ENVIRONMENTAL ASSESSMENT REGISTRATION

VICTORIA STREET CULVERT UPGRADE

CITY OF EDMUNDSTON

Our File No.: 618-16-C[5]

July 2017

Prepared for:

Prepared by:

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EXECUTIVE SUMMARY

The City of Edmundston has identified inadequacies with various culverts on McRae Brook, a tributary of the Madawaska River. The confluence of these watercourses is located adjacent to the culvert at [redacted] Victoria Street, within the municipal limits. In order to mitigate flooding at this location and stream crossings upstream, the City has been replacing culverts on McRae Brook as part of a larger culvert replacement project. Victoria Street is the final culvert to be upgraded as part of this program.

The proposed project involves the installation of six (6) 1200 mm round, concrete culverts beneath Victoria Street, but slightly above the invert of an existing 1200 mm culvert. This will allow proper passage of water from McRae Brook during periods of high flows. This will also allow the installation of these culverts while maintaining fish passage through the original culvert. The culverts will be installed by trenching and a traffic detour will be in place. Furthermore, city water and wastewater infrastructure under Victoria Street will be removed and reinstated as part of the work.

Given the positive net effect on stream flows and the proposed mitigation measures, no adverse environmental impacts are anticipated from the proposed project.

1. THE PROPONENT

1.1 NAME OF PROPONENT

The proponent is the City of Edmundston.

1.2 ADDRESS OF PROPONENT

City of Edmundston
7 Canada Road
Edmundston, NB E3V 1T7

1.3 CHIEF EXECUTIVE OFFICER

Marc Michaud
Chief Administrative Officer

1.4 PRINCIPAL CONTACT PERSONS FOR THE PURPOSES OF THE ENVIRONMENTAL IMPACT ASSESSMENT

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1.5 PROPERTY OWNERSHIP

The project will be located on the following properties.

Property Description	**Property Owner**
[redacted]	[redacted]
Rue Victoria Street	City of Edmundston
[redacted]	[redacted]

2. THE UNDERTAKING

2.1 NAME OF THE UNDERTAKING

The name of the Undertaking is *Victoria Street Culvert Upgrade*.

2.2 BACKGROUND

The City of Edmundston manages infrastructure projects within the City planning area, including culvert installation and maintenance.

McRae Brook is a tributary of the Madawaska River north of Edmundston Centre, of which water levels are partially impacted by the Madawaska Dam located approximately 4.9 kilometres downstream, near Madawaska. Flooding of upstream properties has occurred above this location in the past, most recently on the June 29, 2016.

The municipality is in the process of replacing undersized culverts on McRae Brook upstream of the Victoria Street culvert, to prevent flow constrictions, flooding and road deterioration from erosion at these sites. To complete the McRae Brook program, the Victoria Street crossing over McRae Brook must also be upgraded to allow passage of water during periods of high flows and to prevent flooding at this location.

The project involves the installation of additional culverts adjacent to the existing culvert, thereby allowing fish passage to continue throughout the installation.

Photo No. 1: Victoria Street at McRae Brook (Google Earth)

2.3 PROJECT OVERVIEW

The City of Edmundston is proposing to upgrade the McRae Brook stream crossing at Victoria Street by installing six (6) additional culverts adjacent to the existing culvert at a slightly higher invert.

The proposed culvert upgrade will be located within the footprint of the existing Victoria Street right-of-way (ROW) and will also be located on two private properties. The City has met with these property owners to discuss the project and associated encroachments. To correct existing stability and erosion issues, the road base will also be widened within McRae Brook at the toe-of-slope by reconstructing the embankment with competent fill and adding clean rip rap.

The culverts will be installed by trenching with excavators, according to the following sequence of work:

- Installation of temporary water control works (TWCW), sediment control measures and detour signage;
- Electrofishing and removal of fish from work area;
- Installation and commissioning of temporary watermain bypass line, relocated forcemain and sanitary sewer bypass pumping;
- Installation of culverts;
- Placement of culvert pipe end protection;
- Removal of TWCW;
- Reinstallation of city service infrastructure noted above;
- Completion of roadway, private property reinstatement and detour signage;
- Removal of sediment control measures following stabilization of disturbed surfaces.

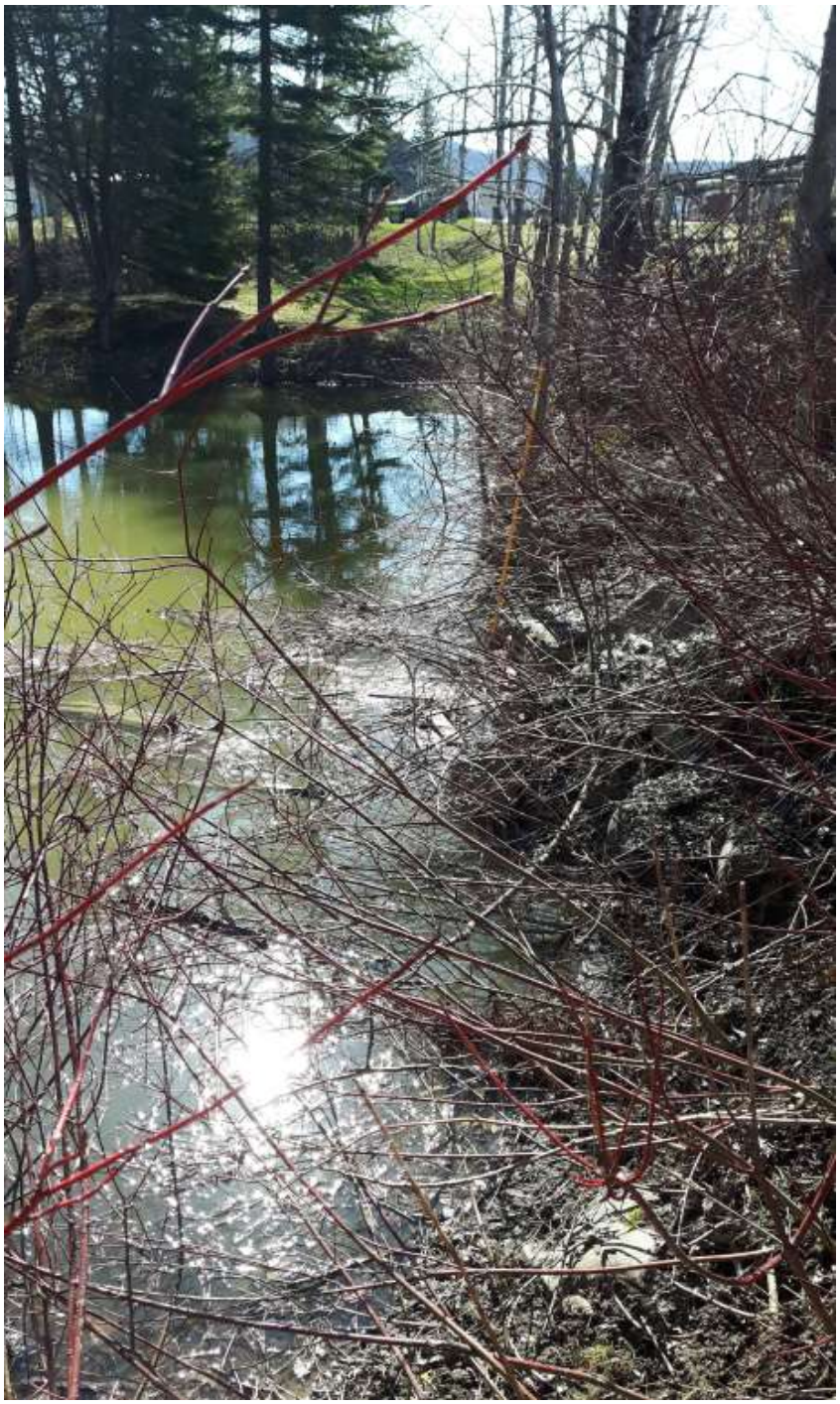

Photo No. 2: Upstream Side of Victoria Street Culvert

2.4 PURPOSE/RATIONALE/NEED FOR THE UNDERTAKING

The McRae Brook culvert under Victoria Street is undersized and does not properly convey water to the Madawaska River during periods of high flows (heavy precipitation events and spring freshet). The required upgrading of upstream culverts, which are currently under construction, will increase the flooding risk.

The installation of six additional culverts will reduce the risk of flooding during present and future high flows in McRae Brook. The widening of the Victoria Street toe-of-slope will correct road stability concerns at this site, preventing erosion of the road subsurface and thereby preventing water quality issues in the future.

2.5 PROJECT LOCATION

The proposed culvert upgrade is located at the Victoria Street crossing of McRae Brook, at civic address [redacted]Victoria Street. The subject property, Service New Brunswick PID No. 00000003, is a provincial road right-of-way (ROW) under the management of the City of Edmundston. Parcel Nos. [redacted] and [redacted]are located immediately adjacent to the stream crossing and have been affected by flooding in the past (refer to project location figure 1.0).

The site is located within the City of Edmundston city limits, and is therefore within the mandate of the City of Edmundston's Director of Development and Engineering.

The centre of the proposed project is geo-referenced at LAT 47^{O}, 24', 11.29" N, LONG 68^{O}, 21', 13.16" W.

Figure 1: Project Location

The overall footprint of the project development area is approximately 2,000 square metres, located at the confluence of McRae Brook and the Madawaska River. The site is bordered to the east by forested parcels and to the west by the Madawaska River. North and south of the site is primarily residential development along Victoria Street.

No regulated wetlands are located within, or adjacent to, the project footprint.

2.6 SITING CONSIDERATIONS

The project site is a necessity due to existing conditions in McRae Brook and the Madawaska River. Alternative sites were not considered as relocating the project is not possible.

2.7 PHYSICAL COMPONENTS AND DIMENSIONS OF THE UNDERTAKING

The drainage basin upstream of Victoria Street has an approximate area of 247 ha, an approximate average slope of 6% and an approximate weighted curve number of 83. The estimated peak flow generated by a 100 year +20% storm is 15.8 m^3/s.

Figure 2: Project Area Overview

The proposed culverts consist of six (6) circular 1200 mm ø concrete conduits having a length of 34.2 metres and a slope of 2.05% each. Scour protection will be achieved by placing R-100 riprap at pipe inlets and outlets, as well as on the embankments, and a cast-in-place concrete headwall will be installed at the inlet and outlet ends of the culverts. Removable grate will be anchored to the cast-in-place headwalls to ensure that beavers do not create blockages at or within the culverts, as this has been a problem in the past. Backfilling of the pipe surround area will be achieved by placing unshrinkable fill between the conduits in order to prevent consolidation of material due to the weight of overlying material. Tension bar assemblies will be installed, and will span the first three pipe joints on all inlets and outlets.

An existing partially submerged circular 1200 mm ø concrete conduit having a length of 21.8 metres and a slope of -0.20% will remain in place during and following the installation of the new conduits in order to provide continued water conveyance and fish passage. Fish weirs are not present in the existing culvert, as it is at least partially submerged at all times; the inlet and outlet invert elevations are 142.79 metres and 143.18 metres respectively, and the normal operating water levels vary between approximately 143.30 metres and 143.70 metres. A bathymetric survey was carried out on April 28, 2017, and the water elevation was measured at approximately 143.70 metres. The condition of the existing culvert was evaluated by CCTV inspection by the City of Edmundston, and was deemed to be in good condition.

