

**Environmental Review and Project Assessment Report (ERPAR):**

**Proposed PTH 1A (First Street) Bridges over the  
Assiniboine River – Existing Site #2582-00**

**Prepared by: Manitoba Infrastructure and Transportation  
Water Management and Structures**

**June 2015**



## ERPAR PARTICIPANTS

### **Manitoba Infrastructure and Transportation – Water Management and Structures (MIT-WMS):**

Paul Graveline

MIT-WMS Environmental

Michael Hagos

MIT-WMS Project Manager - Structures

Christa Woloschiniwsky

MIT-WMS Environmental

Alrika Rojas

MIT-WMS Environmental

## TABLE OF CONTENTS

	Page
1.0 Introduction .....	6
2.0 Project Area and Location.....	7
3.0 Project Description .....	8
3.1 Background and Project Justification .....	8
3.2 Nature of the Project and Main Components .....	8
4.0 Scope.....	12
4.1 Scope of Project .....	12
4.2 Scope of Review .....	12
5.0 Description of the Existing Environment .....	13
5.1 Description of the Physical Environment.....	13
5.1.1 Climate .....	13
5.1.2 Air Quality .....	13
5.1.3 Noise .....	14
5.1.4 Geology, Hydrogeology, and Soils .....	14
5.1.5 Surface Hydrology.....	18
5.1.6 Brandon Weir/Third Street Dam.....	19
5.1.7 Roadways, Pedestrian Paths and Portages.....	19
5.1.8 Railways .....	19
5.2 Description of the Biophysical Environment .....	21
5.2.1 Aquatic Environment .....	21
5.2.2 Terrestrial Environment.....	26
5.3 Description of the Socio-Economic and Cultural Environment .....	32
5.3.1 Human Environment.....	32
5.3.2 Heritage Resources .....	33
6.0 Environmental Effects and Mitigation Measures .....	34
6.1 Environmental Effects on Physical Components .....	34
6.1.1 Geology, Hydrogeology, and Soils .....	34
6.1.2 Surface Hydrology.....	34
6.2 Environmental Effects on Biophysical Components .....	35
6.2.1 Aquatic Environment .....	35
6.2.2 Terrestrial Environment Effects and Mitigation .....	38
6.3 Environmental Effects on the Socio-Economic and Cultural Components.....	40

---

6.3.1	Human Environment.....	40
6.3.2	Heritage Resources .....	40
7.0	Summary of residual Effects .....	41
7.1	Geology, HYDROGEOLOGY and soils.....	41
7.1.1	Construction Phase .....	41
7.1.2	Post-Construction Phase.....	41
7.2	Surface Hydrology.....	41
7.2.1	Construction Phase .....	41
7.2.2	Post-Construction Phase.....	41
7.3	Water Quality.....	41
7.3.1	Construction Phase .....	41
7.3.2	Post-Construction Phase.....	41
7.4	Sediment Quality .....	42
7.4.1	Construction Phase .....	42
7.4.2	Post-Construction Phase.....	42
7.5	Aquatic habitat.....	42
7.5.1	Construction Phase .....	42
7.5.2	Post-Construction Phase.....	42
7.6	Bivalves .....	42
7.6.1	Construction Phase .....	42
7.6.2	Post-Construction Phase.....	42
7.7	Fish .....	42
7.7.1	Construction Phase .....	42
7.7.2	Post-Construction Phase.....	42
7.8	Species at Risk.....	43
7.8.1	Construction Phase .....	43
7.8.2	Post-Construction Phase.....	43
7.9	Birds .....	43
7.9.1	Construction Phase .....	43
7.9.2	Post-Construction Phase.....	43
7.10	Mammals .....	43
7.10.1	Construction Phase .....	43
7.10.2	Post-Construction Phase.....	44
7.11	Amphibians .....	44
7.11.1	Construction Phase .....	44
7.11.2	Post-Construction Phase.....	44

---

7.12	Reptiles .....	44
7.12.1	Construction Phase .....	44
7.12.2	Post-Construction Phase.....	44
7.13	Human Environment.....	44
7.13.1	Construction .....	44
7.13.2	Post-Construction Phase.....	44
8.0	Public Participation .....	45
8.1	Public and Community Engagement.....	45
8.2	Aboriginal Engagement.....	47
9.0	Monitoring Requirements .....	48
9.1	Pre- and During-Construction .....	48
9.2	Post-Construction .....	48
10.0	References .....	49
11.0	Personal Communications .....	53
12.0	Figures.....	54
13.0	Tables.....	61
14.0	Appendices.....	92
14.1	APPENDIX 1 – Tetra Tech May 2015 Designs.....	92
14.2	APPENDIX 2 – Environmental Description and Proposed Works .....	92
14.3	APPENDIX 3 – Significance Determination .....	92

## 1.0 INTRODUCTION

Located within the northern city limits of the City of Brandon on the Assiniboine River, Site#2582-00 was built in 1972 as a seven span slab on Girder Bridge. The bridge serves as a vital link between the north and south sides of Brandon and is the city route for Trans-Canada Highway 1.

Inspections of the Assiniboine River/CPR Bridge on PTH 1A in Brandon (Bridge Site# 2582-00) by MIT indicated that the bridge rail required replacing and that there was significant concrete deterioration in the deck and substructure. In 2010, MIT carried out a Structural Steel Inspection of the girders and engaged National Testing Laboratories Ltd. to perform a Detailed Condition Survey of the deck and substructure (*email to P. Graveline from M. Hagos from V. Banthia (Tetra Tech), 2015-05-21 – “Project Description for Use In Regulatory Application”*).

Tetra Tech was engaged in 2013 to carry out a preliminary design of a major bridge rehabilitation that included a guardrail replacement and deck, girder and substructure rehabilitation. It was determined that both the girders and substructures would require strengthening and the piers adjacent to the rail lines would require protection from rail impacts. It became apparent that a bridge replacement option should be considered in addition to the bridge rehabilitation options. The proposed works transformed from a bridge rehabilitation into a bridge replacement, in which existing bridge structure would be replaced with twin structures, one running north bound and one running south bound (Bridge Site# 2582-11 and 2582-12), that have longer spans, and reduced number of piers in the waterway (*email to P. Graveline from M. Hagos from V. Banthia (Tetra Tech), 2015-05-21 – “Project Description for Use In Regulatory Application”*) (Appendix 1).

This Environmental review and Project Assessment Report (ERPAR) was assembled to address (to the closest degree possible) the requirements stipulated for an Environmental Assessment Report pursuant to the Canadian Environmental Assessment Act (CEAA), Department of Fisheries and Oceans (DFO), and Transport Canada – Navigation Protection Act (NPA). This document includes information on the following:

- Project area and location;
- Scope of the assessment;
- Project description, including activities;
- Existing environmental conditions within the proposed Project Area;
- Assessment of the need for the Project (e.g., environmental and socio-economic impacts);
- Potential environmental effects of the proposed Project;
- Recommended mitigation measures to minimize or prevent potential environmental effects of the proposed Project; and,
- Summary of residual effects.

## **2.0 PROJECT AREA AND LOCATION**

Site #2582-00 on PTH 1A (First Street Bridge) is located over the Assiniboine River in the City of Brandon, Municipality of Cornwallis (Section E23, Township 10, Range 19W) (Figures 1 to 4).

Considering the proposed works, a review of maps, files, photographs, and existing literature was conducted. In addition, site inspections (e.g., environmental review) were conducted at this site on April 21 and May 21, 2015. A summary of findings and interpretations is listed in Table 1, and further illustrated in Appendices 2.1 to 2.5.

### 3.0 PROJECT DESCRIPTION

#### 3.1 BACKGROUND AND PROJECT JUSTIFICATION

Located within the northern city limits of the City of Brandon on the Assiniboine River, Site#2582-00 was built in 1972 as a seven span slab on Girder Bridge. The bridge serves as a vital link between the north and south sides of Brandon and is the city route for Trans-Canada Highway 1 (Appendix 1). Inspections at Site#2582-00 identified (at a minimum) the need for safety improvements (e.g. guardrail), rehabilitation of bridge deck and sidewalk, and revealed extensive scour within the river channel. Upon further review, the substructure conditions were found to be poor requiring extensive pier modifications. MIT-WMS retained the services of Tetra Tech to review this site and develop preliminary plans. This information (summarized below) was provided to MIT-WMS in report form in July 2014 (*email to P. Graveline from M. Hagos, 2015-04-17 – “Preliminary Design of Major Rehabilitation Works for the Bridge on PTH 1A over Assiniboine River & CP Rail” (BridgeSiteNo.2582-00) – Tetra Tech and email to P. Graveline from M. Hagos, 2015-04-17 – “First Street Bridge Brandon, Public Consultation Report” – Landmark Planning & Design Inc. December 2014*).

#### 3.2 NATURE OF THE PROJECT AND MAIN COMPONENTS

The proposed Site#2582-00 works are anticipated to consist of the following (extracted from: *email to P. Graveline from M. Hagos, 2015-04-17; email to P. Graveline from M. Hagos from V. Banthia (Tetra Tech), 2015-05-21 – “Project Description for Use In Regulatory Application”; email to P. Graveline from M. Hagos, 2015-04-17 – “Preliminary Design of Major Rehabilitation Works for the Bridge on PTH 1A over Assiniboine River & CP Rail” (BridgeSiteNo.2582-00) – Tetra Tech*) (Appendix 1):

- The structure was initially planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications were needed. The structure will require demolition and replacement.
  - **Temporary Access Roads/Crane Pads:** Temporary access roads/crane pads are required for construction of both structures, including demolition of existing structure, construction of new piers and girder erection. Access Roads in the water will be constructed of granular material. At the conclusion of the work the rip-rap used for the Temporary Access Roads will either be salvaged and reused as part of final erosion protection or removed from site.
  - **Temporary cofferdams:** Cofferdams are required for the construction of the proposed new piers. Cofferdams are anticipated to consist of sheetpiling. Sheetpiling will be placed; the cofferdams will be excavated and dewatered. The pier will be constructed in the sequence of driving steel H-piles, forming and casting cast-in-place pile cap, and forming and casting a cast-in-place pier shaft. For each structure two new piers will



require cofferdams, but only one cofferdam will be allowed to be in place at any given time to reduce impact on navigation.

- **Rip-Rap:** The riprap used for final erosion protection is anticipated to be Class 450. The stone will be clean and free from fine materials.
- **Traffic Accommodation and Interruption to the public:** The bridge replacement work will be carried out in stages and two-way traffic (one lane in each direction) will be maintained at all times.
- **Demolition of the Existing Bridge:** Debris shall be prevented from entering the Assiniboine River. Existing concrete pier shafts shall be demolished in-situ to a minimum of 1m below the existing stream bed. Rubble shall be removed and the excavation shall be filled-in with clean rip-rap.
- **Right of Way (ROW) considerations:** The majority of the work will take place within the existing Right of Way. Property acquisition will not be required.
- **Navigational Considerations:**
  - The Assiniboine River is navigable at this location and is listed on the Scheduled List of Waterways by the Navigation Protection Act as is site is located between the Shellmouth Dam and the Red River (Government of Canada 2015).
  - Warning signs shall be placed upstream and downstream of the site on each bank of the waterway until completion of the project.
  - The proposed permanent vertical navigation clearance is 9.58m to the underside of girders and 9.43m to the underside of deck drains.
  - Note: A submission for this project (via MIT-ESS) was made to Transport Canada (NPA) on June 11, 2015.
- Factors requiring consideration for improving the service level of the facility were shortlisted and evaluated, which includes:
  - Alignment - Changing the horizontal alignment of the bridge is constrained at the south abutment due to the presence of intersection with Pacific Avenue. Raising the vertical alignment over the CP Rail tracks would assist in future repairs, rehabilitation, and maintenance of the structure.
  - Existing Structure Capacity - The girders that span the CP Rail tracks require strengthening. There is very little vertical clearance between the rail cars and the existing girders. The existing foundations require strengthening to bring the bridge into compliance with the current AASHTO code. Strengthening foundations for abutments and river piers introduces complications in construction staging and carries significant construction risks.

- Highway Considerations - MIT classifies the bridge on PTH 1A/First Street as a secondary arterial. Over the bridge, optimally, a 10.9m clear roadway width in each direction, allowing for two 3.7m lanes, a 1.5m left shoulder, and a 2.0m right shoulder is required. In addition, a 4.2m clear width sidewalk on either side of the bridge to accommodate pedestrians and cyclists is preferred.
- Staging and Detours – Due to significance of this facility, any improvement works must accommodate a minimum of one 3.7m wide traffic lane in each direction at any stage of the work.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction;
  - New bridge width (overall) will be 9.8 m;
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck;
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles; and
  - Two bridge structures will result, #2582-11 and #2582-12.

### **Project Sequencing**

The anticipated project sequencing consisting of the following (extracted from *email to P. Graveline from M. Hagos, 2015-04-17 – “First Street Bridge Brandon, Public Consultation Report” – Landmark Planning & Design Inc. December 2014*):

- Stakeholder consultation: September 2014 – November 2014
- Finalize decision on bridge option: November 2014
- Detailed design: December 2014 – September 2015
- Project tender: Fall 2015
- Construction period: Late 2015 – Late 2017

Public information sessions:

- September 2014 – November 2014
  - City of Brandon (Mayor and CAO)
  - CP Rail Utilities
  - Emergency Services
  - Brandon Transit
  - Brandon School Division
  - Brandon Chamber of Commerce
  - Recreation Development Department
  - Community Services Department
  - Manitoba Trucking Association
- November 2014

- Public Open House

See Table 1 for proposed work and schedule (*email to P. Graveline from M. Hagos from V. Banthia (Tetra Tech), 2015-05-21 – “Project Description for Use in Regulatory Application”*)

See Table 2 for proposed temporary work and tentative schedule (*email to P. Graveline from M. Hagos from V. Banthia (Tetra Tech), 2015-05-21 – “Project Description for Use in Regulatory Application”*)

## **4.0 SCOPE**

### **4.1 SCOPE OF PROJECT**

Manitoba Infrastructure and Transportation – Water Management and Structures (MIT-WMS) is proposing to expand and replace the existing structure at Site# 2582-00 (First Street Bridge) on PTH 1A in E23-10-19W located in the City of Brandon spanning over the Assiniboine River (R.M. of Cornwallis) and five (5) Canadian Pacific (CP) rail tracks (Figure 1 to 4) (Appendix 2.1 to 2.5).

### **4.2 SCOPE OF REVIEW**

This document provides a preliminary review (assessment) of the surrounding environment. Based on this review, the potential impacts of the project on the environment were determined. This assessment was limited to the Assiniboine River within the vicinity of the PTH 1A (First Street) bridge crossing, located in the City of Brandon, Manitoba. It is through this Environmental Review and Project Assessment that information collected is used to satisfy (where possible) the regulatory requirements set forth from The Environmental Act, Department of Fisheries and Oceans, Heritage Resource Branch, and Transport Canada (Navigation Protection Act (NPA)).

## 5.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

### 5.1 DESCRIPTION OF THE PHYSICAL ENVIRONMENT

#### 5.1.1 Climate

Climate characteristics for the project area were taken from the Canadian Climate Normals (1911-2000) (Environment Canada [EC] 2015). Normals were recorded at the Brandon A Station, Manitoba (Latitude: 49°54' N, Longitude: 99°57' W, Elevation: 409.4 m)

From 1971 to 2000, average annual air temperature was 1.9°C, with average daily temperatures ranging from -18.0°C in January to 18.4°C in July. Average daily maximum temperatures ranged from -12.6°C in January to 25.2°C in July while average daily minimum temperatures ranged from -23.5°C in January to 11.4°C in July. The hottest recorded temperature (38.5°C) was in August 1988 while the coldest recorded temperature (-45.6°C) occurred in January 1966.

For the period of record from 1971 to 2000, the area received an average of 373.1 mm of rain and 112.0 cm of snow per year. The highest average rainfall occurred in July (75.8 mm), while the highest average snowfall occurred in January (22.1 cm). The majority of the precipitation (68%) falls between the months of May and August.

#### 5.1.2 Air Quality

Air quality surrounding the region of Brandon was described by North/South Consultants Inc. (2014) in the Environmental Screening Report of the Proposed Dredging of the Rapid City Dam:

*Air quality in Manitoba is monitored by Manitoba Conservation under the National Air Pollution Surveillance (NAPS) Network at three locations: Winnipeg, Brandon and Flin Flon. The nearest NAPS station to the project area is in the industrial area of Brandon, Manitoba. From 2003 to 2008 air quality recorded at this station was in the "Good" range over 85% of the time (PSRM 2009). The air quality in the project area is presumed to be that of a small city, rural community. Factors that contribute to air quality in the project area include vehicle emissions and road dust, exhaust resulting from using natural gas, diesel or wood to heat homes and buildings, and sources associated with agricultural practices outside of the city. Some of these sources affecting air quality may include the dust generated during sowing and harvesting of crops or high winds, the seasonal application of fertilizers and pesticides, the presence of livestock on neighbouring land and seasonal burning of crops. In most years, the majority of the "Fair" to "Very Poor" air quality events recorded at the Brandon station occurred between May and October, and was attributed to smoke from forest fires within Manitoba and adjacent provinces, burning of agricultural residue locally, and wind swept dust (PSRM 2009, Krawchuk and Snitowski 2008).*

### 5.1.3 Noise

Noise levels in the project area should be typical of a small city. Expected sources of noise year round include local traffic on PTH 1A and surrounding residential neighbourhood, outdoor residential activities, recreational activities in the adjacent parks, train traffic (CPR), and on the river (boat motor/snowmobile).

### 5.1.4 Geology, Hydrogeology, and Soils

Earth Tech (Canada) Inc. was retained by the City of Brandon to conduct a Three Phase Environmental Site Assessment on four (4) properties located at 9-1<sup>st</sup> Street, 17 Pacific Avenue, 218 Pacific Avenue, and 308 Pacific Avenue in Brandon Manitoba (Figure 6). The four (4) sections of land have the following legal descriptions:

- Lot 13 – 22 Block 39 Plan 4, and Lots 13 to 22 Block 38 Plan 4 BLTO
- Lot 37 – 43 and portions of Lot 44 Block 40 Plan 4 BLTO
- Lot 17 – 22 Block 37 Plan 4 BLTO
- Lot 15 – 24 Block 36 Plan 4 BLTO

Dates in which the reports were completed include Phase I July 2002, Phase II June 2003, and Phase III May 2005 (Earth Tech Inc. 2002, 2003, and 2005). It was through these Environmental Site Assessments that the areas in these properties were assessed in regards to land contamination. It is the property located at 9-1<sup>st</sup> Street that is in closest proximity to Site#2582-00 (i.e., southeast corner of anticipated construction).

Earth Tech (Canada) Inc. (2002) conducted Phase I Environmental Site Assessment in Brandon, and stated the following site information:

#### **GENERAL SITE DESCRIPTION**

*The subject properties are presently registered to The City of Brandon. We understand the properties have recently been reclaimed by the City of Brandon to pay outstanding taxes. The closest body of water is the Assiniboine River, located less than 270 m north of all four properties. There are no other major sources of surface water that could be cause for concern. A review of the Environment Canada Flood Risk Map for the City of Brandon indicates that subject properties are located outside the area identified to be at risk of flooding as a result of high flows on the Assiniboine River. The subject properties have an approximate elevation of 370 m above mean sea level as given by topographical map 62 G/13, Department of Energy, Mines, and Resources; information current as of 1981. The ground water withdrawal demands in the area are expected to be relatively low since the City of Brandon provides a municipal water supply from the Assiniboine River as a source for potable water. It is likely that the building located at 9-1st Street received potable water from the City of Brandon. The wastewater generated on the*

*site was disposed of via the municipal sewer system maintained by the City of Brandon. The closest known landfill site (dumpsite) is at least 3.6 km (2.3 miles) away to the southeast.*

*A review of the well logs obtained from the Groundwater Division, Natural Resources Department, Province of Manitoba, indicates that the soils in the vicinity of the site are highly variable. However, the typical lithology of the soils around the site would include layers of fine to coarse sand and gravel overlaying layers of either clay or stony till. The layers of sand and gravel ranged from approximately 0.5 m to more than 5.5 m in thickness. A layer of boulders can be expected to be encountered somewhere between 9 m to 18 m below ground level.*

### **9-1st Street**

*The property located at 9-1st Street is approximately 150 m by 32 m and was occupied by one building. It appeared that the building contained office and storage space for Brandon Scrap Iron and Metal Ltd. and Manitoba Hide and Fur, as well as an area believed to be used for the tanning of animal hides. The remainder of the site consisted of a storage area covered with gravel. It is likely that this area was used to store scrap metal and derelict automobiles. An abandoned rail spur line enters the property from the south about midway between the east and west extents of the property and continues along the southern property line. Immediately north of where the spur line enters the property a concrete pad, which appears to be the remains of a shearing mechanism, was present.*

*Land use on the surrounding properties appeared to be primarily commercial, with the exception of two properties located east of 9-1st Street, which appeared to be residential. Horizon Builders and 17 Pacific Avenue are located north of the subject property across Pacific Avenue. The property located across Russell Street, east of the subject site, appeared to be residential and contained a house; however no one was present to confirm the status of the house. The Canadian Islamic Trust owns the property located south of the subject site. This property was formerly owned by Imperial Oil and is still occupied by the Imperial Oil buildings. The properties located west of the subject property, across 1st Street, were all commercial properties and include Mohawk and Lawn Boy.*

In 2003, Earth Tech (Canada) Inc. conducted Phase II Environmental Site Assessment in Brandon, and stated the following site information in regards to soil, geology and hydrogeology:

### **Surface Water Usage**

*The City of Brandon obtains drinking water for treatment prior to distribution well upstream from the nearest significant surface water source, the Assiniboine River. The nearest portion of the site is located approximately 200 m up-gradient to the south of the river with the CPR rail yard in between. The Assiniboine River provides recreational fishing and boating activities and is also the effluent receiver from runoff and the wastewater plants in the Brandon area.*

### **Soil Types**

*Soils of the area are part of the Benchlands Complex consisting of fine textured alluvial and outwash deposits over substratum, which may consist of cobbles, gravel, shaly gravel, sand or modified boulder till. The soils are normally encountered on the valley terraces of the Assiniboine River, as well as other rivers in the area with smooth gently sloping topography (Report of Reconnaissance Soil Survey of Rossburn and Virden Map Sheet Areas, April 1956, Manitoba Soil Survey).*

*The soils encountered on the site during the investigation, generally consisted of varying layers of clay, gravel, and sand fill overlying clayey till or silty sand layers representing assumed native material at varying depths with groundwater encountered in some of the drilling locations. The inferred native materials were encountered between 0.6 and 6.1 m below ground level (mBGL), depending on the area of the site.*

### **Bedrock Geology**

*The underlying bedrock geology in the area is composed of Cretaceous shales of the Vermilion River formation (Geological Highway Map of Manitoba, 1987). These include carbonaceous shale (Morden Member); speckled calcareous and carbonaceous shale (Boyne Member); thin bentonite beds, carbonaceous shale; and, bentonitic shale (Pembina Member).*

### **Hydrogeology and Water Wells**

*The well log database supplied by the Groundwater Management Branch of Manitoba Conservation's Water Branch was searched to identify the nature of registered wells in the vicinity of the subject site. The search was conducted to identify all registered wells within Section 24, Township 10, Range 19 west. In total, nine (9) wells were registered including five (5) registered for domestic production and four (4) registered as test wells.*

The preliminary soil analyses performed during the Phase I site investigation indicated that the property has been impacted with lead, arsenic, copper, thallium, and tin in excess of the Canadian Council of Ministers of the Environment's (CCME) comparison criteria, as well as having other heavy metals that did not exceed the criteria (2002)

In Phase II, the assessment focused on heavy metal contamination. All four sites were found to be impacted by heavy metal contamination in excess of CCME's residential/parkland and industrial criteria, which included samples in both soil and groundwater. Based on the testing that was completed, most of the contamination was found in the fill material that was deposited on site. There were some suspected hydrocarbon indications and impacts, however, hydrocarbons was not a focal investigation in Phase II (2003)

Phase III found that properties located at 123 Rosser Avenue, 9 - 1st Street, and 17, 218 & 308 Pacific Avenue were impacted by the presence of hydrocarbon and heavy metal contamination in concentrations exceeding CCME commercial criteria, the Canada Wide Standards (CWS) for Hydrocarbons in Soil and the Freshwater/Aquatic Life criteria. The information gathered during the



Phase III investigation was meant to summarize the size and extent of the soil and groundwater impacts as a precursor to any remediation work.

