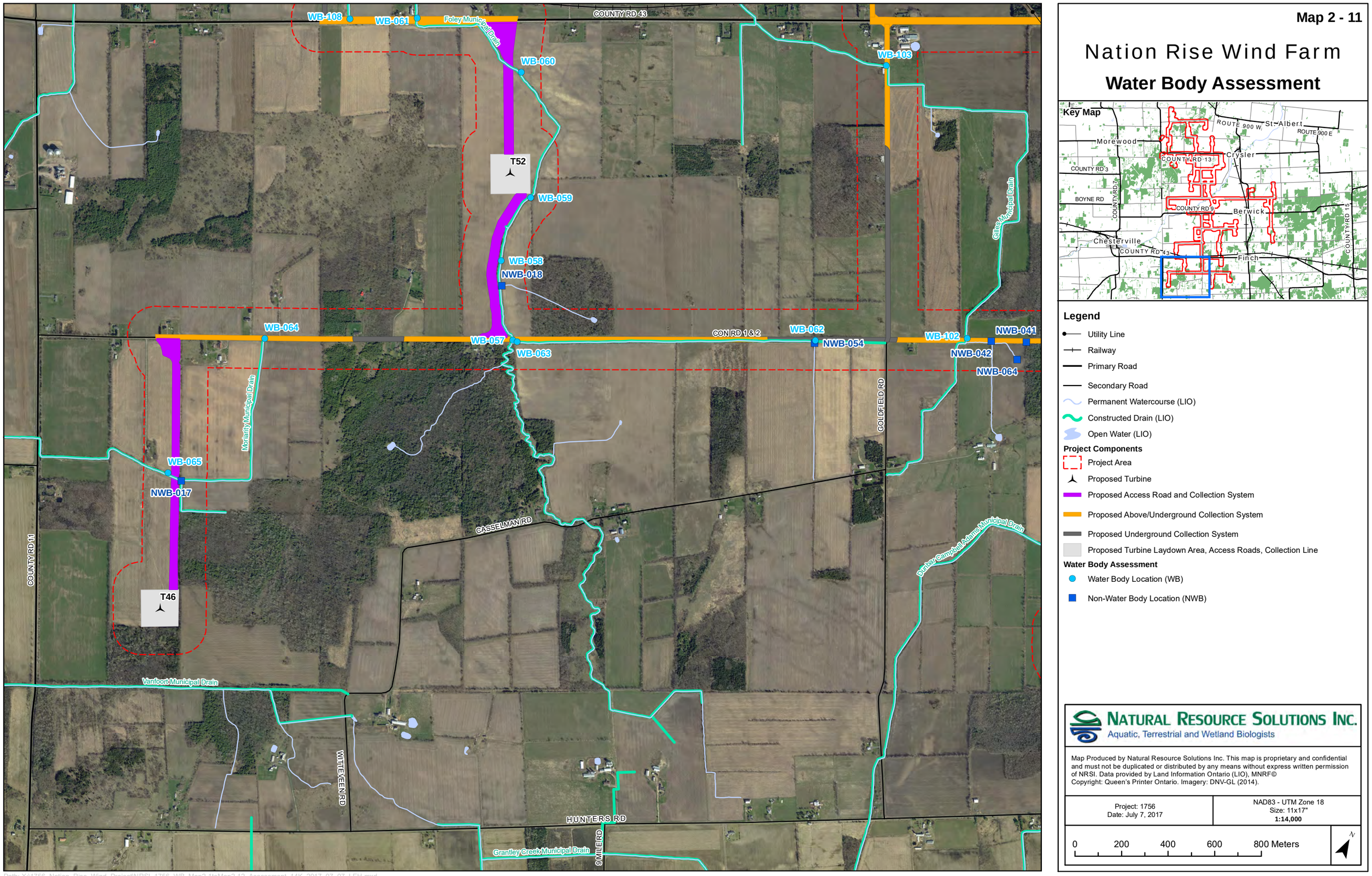
Map 2 - 11

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

0 200 400 600 800 Meters

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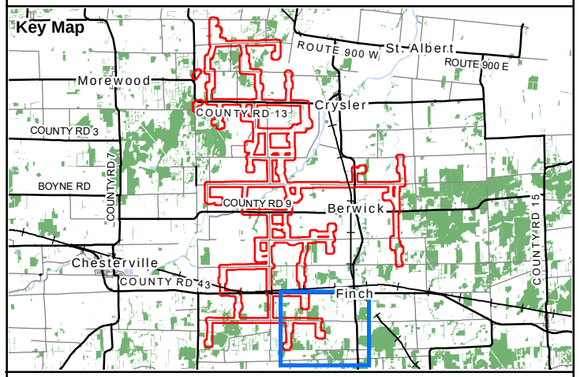
Map 2 - 12

Nation Rise Wind Farm

Water Body Assessment



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Constructed Drain (LIO)
- Open Water (LIO)

Project Components

- Project Area
- Proposed Turbine
- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line

Water Body Assessment

- Water Body Location (WB)
- Non-Water Body Location (NWB)

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Project: 1756 Date: July 7, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:14,000**

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