Figure 3: Technical Drawing C1

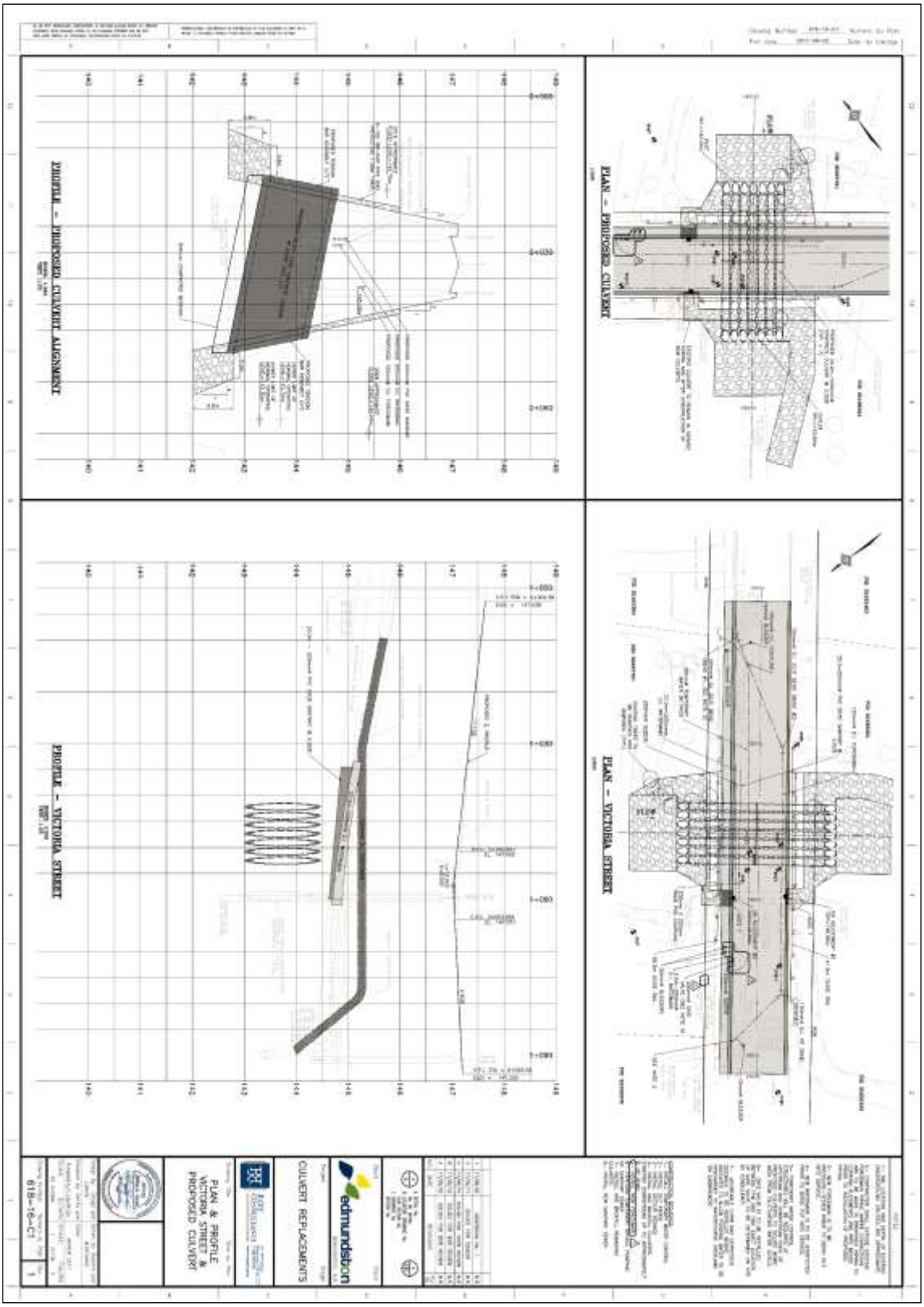

Figure 3: Technical Drawing C1

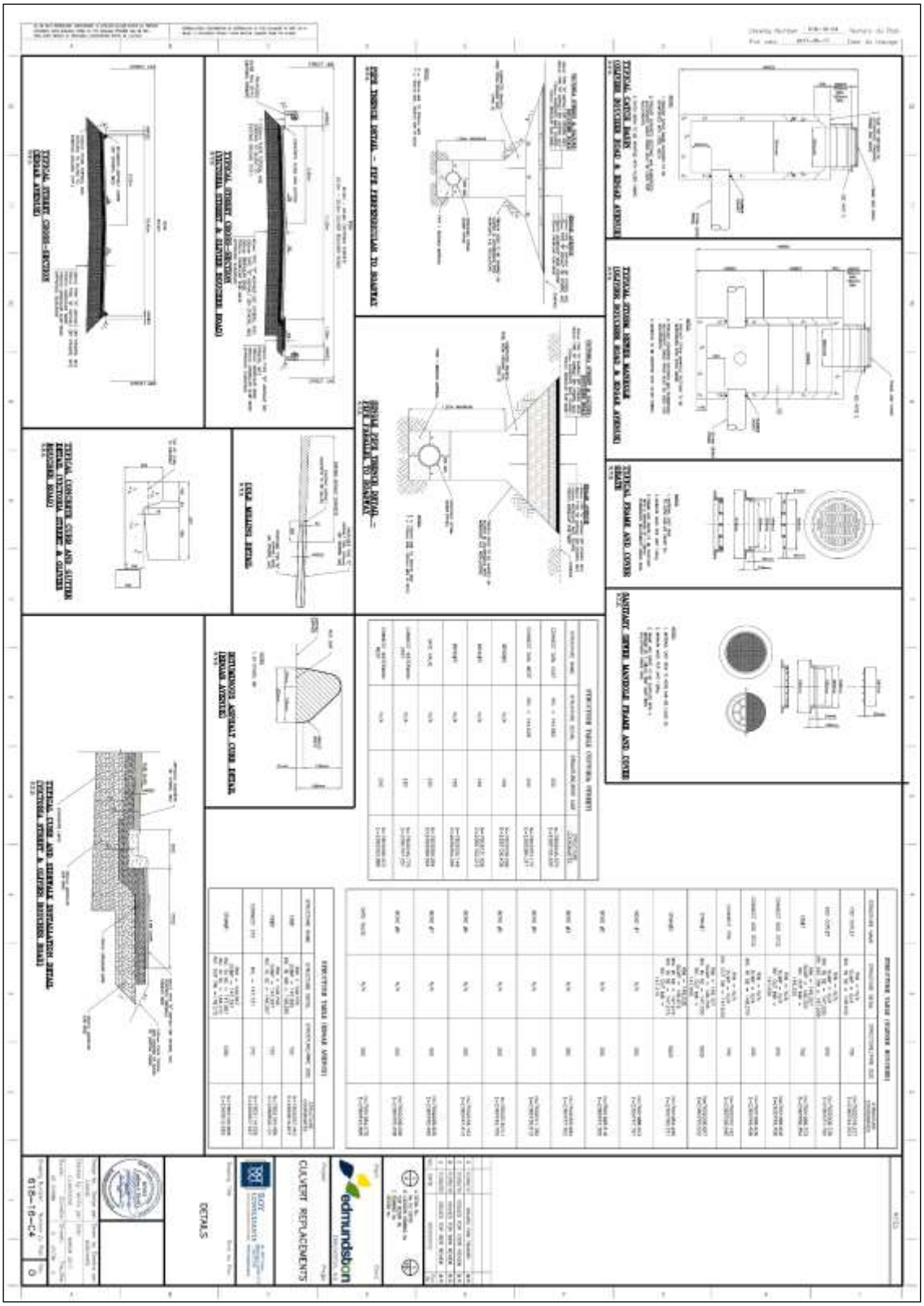

Figure 4: Technical Drawing C4

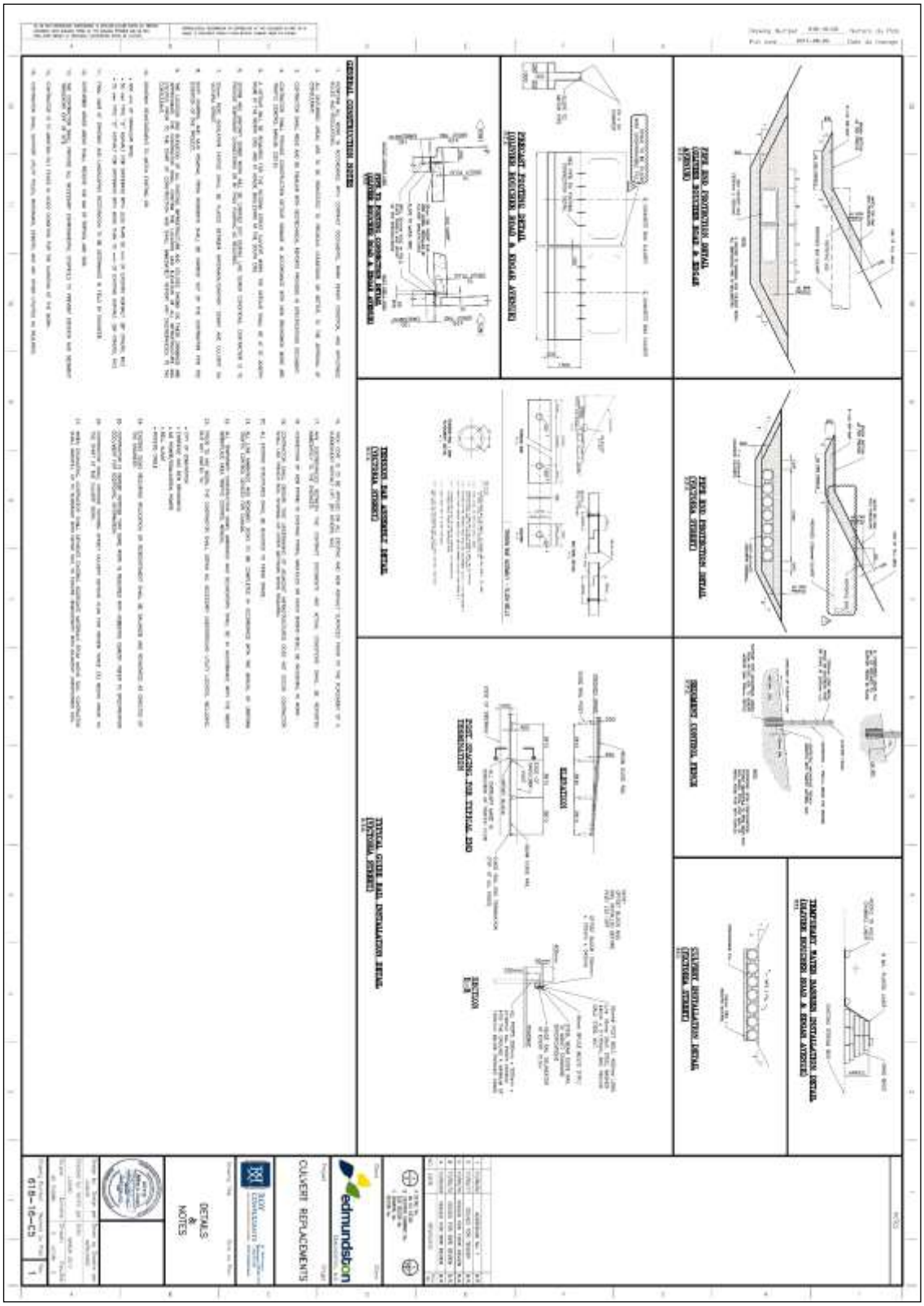

Figure 5: Technical Drawing C5

2.8 CONSTRUCTION, OPERATION AND MAINTENANCE DETAILS

The installation of the six culverts will be completed through the following construction sequence:

2.8.1 Construction Sequence

- Installation of temporary water control works;
- Installation of sediment control measures;
- Electrofishing and removal of fish from work area;
- Installation and commissioning of temporary watermain bypass line;
- Installation of detour signage;
- Installation and backfill of culverts starting downstream up to approximately centreline of road;
- Installation of relocated forcemain;
- Installation of temporary sanitary sewer bypass pumping;
- Installation and backfill of remaining culverts;
- Placement of culvert pipe end protection;
- Removal of temporary water control works;
- Reinstallation of sanitary sewer and removal of temporary bypass pumping;
- Reinstallation and commissioning of watermain and removal of temporary watermain bypass line;
- Completion of roadway and private property reinstatement;
- Removal of detour signage;
- Removal of sediment control measures following stabilization of disturbed surfaces.