The following information was drawn from Earth Tech (Canada) Inc. (2005) Phase III report:

*Although impacted soil plumes have been delineated for both hydrocarbons and metals, the extent of the groundwater impacts to the north of the entire site have not been delineated onto Canadian Pacific Rail (CPR) property. As the potential transport to the Assiniboine River has potentially significant ramifications in regards to impacts on fish and aquatic life, any potential remediation options should attempt to mitigate the migration of impacted groundwater off-site to the north.*

*Heavy metal impacts to groundwater in excess of the Freshwater/Aquatic Life criteria have been confirmed in samples collected from every installed monitoring well on the site including background monitoring wells installed in upgradient locations. This suggests either high background concentrations of several heavy metal groundwater parameters or a potential off-site source of heavy metal impacts to the groundwater in the area. Metal parameter concentrations encountered in all monitoring wells including upgradient background monitoring wells in excess of the referenced criteria include the following:*

- Aluminum · Iron · Selenium*
- Arsenic · Manganese*
- Copper · Lead*

*It should be noted that although the concentrations of some heavy metals in the background monitoring wells installed upgradient of the site already exceed the Freshwater/Aquatic Life criteria, the concentrations of the heavy metals listed above generally increase as the groundwater travels across the site to the north before decreasing slightly along the northern boundary of the site.*

*Additional heavy metals not present in the background monitoring wells installed upgradient of the site (i.e. – groundwater heavy metal impacts originating on the site) are also present in concentrations exceeding the referenced criteria and include the following:*

- Antimony · Chromium · Thallium*
- Barium · Mercury · Zinc*
- Cadmium · Nickel*

*The hydrocarbon-impacted soil plume is mostly contained on the 123 Rosser Avenue property occupying an approximate area of 4,950 m<sup>2</sup> and representing a volume of approximately 27,000 m<sup>3</sup>. The Phase III investigation has also delineated a heavy metal-impacted soil plume with an approximate volume of 16,500 m<sup>3</sup>. Heavy metal-impacted soil volume estimates for the northern portions of the site located at 9 – 1st Street, 17 Pacific Avenue, and 218 & 308 Pacific*

*Avenue were determined in the Phase II investigation to be approximately 22,100 m<sup>3</sup>, 900 m<sup>3</sup>, and 1,400 m<sup>3</sup>, respectively. This equates to a total of 40,900 m<sup>3</sup> for all five properties. An overlap of the hydrocarbon impacted and metals-impacted soil plumes exists on the 123 Rosser Avenue property occupying an approximate area of 1,100 m<sup>2</sup> and an estimated volume of 4,900 m<sup>3</sup>.*

*Groundwater in background monitoring wells installed upgradient of the site contain several metal parameters in excess of the referenced criteria. Groundwater impacts on the site include hydrocarbons identified in six monitoring wells in excess of the referenced criteria in addition to heavy metals identified in all on-site monitoring wells exceeding the referenced criteria. Groundwater impacts have not been delineated to the north of the site.*

Note: Additional investigations on Hydrogeology are currently underway. Information may be appended to this report as required and/or if relevant.

### **5.1.5 Surface Hydrology**

North/South Consultants Inc. (2006) conducted a Fish Habitat Assessment for MIT for the construction of the 18<sup>th</sup> Street Bridge (PTH 10) in Brandon, and reported on the following hydrology information:

*The Assiniboine River at Brandon has a total upstream drainage area of 93,700 km<sup>2</sup>. The majority of the water supply comes from the upper Assiniboine River (Shellmouth Reservoir) and the Qu'Appelle River, which enters the Assiniboine River near the Manitoba / Saskatchewan border south of the Shellmouth Dam. Downstream of these sources, the largest influents are the Little Saskatchewan River (9 km upstream of Brandon) and the Souris River (approximately 35 km downstream of Brandon).*

*The discharge in the Assiniboine River has been regulated since 1974 through the controlled release of water from the Shellmouth Reservoir. Despite regulation, the river undergoes wide seasonal fluctuations in discharge (Figure 5). Median discharge at Brandon (WSC 05MH013) is highest in mid-April at 87 m<sup>3</sup>/s, dropping rapidly through summer to a low of 10 m<sup>3</sup>/s in mid-September (Environment Canada 1997). A small increase in discharge generally occurs in fall and is maintained through much of the winter. Discharge at the 18th Street bridge in Brandon was 11.95 m<sup>3</sup>/s on September 11, 2006, slightly higher than the median for that date at WSC 05MH013.*

*The Assiniboine River is characterized as a river that meanders through the well-drained historic river valley within an occasionally confined but mobile channel. Bottom substrate is dominated by sand interspersed with varying amounts of gravels as well as finer sediments in low water velocity areas. Riffles created by granite and limestone cobble provide diversity in depths, channel morphology, and water velocities. Other than filamentous algae on stable substrata in shallow water, instream vegetation is minimal, due to scouring during high flows, unstable*

*substrata, and/or limited light penetration. However, during prolonged low flows, algae and vascular vegetation increase (Toews 2002).*

*The nearest barriers to fish passage in relation to the 18th Street bridge site are two fixed weirs at the City of Brandon, both downstream of the project site. The Brandon 3rd Street Weir ("Dam") likely blocks fish passage at river flows below 40 – 80 m<sup>3</sup>/s, whereas the weir constructed by Manitoba Hydro just downstream of Brandon appears to allow fish passage at flows as low as approximately 14 m<sup>3</sup>/s (pers. comm. B. Bruederlin, Manitoba Water Stewardship Fisheries Branch, Brandon Manitoba, October 2006).*

#### **5.1.6 Brandon Weir/Third Street Dam**

The Third Street Dam in Brandon is located approximately 200 m upstream of the PTH 1A – First Street Bridge location. The original dam had been in operation since 1962 (DFO 2010), however following the failure of spring 2008, a replacement overflow rockfill weir was installed in 2013. This newer structure was equipped with a low flow rock ramp fishway, restoring fish passage and adding a possible spawning habitat (KGS Group 2015; City of Brandon 2012).

#### **5.1.7 Roadways, Pedestrian Paths and Portages**

Bridge Site#2582-00 permits traffic over the Assiniboine River into the southern portions of the City of Brandon. PTH 1A is a major highway that has two (2) lanes northbound and two (2) lanes southbound that allows traffic within and outside of the City of Brandon. As well, at the southwest abutment, Pacific Avenue (residential street) intersects PTH 1A. Pacific Avenue has a bus stop approximately 50 m west of the southwest abutment. There are also two gravel access roads within the project area. One runs alongside PTH 1A and the Optimist Soccer Park towards the Assiniboine River on the northeast abutment. The other runs between the Assiniboine River and the CP tracks under the south portion of the bridge structure with access from Assiniboine Avenue (Appendix 2.1).

There are several pedestrian paths within and surrounding the project area. A paved pedestrian path runs under the north abutment of the bridge structure. This path connects the Dinsdale Park on the northwest side to the Optimist Soccer Park on the northeast side. There is also a pedestrian path in the southeast corner of the project area that continues southward into a park area.

There is a paddle vessel launch/portage location on the north side of the Third Street Dam, which is approximately 200 m west of Site#2582-00. The launch is on the inside curve of the river, and the bank is primarily composed of silt and mud. This location promotes accessibility of paddle vessels to the Assiniboine River.

#### **5.1.8 Railways**

The project area includes land used by Canadian Pacific (CP) railways. Five (5) tracks of CP railways run in an east-west direction under the south portion of Bridge Site #2582-00. The location of these tracks is

between the riverbank and a secondary grassed slope, and it is only beyond the southern portion of CP land that the residential land of the City of Brandon continues. (Appendix 2.1, 2.3, and 2.4)

## 5.2 DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT

### 5.2.1 Aquatic Environment

#### 5.2.1.1 *Water Quality*

The Assiniboine River is a typical highly turbid river that flows in a west to east direction, discharging into the Red River within the City of Winnipeg. The water quality of the Assiniboine River was studied from May 2001 to May 2002 by the Water Quality Management Section of the Water Branch of Manitoba Conservation (Armstrong 2002). Average chemical concentrations were measured along the Assiniboine River, as well as, at station MB05MHS002 (Assiniboine River at TCH, West of Brandon) is located 0 km from Brandon (Lat. 49.8681, Long. 100.0983). This station is upstream from Site#2582-00. At this station, average measurements recorded include:

- pH – 8.29
- Specific conductivity (uS/cm) – 894
- True color (color units) – 20
- Turbidity (NTU) – 20.62
- TDS (total dissolved solids; mg/L) – 628
- TSS (total suspended solids; mg/L) – 46
- DO (dissolved oxygen; mg/L) – 7.31
- BOD (biological oxygen demand; mg/L) – 2.5
- TC (total carbon; mg/L) – 81
- TOC (total organic carbon; mg/L) – 14
- NH<sub>3</sub> (ammonia-N; mg/L) – 0.065
- TKN (total kjeldahl nitrogen; mg/L) – 0.922
- NO<sub>2</sub>NO<sub>3</sub> (nitrate-nitrite-N; mg/L) – 0.205
- TP (total phosphorus; mg/L) – 0.159
- TDP (total dissolved phosphorus; mg/L) – 0.073
- OrthoP (orthophosphate; mg/L) – 0.121
- Chla (chlorophyll a; µg/L) – 12.3

#### 5.2.1.2 Aquatic Habitat

The aquatic habitat was described by North/South Consultants Inc. (2006) in the Fish Habitat Assessment for the Assiniboine River Bridge Construction PTH 10 in Brandon:

*The Assiniboine River is characterized as a river that meanders through the well-drained historic river valley within an occasionally confined but mobile channel. Bottom substrate is dominated by sand interspersed with varying amounts of gravels as well as finer sediments in low water velocity areas. Riffles created by granite and limestone cobble provide diversity in depths, channel morphology, and water velocities. Other than filamentous algae on stable substrata in shallow water, instream vegetation is minimal, due to scouring during high flows, unstable substrata, and/or limited light penetration. However, during prolonged low flows, algae and vascular vegetation increase (Toews 2002).*

#### 5.2.1.3 Bivalves

A literature review describing available published information with respect to freshwater mussels and mussel habitat within the Assiniboine River and associated waterbodies was conducted. To supplement the literature review, qualitative mussel surveys will be conducted by Tetra Tech in the Project Area.

The Assiniboine River provides year-round habitat for a wide variety of mussel species, (Table 4). A survey performed by the Manitoba Conservation Wildlife and Ecosystem Protection Branch in 2006 found nine freshwater mussel species (Mollusca: Unionidae) inhabiting the Assiniboine River in the Brandon area (North/South 2006; Table 4). An informal field survey conducted in accordance with protocol outlined in the *Fish Habitat Inventory and Information Program, Stream Survey Guide* by the Department of Fisheries and Oceans and British Columbia's Ministry of Environment during September 2006 reported empty valves of Pigtoe, Plain Pocketbook, Fat Mucket, and Giant Floater species. Living specimens found during this survey were exclusively Plain Pocketbooks. Survey method involved searching for empty valves along the shoreline, bottom grabs for live specimens during cross-section substrate sampling, and some raking (North/South 2006). The endangered Mapleleaf mussel (*Quadrula quadrula*) was not included in the study, however, a fish and mussel salvage conducted by North/South Consultants during the PTH 10 - 18<sup>th</sup> Street, Brandon 2009 bridge construction identified and relocated three Mapleleaf mussels (North/South 2009).

Mussel salvages were conducted in 2009 at 18th Street bridge site in Brandon, Manitoba (North/South 2009). The south cofferdam salvage was conducted September 25, 2009 and the north cofferdam salvage was conducted October 14, 2009. The south-shore cofferdam resulted in 158 mussels recovered. The threeridge (*Amblema plicata*) was the dominant mussel species captured, comprising just over half of the mussel catch (n=81). Other mussels recovered included the fatmucket (*Lampsilis siliquoidea*) (n=22), the plain pocketbook (*Lampsilis cardium*) (n=18), and the black sandshell (*Ligumia recta*) (n=16). Less common captures included the giant floater (*Pyganodon grandis*) (n=9), the Wabash pigtoe

(*Fusconaia flava*) (n=6), the white heelsplitter (*Lasmigona complanata*) (n=2), and the creeper (*Strophitus undulatus*) (n=1). Three mapleleaf mussels (*Quadrula quadrula*) were recovered and relocated. The north-shore cofferdam on October 14, 2009 recovered three mussels. Mussel captures included two fatmuckets and one giant floater. Mussels were located in substrate consisting of soft clay, mud and silt. Mussels were relocated in silt/clay substrate at approximately 0.75 m water depth and dropped from the water surface, settling to the bottom (in waters greater than 1 m in depth). Three mapleleaf mussels were recovered during the south-shore cofferdam salvage. All specimens were found in clay/silt in the north-western portion of the cofferdam. No mapleleaf mussels were found during the salvage at the north-shore cofferdam. The recovered mapleleaf mussels were all relatively small, measuring 6.4, 5.8 and 5.8 cm in length (anterior-posterior). Ages were estimated to be relatively young (less than 10 years) based on the number of annuli observed and length-age data (Carney 2003 *in North/South 2009*). The three mapleleaf mussels found were similar in size to those recovered in 2008 (Mazur and Heese 2009 *in North/South 2009*).

The bottom substrate of the Brandon segment of the Assiniboine River is predominantly sandy with varying amounts of gravel and fine sediment in low water velocity areas such as shorelines (North/South 2006). This provides a suitable habitat for Mapleleaf mussels, which favour a mixture of sand, gravel and cobble over pure sand (Carney 2004). However, the presence of the Brandon Dam located approximately 200 m upstream to the current location of the PTH 1A – First Street Bridge may have negatively altered the existing Mapleleaf mussel habitat conditions through increased velocity, sedimentation or riverbank damage (COSEWIC 2006; Mackie et. al, 2008).

#### 5.2.1.4 Fish

Fish habitat was assessed within Assiniboine River in the vicinity of the 18th Street bridge on September 11 and 12 (2006) by North/South Consultants Inc. The assessment of fish habitat followed the protocol outlined by the Department of Fisheries and Oceans and British Columbia Ministry of Environment document (DFO and BCMOE 1989). The following information is from North/South Consultants Inc. December 2006 Report “*Assiniboine River Bridge Construction PTH 10 Brandon - Fish Habitat Assessment. Conducted for Manitoba Infrastructure and Transportation*”:

*The Assiniboine River at the 18th Street bridge site in Brandon is comparable to the First Street bridge site in Brandon. It can be considered that both sites provide suitable habitat and cover for both small and large-bodied species for all life requisites, including migration, foraging, spawning, rearing, and over-wintering. Habitat at the sites is similar to areas upstream and downstream and therefore not unique. Based on these considerations, the habitat can be considered important according to the DFO criteria (Fisheries & Oceans Canada 1998).*

*The Assiniboine River near the 18th Street bridge site provides year-round habitat for a wide variety of fish species, including species that are sought after for recreational fishing, such as walleye, sauger, northern pike, channel catfish and lake sturgeon (Table 4).*

*Six species of fish were captured during the one day survey as part of this project, including chestnut lamprey, common carp, northern pike, mooneye, quillback, and silver redhorse. All species were caught within or adjacent to the aquatic macrophyte bed along the right bank downstream of the existing bridge, except the mooneye which was caught along an area of riprap approximately 120 m downstream of the existing bridge along the left bank. The chestnut lamprey was attached to a carp that was captured. All fish were captured in near-shore areas in water less than 2.0 m deep over substrates primarily of silt and sand, except the mooneye which was captured along cobble/boulder riprap.*

*Other surveys of the Assiniboine River in areas from Brandon downstream to the Red River report sucker species (shorthead redhorse, silver redhorse, white sucker and quillback) as a dominant component of the large-bodied fish community (MacDonell 1999, Toews and Schneider-Vieira 1999, Nelson and Franzin 2000). Walleye, sauger, goldeye, mooneye, carp and silver chub although not as abundant as suckers were, also commonly recorded in these studies. In their study of habitat availability and use by fish in the Assiniboine River from Portage la Prairie downstream to the Red River, Nelson and Franzin (2000) reported a greater diversity of habitat in bank areas as compared to channel areas of the river. Similarly, fish species diversity and abundance was greater in bank areas. Nelson and Franzin (2000) observed a selection for low to moderate water depths (1.0 - 2.0 m), moderate water velocities (0.5 – 1.0 m/sec), and substrates ranging from silt, sand and gravel/cobble. There was an avoidance of deep main channel areas, as well as shallow water clay zones. Recognizing the limitations of the sampling method and the limited sampling conducted as part of this project, the fish survey results support the findings of Nelson and Franzin (2000) in that no fish were captured in the shallow water clay substrates or the deep channel areas.*

#### 5.2.1.5 Aquatic Species at Risk

The following information is from North/South Consultants Inc. December 2006 Report "Assiniboine River Bridge Construction PTH 10 Brandon - Fish Habitat Assessment. Conducted for Manitoba Infrastructure and Transportation":

*Manitoba indigenous species of plants and animals that are at risk of extirpation or extinction receive protection under the Manitoba Endangered Species Act (MESA) and/or the Canadian Species at Risk Act (SARA). The purpose of these two pieces of legislation is to prevent species from becoming extinct; to facilitate the recovery of species determined to be at risk; and to encourage the management of species to prevent them from becoming at risk. The MESA and SARA provide protection for species of indigenous organisms that are considered "Endangered", where the species is in imminent danger of extinction, or species considered "Threatened", where the species is likely to become endangered. The SARA also identifies species that are of "Special Concern" due to the combination of biological factors and threats that put a species at risk of becoming Threatened or Endangered. However, protection under SARA is not afforded to species designated as Special Concern. Currently, the SARA lists species on Schedules 1, 2 and 3,*



*and it is only species listed on Schedule 1 that are afforded protection under the Act. Species listed on Schedule 2 or 3 of SARA are either awaiting review by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or final recommendation by the Minister as to listing under the Act.*

*Two of the fish species that are known from the Assiniboine River in the Brandon area are listed under the SARA (<http://www.speciesatrisk.gc.ca>) but are not listed under MESA. The silver chub is listed as Special Concern on Schedule 1 of SARA, and the chestnut lamprey is listed as Special Concern on Schedule 3 of SARA. The Assiniboine River likely provides year-round habitat for the silver chub, whereas adult chestnut lamprey are expected in the Assiniboine River with spawning and rearing of ammocoetes occurring in tributaries (Stewart and Watkinson 2004).*

*In May 2005, COSEWIC recommended the western population of the lake sturgeon be listed as Endangered under SARA; however, official status under SARA is pending public consultation. Historically, lake sturgeon have inhabited the Assiniboine River and have been stocked annually in the Assiniboine River near Brandon since 1996 with approximately 9,000 fry, fingerlings, juveniles or adults released into the river to date (pers. comm. B. Bruederlin, Manitoba Water Stewardship Fisheries Branch, Brandon Manitoba, October 2006). Lake sturgeon have been reported by anglers from the Assiniboine River in Brandon, and they likely make use of the river near the bridge site for foraging during at least part of the year (pers. comm. B. Bruederlin, Manitoba Water Stewardship Fisheries Branch, Brandon Manitoba, October 2006). The mapleleaf mussel (*Quadrula quadrula*) was recommended by COSEWIC for listing under SARA as Endangered in April 2006. As for the lake sturgeon, official status under SARA has not been granted. Historically, (prior to 1992), the mapleleaf mussel was known largely from the Red River, south basin of Lake Winnipeg, and the lower Assiniboine River, with only two records upstream of Brandon in the Assiniboine River (COSEWIC 2006). Recent studies (1992 – 2006) show a distribution in the Assiniboine River that is restricted to the lower reaches, with the furthest upstream record 50 km upstream of the Portage Diversion (COSEWIC 2006). Based on the COSEWIC (2006) status report, this species is not expected to occur at the 18th Street Bridge Site in Brandon.*

MIT completed a review of aquatic species of concern in relation to COSEWIC, SARA, and MBESA in June 2015 and updated changed statuses. The updated Silver Chub (*Macrhybopsis storeriana*) COSEWIC status was found to be “not at risk”, and the Chestnut Lamprey (*Ichthyomyzon castaneus*) COSEWIC status was “data deficient”. Both species were unlisted by SARA or MBESA. As well, the Mapleleaf Mussel (*Quadrula quadrula*) was designated as “endangered” by COSEWIC, SARA and MBESA. The Manitoban Red-Assiniboine Rivers population of Lake Sturgeon (*Acipenser fulvescens*) continues to be listed as “endangered” by COSEWIC, and unlisted by both SARA and MBESA.