2.8.2 Construction Schedule

Construction of the Victoria Street Culvert Upgrade is scheduled to begin as soon as regulatory approval (Certificate of Determination) is granted. The tendering process has already been completed, the contract has been awarded, and the necessary materials have been acquired.

The construction is anticipated to be completed in 6 weeks, provided that there are no significant weather-related delays.

2.9 REGULATORY APPROVALS

The Province of New Brunswick's Department of Environment and Local Government (DELG) regulates any alteration within 30m of a watercourse or wetland, including the installation of culverts, through the Watercourse and Wetland Alteration Regulation and permitting process.

In instances where a culvert may also impact an item under Schedule A of the Environmental Impact Assessment (EIA) Regulation, the project must be registered for an Environmental Impact Assessment (EIA) as well as obtain WAWA permit, in addition to any municipal permits and approvals. In this instance, the Department of Environment and Local Government has identified the subject site section of Victoria Street as a causeway as per *Item i)* of Schedule A *"all causeways and multiple-span bridges"*, and the installation of six additional culverts as a significant modification to a causeway.

2.10 ALTERNATIVE DESIGN CONSIDERATIONS

The 6-culvert design was chosen after assessing alternative options for this site:

Null Alternative: The null alternative is not an option; if the current situation at Victoria Street is not corrected, the area will experience flooding at an even greater scale than has previously occurred. This could result in property damage, damages to private structures, and to Victoria Street.

Bridge Option: A bridge option was reviewed; however, this would have required a complete excavation of the existing section of Victoria Street, the rerouting of McRae Brook and installation of significant water control structures in McRae Brook and Madawaska River, the suspension and protection of municipal utilities to the underside of the bridge, the excavation of virgin ground and the installation of significant bridge abutment structures on both sides of the watercourse. Based on these factors, the increased construction time, the potential for environmental impacts, and the prohibitive cost, this option was discarded.

Box Culvert Option: A concrete box culvert option was also assessed. The installation of a box culvert would require the use of a crane, requiring the temporary removal of overhead power lines and subsequent suspension of power services. This option was deemed to be more cost prohibitive than the proposed round culvert upgrade, and not feasible due to the issues associated with the overhead power lines. As such, this option was discarded.

Preferred Option: The proposed installation of multiple culverts was chosen due to the ease of installation (using standard equipment), the short timeline required for project completion, the avoidance of removing overhead power lines, and the least prohibitive cost.

3. DESCRIPTION OF THE EXISTING ENVIRONMENT

3.1 PHYSICAL AND NATURAL FEATURES

General

The subject site consists of the Victoria Street right-of-way in Edmundston, Madawaska County, New Brunswick where it crosses McRae Brook. The confluence of McRae Brook and the Madawaska River is adjacent to (west of) Victoria Street at this location.

McRae Brook is approximately 15 metres in width upstream of the crossing and approximately 45 metres in width downstream; however, it should be noted that this width is due to the impoundment of the downstream Madawaska Dam, and narrows significantly approximately 150m upstream.

Geology

Geology in the area is not applicable to this project. The project will take place within the constructed (man-made) sub-layers of Victoria Street.

Topography

The portion of Victoria Street at the project site is flat, sloping to either side (east and west) at a 1:1 slope. McRae Brook has relatively gentle slopes on either side at this location, due in part to the residences on either side.

Surface Water

According to GeoNB Map Viewer, there are no regulated wetlands within the proposed project footprint. There is one (1) Provincially Significant Wetland (PSW), Boucher Lake, approximately 1 km upstream and east of the site; however, this is not anticipated to be impacted by the project.

The subject site is located adjacent to the confluence of Madawaska River and McRae Brook; however, the water level at the subject site is impacted by the existing Madawaska Dam downstream at Queen Street.

The confluence of the Madawaska River and Saint John River is approximately 5.5 kilometres south of the subject site.

The McRae Brook drainage basin upstream of Victoria Street has an approximate area of 247 ha, an approximate average slope of 6% and an approximate weighted curve number of 83. The estimated peak flow generated by a 100 year +20% storm is 15.8 m^3/s.

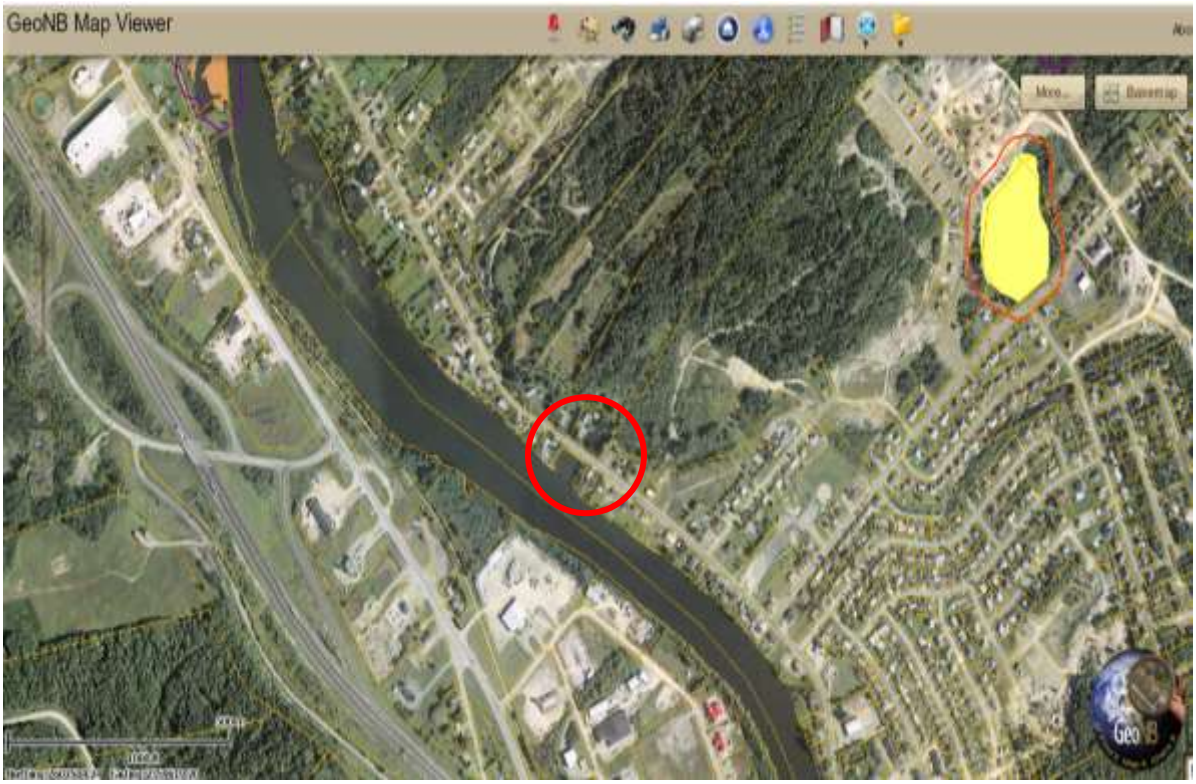

Figure 6: Site Location and Wetland Mapping (GeoNB Map View).

Groundwater

Nearby residences are serviced by the City of Edmundston's water and sewer services.

Vegetation

The site location contains common vegetation species at the edge of Victoria Street, primarily speckled alder (*Alnus incana*) and willow (*Salix* spp), immature white pine (*Pinus strobus*), trembling aspen (*Populus tremuloides*), balsam fir (*Abies balsamea*), red maple (*Acer rubrum*), white birch (*Betula papyrifera*) and mountain ash (*Sorbus aucuparia*). Only the vegetation within the footprint of the culvert installations within the ROW will be removed for the purpose of the project.

Wildlife and Wildlife Habitat

The subject site is located in an urban area within the City of Edmundston and is not considered suitable habitat for most common wildlife species.

Based on previous culvert installations, McRae Brook is known to contain Creek Chub (*Semotilus atromaculatus*), White Sucker (*Catostomus commersoni*) and Ninespine Stickleback (*Pungitius pungitius*).

Migratory Birds

According to the Canadian Wildlife Service, "Under Section 6 of the *Migratory Birds Regulations* (MBR), no person shall disturb, destroy or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird, or its carcass, skin, nest or egg, except under authority of a permit. It is important to note that under the current MBR, no permits can be issued for the incidental take of migratory birds caused by development projects or other economic activities. Furthermore, Section 5.1 of the MBCA describes prohibitions related to deposit of substances harmful to migratory birds:

"5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

(2) No person or vessel shall deposit a substance or permit a substance to be deposited in any place if the substance, in combination with one or more substances, results in a substance — in waters or an area frequented by migratory birds or in a place from which it may enter such waters or such an area — that is harmful to migratory birds."

The City of Edmundston recognizes that it is the responsibility of the proponent to ensure that activities comply with the MBCA and regulations.

The site is anticipated to contain typical, common bird species for an urban area; however, the project is not anticipated to impact migratory birds.

Species at Risk

Canada's Species at Risk Act (SARA) is one of three major components in the Government of Canada Strategy for the Protection of Species at Risk. It is designed as a key tool for the conservation and protection of Canada's biological diversity and fulfils an important commitment under the United Nations Convention on Biological Diversity. New Brunswick also has a Species at Risk Act, which complements the federal Act.

The purpose of **SARA** is to:

A. Prevent wildlife species from becoming extinct or extirpated (lost from the wild in Canada);
B. Help in the recovery of extirpated, endangered or threatened species; and
C. Ensure that species of special concern do not become endangered or threatened.

The project is not anticipated to impact species at risk.

Environmentally Significant Areas

A review of the Nature Trust NB Environmentally Significant Area (ESA) database found several ESAs within a 5 km radius of the subject site; however, the closest ESA sites are:

- **ESA #214 Etang McRae:**

This small bog pond of 1.6 hectare is the focus of much attention among local naturalists. It serves as a good representative of bog habitat, which is rare in this part of the province. It is also home to several plant species that are uncommon or rare in the northern part of the province. These include: Small

Cranberry (*Vaccinium oxycoccus);* American Watershield (*Brasenia schreberi*); Water-arum (*Calla palustris*); Common Duckweed (*Lemna minor*); Yellow Loosestrife (*Lysimachia terrestris*). At least 68 species of birds have been observed here.

This wetland is located approximately 1 km upstream of the subject site and is not anticipated to be impacted by the project.

- **ESA #218 Madawaska River Sandspit:** This ESA is located on the west (opposite) bank of the Madawaska River. Known as good migratory waterfowl habitat. Ice scouring and flooding are probably the main natural disturbances. This site is suitable for plants associated with gravel strands. The rare plants Muhlenbergia richardsonis and Schizachyrium scoparium (Michx.) Nash, have been reported near here at Clair on a river strand. Another rare plant to look for at this site is Potamogeton pectinatus.

This site is not anticipated to be impacted by the project.

Figure 7: Environmentally Significant Area Locations

Archaeological Resources

Based on the subject site (a man-made road structure), no archaeological resources are anticipated to be encountered or impacted by the project.

Land Use

The project is proposed on land owned by the City of Edmundston which serves as an existing road ROW, as well as on two parcels of private land. No Land Gazette flags were identified within the subject site or adjacent properties.

No land use issues or conflicts are anticipated from the project, as the private land owners on which the work will take place have been contacted and are in agreement with the proposed work.

Transportation

The subject site is an existing municipal roadway, necessary for efficient traffic flow in the area. The work will require closure of the road and a traffic detour will be implemented for the duration of the project. The NB Department of Transportation and Infrastructure is aware of this requirement.

4. ENVIRONMENTAL ASSESSMENT OF POTENTIAL IMPACTS

Based on the project description and the existing environment, the following Valued Environmental Components (VECs) were identified for the EIA:

a) Surface Water Quality
b) Fish Habitat
c) Transportation

A qualitative rating system was used to evaluate the potential for interactions between the project and the environment. A rating was given to each Valued Environmental Component (VEC) based on a rating system according to professional judgment and experience of the consultant.

0 = No interaction anticipated.
1 = Interaction occurs; however, it is unlikely to result in a significant environmental effect even without mitigation, or it is unlikely to be significant because of mitigation measures.
2 = Interaction could potentially result in an environmental effect.

Where there is a potential for project-VEC interaction (ratings of 1 or 2), further discussion is provided in the following sections. For issues where there is limited interaction (ratings 0 or 1), a rationale is provided and the issue is not discussed further in the present report. Potential project-environment interactions are presented in Table 8.

Table 1: Potential Project-Environment Interactions Matrix

Activities / **Potential VEC**	**Construction / Installation of the Physical Work**	**Operation / Maintenance of the Physical Work**	**Decommissioning / Abandonment of the Physical Work**	**Accidents and Unplanned Events**
Biophysical				
Surface Water	2	0	1	1
Fish Habitat	1	0	1	1
Socio-Economic				
Transportation	2	0	1	1

The potential VECs that have a rating of zero for all activities indicate that the particular VEC is not present within or in proximity to the project's footprint. The rationales for excluding these VECs from further assessment are discussed in the following sections.

Significance of potential environmental effects is also evaluated in this section, based on a consideration of four (4) characteristics of the project-VEC interaction:

1. Likelihood: What is the likelihood of the impact on the VEC?
2. Spatial scale: How large an area/how many of the VEC will be impacted?
3. Duration of impact: How long will the VEC be impacted? and

4. Mitigation: What mitigation measures can be employed to minimize the impact, and how efficient?

4.1 SURFACE WATER

The proposed project will be completed within the footprint of the McRae Brook/Madawaska River confluence.

Existing Conditions:

At present, the Victoria Street culvert is partially to completely submerged and inadequate (undersized) for conveying increased water flows in McRae Brook during periods of high water flows.

The water level immediately upstream of the site is affected by the Madawaska Dam, located approximately 5 km downstream. However, during periods of high flows, the upstream properties' water levels increase significantly and flooding occurs.

The proponent has applied for a WAWA permit to undertake work within 30 m of a watercourse.

Furthermore, the project is the final culvert in a larger program of culvert replacements on McRae Brook designed to prevent localized flooding and road erosion created from undersized culverts.

Project-VEC Interactions, Potential Environmental Effects:

Environmental Impact 1: Excavation may result in sediments reaching the watercourse.

The installation of the six (6) culverts will be conducted by trenching, using an excavator from road level. This may result in sediments from the road sub-compacted layers reaching the watercourse during excavation, which may adversely impact water quality if not properly mitigated.

Recommended Mitigation 1:

- Work will take place "in the dry";
- Work will take place during the summer low-flow period;
- In the event of a sustained, heavy precipitation period, work will be delayed until conditions return to favourable;
- Material and equipment will be stockpiled outside of the 30 m watercourse buffer where practical;
- Equipment will be refueled outside of the 30 m watercourse buffer zone;
- All site work, excavation, culvert installation, backfilling, placement of rip-rap, etc. will be completed according to a signed and stamped engineer's design – and as per the *NB WAWA Technical Guidelines*. This will include, but not be limited to, the use of clean, non-toxic materials and standard sediment and erosion controls such as the placement of geotextile fabric fences.

Significance of Potential Impacts

Based on the temporary nature of the project, the work is anticipated to take place "in the dry", and the use of the mitigation measures noted above, water quality impacts are considered unlikely and not significant.

4.2 FISH HABITAT

The proposed project will be completed within the footprint of the McRae Brook/Madawaska River confluence.

Existing Conditions:

Although a fish habitat survey has not been completed for this project, it can reasonably be assumed that McRae Brook and Madawaska River contain fish and fish habitat. Electrofishing previously conducted on McRae Brook identified three species: Creek Chub, White Sucker and Ninespine Stickleback.

Project-VEC Interactions, Potential Environmental Effects:

Environmental Impact 1: Placement of rip rap along the toe-of-slope may impact approximately 250 square metres of fish habitat.

Environmental Impact 2: The excavation of Victoria Street may result in increased sedimentation in McRae Brook and the Madawaska River, which may impact fish habitat.

Environmental Impact 3: The project may impede fish passage during the 6-week construction period.

Recommended Mitigation 1:

The area to be impacted will be limited to the smallest area necessary to strengthen the roadway from future flooding, thereby reducing the potential for future excavations within the McRae Brook watercourse. The work area will be electrofished and individual fish will be removed/released outside of the work site. Fish species identified will be recorded and compiled.

Recommended Mitigation 2:

Standard erosion and sediment controls will be implemented throughout the construction process, based on a stamped engineer's design and as per the WAWA Technical Guidelines.

Recommended Mitigation 3:

The excavation will be conducted from street level, adjacent to the existing culvert, and will not require excavation of the watercourse, nor alter or impact the existing culvert, which will be maintained in place for fish passage during construction.

Significance of Potential Impacts

Based on the minimal area of fish habitat potentially impacted and the mitigation measures to be employed during construction, potential impacts to fish habitat are considered unlikely and not significant.

5. ACCIDENTS AND UNPLANNED EVENTS

The City of Edmundston and its contractors will adhere to all WorkSafe NB and other applicable health, safety and environmental legislation to ensure the construction and installation of the proposed culvert upgrade are completed in an environmentally responsible and safe manner.

Only licensed, insured and qualified contractors will be employed for the construction and commissioning of the project, under the supervision of Roy Consultants and City of Edmundston engineers.

Petroleum products or any other deleterious substances will not be dumped on the ground or in the water, or handled or stored in a careless manner.

All necessary precautions will be taken to avoid spills and contamination to the soil and water when handling petroleum products on site and during fuelling and servicing of vehicles and equipment. Vehicles and equipment will be maintained in good working order to prevent leaks on site.

Appropriate emergency spill response equipment will be maintained on site.

All spills or leaks will be promptly contained, cleaned-up and reported to regulatory authorities. Employees will be briefed in the use of spill kits and appropriate emergency reporting procedures.

Should contaminated soils be encountered during construction activities, they will be managed in accordance with applicable federal and/or provincial requirements (i.e. New Brunswick *Guideline for the Management of Contaminated Sites* (July 2012)).

Vehicles and equipment will be maintained in good working order to prevent leaks on site.

Municipal employees and all contractors working on site will be required to maintain and wear personal protective equipment (PPE) at all times.

All required health and safety equipment will be kept on site and in good working order, including a first aid kit and any other necessary health and safety equipment.

Only employees properly skilled and trained shall be employed in the construction, operation and maintenance of the project. All appropriate employee certification shall be maintained in good standing.

All workers on site shall be properly trained and insured as per the requirements of WorkSafe NB and the Occupational Health and Safety Act (OHSA).

All accidents shall be reported to WorkSafe NB and, where necessary, protocols developed to avoid future, similar occurrences.

6. CUMULATIVE EFFECTS

The construction of the proposed project will correct an undersized culvert, which if not completed will be creating impacts upstream on McRae Brook, namely flooding of the riparian area and possible erosion of infrastructure during high flows.

Based on the minimal potential adverse environmental impacts, the existing project footprint and the anticipated restorative benefits of the project, no cumulative effects assessment was required for this project.

7. PUBLIC INVOLVEMENT

The City of Edmundston has advised the following neighbouring landowners of the proposed culvert upgrade project:

- [redacted]

Meetings with landowners took place on site during the tender process on April 10, 2017, and June 6 2017. Refer to Appendix D for a landowner agreement template. Each landowner will complete the form and submit to the City prior to initiating work on their property.

No objections to the project were raised and feedback towards the project has been positive.

The project will be advertised on local radio and newspapers, the City of Edmundston Website and Facebook page. DTI is already aware of, and working with the City for the detours for other culvert sites and is aware of the project.

8. FIRST NATIONS

The proposed project is located on municipal and private land. Given that the project is within city limits, is a maintenance project and no archaeological resources are anticipated to be encountered or impacted, no involvement with First Nations was undertaken by the proponent and no impacts to First Nations are anticipated as a result of this project.

9. APPROVAL OF THE UNDERTAKING

The following permits, approvals and authorizations are anticipated for the project to include, but not be limited to:

a) Certificate of Determination – DELG
b) Watercourse and Wetland Alteration Permit – DELG

10. FUNDING

The proposed project is funded by the City of Edmundston, the Province of New Brunswick, and the Government of Canada under the Clean Water and Wastewater Fund.

11. CLOSING STATEMENT

This environmental impact assessment identified Valued Environmental Components, which may potentially be impacted by the proposed culvert upgrade and identified potential adverse effects, which may occur from the development of the project. Significance was determined based on four criteria: *likelihood, scale, duration* and proposed *mitigation*.

All VECs were assessed and identified as either not impacted by the project, or the impacts were considered not significant based on the above criteria.

This report was prepared by Roy Consultants for the exclusive use of the City of Edmundston. The information contained herein may not be republished or relied upon for any other purpose or by any other third party without the express written notice of the author.

12. REFERENCES CITED

Flora of North America, 2008. www.foranorthamerica.org.

Important Bird Areas Canada. www.ibacanada.com.

Natech, 2017. *Bathymetric Survey of the Madawaska River near the Culvert Replacement Location on Victoria Street*. Natech Environmental Services Inc. April 28, 2017.

Nature Trust NB Environmentally Significant Areas (ESA) Database.

New Brunswick, 1987. *Environmental Impact Assessment Regulation* (87-83) O.C. 87-558.

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New Brunswick. Service New Brunswick. NBGIC Parcel Data, 2009. Real Property Information PID numbers.

Service New Brunswick, 2017. GeoNB Map Viewer.

APPENDIX A:

Large Technical Diagrams

- TP1-Rev0
- C1 rev0
- C2 rev0
- C3 rev0
- C4 rev0
- C5 rev0

Drawing No: 618-16-TP Rev0

CITY OF EDMUNDSTON

TENDER NAME: CULVERT REPLACEMENTS

- *VICTORIA STREET*
- *OLIVIER BOUCHER ROAD*
- *EDGAR AVENUE*

PROJECT No. 618-16

ISSUED FOR TENDER

CLIENT: CITY OF EDMUNDSTON

CONSULTING ENGINEERS:

ROY CONSULTANTS
ENGINEERING SERVICES D'INGÉNIERIE
45 - 34th Avenue
Edmundston (NB) E3V 2T3
T. 506.737.9730
www.royconsultants.ca

LEGEND

- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED FORCEMAIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED ASPHALT AREA
- PROPOSED CURB STOP
- EXISTING SANITARY SEWER
- EXISTING MANHOLE
- EXISTING STORM SEWER
- EXISTING CATCH BASIN
- EXISTING WATERMAIN
- EXISTING FORCEMAIN
- EXISTING GATE VALVE
- EXISTING FIRE HYDRANT
- EXISTING CURB STOP
- EXISTING TREE
- EXISTING SIGN
- EXISTING HYDRO\UTILITY POLE
- EXISTING FENCE
- EXISTING DITCH/ SWALE
- EXISTING UNDERGROUND PHONE CABLE
- EXISTING UNDERGROUND ELECTRICAL CABLE
- EXISTING OVERHEAD ELECTRICAL CABLE
- EXISTING RIGHT OF WAY (ROW)
- EXISTING PROPERTY LINES
- EXISTING PROPERTY PIN
- PROPOSED SEDIMENT CONTROL FENCE