## 5.2.2 Terrestrial Environment

A review of information on the terrestrial environment was conducted. Federal and provincial legislation and sources, including SARA, MBESA, and the MBCDC, were used to identify at-risk species with distribution ranges within the Project Study Area. Assessment and status reports from North/South Consultants Inc. (2006; 2014), COSEWIC, SARA and MBESA were utilized where available for species of interest (Tables 4 to 11) and for descriptions on regional conditions. Literature examining the potential impacts of activities associated with and relevant to the Project was reviewed.

The terrestrial environment surrounding the Project was considered via a desktop review and site visits (Figures 1 to 4). The desktop review included the evaluation of the surrounding area and identification of species that may be present within the area. Observations during the course of field investigations by MIT on April 21 and May 21, 2015 were used to describe the existing terrestrial environment within the project area. The Project site was delineated into four areas: northeast abutment, southeast abutment, southwest abutment, and northwest abutment. Each of these areas are described, documented and illustrated (by photograph) in Appendices 2.1 to 2.5.

The Project area is considered to be within Manitobas Aspen Parkland Ecoregion.

### 5.2.2.1 Habitat and Plants

#### 5.2.2.1.1 Landscape

The Regional landscape of the area (i.e., Manitobas Aspen Parkland Ecoregion) was described by North/South Consultants Inc. (2014):

*The Study Area is located within Manitoba's Aspen Parkland Ecoregion of the Prairie Ecozone, demarked by the Manitoba Escarpment at the eastern-most boundary (Manitoba Conservation 2001, Smith et al. 1998). The Aspen Parkland Ecoregion is underlain by Upper Cretaceous shale sediments, and is covered by calcareous glacial till, with significant areas of lacustrine and hummocky to ridged fluvioglacial deposits (Ecological Stratification Working Group 1995). This ecoregion is considered the transitional area between the boreal forest to the north and the grasslands to the south (Ecological Stratification Working Group 1995). In general, the Aspen Parkland Ecoregion slopes gently eastward, and is drained by the Souris, Assiniboine, Qu'Appelle and Pembina Rivers (Smith et al. 1998).*

The project area is situated in the city of Brandon on PTH 1A, which continues over the Assiniboine River by Bridge Site#2582-00. The bridge site acts as an important passage into the southern portion of the City of Brandon, and also spans over 5 CP rail lines across the south abutment (Appendix 2.3 and 2.4). The area south of the bridge side is residential property, as well as a park in the southeast quadrant. North of the project area resides two parks: Dinsdale Park is to the northwest, featuring a children's playground, and Optimist Soccer Park is to the northeast of the Project Area. Due to the parks location, there is a multi-use path that travels under the north abutment of the bridge, connecting park access (Appendix 2.2 and 2.5).

#### 5.2.2.1.2 Vegetation

The regional vegetation pattern area (i.e., Manitobas Aspen Parkland Ecoregion) was described by North/South Consultants Inc. (2014):

*The Aspen Parkland Ecoregion is characterized as having a transitional grassland eco-climate (Ecological Stratification Working Group 1995), home to both wetlands and grasslands. It is characterized by trembling aspen, mixed tall shrubs on moist sites, and bur oak and grassland communities in drier sites (Smith et al. 1998). Dominant grasses include fescues (Festuca spp), wheat grasses (Agropyron spp), Junegrass (Koeleria spp) and Kentucky bluegrass (Poa pratensis), as well as a host of deciduous shrubs and herbs. Poorly drained sites typically support slough grasses (Beckmannia spp), marsh reed grass (Calamagrostis spp), sedges (Carex spp), cattails (Typha spp), and shrubby willows (Smith et al. 1998). A list of plant species of concern within the Aspen Parkland Ecoregion is presented in Table 5. A description of ranking codes is presented in Table 12 and 13.*

*Favourable climate and fertile warm black soils within the Aspen Parkland Ecoregion have resulted in conversions from the natural state of this ecoregion to farmland. This ecoregion, with some of the most productive agricultural land on the prairies, is now predominated by a wide variety of pasture, hayed, and cropped areas (Ecological Stratification Working Group 1995).*

#### 5.2.2.2 Birds

Bird species within the Manitobas Aspen Parkland Ecoregion were described by North/South Consultants Inc. (2014):

*The Prairie Ecozone and associated Aspen Parkland Ecoregion contain numerous wetlands that provide major breeding, staging, and nesting habitat for various species of migratory waterfowl (Ecological Stratification Working Group 1995). Other bird species found in the Aspen Parkland Ecoregion include various raptors such as red-tailed and American Kestrel (Smith et al. 1998). Mourning Dove, Black-Billed Magpie, Red-Winged Blackbird, Killdeer, and Meadowlark are also common to this Ecoregion (Ecological Stratification Working Group 1995, Smith et al. 1998).*

A list of birds found within the Aspen Parkland Ecoregion of Manitoba is presented in Table 5.

#### 5.2.2.3 Mammals

Mammal species within the Manitobas Aspen Parkland Ecoregion were described by North/South Consultants Inc. (2014):

*Species widespread in the Aspen Parklands Ecoregion include White-Tailed Deer, Coyote, Red Fox, Ground Squirrel, Cottontail Rabbit, Striped Skunk, Redback Vole and Deer Mice (Smith et al. 1998). Additional species include Snowshoe Hare, Northern Pocket Gopher, and Franklin's Ground Squirrel (Ecological Stratification Working Group 1995). Semi-aquatic species include*

*Muskrat, Beaver and American Mink. In general, most species of mammals are year-round residents of these areas.*

A list of mammals found within the Aspen Parkland Ecoregion of Manitoba is presented in Table 6.

#### 5.2.2.4 Amphibians and Reptiles

Amphibian and reptile species within Manitobas Aspen Parkland Ecoregion were described by North/South Consultants Inc. (2014)

*The Prairie Ecozone and associated Aspen Parkland Ecoregion contain numerous wetlands that provide major breeding habitat for various species of anurans, and food sources for other species such as snakes.*

*In total, there are 12 anuran species that may occur in the Project Study Area, including the Canadian toad, Cope's Gray Treefrog, Northern Leopard Frog, Wood Frog and Boreal Chorus Frog. In general, many of these frog species are common to this ecoregion (Smith et al. 1998). Of the four salamander species found within Manitoba, only the Barred Tiger Salamander has a distribution that overlaps the Project Study Area [Rapid City]. All species potentially overlapping the Study Area [Rapid City] are reliant on wetland or riparian habitats (Preston 1982).*

*There are six reptile species that have distribution ranges overlapping the Project Study Area [Rapid City]. Both the Common Snapping Turtle and the Western Painted Turtle potentially occur within the Project Study Area [Rapid City]. Four snake species have distribution ranges overlapping the Project Study Area [Rapid City]. They inhabit uplands and include the Smooth Greensnake, Northern Redbelly Snake, Plains Garter Snake, and Red-Sided Garter Snake. In general, the Red-Sided and Western Plains Garter Snakes are common to the Ecoregion overlapping the Project Study Area [Rapid City] (Smith et al. 1998).*

A list of amphibians and reptiles found within the Aspen Parkland Ecoregion of Manitoba is presented in Table 7.

#### 5.2.2.5 Terrestrial Species at Risk

The following species of concern within Manitoba's Aspen Parkland Ecoregion and their respective status under: 1) Manitoba Conservation Data Centre (MBCDC); 2) The Committee on the Status of Endangered Wildlife in Canada (COSEWIC); 3) Species at Risk Act (SARA); and 4) Manitoba Endangered Species Act (MBESA) were adapted from North/South Consultants Inc. (2014) by MIT in May 2015.

##### 5.2.2.5.1 Habitat and Plants

There are 132 vascular plant species and plant assemblages of conservational concern documented by the MBCDC, seven of which are listed either provincially or federally (Table 5). Within this criterion, seven vascular plant species have listings under COSEWIC, SARA, MBESA, or all three. Most of the listed

species are associated with wet meadows, remnant prairies, or sandy soils of various degrees of stabilization; however, suitable habitat is assumed to be absent from the Project Area as it is municipal and urbanized property.

#### 5.2.2.5.2 Terrestrial Invertebrates

There is one terrestrial invertebrate species listed under federal and provincial Species at Risk legislation with a known distribution and suitable habitat within or in close proximity to the project study area and the City of Brandon. The Dakota Skipper (*Hesperia dacotae*) butterfly is listed as "endangered" by COSEWIC (updated May 2014), and "threatened" under both Schedule 1 of the *Species at Risk Act* (SARA) and *Manitoba Endangered Species and ecosystems Act* (MBESA). A review conducted by MIT found the species in a CDA overlay encompassing the City of Brandon; however, the overlay stated that it was last observed on July 18, 1950. The Manitoba Conservation Data Centre (MBCDC) lists the Dakota Skipper as Rank S2, indicating the species as rare throughout its range and vulnerable to extirpation.

The Dakota Skipper characteristically inhabits tall-grass and mixed-grass prairies. The maintenance of healthy grass populations is tantamount to the survival of the species, as grasses act both as host during the larval stage, and nutrition through nectar extraction. The species has a short, three to five week, period of activity occurring midsummer. Females lay eggs near to the ground on the underside of host species' leaves, where eggs develop over a two-and-one-half week span before emerging as larvae (North Dakota Ecological Services 2014). Larvae go into a stage of dormancy and overwinter in the bases of native bunchgrasses, to emerge and continue development in spring. Pupation occurs over ten days time and adult species live for a maximum of three weeks. It is during this brief period that reproduction occurs (North Dakota Ecological Services 2014).

Alterations to the Site#2582-00 (PTH 1A First Street Bridge) in Brandon will occur in the right-of-way but may potentially impact the area surrounding the present bridge. A small, established riparian zone on the southeastern bank is likely to require partial removal; causing potential habitat degradation and loss (see Appendix 2.5). Should a Dakota Skipper population inhabit the area, undertaking construction in fall or winter is unlikely to assuage any potential damage due to the year-round lifespan of the butterfly. CPR has five railway tracks situated above the northern bank, which has had some environmental impact on the land through possible contamination and soil compaction (see Appendix 2.3). There is a secondary slope located on the northern edge of the CPR that may play host to the species as well. The southern abutment has an established riparian zone and increased erosion protection along the bank through a thin layer of trees and shrubs (see Appendix 2.2 and 2.5). Extending beyond the southern slope is Dinsdale Park to the west and soccer fields to the east. Both areas have had natural vegetation transformed into manicured lawn, providing unsuitable habitat. The high floodwaters of 2014 have limited the access and use of the soccer area, causing damage even through continued inundation. The 2014 flooding also potentially affected any Dakota Skipper population inhabiting this area (COSEWIC 2002). However, anticipated construction in the area is within the right-of-way and is not likely to impede the species.

#### 5.2.2.5.3 Birds

There are 36 bird species of concern found within the Aspen Parkland Ecoregion (Table 9). MBESA lists eleven of these species as endangered, while four species are considered as such by both COSEWIC and SARA. Due to the fact that the Project Area lies within the City of Brandon, the potential for most species to be present in the area is low.

#### 5.2.2.5.4 Mammals

A list of at-risk mammal species found within the Aspen Parkland Ecoregion of Manitoba is presented in Table 10. The Mule or Black-tailed Deer (*Odocoileus hemionus*) is not listed as special concern by COSEWIC or SARA, but is considered ``threatened`` within the province of Manitoba by MBESA. Habitat includes open coniferous forests, aspen parklands, and river valleys. The Mule Deer tends to avoid open prairie and deep coniferous forests (Banfield 1974); therefore, the occurrence potential of this species is low.

#### 5.2.2.5.5 Amphibians and Reptiles

A list of amphibian and reptile species of concern within Manitoba's Aspen Parkland Ecoregion is presented in Table 11. Two at risk amphibian species have distributions that overlap the Project Study Area.

The Northern Leopard Frog (*Lithobates pipiens*) is listed as ``special concern`` under SARA, but unlisted by MBCDC or MBESA. This species utilizes three different habitat types annually. Overwintering occurs in well-oxygenated waterbodies that do not freeze to the bottom. Breeding occurs in pools, ponds, marshes and lakes, and occasionally in slow moving streams and creeks. During the summering stage and for movement, the Northern Leopard Frog utilizes grasslands, riparian areas and ponds (COSEWIC 2009). In the 1970s, the Northern Leopard Frog had been subject to large-scale declines. This species has since seen a recovery, but not to the same geographical extent. Threats include habitat conversion (including wetland drainage and eutrophication), game fish introduction, harvesting, pesticide contamination, and habitat fragmentation. This species is also susceptible to emerging diseases (COSEWIC 2009). Since the Project is within a relatively fast flowing portion of the Assiniboine River, the presence of the Northern Leopard Frog is considered low.

The Great Plains Toad (*Anaxyrus cognatus*) is considered to be of ``special concern`` to both COSEWIC and SARA, and threatened under MBESA. The species is commonly associated with native grasslands, with temporary pools and shallow ditches encompassing its preferred habitat (COSEWIC 2010). Due to the nature and existing conditions within the Project area the presence of the Great Plains Toad in the Project area is considered unlikely.

There are three reptile species considered at risk that may be found in the Study Area (Table 11). The Common Snapping Turtle (*Chelydra serpentina serpentina*) is listed as ``special concern`` under both COSEWIC and SARA. It is not listed under MBESA. The Common Snapping Turtle inhabits slow-moving

water with a soft-mud bottom and dense aquatic vegetation, including ponds, sloughs, shallow bays, river edges, and/or slow streams (COSEWIC 2008). Females generally nest on sand and gravel banks along waterways. Hibernation occurs in streams, lakeshores, and muddy sites (COSEWIC 2008). Since the Project area is through/adjacent to a fast flowing river the presence of the Common Snapping Turtle is considered low.

The Northern Prairie Skink (*Plestiodon sptentrionalis*) is considered to be “endangered” by COSEWIC, SARA and MBESA. This species is associated with mixed grass prairie habitat on sandy soils. The species avoids coniferous and deciduous forests (COSEWIC 2004). Hibernation is undocumented in Canada but found to occur both communally and individually just south of the United States border. Preferred nesting sites include artificial burrows, such as under plywood or metal sheets, and natural burrows under rocks and fallen trees (COSEWIC 2004). Due to the nature of the vegetation and ground conditions surrounding the Project site, the likelihood of a Northern Prairie Skink population inhabiting the area is considered low.

The Western Hognose Snake (*Heteron nasicus*) is listed as “threatened” exclusively by MBESA. This species typically inhabits grasslands or open woodlands with loose, sandy soils (NatureNorth 2015). The mating season extends from May through September and overwintering takes place in other animal or sandy burrows (NatureNorth 2015). Considering the impacted nature of the project area, ideal habitat for the Western Hognose Snake has already been compromised, reducing the likelihood of a species presence significantly.

## 5.3 DESCRIPTION OF THE SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT

### 5.3.1 Human Environment

#### 5.3.1.1 Study Area

The Socio-economic Study Area encompasses the City of Brandon, which extends approximately 3.9 km north, 4.8 km east, 4.9 km south, and 4.9 km west. Assiniboine River boundaries are within one km upstream and one km downstream of the Project site (Figures 1 to 4).

#### 5.3.1.2 Aboriginal Lands and Resource Use

At the direction of G. Manitopyes (MIT-Aboriginal Liaison), MIT-WMS completed a *Crown-Aboriginal Consultation Initial Assessment and Record of Conclusion*. Based on this assessment, no Aboriginal consultation/engagement was deemed to be required for this Project. In addition to the initial assessment, the following additional factors were considered (but not limited to):

- MIT had already conducted a Public Consultation (Landmark 2014) where no Aboriginal/First Nations groups had expressed concerns;
- There was no First Nations lands within (at least) a 30 km radius of the project site; and
- There was no known domestic harvest activity at the site.

#### 5.3.1.3 Other Land and Resource Use

The area surrounding Bridge Site#2582-00 is comprised CPR, parks, residential roadways and pedestrian paths, and PTH 1A within the City of Brandon. The City of Brandon also has several recreation activities that rely on the water supply. These activities include: fishing, boating, pontoon tours, camping, pools, sprinkler parks, hockey rinks, pools, and local groups' use Assiniboine River for slalom and jump courses. As well, local marine dealerships test their products on the river and Ducks Unlimited Canada utilizes the river to top up their duck ponds and interpretive ponds (Hargreaves 2013). The river is also assumed to be utilized for ice fishing and snowmobiling during the winter months.

Fishing is permitted along the Assiniboine River, except from April 1 to, and including, May 31. It is a violation for all fishers (including Aboriginal fishers) to fish within 25 yards (23 m) of a fishway or fish ladder (Manitoba Conservation and Water Stewardship 2012). Actual fishing activity is unknown; however, based on observations, the Assiniboine River in the vicinity of the Project is actively fished recreationally.

Hunting activity likely does not occur in the Project Area due to the Project being situated within a 'built-up area' where the discharge of firearms is not allowed (see Manitoba Conservation and Water Stewardship 2014).



#### 5.3.1.4 *Navigation and Access*

Transport Canada – Navigation Protection Act (NPA) has identified the Assiniboine River (in the vicinity of the proposed works) as a ‘Scheduled Waterway’. As such, a submission for project review was made to NPA on June 11, 2015.

#### 5.3.1.5 *Human Health and Safety*

This section focuses on the quality of drinking water as the City of Brandon has water supply intakes from the Assiniboine River upstream of Site#2582-00 and the Third Street Dam. The following information was gathered from the City of Brandon’s Water Conservation Plan (Hargreaves 2013):

*The City of Brandon withdraws its water primarily from the Assiniboine River unless the City faces challenges with spring runoff or during the summer months when the water contains increased levels of turbidity and total organic carbon (TOC). In these events where the water quality is subject to being compromised, the City blends the river source with groundwater from its underground aquifer to continue to improve the water quality and meet the demands of the community. The City’s river water withdrawal is governed by the Province and allows the City to divert up to 14,808 cubic decameters of water annually at a maximum withdrawal rate of 0.59m<sup>3</sup>/s. The flow in the river is maintained by regulated discharges from the Lake of the Prairies Shellmouth Dam located upstream from Brandon. In addition to the river the City has in place two high capacity emergency use supply wells that draw groundwater from Assiniboine River Valley Aquifer (ARVA). These wells are primarily intended for emergency purposes in the event a catastrophe takes place upstream (e.g. chemical spill).*

#### 5.3.1.6 *Protected Areas*

A review of the surrounding area and preliminary construction plans did not result in the discovery of protected areas. No protected areas, federal or provincial Crown Lands or lands with special designation are located specifically within the Project Area.

### **5.3.2 Heritage Resources**

MIT-WMS’ Engineering Service Provider made a formal request to the Historic Resources Branch (HRB) of Manitoba Culture, Heritage and Tourism on April 30, 2015 to determine if a heritage resources impact assessment (HRIA) was required for the proposed Project Area. On June 11, 2015 HRB notified MIT that “the potential to impact significant heritage resources has been deemed moderate in this area and that HRB has some concerns with the Project” (HRB File # AAS-15-9209). As such, MIT has retained the services (as of June 15, 2015) of a qualified archaeological consultant to conduct a Heritage Resources Impact Assessment (HRIA).

## **6.0 ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES**

The following section provides a description of potential environmental effects resulting from the project and recommended mitigation and environmental protection measures to minimize the potential effects. Only those environmental components that are considered susceptible to potential project effects were included.

### **6.1 ENVIRONMENTAL EFFECTS ON PHYSICAL COMPONENTS**

#### **6.1.1 Geology, Hydrogeology, and Soils**

The potential effects of the project on the geology, hydrogeology and soils within the Project Area include:

- Disturbance to soils and terrain within the Project Area;
- Potential for the contamination of soil and/or groundwater resources as a result of accidental or incidental petroleum spills; and
- Potential release of hazardous materials resulting from accidents or equipment malfunctions.