DRAWING INDEX

PLAN NO.	TITLE	REV. No.
618-16-TP	TITLE PAGE	0
618-16-C1	PLAN & PROFILE VICTORIA STREET & PROPOSED CULVERT	0
618-16-C2	PLAN & PROFILE OLIVIER BOUCHER ROAD & PROPOSED CULVERT	0
618-16-C3	PLAN & PROFILE EDGAR AVENUE & PROPOSED CULVERT	0
618-16-C4	DETAILS	0
618-16-C5	DETAILS	0

HORIZONTAL COORDINATES AND GEODETIC ELEVATIONS SHOWN ON THESE PLANS ARE BASED ON THE NEW BRUNSWICK STEREOGRAPHIC DOUBLE PROJECTION OF THE NAD83 (CSRS) REFERENCE SYSTEM. POSITIONING SYSTEM OBSERVATIONS ARE REFERENCED TO NEW BRUNSWICK HIGH PRECISION NETWORK:
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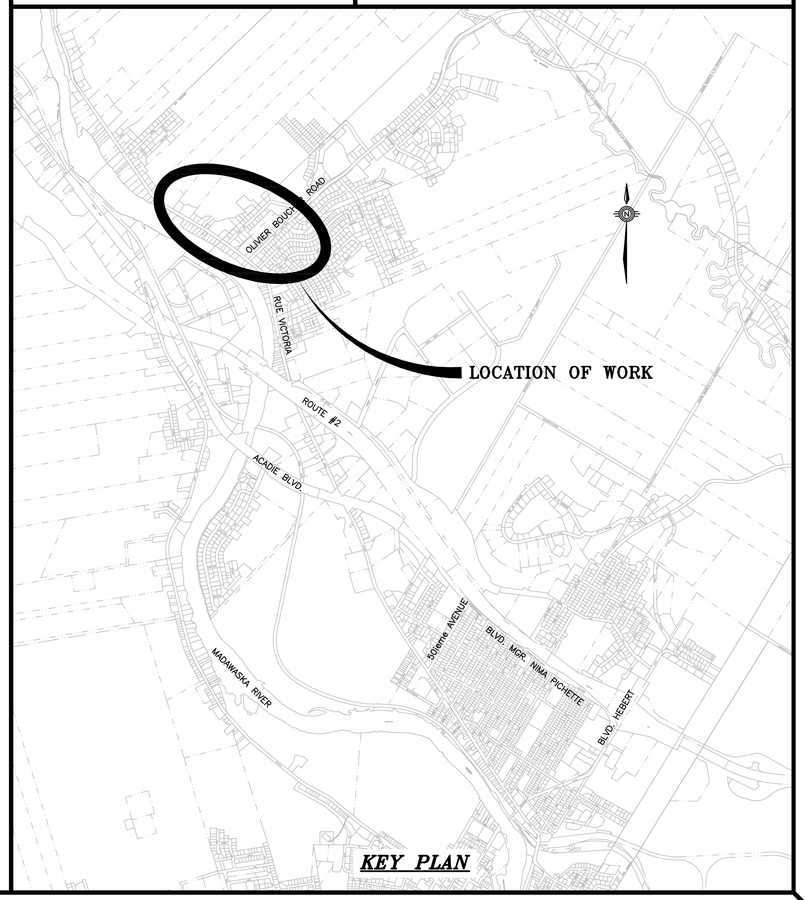
NORTHING: 7597567.834
ELEVATION: 165.865m

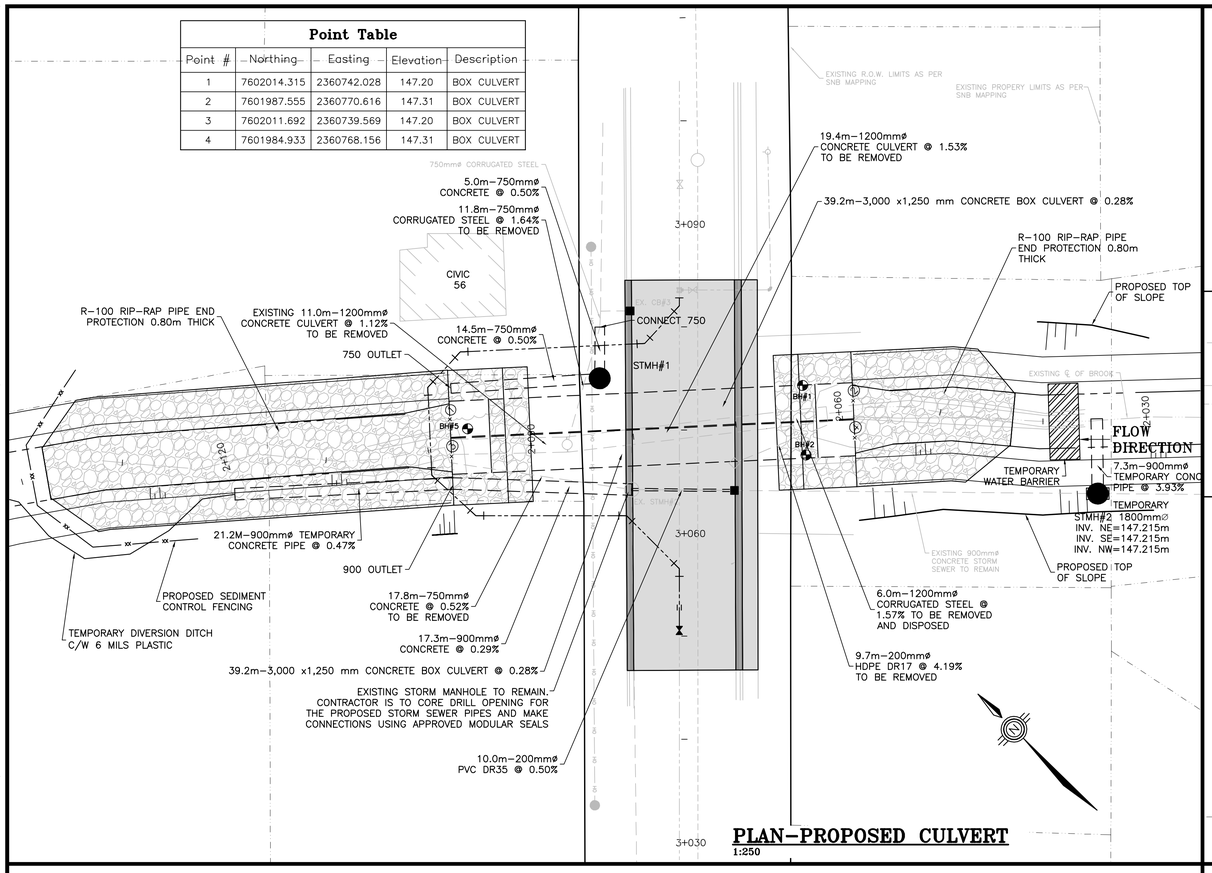


KEY PLAN

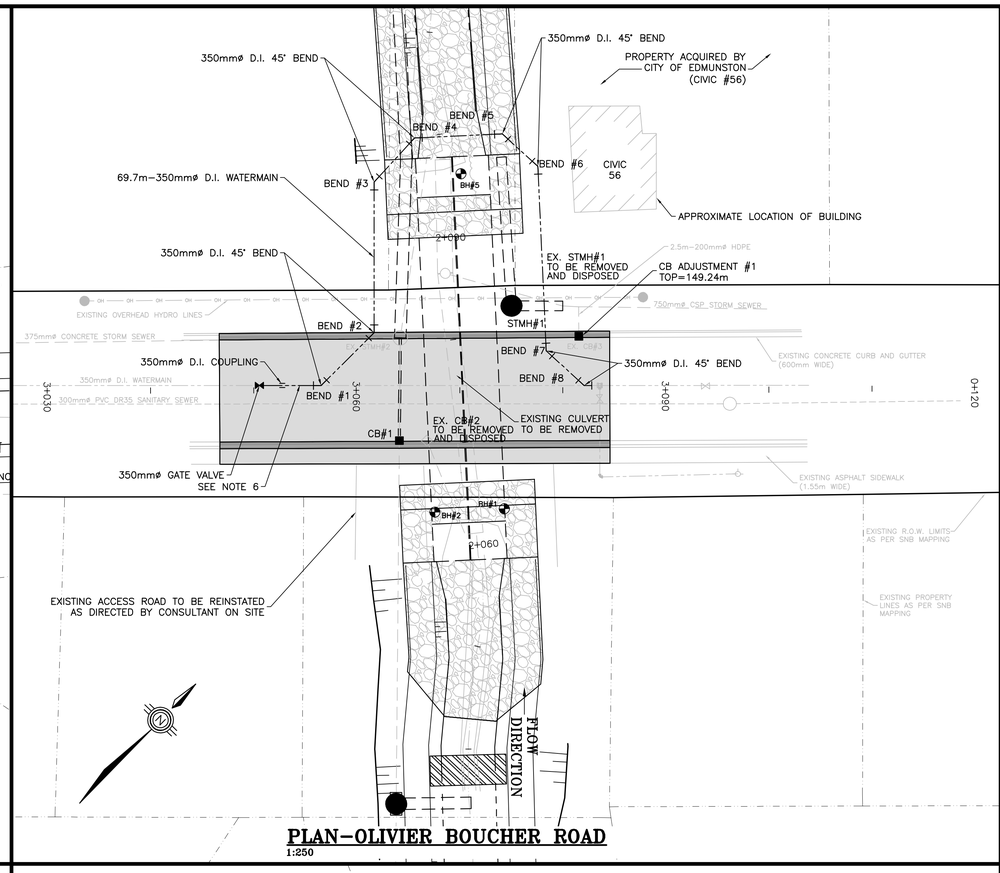
COPY No. / COPIE No.

Drawing Number 618-16-C2 Numero du Plan
Plot date 2017-05-17 Date du tracage

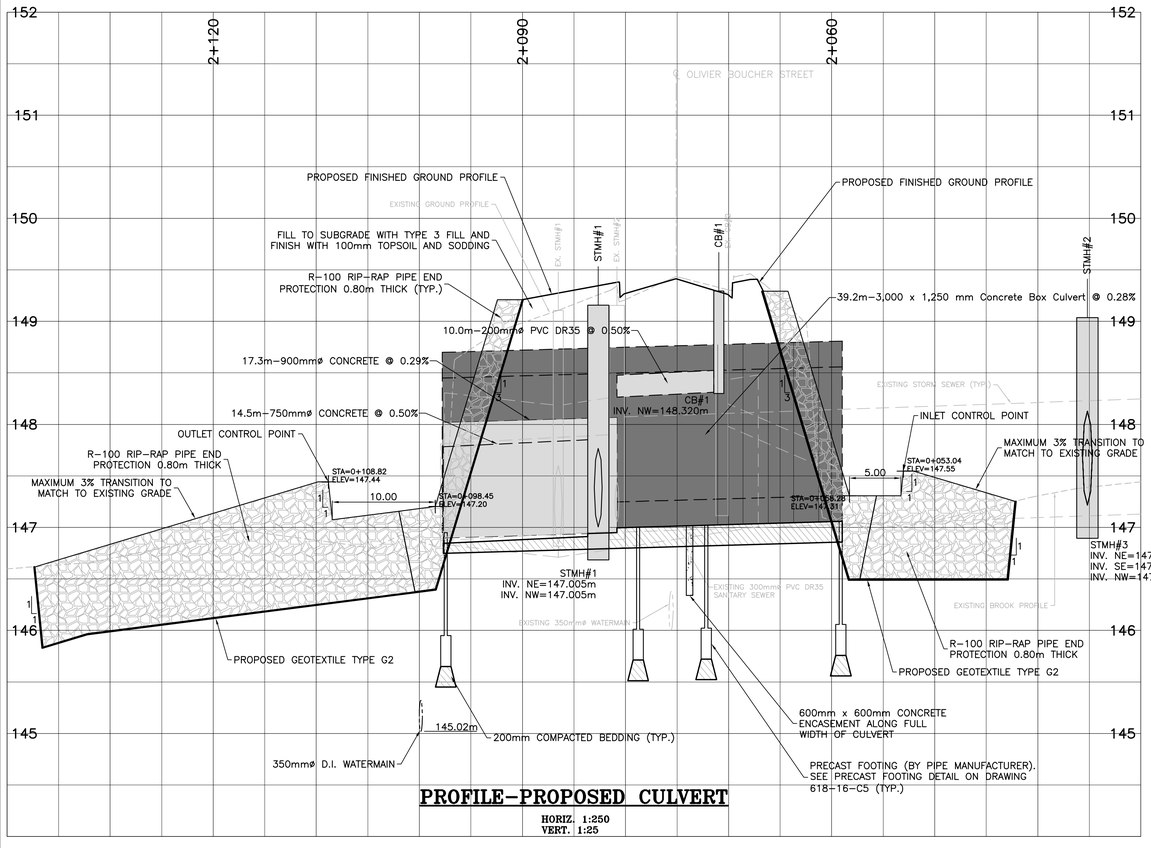
Point Table				
Point #	Northing	Easting	Elevation	Description
1	7602014.315	2360742.028	147.20	BOX CULVERT
2	7601987.555	2360770.616	147.31	BOX CULVERT
3	7602011.692	2360739.569	147.20	BOX CULVERT
4	7601984.933	2360768.156	147.31	BOX CULVERT



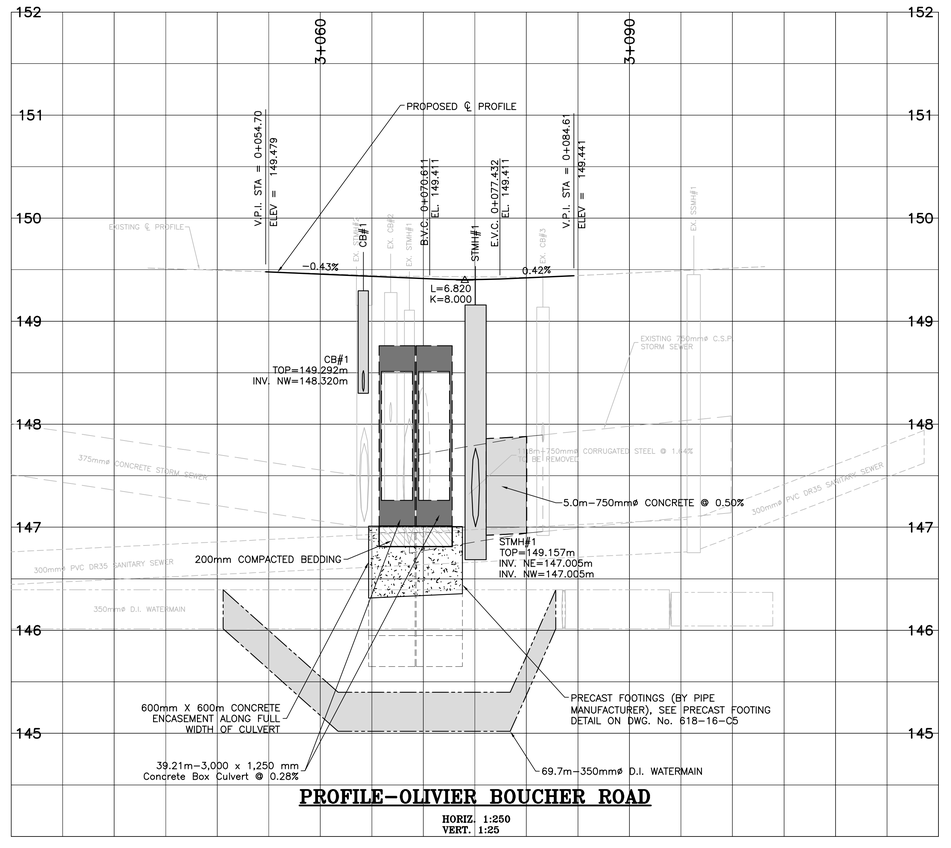
PLAN–PROPOSED CULVERT
1:250



PLAN–OLIVIER BOUCHER ROAD
1:250



PROFILE–PROPOSED CULVERT
HORIZ. 1:250
VERT. 1:25



PROFILE–OLIVIER BOUCHER ROAD
HORIZ. 1:250
VERT. 1:25

LEGEND

1– TEMPORARY BY–PASS SHALL BE CREATED USING THE EXISTING 900mmø CONCRETE PIPE PARALLEL TO THE BROOK. A MANHOLE SHALL BE INSTALLED TO CREATE INLET TO THE EXISTING PIPE. ALTERNATE APPROACH IS TO BE APPROVED BY THE CONSULTANT.

2– THE PROPOSED WATER BARRIER IS TO HAVE A MAXIMUM ELEVATION TO ENSURE FLOODING INTO THE WORK AREA.

3– CONTRACTOR IS TO HAVE A PUMP ON STAND–BY TO MITIGATE PEAK FLOWS. PUMP IS TO HAVE A PUMPING RATE OF AT LEAST 2000 GPM US. THE PUMP IS TO DISCHARGE INTO STRAW/HAY BALE WRAPPED IN GEOTEXTILE.

4– ALL TEMPORARY DITCHING SHALL HAVE 1m WIDE BOTTOM, 1:1 SIDE SLOPES AND DEPTH OF 1m. IT SHALL BE LINED WITH 6 MIL THICK PLASTIC. SAND BAGS MAY BE USED TO WEIGH PLASTIC DOWN.

5– PRE–CAST FOOTINGS SHALL BE SET ON 200mm OF COMPACTED BEDDING. CONTRACTOR SHALL ANTICIPATE AND BE PREPARED TO PROVIDE TRENCH DEWATERING MEASURES.

6– VALVE AND CONNECTION TO EXISTING WATERMAIN SHALL BE INSTALLED BETWEEN 7PM AND 7AM.

CONSTRUCTION SEQUENCE:
1– INSTALL PROPOSED 900mmø PIPE OUTLET
2– CONSTRUCT TEMPORARY BY–PASS INCLUDING DITCHING
3– INSTALL TEMPORARY WATER BARRIER
4– HAVE BY–PASS PUMPING ON STAND–BY C/W WRAPPED HAY BALE AT PUMP DISCHARGE
5– INSTALL SILT FENCE
6– INSTALL DETOUR SIGNAGE
7– INSTALL CULVERTS
8– REMOVE TEMPORARY BY–PASS AND REPAIR 900mm STORM LINE

NO.	DATE	REVISIONS	Par: By:
0	17/05/17	ISSUED FOR TENDER	M.R.
C	17/05/15	ISSUED FOR 100% REVIEW	N.R.
B	17/05/10	ISSUED FOR 99% REVIEW	N.R.
A	17/05/02	ISSUED FOR 85% REVIEW	M.R.

A DETAIL No / No DU DETAIL
B LOCATION DRAWING No / SUR DESSIN No
C DRAWING No / DESSIN No

Client / Client
edmundston
EDMUNDSTON, N.B.

Project / Projet
CULVERT REPLACEMENTS

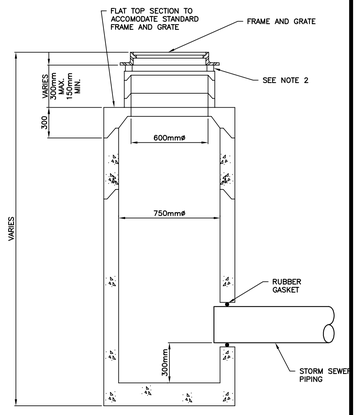
ROY CONSULTANTS
45 - 34th Avenue
Edmundston (NB) E3V 2T3
T: 506.737.9720
www.royconsultants.ca

Drawing Title / Titre du Plan
PLAN & PROFILE OLIVIER BOUCHER ROAD & PROPOSED CULVERT

REGISTERED PROFESSIONAL ENGINEER
Province of New Brunswick
M7418
Jeffrey A. David
Signature
2017-05-17
Date
Permit to Practice by Nouveau-Brunswick
INGÉNIEUR IMMATRICULÉ

Design by: Design par:	Drawn by: Dessine par:
C.LANTEIGNE/M.ROY	A.KNOWLES
Checked by: Verifie par:	Date:
M.ROY/J.DAVID	MARCH 2017
Scale: Echelle:	Sheet: Feuille:
AS SHOWN	2 of/de 5

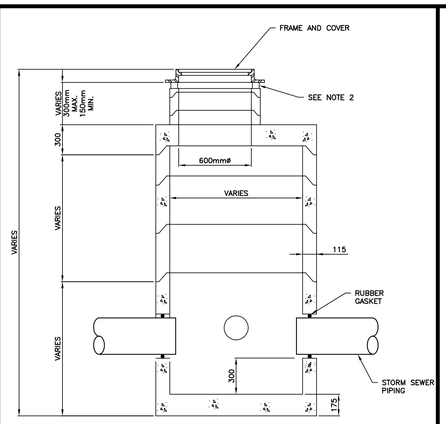
Drawing Number: Numero du Plan: 618–16–C2 | Rev. 0



NOTES:

1. PRECAST CATCH BASIN SECTIONS TO BE REINFORCED WITH STEEL MESH.
2. PRECAST CONCRETE SECTIONS AND RUBBERIZED ADJUSTMENT GRADE RINGS MUST BE USED FOR ADJUSTMENTS.
3. CATCH BASIN TO BE WRAPPED WITH FILTER FABRIC.

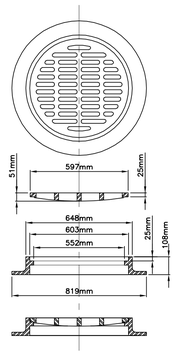
TYPICAL CATCH BASIN (OLIVIER BOUCHER ROAD & EDGAR AVENUE)
N.T.S.



NOTES:

1. PRECAST STORM MANHOLE SECTIONS TO BE REINFORCED WITH STEEL MESH.
2. PRECAST CONCRETE SECTIONS AND RUBBERIZED ADJUSTMENT GRADE RINGS MUST BE USED FOR ADJUSTMENTS.
3. MANHOLE TO BE WRAPPED WITH FILTER FABRIC.

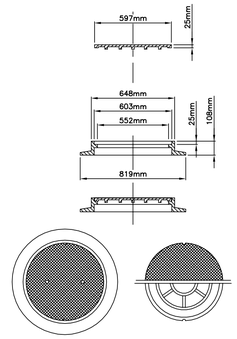
TYPICAL STORM SEWER MANHOLE (OLIVIER BOUCHER ROAD & EDGAR AVENUE)
N.T.S.



NOTES:

1. MATERIAL CAST IRON TO ASTM A48-83 CLASS 30.
2. MINIMUM MASS PER UNIT 136Kg.
3. FRAME AND GRATE TO BE SUPPLIED WITH A MINIMUM OF 1-38mm RUBBERIZED ADJUSTMENT GRADE RING.

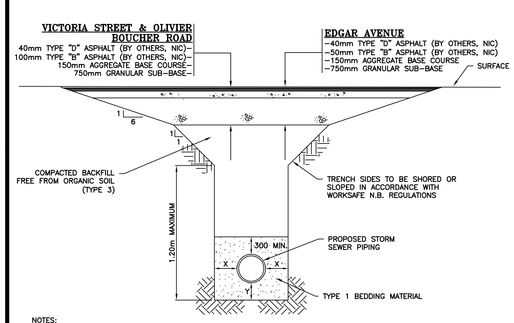
TYPICAL FRAME AND COVER GRATE
N.T.S.