The potential effects to geology, hydrogeology and soils can be mitigated through implementation of the following measures:

- Construction to occur under frozen ground conditions;
- Access points reclaimed to pre-construction conditions following completion of works;
- The contractor will comply with any permitting requirements with respect to storage and handling of petroleum and allied products as per the Dangerous Goods Handling and Transportation Act Regulation 188/2001 and the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (2003). These may include but may not be limited to:
  - Construction crews will be adequately trained in spill prevention and containment procedures;
  - An on-site emergency response and containment plan will be developed;
  - Emergency spill clean-up kits will be on site at all times; and
  - All vehicles, machinery, and construction materials will arrive on site clean and free of leaks.

#### **6.1.2 Surface Hydrology**

The proposed construction and/or construction of temporary works (e.g., cofferdams) will not result in changes to water level elevation in the Assiniboine River.

## 6.2 ENVIRONMENTAL EFFECTS ON BIOPHYSICAL COMPONENTS

### 6.2.1 Aquatic Environment

#### 6.2.1.1 *Water Quality*

Potential effects of construction on water quality in the Study Area include:

- Deterioration of water quality during rewatering and/or freshet as a result of resuspension of sediment; and
- Increases in nutrients, metals, hydrocarbons, and pesticides in the water column due to exposure to sediment of different quality.

As construction activities will occur in fall/winter months, no active impacts to water quality are anticipated during the construction phase. Rather, suspension of newly exposed surficial sediments may increase turbidity and concentrations of suspended solids (TSS) and some nutrients and metals (e.g., aluminum and iron) during cofferdam removal (presumably during freshet). The freshet normally coincides with increases of these compounds due to inputs of erosive materials; however, these particulates tend to settle out of the water column within days to weeks following ice-off.

Potential effects to water quality can be mitigated by:

- Gradually re-watering the cofferdam area to avoid a sudden disturbance of the substrate, thereby re-introducing the sediment to the water column;
- Implementation of an erosion and sediment control plan;
- Limiting excavation and therefore exposed surfaces;
- Any excavated materials and/or drill castings shall not be stockpiled. Rather, these materials shall be removed from site immediately and disposed of at an appropriate waste disposal area. If at any time the quality or condition of soils are questionable the Project Engineer will be required to test the soils for contaminants (e.g., hydrocarbons) and this material shall be disposed of in an appropriate manner (e.g., soil reclamation);
- Adhering to the safety guidelines for the storage and handling of hydrocarbons.

#### 6.2.1.2 *Sediment Quality*

Potential effects on sediment quality in the Study Area include:

- Increases in nutrients, metals, hydrocarbons, and pesticides in surficial sediments.

Potential impacts to sediment and water quality can be mitigated by:

- Limiting excavation and therefore exposed surfaces;
- Any excavated materials and/or drill castings shall not be stockpiled. Rather, these materials shall be removed from site immediately and disposed of at an appropriate waste disposal area.

If at any time the quality or condition of soils are questionable the Project Engineer will be required to test the soils for contaminants (e.g., hydrocarbons) and this material shall be disposed of in an appropriate manner (e.g., soil reclamation);

- Adhering to the safety guidelines for the storage and handling of hydrocarbons.

#### 6.2.1.3 *Aquatic Habitat*

Potential effects of construction on the aquatic habitat include:

- Changes to the community composition of submergent macrophytes along the riverbanks;
- Resuspension/increase of sediment and nutrient concentrations; and,
- Alteration of sediment/substrate in cofferdam areas, access roads, and access pads.

Aquatic habitat in the immediate area will be altered and disturbed (via armouring, grading, etc.). The disturbances are considered short term and can be mitigated through appropriate best management practices. The alterations (e.g., placement of aggregate, regrading, etc.) are permanent but may naturalize over time. No serious or residual harm are anticipated because of the alterations or disturbances. This is at the site or upstream or downstream.

#### 6.2.1.4 *Bivalves*

Potential effects of the Project on the Bivalve communities include:

- Direct loss of habitat in the project area;
- Direct mortality;
- Exposure to freezing conditions; and
- Exposure to deleterious substances such as elevated concentration of suspended sediments and associated compounds, and petroleum products originating from dredging machinery as water levels rise.

Mitigation to offset the potential effects include a mussel survey, salvage, relocation and monitoring, which are further described in section 9.4. No residual or serious harm to the mussel population (at site or upstream or downstream are anticipated).

#### 6.2.1.5 *Fish*

Potential effects of the Project on fish communities include:

- Permanent alteration of the fish habitat within the project area;
- Temporary reduction or elimination of the overwintering habitat in the river channel within some or all reaches during the construction phase; and

- Introduction of deleterious substances such as suspended solids and associated compounds, and hydrocarbons to the water column after construction.

Potential project effects on fish communities can be mitigated by:

- Completing the cofferdam/drawdown prior to fish becoming established in their normal overwintering areas, fish may move outside the project area to deeper water within the river channel;
- Maintaining continuous flow to prevent dewatering downstream of the Project Area and potential ice jams caused by substrate-bound ice;
- Conducting a fish salvage within any isolated areas prior to dewatering activities;
- Adherence to DFO Timing Windows for in-water works;
- Gradually re-watering the project area to avoid a sudden disturbance of the substrate, thereby re-introducing sediments to the water column;
- Adhering to the safety guidelines for the storage and handling of hydrocarbons;
- Implementation of an erosion and sediment control plan; and
- Project will not result in Serious or Residual harm.

#### 6.2.1.6 *Species at Risk*

Potential effects of the Project on mussel species at risk are limited to the Mapleleaf Mussel and include:

- Stranding of mussels in active project area and cofferdam regions during de-watering; and
- Introduction of deleterious substances such as suspended solids and associated compounds, and hydrocarbons to the water column during re-watering.

Mapleleaf Mussels may be found within the Project Area, as the occurring substrate of this stretch of the Assiniboine River provides suitable habitat.

Potential Project effects on species at risk can be mitigated by:

- See section 9.4 for the monitoring, and the removal and relocation plan;
- Maintaining continuous flow to prevent dewatering downstream or sudden changes in water velocity;
- Gradual removal of any cofferdams to avoid a sudden disturbance of the substrate, thereby re-introducing the sediment to the water column;
- Monitoring turbidity/TSS in the main channel prior to, during, and after construction activities; This measure will ensure that turbidity/TSS concentrations do not exceed CCME guidelines;
- Adhering to the safety guidelines for the storage and handling of hydrocarbons; and
- Implementation of an erosion and sediment control plan.

## **6.2.2 Terrestrial Environment Effects and Mitigation**

### *6.2.2.1 Habitat and Plants*

The project is not expected to affect upland terrestrial habitat and associated vegetation, as Project-related activities are expected to be limited to the project and the current right-of-way, therefore, limiting any further loss of the surrounding area. Where access points and upland deposition of excavated materials occurs, avoidance of uncommon habitat types frequently associated with at-risk plant species is recommended. These habitat types include: dry upland ridge prairie, marsh, and moist prairie.

### *6.2.2.2 Terrestrial Invertebrates*

The project is not expected to significantly affect terrestrial invertebrates. Where access points, construction traffic, and upland deposition of excavated materials occurs, avoidance of uncommon habitat types frequently associated with terrestrial invertebrate species at risk is recommended. These habitat types include: dry upland ridge prairie, marsh, and moist prairie. Due to the fact that these habitat types are not common surrounding the project area, there is low probability of species' presence (e.g., Dakota Skipper) therefore, it is not expected to cause any significant impacts.

### *6.2.2.3 Birds*

The primary effect of the Project on birds relate to habitat alteration within the Project Area:

- Temporary and permanent loss of habitat for some bird species due to loss of vegetation. Considered not a significant impact.

### *6.2.2.4 Mammals*

Semi-aquatic animals, such as the Muskrats and Beavers, can be affected by Project activities as they depend on access to water beneath the ice or during open water conditions. The potential impacts to these types of species is minimal.

Project effects on mammal species in the area is considered low.

### *6.2.2.5 Amphibians*

For amphibian species that utilize the aquatic environment within the Project Area, potential Project effects include:

- Loss of anuran breeding habitat;
- Reduction of egg survival as a result of re-suspension of sediment; and,
- Loss of overwintering habitat.

Project effects on anuran species is considered low.

#### 6.2.2.6 *Reptiles*

The potential effects of the Project on reptiles are limited to turtle species that may use the surrounding area for overwintering, however, the surrounding habitat does not promote reptile species due to the CPR and manicured park area. If species are present, potential effects include:

- Temporary loss of overwintering habitats resulting in direct mortality to overwintering turtles during the cofferdam/drawdown due to low water levels and freezing of the water column.

Project effects on reptile species is considered low.

## **6.3 ENVIRONMENTAL EFFECTS ON THE SOCIO-ECONOMIC AND CULTURAL COMPONENTS**

### **6.3.1 Human Environment**

The Project has the potential to affect the human environment through the following pathways:

- Disruption of fishing (recreational) activities during the construction period;
- Construction affecting the usage of CP rail lines;
- Construction affecting PTH 1A vehicle and pedestrian accessibility and increasing traffic during the construction period (only one lane in each direction) (Appendix 1.2); and
- Disruption of multi-use paths and park use.

The potential to affect recreational fishing activities is expected to be of low magnitude due to the short-term nature of disruption (construction period), the limited geographic area of the construction, and the season of the construction (late fall and early winter) when fishing for food is typically less common (as opposed to spring).

Recreational activities involving use of the river (described in section 5.3.1.3), such as ice fishing or snowmobiling, are expected to be restricted during construction of the Project. Access will be restricted for safety purposes. To protect public safety, mitigation may involve erecting fencing to limit access to the project area. Changes in ice conditions (thickness or stability) may occur upstream and downstream of the project area (during construction only).

Mitigation recommendations for the human environment component of the Project will aid in minimizing effects on fishing activities and recreation, including:

- Restricting public access to equipment staging areas and the reservoir for safety purposes during construction.

### **6.3.2 Heritage Resources**

MIT has retained the services of a qualified Archaeological Service Provider (ASP) to conduct a Heritage Resource Impact Assessment (HRIA). The results of the HRIA will be used to develop a mitigation and monitoring plan to eliminate any risk/impact to Heritage Resources.



## **7.0 SUMMARY OF RESIDUAL EFFECTS**

### **7.1 GEOLOGY, HYDROGEOLOGY AND SOILS**

#### **7.1.1 Construction Phase**

##### Soil Disturbance and Hazardous Materials

With the application of proven mitigation measures and conduct of construction during winter, the residual effects of the disturbance to soils and terrain and potential release of hazardous materials will be of low magnitude, confined to the Project Site, and (if at all) of short duration.

#### **7.1.2 Post-Construction Phase**

Post-construction effects were determined to be none existent.

### **7.2 SURFACE HYDROLOGY**

#### **7.2.1 Construction Phase**

##### Water Level Changes

With the application of mitigation measures, the residual effects of temporary reduction of water levels in the coffer dam regions will be of low to moderate magnitude, confined to the Project Site, and of short duration. The environmental effects on surface hydrology are predicted to be “not significant”.

#### **7.2.2 Post-Construction Phase**

Post-construction effects were determined to be none existent.

### **7.3 WATER QUALITY**

#### **7.3.1 Construction Phase**

Construction effects were determined to be none existent with the application of suitable Best Management practices.

#### **7.3.2 Post-Construction Phase**

##### Resuspension of sediment

With the application of mitigation measures and active construction during winter, the residual effects of sediment on water quality in the Assiniboine River will be of low magnitude, confined to the Project Site, and (if at all) of short duration. The environmental effects on water quality are predicted to be “not significant”.

## **7.4 SEDIMENT QUALITY**

### **7.4.1 Construction Phase**

Construction effects were determined to be none existent with the application of suitable Best Management practices.

### **7.4.2 Post-Construction Phase**

Post-construction effects were determined to be none existent.

## **7.5 AQUATIC HABITAT**

### **7.5.1 Construction Phase**

Construction effects were determined to be none existent with the application of suitable Best Management practices.

### **7.5.2 Post-Construction Phase**

Post-construction effects were determined to be none existent.

## **7.6 BIVALVES**

### **7.6.1 Construction Phase**

With the bi-valve survey and relocation, mortality should not occur during the construction phase.

### **7.6.2 Post-Construction Phase**

#### Resuspension of Sediment and Deleterious Substances

The application of mitigation measures will minimize the release of resuspended sediments and deleterious substances to the Assiniboine River. Therefore, no residual effects are anticipated.

## **7.7 FISH**

### **7.7.1 Construction Phase**

With the application of mitigation measures, (e.g., fish salvage, adherence to fisheries timing windows, etc.), no residual or serious harm to fish populations is anticipated.

### **7.7.2 Post-Construction Phase**

The application of proven mitigation measures will minimize the release of resuspended sediments to the Assiniboine River. Therefore, residual effects are not anticipated.

## **7.8 SPECIES AT RISK**

### **7.8.1 Construction Phase**

#### Mapleleaf Mussels

With the application of mitigation measures, (e.g., salvage and relocation) no impacts to this population are anticipated.

#### Dakota Skipper

The residual effects of construction on the Dakota Skipper surrounding the Assiniboine River will be of moderate magnitude, confined to the Project Site, and of moderate duration. The habitat within the Project area is not conducive for the Dakota skipper and construction will occur within the right-of-way. The environmental effects are therefore, predicted to be “not significant”.

### **7.8.2 Post-Construction Phase**

#### Resuspension of sediment

The application of proven mitigation measures will minimize the release of resuspended sediments into the Assiniboine River. Therefore, no residual effects are anticipated.

#### Revegetation

The application of proven mitigation measures will aid revegetation of disturbed habitat around the project area.

## **7.9 BIRDS**

### **7.9.1 Construction Phase**

#### Loss of Habitat

Habitat loss (e.g., tree removal) is expected to result in a loss of potential habitat for some species. The residual effects on such habitat will be of low magnitude, confined to the Project Site. The environmental effects on bird habitat are therefore, predicted to be “not significant”.

### **7.9.2 Post-Construction Phase**

Post-construction effects were determined to be none existent.

## **7.10 MAMMALS**

### **7.10.1 Construction Phase**

Construction effects were determined to be none existent with the application of suitable Best Management practices.

### **7.10.2 Post-Construction Phase**

Post-construction effects were determined to be none existent.

## **7.11 AMPHIBIANS**

### **7.11.1 Construction Phase**

Effects of construction on amphibians was determined to be not significant.

### **7.11.2 Post-Construction Phase**

Post-construction effects were determined to be none existent.

## **7.12 REPTILES**

### **7.12.1 Construction Phase**

Effects of construction on reptiles was determined to be not significant.

### **7.12.2 Post-Construction Phase**

Post-construction effects were determined to be none existent.

## **7.13 HUMAN ENVIRONMENT**

### **7.13.1 Construction**

#### Traffic Use

With the application of a traffic management plan (e.g., reducing of two lanes to one lane in each direction), the residual effects of construction on traffic use of Site #2582-00 over the Assiniboine River will be of moderate magnitude, confined to the Project Site, and fully reversible. The environmental effects of construction are therefore, predicted to be “not significant”.

#### Recreational Use

With the application of mitigation measures, the residual effects of construction on recreational use of surrounding multi-use paths and parks will be of moderate magnitude, and confined to the Project Site.

### **7.13.2 Post-Construction Phase**

Post-construction effects were determined to be none existent.

## 8.0 PUBLIC PARTICIPATION

### 8.1 PUBLIC AND COMMUNITY ENGAGEMENT

According to emails and reports (*email to P. Graveline from M. Hagos, 2015-04-17*) public and community engagement has occurred. The following information is from the *“First Street Bridge Brandon, Public Consultation Report” – Landmark Planning & Design Inc. December 2014:*

In September 2014 Manitoba Infrastructure and Transportation (MIT) retained Landmark Planning and Design Inc. to undertake a public consultation process for the First Street Bridge Project. The objectives of the process were to communicate project information to key stakeholders and gain feedback concerning the project. The public consultation process was carried out in two rounds and consisted of the following components:

- Preliminary internal and external stakeholder meetings to review project parameters and understand stakeholder concerns or ideas; and,
- A public open house to review project information.

#### **Stakeholder Meetings**

Key stakeholder meetings were carried out (September 2014 – November 2014) in order to discuss key project parameters with identified stakeholders, and to understand stakeholder concerns or ideas. Meetings were held with the following stakeholders:

- City of Brandon (Mayor and CAO)
- CP Rail Utilities
- Emergency Services
- Brandon Transit
- Brandon School Division
- Brandon Chamber of Commerce
- Recreation Development Department
- Community Services Department
- Manitoba Trucking Association

At each of the stakeholder meetings, project representatives informed participants of the proposed project parameters. Participants shared information concerning their respective interests and concerns.

The following notes summarize key discussion points from various stakeholders:

- City of Brandon – There was discussion about the options to rehabilitate or replace the existing bridge. Participants inquired about the cost and design of a new bridge and made suggestions

about elements they thought should be considered during the design process. The consultation process was reviewed. Details on how the Council and the general public would be involved and informed were discussed. Further conversations included how the bridge design and construction would impact the Pacific Avenue intersection.

- RCMP, Brandon Transit, Brandon Recreation and Community Service Departments – Discussions focused on the design of a new bridge and what safety measures would be implemented for cyclists and the general public. Further design considerations were noted, which related to the maintenance of the bridge and impact on surrounding park areas.
- Police Service, School Division and Chamber of Commerce – Justification for prioritizing this project over other bridge projects (Daly Overpass) was clarified. Matters of design such as flood protection, impact on surrounding park areas and the potential need to acquire additional lands were discussed.

### **Public Open House**

A Public Open House was held on November 17, 2014 at the Royal Oak Inn in conjunction with a Public Open House for the PTH 110 Westerly Extension Route Planning project (also an MIT project). The Open House was held in traditional open house format, with a series of display boards illustrating various project parameters. Project representatives were available to respond to questions and speak with participants. Participants were asked to register by name and address and asked to fill out a written response form prior to leaving the open house. The display boards provided the following information:

- Welcome
- Context Plan
- Existing Structure
- Current Project Status
- Alternatives
- Existing Cross Section
- Rehabilitation Option Cross Section
- Replacement Option Cross Section
- Replacement Option Pier Adjustments
- Evaluation
- Project Timing
- Public Information Sessions
- Daly Overpass

The Public Open House was advertised in the *Brandon Sun* on two occasions leading up to the event. Approximately 20 people attended the Public Open House. Open House invitations were provided to *First Street Bridge Project* businesses and homes situated directly in the vicinity of the bridge.

Of the 20 attendees, approximately half indicated that they were primarily interested in the First Street Bridge Project. Several attendees completed comment sheets. Participants were informed of the availability of the display materials by email on request, as well as, they were given the option to return comment sheets via fax or emails as an alternative to submitting them directly after the meeting.

## **8.2 ABORIGINAL ENGAGEMENT**

At the direction and advice of G. Maniopyes (MIT-Aboriginal Liaison), MIT-WMS completed a *Crown-Aboriginal Consultation Initial Assessment and Record of Conclusion*. Based on this assessment, no Aboriginal consultation/engagement was deemed to be required for this Project. In addition to the initial assessment, the following additional factors were considered (but not limited to):

- MIT had already conducted a Public Consultation (see past report by Landmark) where no Aboriginal groups had expressed concerns;
- There was no First Nations lands within (at least) a 30 km radius of the project site; and
- There was no known domestic harvest activity at the site.

Two letters of information were also sent out to the Rolling River First Nation and Sioux Valley Dakota Nation.

## **9.0 MONITORING REQUIREMENTS**

### **9.1 PRE- AND DURING-CONSTRUCTION**

The following monitoring components will be adhered to:

- A designated person will be inspecting all erosion and sediment Management devices/structures and immediately carryout any necessary maintenance. Several inspections per day will be carried out as required;
- Any records of fisheries based operations and outcomes will be maintained should future reporting be required; and
- A photo record of the entire project will be maintained.

### **9.2 POST-CONSTRUCTION**

MIT-WMS will monitor this site for a minimum of one year post–construction. These efforts will focus on, but not be limited to, the following:

- Review of the project site to ensure all applicable erosion and sedimentation measures incorporated (e.g., bank stabilization, revegetation, etc) were either effective and/or do not require follow up;
- Any records of fisheries based operations and outcomes will be maintained by MIT-WMS should future reporting be required; and,
- A photo record of the site will be maintained.



## 10.0 REFERENCES

- Armstrong, N. 2002. Assiniboine River water quality study – Nitrogen and phosphorus dynamics, May 2001 to May 2002. Manitoba Conservation Report No. 2002-10, Water Quality Management Section, Water Branch, Manitoba Conservation. 42 pp.
- Banfield, A.W.F. 1974. The Mammals of Canada. Published for the National Museum of Natural Sciences. University of Toronto Press, Toronto, Canada. 438 pp.
- Carney, J.P. 2003. Freshwater mussels (Mollusca: Unionidae) in the Assiniboine, Souris and Pembina Rivers, Manitoba: Demographics, reproduction and parasitism. Data report submitted to the Province of Manitoba Conservation Centre. Brandon University. Brandon, Manitoba. 12-15 pp.
- Carney, J.P. 2004. A Survey to Quantify the Freshwater Mussel (Bivalvia: Unionidae) Fauna of the Assiniboine River in Spruce Woods Provincial Park. Data report submitted to the Province of Manitoba Conservation Centre. Brandon University. Brandon, Manitoba. 4 pp.
- City of Brandon. 2012. WTF – Third Street Dam Replacement and Upgrading. Tender Documents. L-30/12. 14 pp.
- COSEWIC - Committee on the Status of Endangered Wildlife in Canada. Ottawa - [http://www.cosewic.gc.ca/eng/sct5/index\\_e.cfm](http://www.cosewic.gc.ca/eng/sct5/index_e.cfm). (Accessed 04 October 2012; 28 May 2015).
- COSEWIC. 2002. COSEWIC assessment and status report on the Dakota Skipper *Hesperia dacotae* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. [http://www.cosewic.gc.ca/eng/sct1/searchdetail\\_e.cfm?id=792&StartRow=1&boxStatus=All&boxTaxonomic=All&location=All&change=All&board=All&commonName=dakota%20skipper&scienceName=&returnFlag=0&Page=1](http://www.cosewic.gc.ca/eng/sct1/searchdetail_e.cfm?id=792&StartRow=1&boxStatus=All&boxTaxonomic=All&location=All&change=All&board=All&commonName=dakota%20skipper&scienceName=&returnFlag=0&Page=1). (Accessed 29 May 2015).
- COSEWIC 2004. COSEWIC assessment and update status report on the prairie skin *Eumeces septentrionalis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 7 pp. ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm))
- COSEWIC 2006. COSEWIC assessment and status report on the Mapleleaf Mussel *Quadrula quadrula* (Saskatchewan-Nelson population and Great Lakes-Western St. Lawrence population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. v + 17-41 pp. ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)).
- COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp. ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)).
- COSEWIC. 2009. COSEWIC assessment and status report on the Northern Leopard Frog *Lithobates pipiens*, Rocky Mountain population, Western Boreal/Prairie populations and Eastern populations, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 69 pp. ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)).
- COSEWIC. 2010. COSEWIC assessment and status report on the Great Plains Toad *Anaxyrus cognatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 9-10 pp. ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)).