NOTES:

1. MATERIAL CAST IRON TO ASTM A48-83 CLASS 30.
2. MINIMUM MASS PER UNIT 128Kg.
3. FRAME AND GRATE TO BE SUPPLIED WITH A MINIMUM OF 1-38mm HIGH CAST IRON ADJUSTMENT GRADE RING.

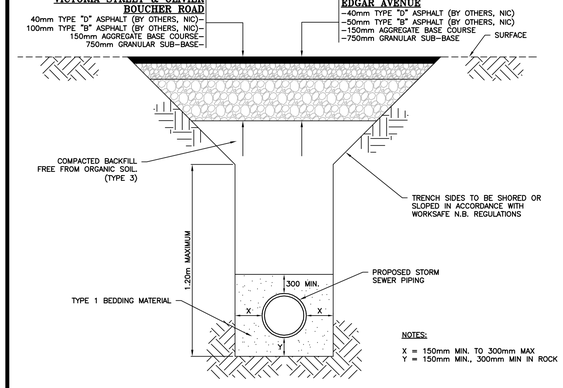
SANITARY SEWER MANHOLE FRAME AND COVER
N.T.S.



NOTES:

X = 150mm MIN. TO 300mm MAX
Y = 150mm MIN., 300mm MIN IN ROCK

PIPE TRENCH DETAIL - PIPE PERPENDICULAR TO ROADWAY
N.T.S.



NOTES:

X = 150mm MIN. TO 300mm MAX
Y = 150mm MIN., 300mm MIN IN ROCK

SINGLE PIPE TRENCH DETAIL - PIPE PARALLEL TO ROADWAY
N.T.S.

STRUCTURE TABLE (VICTORIA STREET)

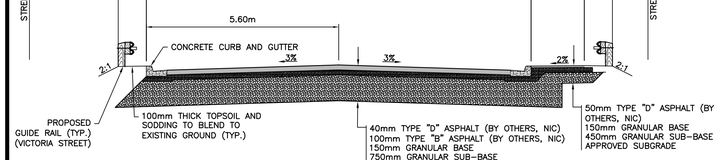
STRUCTURE NAME	STRUCTURE DETAIL	STRUCTURE/PIPE SIZE	STRUCTURE COORDINATES
CONNECT SAN. EAST	INV. = 144.862	200	N=7602040.573 E=2360105.930
CONNECT SAN. WEST	INV. = 144.628	200	N=7602053.137 E=2360084.317
BEND#1	N/A	150	N=7602028.599 E=2360128.408
BEND#3	N/A	150	N=7602031.606 E=2360105.319
BEND#3	N/A	150	N=7602055.146 E=2630064.399
GATE VALVE	N/A	250	N=7602064.584 E=2360066.594
CONNECT WATERMAIN EAST	N/A	250	N=7602040.775 E=2360107.251
CONNECT WATERMAIN WEST	N/A	250	N=7602066.072 E=2360063.989

STRUCTURE TABLE (OLIVIER BOUCHER)

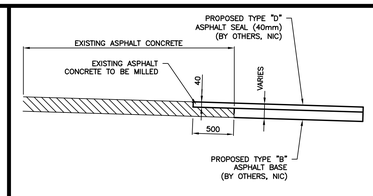
STRUCTURE NAME	STRUCTURE DETAIL	STRUCTURE/PIPE SIZE	STRUCTURE COORDINATES
750 OUTLET	RIM = N/A SUMP = N/A INV. IN SE = 146.933	750	N=7602016.337 E=2360744.253
900 OUTLET	RIM = N/A SUMP = N/A INV. IN SE = 147.000 INV OUT NW = 147.000	900	N=7602009.736 E=2360737.792
CB#1	RIM = 149.257 SUMP = 148.320 INV. OUT NW = 148.320	750	N=7601989.723 E=2360756.354
CONNECT 900 STO2	RIM = N/A SUMP = N/A INV. OUT NW = 147.050	900	N=7601996.926 E=2630749.458
CONNECT 200 STO2	RIM = N/A SUMP = N/A INV. IN SE = 148.270	200	N=7601996.926 E=2360749.458
CONNECT 750	RIM = N/A SUMP = N/A INV. OUT SW = 147.030	750	N=7602010.142 E=2360758.590
STMH#1	RIM = 149.157 SUMP = 146.705 INV. IN NE = 147.005 INV. OUT NW = 147.005	1829	N=7602006.687 E=2360755.022
STMH#2	RIM = 149.035 SUMP = 146.915 INV. IN NE = 147.215 INV. IN SE = 147.215 INV. OUT NW = 147.215	1829	N=7601964.265 E=2360780.731
BEND #1	N/A	350	N=7601988.253 E=2360747.191
BEND #2	N/A	350	N=7601995.516 E=2360747.300
BEND #3	N/A	350	N=7602005.984 E=2360737.102
BEND #4	N/A	350	N=7602011.782 E=2360736.913
BEND #5	N/A	350	N=7602018.011 E=2360742.750
BEND #6	N/A	350	N=7602018.163 E=2360747.413
BEND #7	N/A	350	N=7602005.905 E=2360760.495
BEND #8	N/A	350	N=7602006.066 E=2360765.458
GATE VALVE	N/A	350	N=7601984.075 E=2360742.885

STRUCTURE TABLE (EDGAR AVENUE)

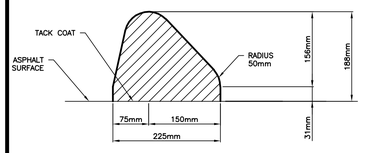
STRUCTURE NAME	STRUCTURE DETAIL	STRUCTURE/PIPE SIZE	STRUCTURE COORDINATES
CB#1	RIM = 149.705 SUMP = 147.995 INV. IN NW = 148.295	750	N=7602097.440 E=2360615.977
CB#2	RIM = 149.702 SUMP = 147.997 INV. IN SE = 148.297	750	N=7602104.455 E=2360609.121
CONNECT 375	INV. = 147.731	375	N=7602114.526 E=2360627.227
STMH#1	RIM = 149.847 SUMP = 147.397 INV. IN NE = 147.557 INV. IN SE = 148.272 INV. OUT NW =178.272	1050	N=7602100.828 E=2360612.655



TYPICAL STREET CROSS-SECTION (VICTORIA STREET & OLIVIER BOUCHER ROAD)
N.T.S.



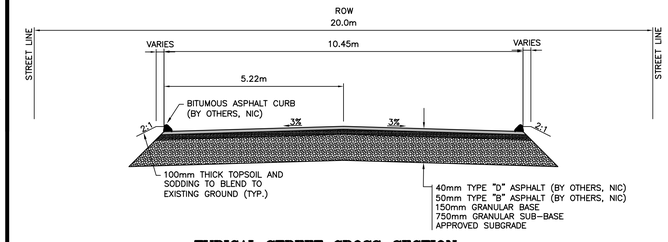
COLD MILLING DETAIL
N.T.S.



NOTES:

1. BY OTHERS, NIC

BITUMINOUS ASPHALT CURB DETAIL (EDGAR AVENUE)
N.T.S.



TYPICAL STREET CROSS-SECTION (EDGAR AVENUE)
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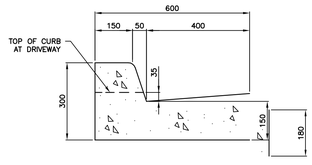
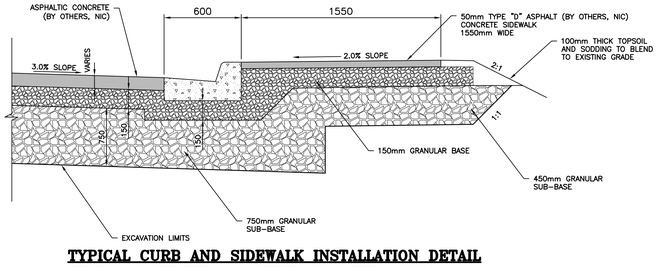


TYPICAL CONCRETE CURB AND GUTTER DETAIL (VICTORIA STREET & OLIVIER BOUCHER ROAD)
N.T.S.



TYPICAL CURB AND SIDEWALK INSTALLATION DETAIL (VICTORIA STREET & OLIVIER BOUCHER ROAD)
N.T.S.

NOTES

NO.	DATE	REVISIONS	Par: By:
0	17/05/17	ISSUED FOR TENDER	M.R.
C	17/05/15	ISSUED FOR 100% REVIEW	N.R.
B	17/05/10	ISSUED FOR 99% REVIEW	N.R.
A	17/05/03	ISSUED FOR 85% REVIEW	M.R.

A DETAIL No
No DU DETAIL
B LOCATION DRAWING No
SUR DESSIN No
C DRAWING No
DESSIN No

Client / Client
edmundston
EDMUNDSTON, N.B.

Project / Projet
CULVERT REPLACEMENTS

ROY CONSULTANTS
INCORPORATED SERVICES INCORPORÉS
45 - 34th Avenue
Edmundston (NB) E3V 2T3
T. 506.737.9720
www.royconsultants.ca

Drawing Title / Titre du Plan
DETAILS

REGISTERED PROFESSIONAL ENGINEER
Province of New Brunswick
M7418
Jeffrey A. David
Signature
2017-05-17
Date
Province du Nouveau-Brunswick
INGÉNIEUR IMMATRICULÉ

Design by: J.DAVID	Design par:	Drawn by: M.RICHARD	Dessine par:
Checked by: C.LANTEIGNE	Verifie par:	Date: MARCH 2017	
Scale: AS SHOWN	Echelle:	Sheet: 4 of/de 5	Feuille:

Drawing Number: 618-16-C4 | Numero du Plan: | Rev. 0

APPENDIX B:

Site Photos

Photo No. 1: Flooded Property Upstream of Victoria Street

Photo No. 2: McRae Brook Upstream of Victoria Street

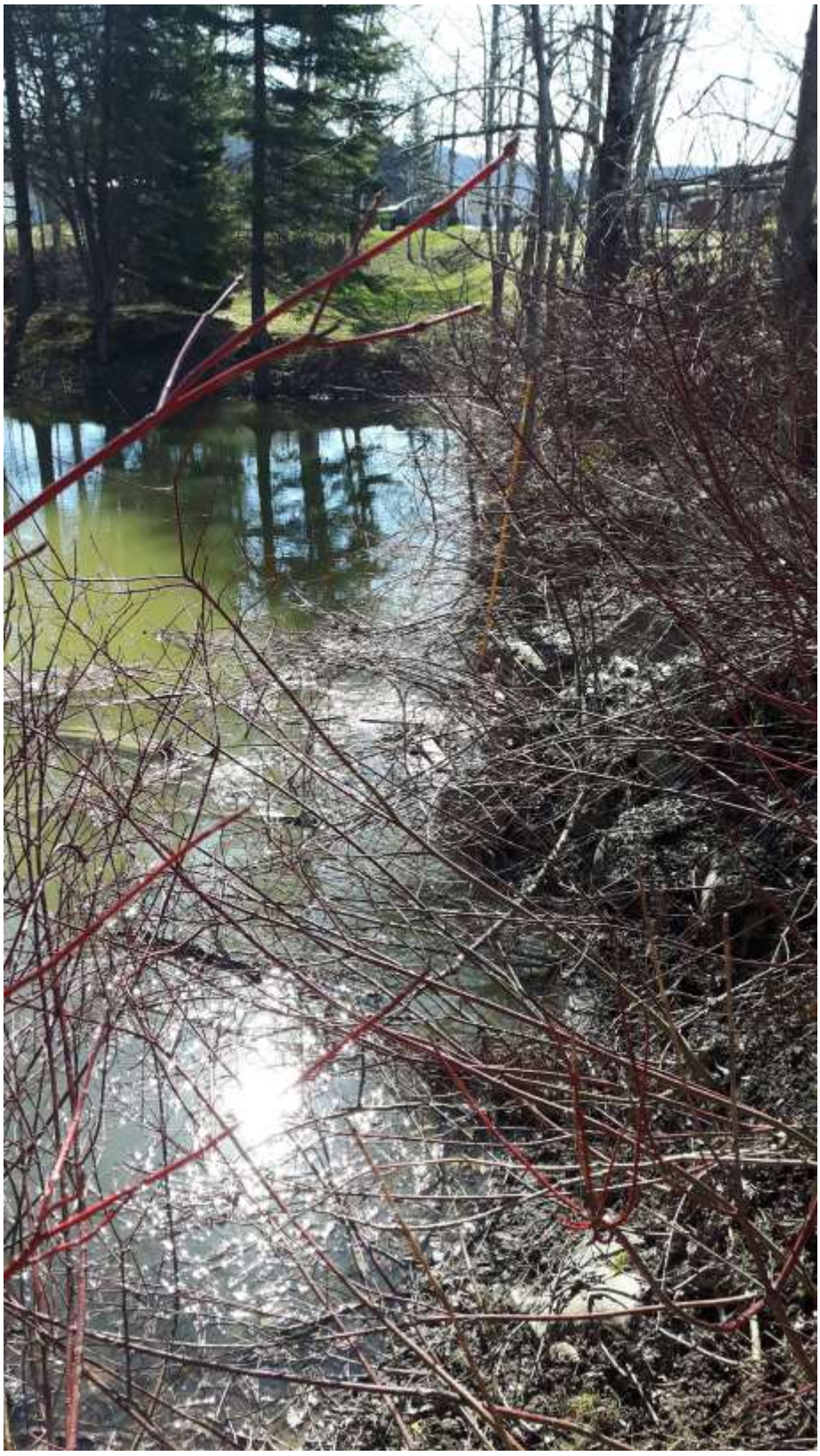


Photo No. 3: McRae Brook / Victoria Street Upstream Bank

Photo No. 4: Upstream Property (North Bank of McRae Brook)

Photo No. 5: Madawaska River (Victoria Street in Foreground)

Photo No. 6: McRae Brook Upstream of Victoria Street

Photo No. 7: McRae Brook Upstream of Victoria Street

APPENDIX C:

Consultation Template

LES PARTIES CONVIENNENT, CHACUN EN CONTREPARTIE DES ENGAGEMENTS PRÉVUS À LA PRÉSENTE CONVENTION, À CE QUI SUIT :

1. Le propriétaire permet expressément à la Municipalité, ses employés, agents, mandataires ou entrepreneurs contractuels indépendants à entrer et empiéter sur sa propriété pendant toute la durée desdits travaux de construction;

2. La municipalité s'engage de libérer dès que possible la propriété du propriétaire à la fin desdits travaux de construction, et de remettre, dans la mesure du possible, la propriété [redacted] du propriétaire dans un état qui est similaire ou meilleur à sa condition d'avant lesdits travaux de construction.

3. La municipalité s'engage à replacer à ses frais toute borne de terrain qui pourrait être déplacé durant les travaux.

PROPRIÉTAIRE

SIGNÉ, SCELLÉ ET REMIS en présence de :)

[redacted] _____

_____ _____

Ville d'Edmundston

SIGNÉ, SCELLÉ ET REMIS en présence de :)

_____ _____

Incl. : Photos du site avant les travaux

APPENDIX D:

NATECH Bathymetry Report

NATECH Environmental Services Inc.
2492 Route 640, Hanwell, N.B. E3E 2C2 ph.: (506) 455-1085 fax.: (506) 455-1088

April 28, 2017

Mr. Jeffrey David, ing./P.Eng.
Roy Consultants Engineering Services
1080, Rue Champlain, unite 13
Dieppe, NB
E1A 8L8

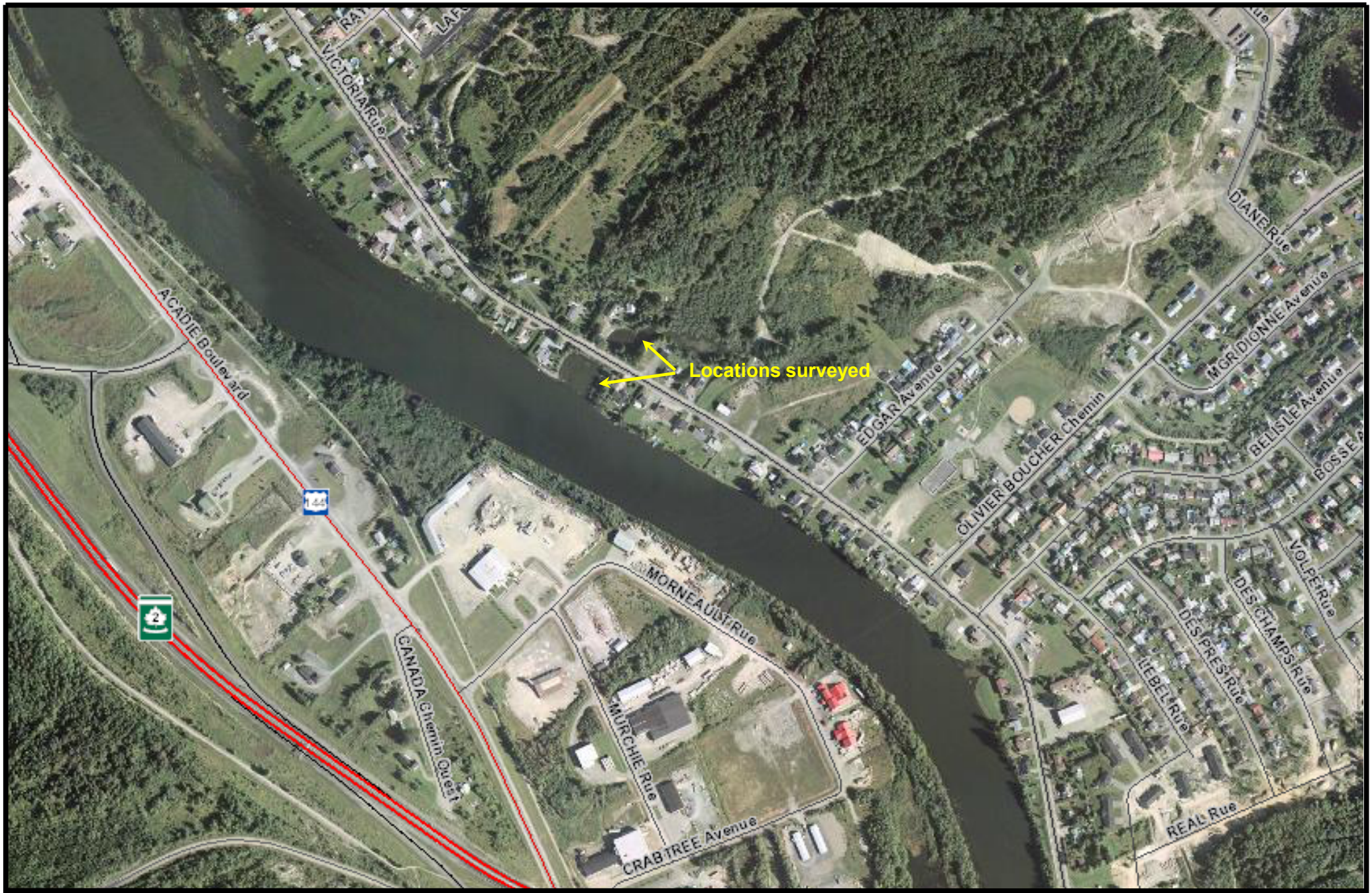
Re: **Bathymetric Survey of the Madawaska River near the culvert replacement location on Victoria Street**

Dear Jeff:

As requested, we surveyed the bathymetry of the small cove on the edge Madawaska River (on the Southwest side of Victoria Street), on April 25, 2017. We also surveyed the small water body on the opposite side of the culvert. Figure 1 shows where these sites are located.

1. Methodology

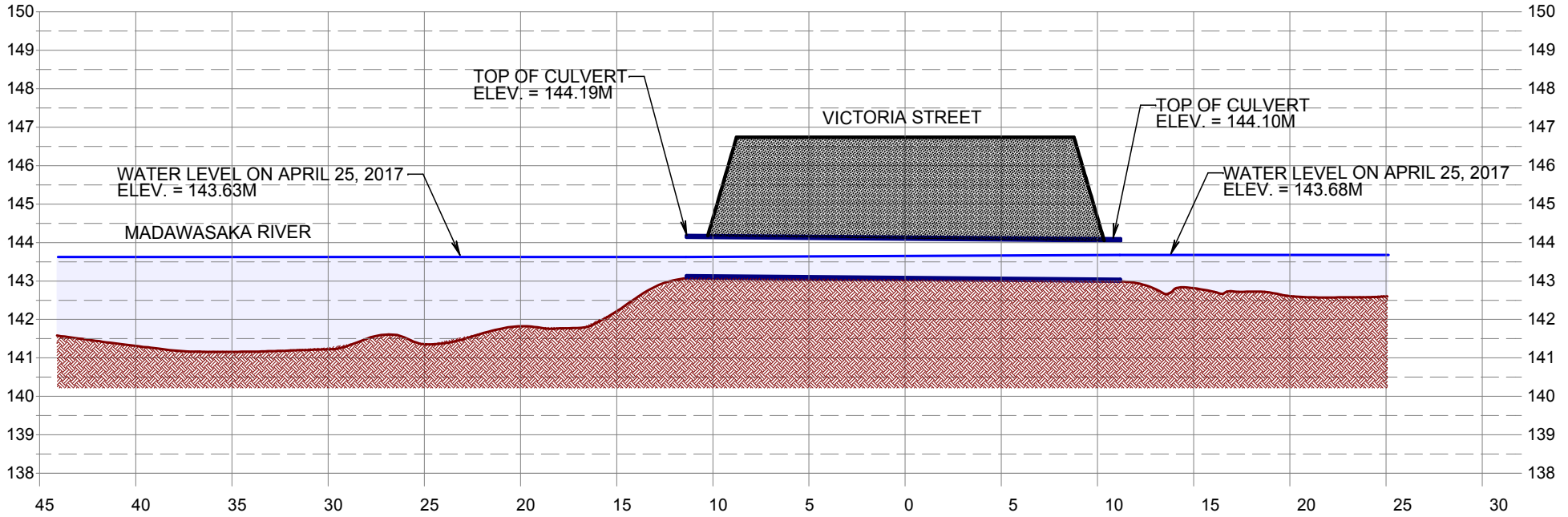
Bottom depths were determined using a manned boat equipped with a GPS and a 200 kHz echo sounder. The shoreline was traced based on aerial photography. The elevation of the water level was surveyed using a Total Station, and referenced to the geodetic benchmark provided by you (#26294, X: 2360632.827m, Y: 7601650.221m, Z: 150.011m)



Bathymetric Survey
Victoria Street, Edmundston
Location map

Environmental Services Inc.
2492 Route 640, Hanwell, NB, E3E 2C2
ph: (506) 455 1085, fax (506) 455 1088

DATE: 2017/04/28	FILE: RED-17-01
SCALE: -	FIGURE: 1



Bathymetric Survey
Victoria Street, Edmundston
Cross-section

NATECH
Environmental Services Inc.
2492 Route 640., Hanwell, N.B.
Ph: (506) 455-1085 Fax: (506) 455-1088

Date: / Date:	Project No.: / N du projet
2017/04/28	RED-17-01
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AS SHOWN	FIGURE 3

Area upstream of culvert

Area upstream of culvert

Upstream end of culvert

Bathymetric Survey **Victoria Street, Edmundston** **Photographs taken on April 25, 2017**	NATECH **Environmental Services Inc.** **2492 Route 640, Hanwell, NB, E3E 2C2** **ph: (506) 455 1085, fax (506) 455 1088**	DATE: 2017/04/28 SCALE: -	FILE: RED-17-01 FIGURE: 5