- DFO. 2010. Recovery potential assessment of Lake Sturgeon: Assiniboine-Red Rivers – Lake Winnipeg populations (Designatable Unit 4). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2010/051. 12 pp.
- DFO and BCMOE. 1989. Fish Habitat Inventory and Information Program. Stream Survey Field Guide. Department of Fisheries and Oceans, and British Columbia Ministry of the Environment.
- Earth Tech (Canada) Inc. 2002. Phase I – Environmental Site Assessment: Former Brandon Scrap Iron and Metals, Ltd., Brandon, Manitoba; Project No. 57359-0000. Conducted for Will Majcher, Property Management Officer, Property Administration, City of Brandon. 136 pp.
- Earth Tech (Canada) Inc. 2003. Phase II Environmental Site Assessment: Former Brandon Scrap Iron and Metals, Ltd., Brandon, Manitoba; Project No. 57359. Conducted for Will Majcher, Property Management Officer, Property Administration, City of Brandon. 170 pp.
- Earth Tech (Canada) Inc. 2005. Phase III Environmental Site Assessment: 123 Rosser Avenue East, 9 – 1st Street, 17, 218, and 308 Pacific Avenue, Brandon, Manitoba; Project No. 82168. Conducted for Ian Christiansen, P.Eng., City of Brandon. 198 pp.
- Ecological Stratification Working Group. 1995. A National Ecological Framework for Canada. Agriculture and Agri-Food Canada, Research Branch, Centre for Land and Biological Resources Research and Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch, Ottawa/Hull.
- Environment Canada. 1997. Canadian Hydrological Data, HYDAT version 2.01, released 02.03.18.
- Environment Canada. Climate Normals.  
[http://climate.weather.gc.ca/climate\\_normals/results\\_e.html?stnID=3471&lang=e&StationName=Brandon&SearchType=Contains&stnNameSubmit=go&dCode=1](http://climate.weather.gc.ca/climate_normals/results_e.html?stnID=3471&lang=e&StationName=Brandon&SearchType=Contains&stnNameSubmit=go&dCode=1). (Accessed 05 2015).
- Fisheries & Oceans Canada. 1998. Habitat Conservation and Protection Guidelines. 21 pp.
- Fowler, R.T. 2004. The recovery of benthic invertebrate communities following dewatering in two braided rivers. *Hydrobiologia*. 523: 17-28.
- Government of Canada – Justice Laws Website. 2015. Navigation Protection Act (R.S.C., 1985, c. N-22.)  
<http://laws-lois.justice.gc.ca/eng/acts/n-22/FullText.html#h-27>. (Accessed 01 June 2015)
- Hargreaves, L.R. 2013. Water Conservation Plan. Conducted by Engineering Services & Water Resources, Brandon, Manitoba. 21 pp. + appendix  
<http://brandon.ca/images/pdf/adminReports/waterConservationPlan.pdf>. (Accessed 29 May 2015)
- KGS Group. 2015. ACEC Awards for KGS Group. [http://www.ksgroup.com/awards\\_acec.html](http://www.ksgroup.com/awards_acec.html). (Accessed 29 May 2015).
- Krawchuk, B. P. and A. Snitowski . 2008. Manitoba Ambient Air Quality Annual Reports for 2003, 2004 and 2005. Manitoba Conservation, Air Quality Section. 102 pp.
- Landmark Planning and Design. 2014. First Street Bridge Brandon, Public Consultation Report” – Landmark Planning & Design Inc. December 2014)
- MacDonell, D.S. 1999. Assiniboine River dyke reconstruction aquatic impact assessment 1998. A report prepared for Manitoba Natural Resources, Water Resources Branch by North/South Consultants Inc. January 1999. viii + 51 pp. + 4 appendices.

- Mackie, G., T.J. Morris, and D. Ming. 2008. Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario-Great Lakes Area (OGLA). Canadian Manuscript Report of the Fisheries and Aquatic Sciences 2790. Fisheries and Oceans Canada. 41 pp.
- Manitoba Breeding Bird Atlas. Bird Studies Canada. [http://birdatlas.mb.ca/index\\_en.jsp](http://birdatlas.mb.ca/index_en.jsp) (Accessed October 2012)
- Manitoba Conservation. 2000. Development of a Nutrient Management Strategy for Surface Waters in Southern Manitoba. Information Bulletin 2000 – 02E. 2pp.
- Manitoba Conservation. 2001. Conservation Data Center Ecoregion Search. <http://web2.gov.mb.ca/conservation/cdc/species/areasearch.php> (Accessed 29 May 2015)
- Manitoba Conservation and Water Stewardship. 2014. 2014 Hunting Guide. 64 pp. [http://www.gov.mb.ca/conservation/wildlife/hunting/pdfs/2014hunting\\_guide\\_web.pdf](http://www.gov.mb.ca/conservation/wildlife/hunting/pdfs/2014hunting_guide_web.pdf). (Accessed 29 May 2015)
- Manitoba Conservation and Water Stewardship - Manitoba Fisheries. 2012. Manitoba Anglers' Guide. 13 pp. [https://www.gov.mb.ca/waterstewardship/fisheries/recreation/pdf/anglers\\_guide\\_2012.pdf](https://www.gov.mb.ca/waterstewardship/fisheries/recreation/pdf/anglers_guide_2012.pdf). (Accessed 29 May 2015)
- Mazur, K., and Heese, A. 2009. Assiniboine River Bridge Construction PTH 10 – 18<sup>th</sup> Street Brandon: Mussel Relocation and Fish Salvage at the Northbound Bridge Site. A report prepared for Manitoba Infrastructure and Transportation by North/South Consultants Inc. 12 pp.
- MBCDC - Manitoba Conservation Data Center - <http://www.gov.mb.ca/conservation/cdc>. (Accessed 04 October 2012; 28 May 2015).
- MBESA - Manitoba Endangered Species Act - <http://www.gov.mb.ca/conservation/wildlife/sar/sarlist.html>. (Accessed 04 October 2012; 28 May 2015).
- McCulloch, B.R. and Franzin, W.G. 1996. Fishes of Canadian portion of the Assiniboine River drainage. Canadian Technical Report of Fisheries and Aquatic Sciences 2087. v + 62 p.
- Nelson, P.A. and Franzin, W.G. 2000. Habitat availability and its utilization by 11 species of fish from the Assiniboine River, Manitoba, with special reference to habitat processes. Can. Tech. Rep. Fish Aquat. Sci. 2313: 55p.
- NatureNorth. [http://www.naturenorth.com/Herps/MHA\\_Snakes.html](http://www.naturenorth.com/Herps/MHA_Snakes.html) (Accessed 22 June 2015).
- North Dakota Ecological Services Field Office: US Fish and Wildlife Service. 2014. [http://www.fws.gov/northdakotafieldoffice/endspecies/species/dakota\\_skipper.htm](http://www.fws.gov/northdakotafieldoffice/endspecies/species/dakota_skipper.htm). (Accessed 29 May 2015).
- North/South Consultants Inc. 2006. Assiniboine River Bridge Construction PTH 10 Brandon - Fish Habitat Assessment. Conducted for Manitoba Infrastructure and Transportation. 17 pp.
- North/South Consultants Inc. 2009. Assiniboine River Bridge Construction, PTH 10 – 18<sup>th</sup> Street Brandon Fish and Mussel Salvage at the Southbound Bridge Site. Conducted for Manitoba Infrastructure and Transportation. 6 pp. + appendices

- North/South Consultants Inc. 2014. Rapid City Dam – Environmental Assessment Screening Report: Proposed Dredging of the Rapid City Reservoir. Conducted for Manitoba Infrastructure and Transportation. 83 pp. + appendices
- Preston, W.B. 1982. The amphibians and reptiles of Manitoba. Manitoba Museum of Man and Nature. Winnipeg, Manitoba. 128 pp.
- Provincial Sustainability Report for Manitoba (PSRM). 2009. 132 pp.  
[https://www.gov.mb.ca/conservation/pdf/sustainability\\_report\\_2009.pdf](https://www.gov.mb.ca/conservation/pdf/sustainability_report_2009.pdf)
- SARA - Species At Risk Act - <http://www.sararegistry.gc.ca>. (Accessed 04 October 2012; 28 May 2015).
- Statistics Canada. 2012. Brandon, Manitoba (Code 0091) and Manitoba (Code 46) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released May 29, 2012.  
<http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/index.cfm?Lang=E>.  
(Accessed 12 July 2012).
- Smith, R.E., H. Veldhuis, G.F. Mills, R.G. Eilers, W.R. Fraser, and G.W. Lelyk. 1998. Terrestrial, ecozones, ecoregions, and ecodistricts: An ecological stratification of Manitoba's natural landscapes. Technical Bulletin 1998-9E. Land Resource Unit, Brandon Research Centre, Research Branch, Agriculture and Agri-Food Canada, Winnipeg, MB.
- Stewart, K.W. and Watkinson, D.A. 2004. The freshwater fishes of Manitoba. University of Manitoba Press. Winnipeg. 276 pp.
- Toews, J. and Schneider-Vieira, F. 1999. A fish habitat assessment of the Assiniboine River near Brandon. A report prepared for the City of Brandon by Reid Crowther and Partners Ltd. and North/South Consultants Inc. April 1999. v + 16 pp. + III app.
- Toews, J. 2002. Assiniboine River Monitoring Study water quality component progress report- October 2002. A report prepared for the City of Brandon by Earth Tech (Canada) Inc. and North/South Consultants Inc. October 2002. viii + 52 pp. + VI app.

## 11.0 PERSONAL COMMUNICATIONS

### **Tetra Tech:**

Dave Tyson, MSc, RPBio, PBIol |Senior Environmental Project Manager  
Environmental Assessment, Permitting, and Natural Resources  
Phone: +1.204.954.6918 | Fax: +1.204.988.0546 | Cell: +1.204.290.1774  
dave.tyson@tetrattech.com

Vaibhav Banthia  
Vaibhav.Banthia@tetrattech.com

### **Historic Resources Branch of Manitoba Culture, Heritage and Tourism:**

Christina Nesbitt

### **Mussels:**

Don MacDonell  
dmacdonell@nscons.ca

Kurt Mazur  
kmazur@nscons.ca

### **Emails:**

email to P. Graveline from M. Hagos from V. Banthia (Tetra Tech), 2015-05-21 – “*Project Description for Use In Regulatory Application*”

email to P. Graveline from M. Hagos, 2015-04-17 – “*First Street Bridge Brandon, Public Consultation Report*” – Landmark Planning & Design Inc. December 2014”

email to P. Graveline from M. Hagos, 2015-04-17 – “*Preliminary Design of Major Rehabilitation Works for the Bridge on PTH 1A over Assiniboine River & CP Rail*” (BridgeSiteNo.2582-00) – Tetra Tech

email to P. Graveline from M. Hagos, 2015-04-17 – “*First Street Bridge Brandon, Public Consultation Report*” – Landmark Planning & Design Inc. December 2014

## **12.0 FIGURES**

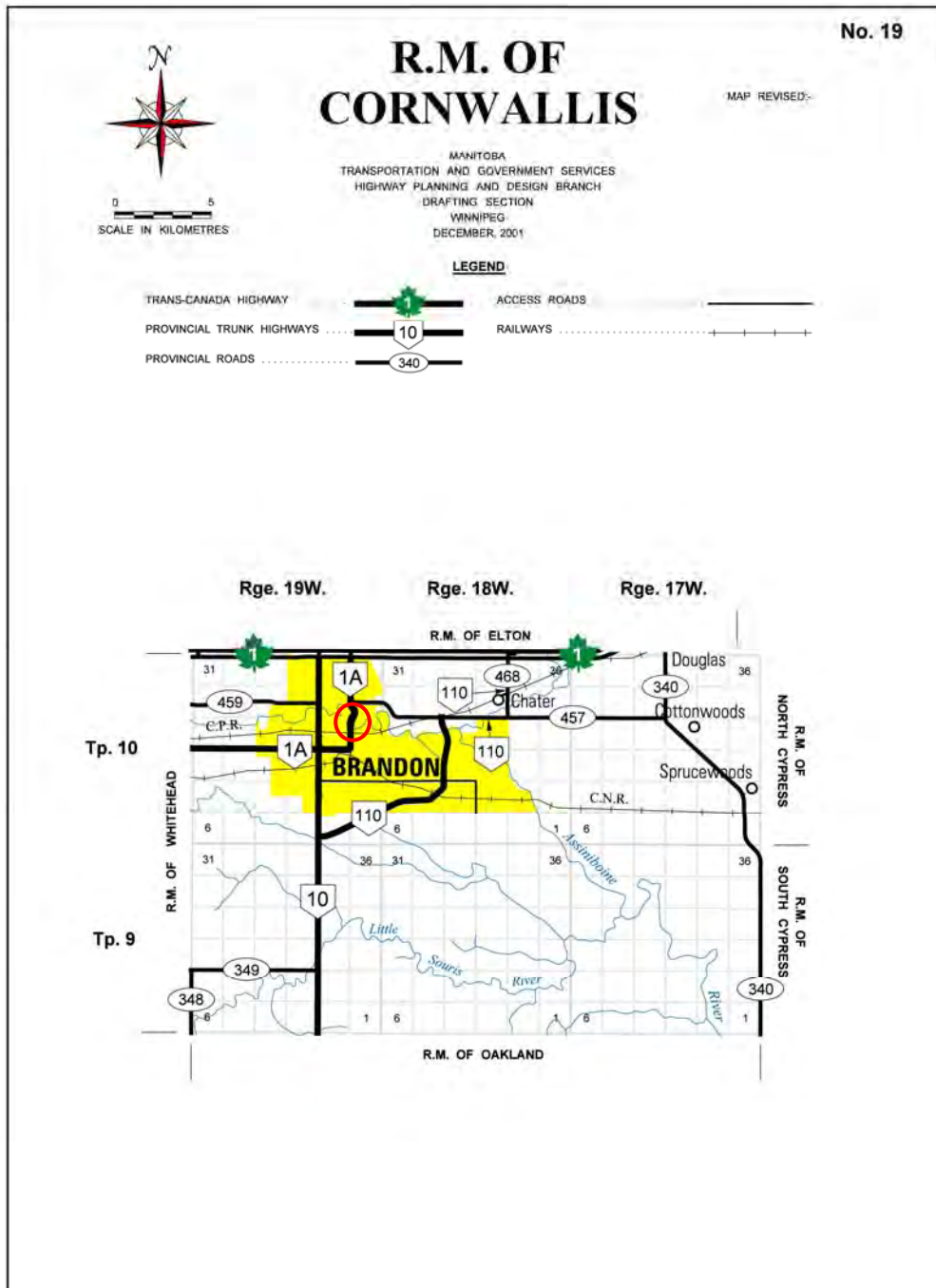


Figure 1 R.M. of Cornwallis with project area at the Site#2582-00 (Assiniboine River) indicated by red circle (source – Manitoba Land Initiative).

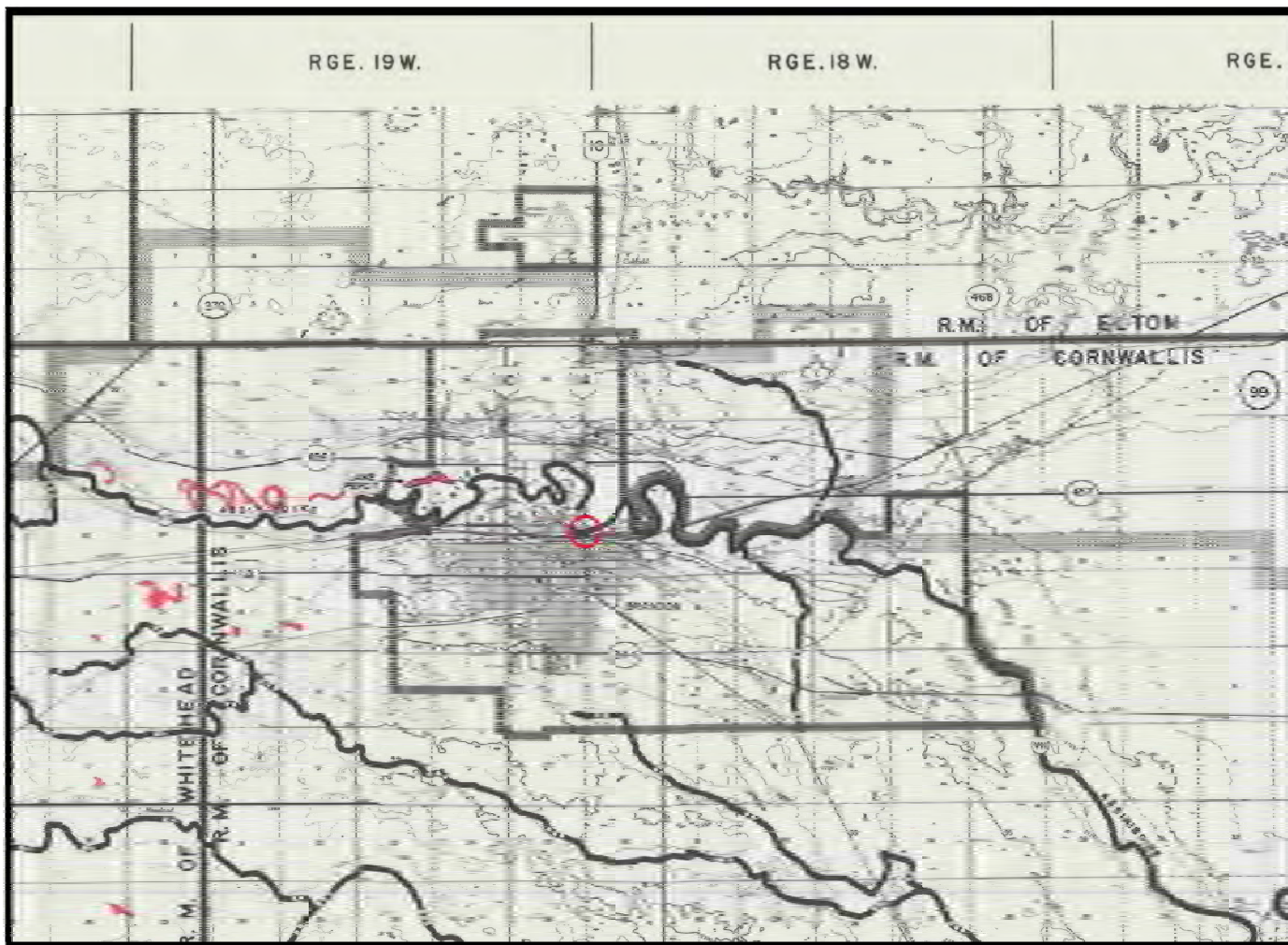


Figure 2 Approximate location of proposed works (red circle) at Site#2582-00 on the Assiniboine River (source – designated watershed map # 98).



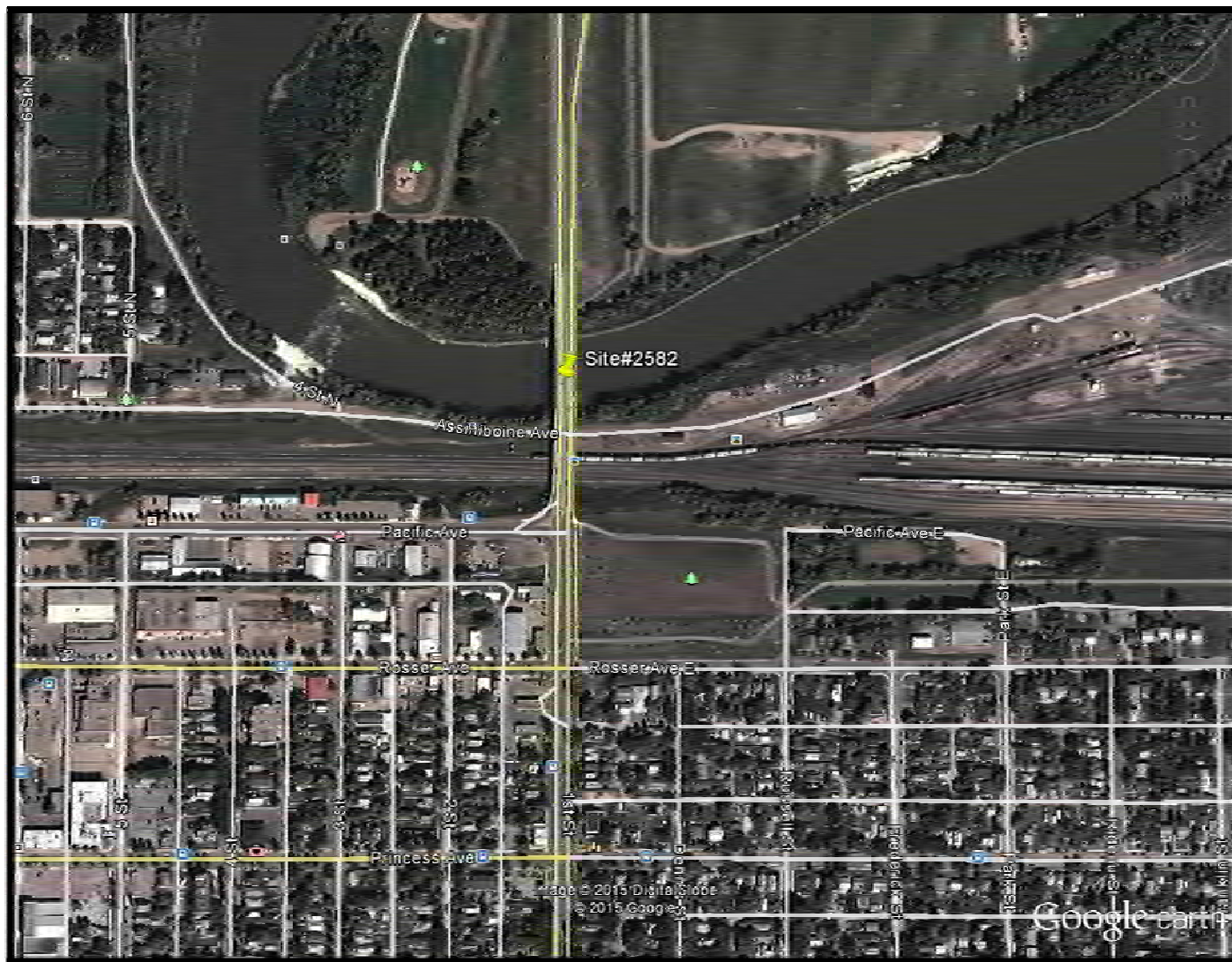


Figure 3 Google Earth image of the Assiniboine River and location of Site#2582-00 (yellow pin) within the City of Brandon (source – Google Earth).

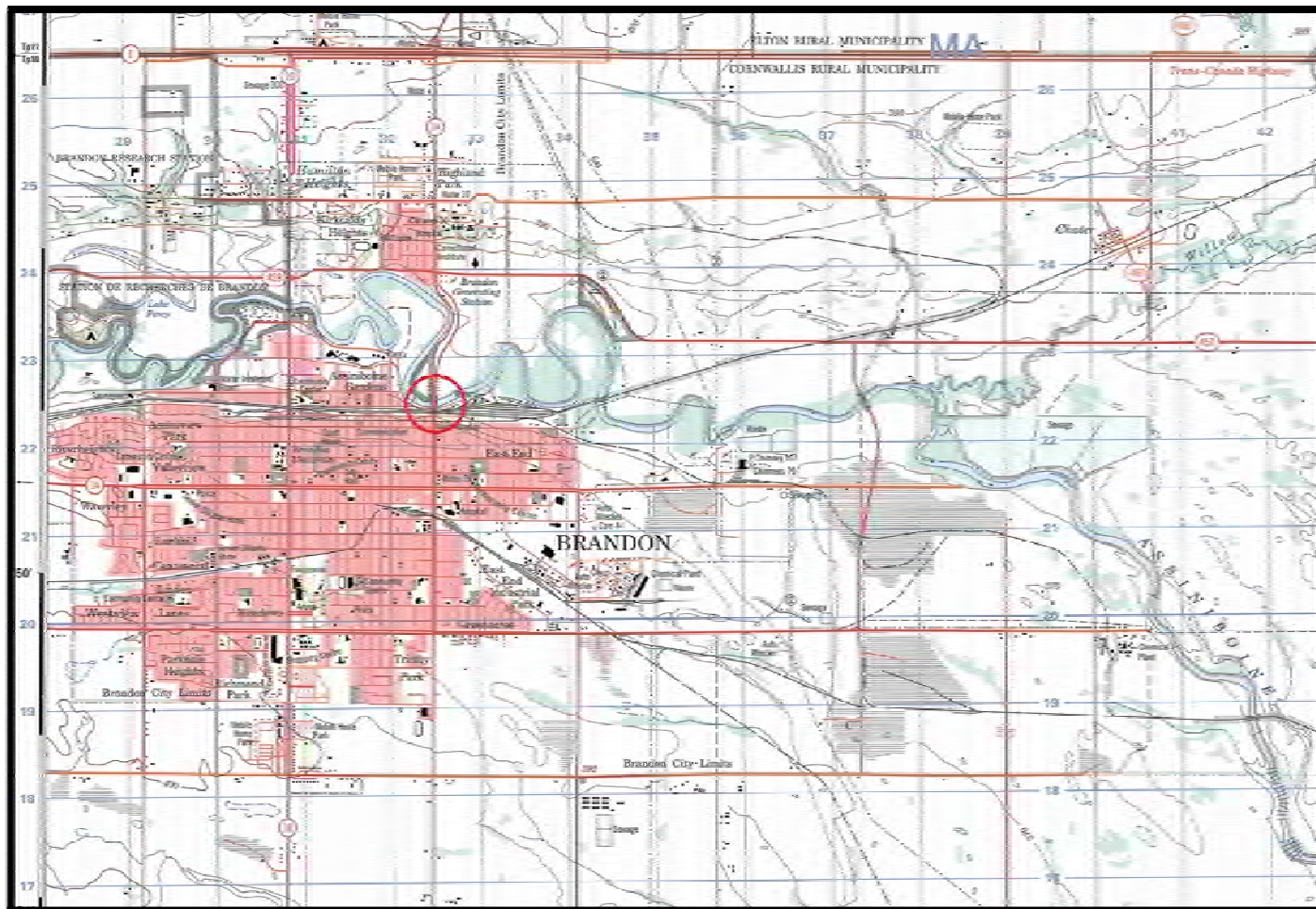


Figure 4 Approximate location of Site 2582-00 on the Assiniboine River (indicated by red circle; source: Topographic map of Brandon, Manitoba #62G13).

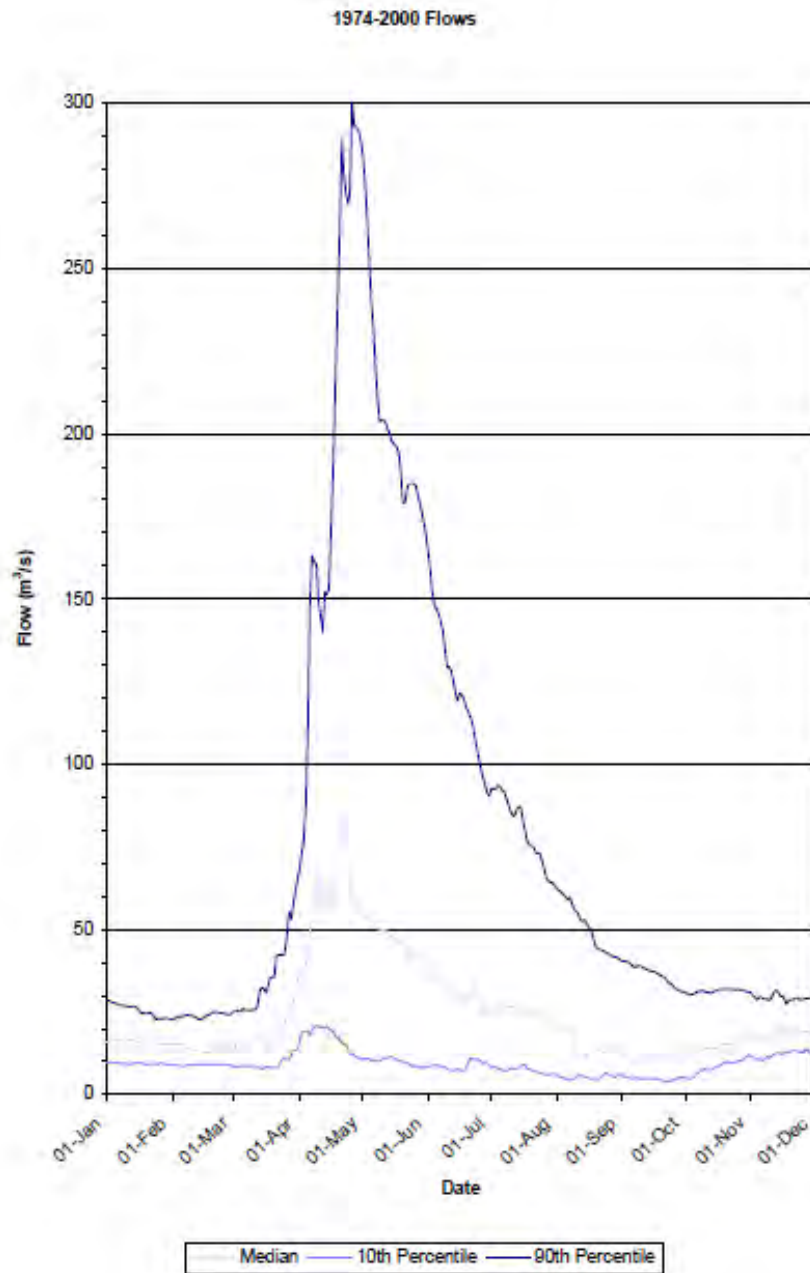
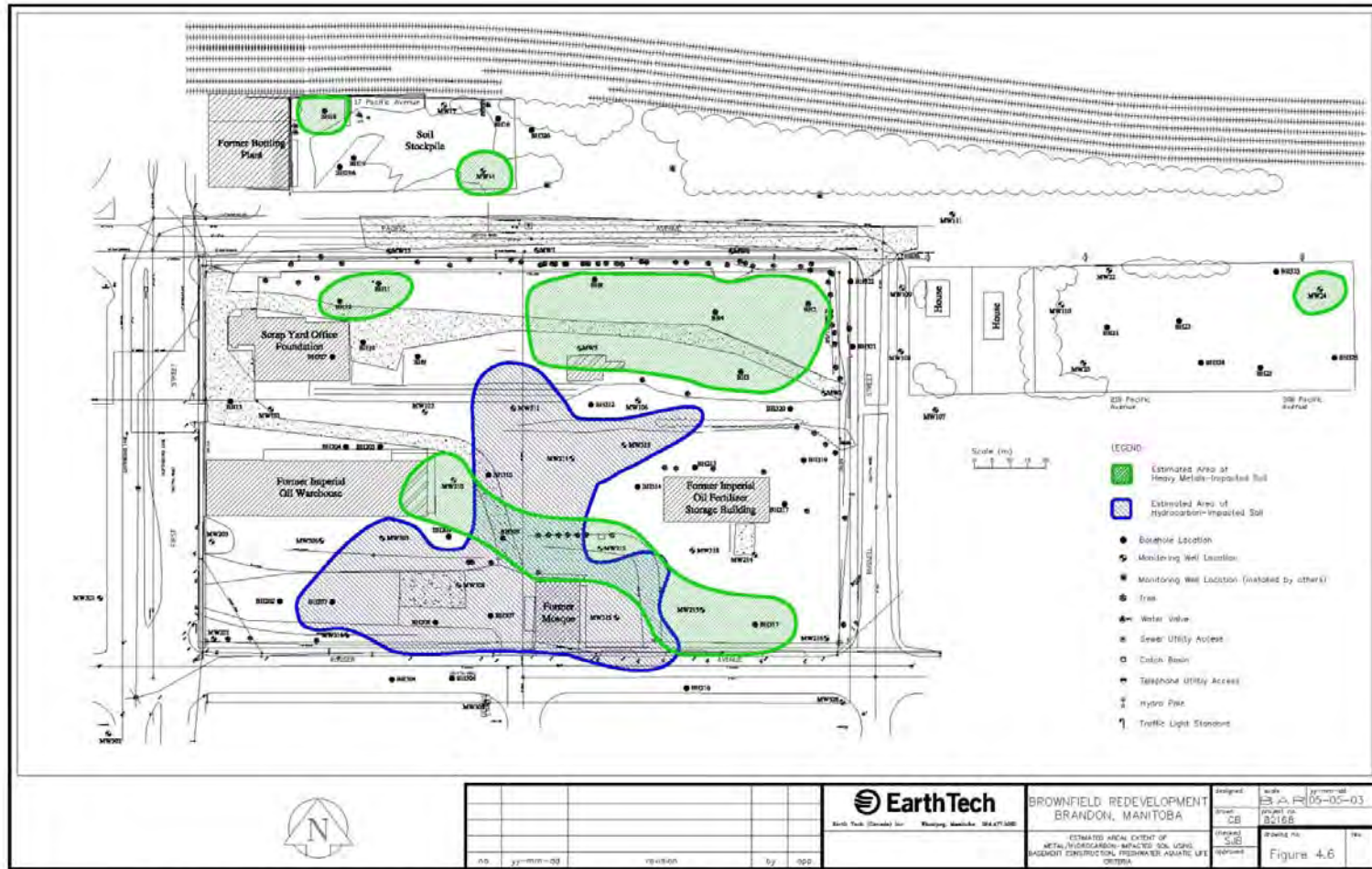


Figure 5 Daily discharge of the Assiniboine River near Brandon. Data from Environment Canada, Water Survey of Canada (WSC) gauge 05MH013, from 1974 – 2000. (North/South Consultants Inc., 2006-12 – “Assiniboine River Bridge Construction, PTH 10 – 18<sup>th</sup> Street Brandon, Fish Habitat Assessment”).



L:\work\B2000\B2168\03-Report\Phase III Report - May 2005\Figure 4.6.dwg 05-05-05 08:35am Layout-Figure 4.6 scott chapman

FORM 11x17  
 REV. 04-11-02

Figure 6 Contaminated soils in vicinity of the Project area (extracted from Earth Tech 2005).

**13.0 TABLES**

Table 1. Environmental review and site specifics of bridge site# 2582-00.

SITE PARAMETERS	SITE SPECIFICS	REFERENCES	COMMENTS AND REQUIREMENTS
<b>Municipality (R.M.)</b>	Cornwallis	Figure #2	
<b>Designated Watershed Map</b>	#98	Figure #1	
<b>Closest Community</b>	Within Brandon, Manitoba	Figure #2	
<b>Topographic Map</b>	Assiniboine River; City of Brandon; CPR rail travels underneath structure (south); residential living/housing (south); Assiniboine Avenue runs under structure; Brandon Dam (Drop structure approx 0.2 km west) upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)	Figure #4	
<b>Location :</b>			
<b>Legal</b>	E23-10-19W	(NPA 2011)	
<b>UTM</b>	14U 432491E 5522461MN	(Inspection Report 2013-05-29)	
<b>DFO Classification :</b>			
<b>Map #</b>	DFO 62G13	(Milani 2013)	
<b>Type</b>	A	(Milani 2013)	
<b>Transport Canada (NPA)</b>	Navigable (Assiniboine River)		MIT-WMS assumes that the Assiniboine River in the vicinity of Site #2582-00 to be a navigable waterway. However, the placement of the 3rd Street Dam upstream limits navigability.

Table 2. Proposed Work and Schedule (*email to P. Graveline from M. Hagos from V. Banthia (Tetra Tech), 2015-05-21 – “Project Description for Use In Regulatory Application”*).

SCHEDULE	ITEM	DESCRIPTION
<b>Fall 2015</b>	1	Relocate utilities as required
	2	Mobilize
<b>Winter 2015</b>	3	Stage 1 demolition – deck/girders
	4	Construct piers (place coffer dams, excavate, drive steel H-piles, drill caissons, cast-in-place concrete pile cap and pier shaft)
	5	Construct abutments (excavate, drive steel H-pile, cast-in-place concrete pile cap)
<b>Spring/Summer 2016</b>	6	Backfill
	7	Erect girders/diaphragms
<b>Fall 2016</b>	8	Place cast-in-place concrete deck/curb/concrete barrier/approach slabs
	9	Waterproofing deck
	10	Place asphalt roadway pavement
	11	Erosion protection
<b>Winter 2016</b>	12	Relocate utilities as required
	13	Turnover south bound/shutdown north bound
	14	Demolition – existing bridge deck/girders/piers/abutments
	15	Construct piers (place coffer dams, excavate, drive steel H-pile, drill caissons, cast-in-place concrete pile cap and pier shaft)
	16	Construct abutments (excavate, drive H-piles, cast-in-place concrete pile cap)
<b>Spring/Summer 2017</b>	17	Backfill
	18	Erect girders/diaphragms
	19	Place cast-in-place concrete deck/curb/concrete barrier/approach slabs
<b>Fall 2017</b>	20	Waterproofing deck
	21	Place asphalt roadway pavement
	22	Erosion protection
	23	Cleanup/demobilize

Table 3. Proposed Temporary Work and Tentative Schedule (*email to P. Graveline from V. Banthia (Tetra Tech), 2015-05-21 – “Project Description for Use In Regulatory Application”*).

<b>SCHEDULE</b>	<b>ITEM</b>	<b>DESCRIPTION</b>
<b>Fall 2015</b>	1	Construct road cross-over to divert traffic to north side of existing bridge for demolition
<b>Winter 2015</b>	2	Construct temporary access roads/crane pads
	3	Install and remove cofferdams (construction of new piers and demolition of existing piers)
	4	Install and remove work barges
<b>Spring/Summer 2016</b>	5	Installation of temporary work platforms for deck construction
<b>Fall 2016</b>	6	Removal of temporary work platforms for deck construction
	7	Remove temporary access roads/crane pads
	8	Cross-over traffic onto new southbound structure for demolition
<b>Winter 2016</b>	9	Construct temporary access roads/crane pads
	10	Install and remove cofferdams (construction of new piers and demolition of existing piers)
	11	Install and remove work barges
<b>Spring/Summer 2017</b>	12	Installation of temporary work platforms for deck construction
<b>Fall 2017</b>	13	Removal of temporary work platforms for deck construction
	14	Remove temporary access roads/crane pads



Table 4. Fish and freshwater mussel species inhabiting the Assiniboine River near Brandon, Manitoba.<sup>1</sup>  
 (Adapted from: *North/South Consultants Inc. 2006 and North/South Consultants Inc. 2009*)

Family	Systematic Name	Common Name	COSEWIC Status	SARA Status	MBESA Status
<b>Fish</b>					
Petromyzontidae	<i>Ichthyomyzon castaneus</i>	Chestnut Lamprey <sup>2</sup>	Data Deficient (Nov 2010)	--	--
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	Data Deficient (May 2011)	--	--
Acipenseridae	<i>Acipenser fulvescens</i>	Lake Sturgeon <sup>3</sup>	Endangered (Nov 2006)	--	--
Hiodontidae	<i>Hiodon alosoides</i>	Goldeye	--	--	--
	<i>H. tergisus</i>	Mooneye <sup>2</sup>	--	--	--
Catostomidae	<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo	Special Concern (April 2009)	Special Concern (Schedule 1)	--
	<i>Catostomus commersonii</i>	White Sucker	--	--	--
	<i>Carpiodes cyprinus</i>	Quillback <sup>2</sup>	--	--	--
	<i>Moxostoma anisurum</i>	Silver Redhorse <sup>2</sup>	--	--	--
	<i>M. macrolepidotum</i>	Shorthead Redhorse	--	--	--
Cyprinidae	<i>Cyprinus carpio</i>	Common Carp <sup>2</sup>	--	--	--
	<i>Luxilus comutus</i>	Common Shiner	--	--	--
	<i>Macrhybopsis storeriana</i>	Silver Chub	Not at Risk (May 2012)	--	--
	<i>N. atherinoides</i>	Emerald Shiner	--	--	--
	<i>N. blennioides</i>	River Shiner	--	--	--
	<i>N. dorsalis</i>	Bigmouth Shiner	Not at Risk (Nov 2003)	--	--
	<i>N. heterodon</i>	Blackchin Shiner	Not at Risk (April 1994)	--	--
	<i>N. heterolepis</i>	Blacknose Shiner	--	--	--
	<i>N. hudsonius</i>	Spottail Shiner	--	--	--
<i>N. stramineus</i>	Sand Shiner	--	--	--	

Table 4. Continued

Family	Systematic Name	Common Name	COSEWIC Status	SARA Status	MBESA Status
	<i>Pimephales promelas</i>	Fathead Minnow	--	--	--
	<i>Platygobio gracilis</i>	Flathead Chub	--	--	--
	<i>Rhinichthys obtusus</i>	Western Blacknose Dace	--	--	--
	<i>R. cataractae</i>	Longnose Dace	--	--	--
	<i>Semotilus atromaculatus</i>	Creek Chub	--	--	--
	<i>Phoxinus neogaeus</i>	Finescale Dace	--	--	--
Ictaluridae	<i>Ictalurus punctatus</i>	Channel Catfish	--	--	--
	<i>Ameiurus melas</i>	Black Bullhead	--	--	--
	<i>A. nebulosus</i>	Brown Bullhead	--	--	--
	<i>Noturus flavus</i>	Stonecat	--	--	--
	<i>N. gyrinus</i>	Tadpole Madtom	--	--	--
Esocidae	<i>Esox lucius</i>	Northern Pike <sup>2</sup>	--	--	--
Umbridae	<i>Umbra limi</i>	Central Mudminnow	--	--	--
Percopsidae	<i>Percopsis omiscomaycus</i>	Trout-Perch	--	--	--
Gadidae	<i>Lota lota</i>	Burbot	--	--	--
Centrarchidae	<i>Ambloplites rupestris</i>	Rock Bass	--	--	--
Percidae	<i>Etheostoma exile</i>	Iowa Darter	--	--	--
	<i>E. nigrum</i>	Johnny Darter	--	--	--
	<i>Perca flavescens</i>	Yellow Perch	--	--	--
	<i>Percina maculata</i>	Blackside Darter	--	--	--
	<i>P. shumardi</i>	River Darter	Not at Risk (April 1989)	--	--
	<i>Sander canadense</i>	Sauger	--	--	--
	<i>S. vitreum</i>	Walleye	--	--	--

Table 4. Continued

Family	Systematic Name	Common Name	COSEWIC Status	SARA Status	MBESA Status
Gasterosteidae	<i>Culaea inconstans</i>	Brook Stickleback	--	--	--
	<i>Pungitius pungitius</i>	Ninespine Stickleback	--	--	--
Sciaenidae	<i>Apodinotus grunniens</i>	Freshwater Drum	--	--	--
<b>Mussels</b>					
Uniononidae	<i>Amblema plicata</i>	Threeridge	--	--	--
	<i>Fusconaia flava</i>	Pigtoe <sup>4</sup>	--	--	--
	<i>Quadrula quadrula</i>	Mapleleaf <sup>6</sup>	Endangered (April 2006)	Threatened (Schedule 1)	Endangered
	<i>Lampsilis cardium</i>	Plain Pocketbook <sup>4,5</sup>	--	--	--
	<i>Lampsilis siliquoidea</i>	Fat Mucket <sup>4</sup>	--	--	--
	<i>Lasmigona complanata</i>	White Heelsplitter	--	--	--
	<i>Ligumia recta</i>	Black Sandshell	--	--	--
	<i>Potamilus alatus</i>	Pink Heelsplitter	--	--	--
	<i>Pyganodon grandis</i>	Giant Floater <sup>4</sup>	--	--	--

<sup>1</sup> List compiled from McCulloch and Franzin (1996), Toews and Schneider-Vieira (1999), Carney (2003), Stewart and Watkinson (2004) and *pers. comm.* B. Watkins, Manitoba Conservation Wildlife and Ecosystem Protection Branch, Winnipeg Manitoba, September 2006.

<sup>2</sup> Observed during field investigation 12 Sept. 2006.

<sup>3</sup> Lake sturgeon have been stocked in the Assiniboine River near Brandon from 1996 – present (*pers. comm.* B. Bruederlin, Manitoba Water Stewardship Fisheries Branch, Brandon Manitoba, October 2006).

<sup>4</sup> Observed during field investigation 11 & 12 Sept. 2006, empty valves.

<sup>5</sup> Observed during field investigation 11 & 12 Sept. 2006, live mussel.

<sup>6</sup> Observed during fish/mussel salvage 25 Sept. 2009, 3 live mussels.

Table 5. List of plant species of concern within Manitoba's Aspen Parkland Ecoregion and their respective status under: 1) Manitoba Conservation Data Centre (MBCDC); 2) The Committee on the Status of Endangered Wildlife in Canada (COSEWIC); 3) Species at Risk Act (SARA); and 4) Manitoba Endangered Species Act (MBESA). Status updated May 2015. (Table adapted from: *North/South Consultants Inc. 2014*).

Species	Common Name	MBCDC Global Rank	MBCDC Provincial Rank	COSEWIC Status	SARA Status	MBESA Status
<b>VASCULAR PLANT</b>						
<i>Agalinis aspera</i>	Rough Purple False-foxglove (aka Rough Agalinis)	G5	S1S2	Endangered (April 2006)	Endangered (Schedule 1)	Endangered
<i>Alisma gramineum</i>	Narrow-leaved Water- plantain	G5	S1	--	--	--
<i>Ambrosia acanthicarpa</i>	Sandbur	G5	S1S2	--	--	--
<i>Andropogon hallii</i>	Sand Bluestem	G4	S2S3	--	--	--
<i>Aristida purpurea var. longiseta</i>	Red Three-awn	G5T5?	S1	--	--	--
<i>Arnica fulgens</i>	Shining Arnica	G5	S2	--	--	--
<i>Artemisia cana</i>	Silver Sagebrush	G5	S2	--	--	--
<i>Asarum canadense</i>	Wild Ginger	G5	S3S4	--	--	--
<i>Asclepias lanuginosa</i>	Hairy Milkweed	G4?	S2	--	--	--
<i>Asclepias verticillata</i>	Whorled Milkweed	G5	S3	--	--	--
<i>Asclepias viridiflora</i>	Green Milkweed	G5	S3	--	--	--
<i>Astragalus gilviflorus</i>	Cushion Milkvetch	G5	S1	--	--	--
<i>Astragalus pectinatus</i>	Narrow-leaved Milkvetch	G5	S2S3	--	--	--
<i>Atriplex argentea</i>	Saltbrush	G5	S2	--	--	--
<i>Bidens amplissima</i>	Beggar-ticks	G3	SNA	Special Concern (Nov 2001)	Special Concern (Schedule 1)	--
<i>Boltonia asteroides var. recognita</i>	White Boltonia	G5T3T5	S2S3	--	--	--
<i>Botrychium campestre</i>	Prairie Moonwort	G3G4	S1	--	--	--
<i>Botrychium multifidum</i>	Leathery Grape-fern	G5	S3	--	--	--
<i>Bouteloua curtipendula</i>	Side-oats Grama	G5	S2S3	--	--	--

Table 5. Continued.

Species	Common Name	MBCDC Global Rank	MBCDC Provincial Rank	COSEWIC Status	SARA Status	MBESA Status
<b>VASCULAR PLANT</b>						
<i>Bromus porteri</i>	Porter's Chess	G5	S3?	--	--	--
<i>Bromus pubescens</i>	Canada Brome Grass	G5	SNA	--	--	--
<i>Bouteloua dactyloides</i>	Buffalograss	G4G5	S1	Special Concern (Nov 2011)	Threatened (Schedule 1)	Threatened
<i>Calamagrostis montanensis</i>	Plains Reed Grass	G5	S3	--	--	--
<i>Callitriche heterophylla</i>	Larger Water-starwort	G5	S2	--	--	--
<i>Carex bicknellii</i>	Bicknell's Sedge	G5	SH	--	--	--
<i>Carex cryptolepis</i>	Northeastern Sedge	G4	S1	--	--	--
<i>Carex gravida</i>	Heavy Sedge	G5	S1	--	--	--
<i>Carex hallii</i>	Hall's Sedge	G4?Q	S3	--	--	--
<i>Carex hystericina</i>	Porcupine Sedge	G5	S3?	--	--	--
<i>Carex parryana</i>	Parry's Sedge	G4	S3?	--	--	--
<i>Carex prairea</i>	Prairie Sedge	G5?	S4?	--	--	--
<i>Carex sterilis</i>	Dioecious Sedge	G4	S2	--	--	--
<i>Carex supina var. spaniocarpa</i>	Weak Sedge	G5T3T5	S2?	--	--	--
<i>Carex tetanica</i>	Rigid Sedge	G4G5	S2	--	--	--
<i>Carex torreyi</i>	Torrey's Sedge	G4	S4	--	--	--
<i>Carex tribuloides</i>	Prickly Sedge	G5	SNA	--	--	--
<i>Carex xerantica</i>	White-scaled Sedge	G5	S3?	--	--	--
<i>Celtis occidentalis</i>	Hackberry	G5	S1	--	--	Threatened
<i>Chamaesyce geyeri</i>	Prostrate Spurge	G5	S1	--	--	--
<i>Chenopodium subglabrum</i>	Smooth Goosefoot	G3G4	S1	Threatened (April 2006)	Threatened (Schedule 1)	Endangered

Table 5. Continued.

Species	Common Name	MBCDC Global Rank	MBCDC Provincial Rank	COSEWIC Status	SARA Status	MBESA Status
<b>VASCULAR PLANT</b>						
<i>Circaea lutetiana ssp. canadensis</i>	Large Enchanter's- nightshade	G5T5	S2	--	--	--
<i>Clematis ligusticifolia</i>	Western Virgin's-bower	G5	S1	--	--	--
<i>Clematis virginiana</i>	Virgin's-bower	G5	S2	--	--	--
<i>Coreopsis tinctoria</i>	Common Tickseed	G5	SH	--	--	--
<i>Corispermum americanum var. americanum</i>	American Bugseed	G5?T5?	S2S3	--	--	--
<i>Corispermum hookeri var. hookeri</i>	Hooker's Bugseed	G4G5T4T 5	S1	--	--	--
<i>Corispermum pallasii</i>	Pallas' Bugseed	G4?	SU	--	--	--
<i>Corispermum villosum</i>	Hairy Bugseed	G4?	S1S2	--	--	--
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	G5	S3	--	--	--
<i>Cryptotaenia canadensis</i>	Honewort	G5	S2	--	--	--
<i>Cycloloma atriplicifolium</i>	Winged Pigseed	G5	S2	--	--	--
<i>Cymopterus acaulis</i>	Plains Cymopterus	G5	S2S3	--	--	--
<i>Cyperus houghtonii</i>	Houghton's Umbrella-sedge	G4?	S2	--	--	--
<i>Cyperus schweinitzii</i>	Schweinitz's Flatsedge	G5	S2	--	--	--
<i>Cypripedium candidum</i>	Small White Lady's-slipper	G4	S2	Threatened (Nov 2014)	Endangered (Schedule 1)	Endangered
<i>Dalea villosa var. villosa</i>	Silky Prairie-clover (aka Hairy Prairie-clover)	G5T5	S2S3	Special Concern (Nov 2011)	Threatened (Schedule 1)	Threatened
<i>Desmodium canadense</i>	Beggar's-lice	G5	S2	--	--	--
<i>Dichanthelium linearifolium</i>	White-haired Panic-grass	GNR	S2	--	--	--

Table 5. Continued.

Species	Common Name	MBCDC Global Rank	MBCDC Provincial Rank	COSEWIC Status	SARA Status	MBESA Status
<b>VASCULAR PLANT</b>						
<i>Dichanthelium wilcoxianum</i>	Sand Millet	G5	S2	--	--	--
<i>Drosera anglica</i>	Oblong-leaved Sundew	G5	S3	--	--	--
<i>Eleocharis engelmannii</i>	Engelmann's Spike-rush	G4G5	S1	--	--	--
<i>Elymus hystrix</i>	Bottle-brush Grass	G5	S2	--	--	--
<i>Eragrostis hypnoides</i>	Creeping Teal Love Grass	G5	S4	--	--	--
<i>Erigeron caespitosus</i>	Tufted Fleabane	G5	S2	--	--	--
<i>Festuca hallii</i>	Plains Rough Fescue	G4	S3	--	--	--
<i>Festuca subverticillata</i>	Nodding Fescue	G5	S1	--	--	--
<i>Galium aparine</i>	Cleavers	G5	SU	--	--	--
<i>Hackelia floribunda</i>	Large Flowered Stickseed	G5?	SU	--	--	--
<i>Helianthus nuttallii ssp. rydbergii</i>	Tuberous-rooted Sunflower	G5T5	S2	--	--	--
<i>Heliotropium curassavicum</i>	Seaside Heliotrope	G5	SH	--	--	--
<i>Hypoxis hirsute</i>	Yellow Stargrass	G5	S4	--	--	--
<i>Juncus interior</i>	Inland Rush	G4G5	S1	--	--	--
<i>Krascheninnikovia lanata</i>	Winterfat	G5	S2	--	--	--
<i>Leersia oryzoides</i>	Rice Cutgrass	G5	S3?	--	--	--
<i>Lemna turionifera</i>	Duckweed	G5	SU	--	--	--
<i>Leucophysalis grandiflora</i>	Large White-flowered Ground-cherry	G4?	S3	--	--	--
<i>Linum sulcatum</i>	Grooved Yellow Flax	G5	S3	--	--	--
<i>Lomatium foeniculaceum</i>	Hairy-fruited Parsley	G5	S3	--	--	--
<i>Lomatium macrocarpum</i>	Long-fruited Parsley	G5	S3	--	--	--

Table 5. Continued.

Species	Common Name	MBCDC Global Rank	MBCDC Provincial Rank	COSEWIC Status	SARA Status	MBESA Status
<b>VASCULAR PLANT</b>						
<i>Lomatium orientale</i>	White-flowered Parsley	G5	S1	--	--	--
<i>Lomatogonium rotatum</i>	Marsh Felwort	G5	S2S3	--	--	--
<i>Lotus unifoliolatus</i>	prairie trefoil	G5	S2S3	--	--	--
<i>Malaxis monophyllos</i>	White Adder's-mouth	G5	S2?	--	--	--
<i>Malaxis paludosa</i>	Bog Adder's-mouth	G4	S1	--	--	--
<i>Mentzelia decapetala</i>	Gumbo-lily	G5	SH	--	--	--
<i>Mertensia lanceolata</i>	Tall Lungwort	G5	S2	--	--	--
<i>Mimulus glabratus</i>	Smooth Monkeyflower	G5	S1	--	--	--
<i>Mimulus glabratus var. jamesii</i>	Smooth Monkeyflower	G5T5	S1	--	--	--
<i>Musineon divaricatum</i>	Leafy Musineon	G5	S2	--	--	--
<i>Myosurus minimus ssp. minimus</i>	Least Mousetail	G5T5	S1	--	--	--
<i>Nassella viridula</i>	Green Needle Grass	G5	S3	--	--	--
<i>Orobanche ludoviciana</i>	Louisiana Broom-rape	G5	S2	--	--	--
<i>Osmorhiza claytonii</i>	Woolly or Hairy Sweet Cicely	G5	S2	--	--	--
<i>Ostrya virginiana</i>	Hop-hornbeam	G5	S2	--	--	--
<i>Oxytropis sericea</i>	Early Yellow Locoweed	G5	S1	--	--	--
<i>Parietaria pensylvanica</i>	American Pellitory	G5	S4	--	--	--
<i>Penstemon nitidus</i>	Smooth Blue Beard-tongue	G5	S2	--	--	--
<i>Penstemon procerus</i>	Slender Beard-tongue	G5	S1?	--	--	--
<i>Phlox hoodii</i>	Moss Pink	G5	S3	--	--	--
<i>Phryma leptostachya</i>	Lopseed	G5	S3	--	--	--
<i>Plagiobothrys scouleri var. scouleri</i>	Scouler's Allocarya	G5TNR	S1	--	--	--



Table 5. Continued.

Species	Common Name	MBCDC Global Rank	MBCDC Provincial Rank	COSEWIC Status	SARA Status	MBESA Status
<b>VASCULAR PLANT</b>						
<i>Plantago elongata ssp. elongata</i>	Linear Leaved-plantain	G4T4	S2	--	--	--
<i>Platanthera orbiculata</i>	Round-leaved Bog Orchid	G5	S3	--	--	--
<i>Poa arida</i>	Plains Blue Grass	G5	S4	--	--	--
<i>Poa cusickii</i>	Mutton-grass	G5	S2?	--	--	--
<i>Poa fendleriana</i>	Mutton Grass	G5	S2	--	--	--
<i>Polanisia dodecandra ssp. dodecandra</i>	Clammyweed	G5T5?	S1	--	--	--
<i>Polanisia dodecandra ssp. trachysperma</i>	Clammyweed	G5T5?	S1	--	--	--
<i>Polygala verticillata</i>	Whorled Milkwort	G5	S2	--	--	--
<i>Polygala verticillata var. isocycla</i>	Whorled Milkwort	G5T5	S2	--	--	--
<i>Potamogeton amplifolius</i>	Large-leaved Pondweed	G5	S2?	--	--	--
<i>Potamogeton illinoensis</i>	Illinois Pondweed	G5	S2	--	--	--
<i>Potentilla plattensis</i>	Low Cinquefoil	G4	S2	--	--	--
<i>Ranunculus cymbalaria var. saximontan us</i>	Seaside Crowfoot	G5T5	S1S2	--	--	--
<i>Rhynchospora alba</i>	White Beakrush	G5	S3?	--	--	--
<i>Rhynchospora capillacea</i>	Horned Beakrush	G4	S2	--	--	--
<i>Sanguinaria canadensis</i>	Blood-root	G5	S2	--	--	--
<i>Schedonnardus paniculatus</i>	Tumble-grass	G5	S2	--	--	--
<i>Shinnersoseris rostrata</i>	Annual Skeletonweed	G5?	S1S2	--	--	--
<i>Sisyrinchium campestre</i>	White-eyed Grass	G5	SU	--	--	--
<i>Sporobolus neglectus</i>	Annual Dropseed	G5	S3?	--	--	--
<i>Thermopsis rhombifolia</i>	Golden Bean	G5	S2	--	--	--

Table 5. Continued.

Species	Common Name	MBCDC Global Rank	MBCDC Provincial Rank	COSEWIC Status	SARA Status	MBESA Status
<b>VASCULAR PLANT</b>						
<i>Townsendia exscapa</i>	Silky Townsend-daisy	G5	S2	--	--	--
<i>Tradescantia occidentalis</i>	Western Spiderwort	G5	S1	Threatened (Nov 2002)	Threatened (Schedule 1)	Threatened
<i>Uvularia sessilifolia</i>	Small Bellwort	G5	S2	--	--	--
<i>Verbena bracteata</i>	Bracted Vervain	G5	S3	--	--	--
<b>ASSEMBLAGE</b>						
<i>Andropogon scoparius- bouteloua spp. (curtipendula, gracilis)- carex filifolia herbaceous vegetation</i>	Little Bluestem- grama Grass (Blue, Side- oats)-thread- leaved Sedge/Herbaceous Ve getation	GNR	S3	--	--	--
<i>Fraxinus pennsylvanica- (ulmus americana)-acer negundo forest</i>	Green Ash-(American Elm)- manitoba/Maple Forest	GNR	S3	--	--	--
<i>Juniperus horizontalis/andropogon scop arius dwarf-shrubland</i>	Creeping Juniper/little Bluest em//Dwarf Shrubland	GNR	S3?	--	--	--
<i>Quercus macrocarpa/amelanchier alnifo lia/aralia nudicaulis- carex assiniboinensis forest</i>	Bur Oak/saskatoon//Serviceb erry/sarsaparilla- assiniboia//Sedge Forest	GNR	S3?	--	--	--
<i>Stipa comata-bouteloua gracilis- carex filifolia herbaceous vegetation</i>	Needle-and-thread- blue/Grama-thread- leaved Sedge/Herbaceous Ve getation	GNR	S3	--	--	--

Table 6. Bird species found within south-western Manitoba. Adapted from Manitoba Breeding Bird Atlas (2012), species names updated based on ITIS. (*North/South Consultants Inc. 2014*)

Order	Scientific Name	Common Name	Species CODE
Anseriformes	<i>Aix sponsa</i>	Wood Duck	WODU
	<i>Anas acuta</i>	Northern Pintail	NOPI
	<i>Anas americana</i>	American Wigeon	AMWI
	<i>Anas clypeata</i>	Northern Shoveler	NSHO
	<i>Anas crecca</i>	Green-winged Teal	GWTE
	<i>Anas discors</i>	Blue-winged Teal	BWTE
	<i>Anas platyrhynchos</i>	Mallard	MALL
	<i>Anas strepera</i>	Gadwall	GADW
	<i>Aythya affinis</i>	Lesser Scaup	LESC
	<i>Aythya americana</i>	Redhead	REDH
	<i>Aythya collaris</i>	Ring-necked Duck	RNDU
	<i>Aythya valisineria</i>	Canvasback	CANV
	<i>Branta canadensis</i>	Canada Goose	CAGO
	<i>Bucephala albeola</i>	Bufflehead	BUFF
	<i>Bucephala clangula</i>	Common Goldeneye	COGO
	<i>Lophodytes cucullatus</i>	Hooded Merganser	HOME
	<i>Mergus merganser</i>	Common Merganser	COME
<i>Oxyura jamaicensis</i>	Ruddy Duck	RUDU	
Galliformes	<i>Perdix perdix</i>	Gray Partridge	GRPA
	<i>Bonasa umbellus</i>	Ruffed Grouse	RUGR
	<i>Gavia immer</i>	Common Loon	COLO
	<i>Meleagris gallopavo</i>	Wild Turkey	WITU
	<i>Phasianus colchicus</i>	Ring-necked Pheasant ♂ ♀	RIPH
Gaviiformes	<i>Tympanuchus phasianellus</i>	Sharp-tailed Grouse	STGR
Podicipediformes	<i>Aechmophorus clarkii</i>	Clark's Grebe †	CLGR
	<i>Aechmophorus occidentalis</i>	Western Grebe §	WEGR
	<i>Podiceps auritus</i>	Horned Grebe ♂	HOGR
	<i>Podiceps grisegena</i>	Red-necked Grebe §	RNGR
	<i>Podiceps nigricollis</i>	Eared Grebe §	EAGR
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	PBGR
Suliformes	<i>Phalacrocorax auritus</i>	Double-crested Cormorant §	DCCO
Pelecaniformes	<i>Ardea sumatrana</i>	Great Blue Heron §	GBHE
	<i>Botaurus lentiginosus</i>	American Bittern	AMBI
	<i>Bubulcus ibis</i>	Cattle Egret ♂ ♀	CAEG
	<i>Egretta caerulea</i>	Little Blue Heron †	LBHE
	<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron §	BCNH
	<i>Pelecanus erythrorhynchos</i>	American White Pelican §	AWPE
	<i>Plegadis chihi</i>	White-faced Ibis ♂ ♀	WFIB

Table 6. Continued.

Order	Scientific Name	Common Name	Species CODE
Accipitriformes	<i>Accipiter cooperii</i>	Cooper's Hawk	COHA
	<i>Accipiter gentilis</i>	Northern Goshawk	NOGO
	<i>Accipiter striatus</i>	Sharp-shinned Hawk	SSHA
	<i>Buteo jamaicensis</i>	Red-tailed Hawk	RTHA
	<i>Buteo platypterus</i>	Broad-winged Hawk	BWHA
	<i>Buteo regalis</i>	Ferruginous Hawk †	FEHA
	<i>Buteo swainsoni</i>	Swainson's Hawk	SWHA
	<i>Cathartes aura</i>	Turkey Vulture	TUVU
	<i>Circus cyaneus</i>	Northern Harrier	NOHA
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	BAEA
	<i>Pandion haliaetus</i>	Osprey ‡	OSPR
Falconiformes	<i>Falco columbarius</i>	Merlin	MERL
	<i>Falco peregrinus</i>	Peregrine Falcon ♂ ‡	PEFA
	<i>Falco sparverius</i>	American Kestrel	AMKE
Gruiformes	<i>Coturnicops noveboracensis</i>	Yellow Rail ♂	YERA
	<i>Fulica americana</i>	American Coot	AMCO
	<i>Grus canadensis</i>	Sandhill Crane	SACR
	<i>Porzana carolina</i>	Sora	SORA
	<i>Rallus limicola</i>	Virginia Rail	VIRA
Charadriiformes	<i>Actitis macularia</i>	Spotted Sandpiper	SPSA
	<i>Bartramia longicauda</i>	Upland Sandpiper	UPSA
	<i>Charadrius melodus</i>	Piping Plover †	PIPL
	<i>Charadrius vociferus</i>	Killdeer	KILL
	<i>Chlidonias niger</i>	Black Tern §	BLTE
	<i>Chroicocephalus philadelphia</i>	Bonaparte's Gull ‡	BOGU
	<i>Gallinago delicata</i>	Wilson's Snipe	WISN
	<i>Hydroprogne caspia</i>	Caspian Tern §	CATE
	<i>Larus argentatus</i>	Herring Gull §	HERG
	<i>Larus delawarensis</i>	Ring-billed Gull	RBGU
	<i>Leucophaeus pipixcan</i>	Franklin's Gull	FRGU
	<i>Limosa fedoa</i>	Marbled Godwit	MAGO
	<i>Phalaropus tricolor</i>	Wilson's Phalarope	WIPH
	<i>Recurvirostra americana</i>	American Avocet	AMAV
	<i>Scolopax minor</i>	American Woodcock	AMWO
	<i>Sterna forsteri</i>	Forster's Tern	FOTE
	<i>Sterna hirundo</i>	Common Tern	COTE
<i>Tringa semipalmata</i>	Willet	WILL	
Columbiformes	<i>Columba livia</i>	Rock Pigeon	ROPI
	<i>Zenaida macroura</i>	Mourning Dove	MODO
Cuculiformes	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	BBCU

Table 6. Continued.

Order	Scientific Name	Common Name	Species CODE	
Strigiformes	<i>Aegolius acadicus</i>	Northern Saw-whet Owl	NSWO	
	<i>Asio flammeus</i>	Short-eared Owl ♂	SEOW	
	<i>Asio otus</i>	Long-eared Owl ♂	LEOW	
	<i>Athene cunicularia</i>	Burrowing Owl †	BUOW	
	<i>Bubo virginianus</i>	Great Horned Owl	GHOW	
	<i>Caprimulgus vociferus</i>	Whip-poor-will ♂	WPWI	
	<i>Chordeiles minor</i>	Common Nighthawk ♂	CONI	
	<i>Megascops asio</i>	Eastern Screech-Owl	EASO	
	<i>Strix nebulosa</i>	Great Gray Owl ♂	GGOW	
	<i>Strix varia</i>	Barred Owl ♂	BDOW	
	<i>Surnia ulula</i>	Northern Hawk Owl ♂	NHOW	
Apodiformes	<i>Archilochus colubris</i>	Ruby-throated Hummingbird	RTHU	
	<i>Chaetura pelagica</i>	Chimney Swift ♂	CHSW	
Coraciiformes	<i>Megaceryle alcyon</i>	Belted Kingfisher	BEKI	
Piciformes	<i>Colaptes auratus</i>	Northern Flicker	NOFL	
	<i>Dryocopus pileatus</i>	Pileated Woodpecker	PIWO	
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker ♂	RHOW	
	<i>Picoides arcticus</i>	Black-backed Woodpecker	BBWO	
	<i>Picoides dorsalis</i>	American Three-toed Woodpecker	ATTW	
	<i>Picoides pubescens</i>	Downy Woodpecker	DOWO	
	<i>Picoides villosus</i>	Hairy Woodpecker	HAWO	
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	YBSA	
	Passeriformes	<i>Contopus cooperi</i>	Olive-sided Flycatcher ♂	OSFL
		<i>Contopus virens</i>	Eastern Wood-Pewee	EAWP
<i>Empidonax alnorum</i>		Alder Flycatcher	ALFL	
<i>Empidonax flaviventris</i>		Yellow-bellied Flycatcher	YBFL	
<i>Empidonax minimus</i>		Least Flycatcher	LEFL	
<i>Empidonax traillii</i>		Willow Flycatcher ♂ ‡	WIFL	
<i>Sayornis phoebe</i>		Eastern Phoebe	EAPH	
<i>Sayornis saya</i>		Say's Phoebe ♂ ‡	SAPH	
<i>Myiarchus crinitus</i>		Great Crested Flycatcher	GCFL	
<i>Tyrannus tyrannus</i>		Eastern Kingbird	EAKI	
<i>Tyrannus verticalis</i>		Western Kingbird	WEKI	
<i>Lanius ludovicianus</i>		Loggerhead Shrike †	LOSH	
<i>Vireo flavifrons</i>		Yellow-throated Vireo	YTVI	
<i>Vireo gilvus</i>		Warbling Vireo	WAVI	
<i>Vireo olivaceus</i>		Red-eyed Vireo	REVI	
<i>Vireo philadelphicus</i>		Philadelphia Vireo	PHVI	
<i>Vireo solitarius</i>		Blue-headed Vireo	BHVI	
<i>Cyanocitta cristata</i>		Blue Jay	BLJA	
<i>Perisoreus canadensis</i>		Gray Jay	GRAJ	
<i>Pica hudsonia</i>		Black-billed Magpie	BBMA	
<i>Corvus brachyrhynchos</i>	American Crow	AMCR		
<i>Corvus corax</i>	Common Raven	CORA		
<i>Eremophila alpestris</i>	Horned Lark	HOLA		
<i>Progne subis</i>	Purple Martin §	PUMA		

Table 6. Continued.

Order	Scientific Name	Common Name	Species CODE
Passeriformes	<i>Tachycineta bicolor</i>	Tree Swallow	TRES
	<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	NRWS
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow §	CLSW
	<i>Riparia riparia</i>	Bank Swallow §	BANS
	<i>Riparia riparia</i>	Barn Swallow	BARS
	<i>Poecile atricapillus</i>	Black-capped Chickadee	BCCH
	<i>Sitta canadensis</i>	Red-breasted Nuthatch	RBNU
	<i>Sitta carolinensis</i>	White-breasted Nuthatch	WBNU
	<i>Certhia americana</i>	Brown Creeper	BRCR
	<i>Troglodytes aedon</i>	House Wren	HOWR
	<i>Troglodytes troglodytes</i>	Winter Wren	WIWR
	<i>Cistothorus palustris</i>	Marsh Wren	MAWR
	<i>Cistothorus platensis</i>	Sedge Wren	SEWR
	<i>Regulus calendula</i>	Ruby-crowned Kinglet	RCKI
	<i>Regulus satrapa</i>	Golden-crowned Kinglet	GCKI
	<i>Sialia currucoides</i>	Mountain Bluebird ‡	MOBL
	<i>Sialia sialis</i>	Eastern Bluebird	EABL
	<i>Catharus fuscescens</i>	Veery	VEER
	<i>Catharus guttatus</i>	Hermit Thrush	HETH
	<i>Catharus ustulatus</i>	Swainson's Thrush	SWTH
	<i>Dumetella carolinensis</i>	Gray Catbird	GRCA
	<i>Sturnus vulgaris</i>	European Starling	EUST
	<i>Toxostoma rufum</i>	Brown Thrasher	BRTH
	<i>Turdus migratorius</i>	American Robin	AMRO
	<i>Anthus spragueii</i>	Sprague's Pipit ♂ ‡	SPPI
	<i>Bombycilla cedrorum</i>	Cedar Waxwing	CEDW
	<i>Vermivora celata</i>	Orange-crowned Warbler	OCWA
	<i>Vermivora chrysoptera</i>	Golden-winged Warbler ♂ ‡	GWWA
	<i>Vermivora peregrina</i>	Tennessee Warbler	TEWA
	<i>Vermivora ruficapilla</i>	Nashville Warbler	NAWA
	<i>Dendroica coronata</i>	Yellow-rumped Warbler	YRWA
	<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler	CSWA
	<i>Dendroica petechia</i>	Yellow Warbler	YWAR
	<i>Dendroica tigrina</i>	Cape May Warbler	CMWA
	<i>Mniotilta varia</i>	Black-and-white Warbler	BAWW
	<i>Seiurus aurocapilla</i>	Ovenbird	OVEN
	<i>Seiurus noveboracensis</i>	Northern Waterthrush	NOWA
	<i>Setophaga ruticilla</i>	American Redstart	AMRE
	<i>Oporornis agilis</i>	Connecticut Warbler	CONW
	<i>Oporornis philadelphia</i>	Mourning Warbler	MOWA
	<i>Geothlypis trichas</i>	Common Yellowthroat	COYE
	<i>Pipilo erythrophthalmus</i>	Eastern Towhee	EATO
	<i>Ammodramus bairdii</i>	Baird's Sparrow †	BAIS
	<i>Ammodramus leconteii</i>	Le Conte's Sparrow	LCSP
	<i>Ammodramus nelsoni</i>	Nelson's Sparrow	NSTS
	<i>Ammodramus savannarum</i>	Grasshopper Sparrow ♂ ‡	GRSP

Table 6. Continued.

Order	Scientific Name	Common Name	Species CODE
	<i>Chondestes grammacus</i>	Lark Sparrow	LASP
	<i>Poocetes gramineus</i>	Vesper Sparrow	VESP
	<i>Spizella pallid</i>	Clay-colored Sparrow	CCSP
	<i>Spizella passerina</i>	Chipping Sparrow	CHSP
	<i>Melospiza georgiana</i>	Swamp Sparrow	SWSP
	<i>Melospiza lincolnii</i>	Lincoln's Sparrow	LISP
	<i>Melospiza melodia</i>	Song Sparrow	SOSP
	<i>Passer domesticus</i>	House Sparrow	HOSP
	<i>Passerculus sandwichensis</i>	Savannah Sparrow	SAVS
	<i>Zonotrichia albicollis</i>	White-throated Sparrow	WTSP
	<i>Junco hyemalis</i>	Dark-eyed Junco	DEJU
	<i>Calcarius ornatus</i>	Chestnut-collared Longspur † ‡	CCLO
	<i>Passerina cyanea</i>	Indigo Bunting	INBU
	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	RBGR
	<i>Piranga olivacea</i>	Scarlet Tanager †	SCTA
	<i>Dolichonyx oryzivorus</i>	Bobolink	BOBO
	<i>Sturnella neglecta</i>	Western Meadowlark	WEME
	<i>Agelaius phoeniceus</i>	Red-winged Blackbird	RWBL
	<i>Euphagus cyanocephalus</i>	Brewer's Blackbird	BRBL
	<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird	YHBL
	<i>Quiscalus quiscula</i>	Common Grackle	COGR
	<i>Molothrus ater</i>	Brown-headed Cowbird	BHCO
	<i>Icterus galbula</i>	Baltimore Oriole	BAOR
	<i>Icterus spurius</i>	Orchard Oriole	OROR
	<i>Carpodacus mexicanus</i>	House Finch	HOFI
	<i>Carpodacus purpureus</i>	Purple Finch	PUFI
	<i>Loxia curvirostra</i>	Red Crossbill †	RECR
	<i>Loxia leucoptera</i>	White-winged Crossbill †	WWCR
	<i>Carduelis pinus</i>	Pine Siskin	PISI
	<i>Carduelis tristis</i>	American Goldfinch	AMGO
	<i>Coccothraustes vespertinus</i>	Evening Grosbeak	EVGR

† and † rare species in Manitoba; ‡ a regionally rare species; § a colonial species.

Table 7. List of mammal species found within Manitoba's Aspen Parkland Ecoregion. Adapted from The Mammals of Canada (1974). Species names updated based on ITIS, accessed October 2012 (<http://www.itis.gov>). (Adapted from: *North/South Consultants Inc. 2014*)

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Soricidae	<i>Sorex arcticus</i>	Arctic Shrew
	<i>Sorex cinereus</i>	Masked Shrew
	<i>Sorex hoyi</i>	Pygmy Shrew
	<i>Sorex palustris</i>	Water Shrew
	<i>Blarina brevicauda</i>	Northern Short-tailed Shrew
Talpidae	<i>Condylura cristata</i>	Star-nosed Mole
Vespertilionidae	<i>Myotis lucifugus</i>	Little Brown Bat
	<i>Myotis keenii</i>	Keens' Myotis
	<i>Lasiurus borealis</i>	Red Bat
	<i>Lasiurus cinereus</i>	Hoary Bat
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
	<i>Eptesicus fuscus</i>	Big Brown Bat
	<i>Sylvilagus floridanus</i>	Eastern cottontail
Leporidae	<i>Lepus americanus</i>	Snowshoe Hare
	<i>Lepus townsendii</i>	White-tailed Jackrabbit
	<i>Tamias minimus</i>	Least Chipmunk
Sciuridae	<i>Tamias striatus</i>	Eastern Chipmunk
	<i>Marmota monax</i>	Woodchuck/Groundhog/Marmot
	<i>Spermophilus richardsonii</i>	Richardson's Ground Squirrel
	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel
	<i>Spermophilus tridecemlineatus</i>	Thirteen-lined Ground Squirrel
	<i>Sciurus carolinensis</i>	Eastern Gray Squirrel
	<i>Tamiasciurus hudsonicus</i>	Red Squirrel
	<i>Glaucomys sabrinus</i>	Northern Flying Squirrel
	<i>Thomomys talpoides</i>	Northern Pocket gopher
	Heteromyidae	<i>Perognathus fasciatus</i>
Geomyidae	<i>Castor canadensis</i>	American Beaver



Table 7. Continued.

Family	Scientific Name	Common Name
Muridae	<i>Peromyscus maniculatus</i>	Deer Mouse
	<i>Onychomys leucogaster</i>	Northern Grasshopper Mouse
	<i>Clethrionomys gapperi</i>	Southern Red-backed Vole
	<i>Phenacomys intermedius</i>	Heather Vole
	<i>Microtus ochrogaster</i>	Prairie Vole
	<i>Microtus pennsylvanicus</i>	Meadow Vole
	<i>Ondatra zibethicus</i>	Muskrat
	<i>Synaptomys borealis</i>	Northern Bog Lemming
	<i>Mus musculus</i>	House Mouse
	<i>Rattus norvegicus</i>	Norway Rat
Dipodidae	<i>Zapus hudsonius</i>	Meadow Jumping Mouse
Erethizontidae	<i>Erethizon dorsatus</i>	North American Porcupine
Canidae	<i>Canis latrans</i>	Coyote
	<i>Canis lupus</i>	Wolf
	<i>Vulpes vulpes</i>	Red Fox
	<i>Urocyon cinereoargenteus</i>	Gray Fox
Ursidae	<i>Ursus americanus</i>	Black Bear
Procyonidae	<i>Procyon lotor</i>	Raccoon
Mustelidae	<i>Martes americana</i>	American Marten
	<i>Martes pennanti</i>	Fisher
	<i>Mustela erminea</i>	Ermine
	<i>Mustela frenata</i>	Long-tailed Weasel
	<i>Mustela nivalis</i>	Least Weasel
	<i>Neovison vison</i>	American Mink
	<i>Taxidea taxus</i>	American Badger
	<i>Mephitis mephitis</i>	Striped Skunk
	<i>Lontra canadensis</i>	River Otter
	Felidae	<i>Puma concolor</i>
<i>Lynx canadensis</i>		Lynx
<i>Lynx rufus</i>		Bobcat
Cervidae	<i>Odocoileus hemionus</i>	Mule Deer
	<i>Odocoileus virginianus</i>	White-tailed Deer
	<i>Alces alces</i>	Moose

Table 8. List of amphibian and reptile species found in Manitoba. Adapted from Preston (1982), with updated taxonomy based on ITIS, accessed October 2012 (<http://www.itis.gov>). (Adapted from: *North/South Consultants Inc. 2014*)

Class	Order	Scientific Name	Common Name	Distribution Range Overlapping Rapid City		
Amphibia	Anura (frogs & toads)	<i>Anaxyrus americanus americanus</i>	Eastern American Toad	NO		
		<i>Anaxyrus cognatus</i>	Great Plains Toad	NO		
		<i>Anaxyrus hemiophrys</i>	Canadian Toad	YES		
		<i>Hyla chrysoscelis</i>	Cope's Gray Treefrog	YES		
		<i>Hyla versicolor</i>	Gray Treefrog	NOT LIKELY		
		<i>Lithobates clamitans</i>	Green Frog	NO		
		<i>Lithobates pipiens</i>	Northern Leopard Frog (western boreal/prairie population)	YES		
		<i>Lithobates septentrionalis</i>	Mink Frog	NO		
		<i>Lithobates sylvaticus</i>	Wood Frog	YES		
		<i>Pseudacris crucifer</i>	Spring Peeper	NO		
		<i>Pseudacris maculata</i>	Boreal Chorus Frog	YES		
		<i>Spea bombifrons</i>	Plains Spadefoot	POSSIBLE		
		Caudata (Salamanders)	<i>Ambystoma laterale</i>	Blue-Spotted Salamander	NO	
			<i>Ambystoma tigrinum</i>	Eastern Tiger Salamander	NO	
			<i>Ambystoma mavortium</i>	Barred Tiger Salamander	YES	
			<i>Necturus maculosus maculosus</i>	Common Mudpuppy	NOT LIKELY	
			<i>Chelydra serpentina serpentina</i>	Common Snapping Turtle	YES	
		Reptilia	Testudines	<i>Chrysemys picta bellii</i>	Western Painted Turtle	YES
				<i>Plestiodon septentrionalis septentrionalis</i>	Northern Prairie Skink	NO
Squamata (lizards & snakes)	<i>Heterodon nasicus nasicus</i>		Plains Hognose Snake	NO		
	<i>Opheodrys vernalis</i>		Smooth Greensnake	YES		
	<i>Storeria occipitomaculata occipitomaculata</i>		Northern Redbelly Snake	YES		
	<i>Thamnophis radix</i>		Plains Garter Snake	YES		
	<i>Thamnophis sirtalis parietalis</i>		Red-sided Garter Snake	YES		

Table 9. List of bird species of concern within Manitoba's Aspen Parkland Ecoregion and their respective status under 1) Manitoba Conservation Data Centre (MBCDC), 2) The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), 3) Species at Risk Act (SARA), and 4) Manitoba Endangered Species Act (MBESA). Status update May 2015. (Adapted from: *North/South Consultants Inc. 2014*).

Species	Common Name	MBCDC Rank	COSEWIC Status	SARA Status	MBESA Status	Habitat
<i>Accipiter cooperii</i>	Cooper's Hawk	G5, S4S5B	Not at Risk (April 1996)	--	--	open forest; forest edge, oak and riparian <sup>1</sup>
<i>Aechmophorus occidentalis</i>	Western Grebe	G5, S4B	Special Concern (May 2014)	--	--	marshes, lakes, rivers and vicinity, sandspits, mudflats, ponds, and rocky or sandy seashores & coastal habitats <sup>1</sup>
<i>Ammodramus bairdii</i>	Baird's Sparrow	G4, S1B	Special Concern (May 2012)	No Status (no schedule)	Endangered	mixed-grass prairies or lightly razed pastures, occasionally in hayfields, fallow fields, or cropland <sup>2</sup>
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	G5, S2B	Special Concern (Nov 2013)	--	--	open landscapes, including grasslands; grasslands with scattered trees <sup>1</sup>
<i>Anthus spragueii</i>	Sprague's Pipit	G4, S2B	Threatened (April 2010)	Threatened (Schedule 1)	Threatened	grassland habitat; prefers to nest in open native grasslands with no or low shrub density; rarely found in cultivated lands, less abundant in native grasslands with introduced grasses; may breed in tame forages <sup>3</sup>
<i>Ardea herodias</i>	Great Blue Heron	G5S4S5B	Special Concern (April 2008)	Special Concern (Schedule 1)	--	marshes, lakes, rivers and vicinity, sandspits, mudflats, ponds <sup>1</sup>
<i>Asio flammeus</i>	Short-eared Owl	G5, S2S3B	Special Concern (April 2008)	Special Concern (Schedule 1)	Threatened	open habitats: unforested, including grasslands, sand-sage, peat-bogs, marshes, fallow pastures, & occasionally fields planted with row-crops & agricultural fields <sup>3</sup>
<i>Athene cunicularia</i>	Burrowing Owl	G4, S1B	Endangered (April 2006)	Endangered (Schedule 1)	Endangered	flat/gently rolling treeless pastureland & prairie, with abandoned burrows; also seen nesting in ditches, cropland, golf course & lawns <sup>2</sup> ; open, sparsely vegetated grasslands with excavated burrows <sup>3</sup>
<i>Bubulcus ibis</i>	Cattle Egret	G5, S1S2B	--	--	--	grassland with scattered trees, marshes & swamps <sup>1</sup>

Species	Common Name	MBCDC Rank	COSEWIC Status	SARA Status	MBESA Status	Habitat
<i>Buteo regalis</i>	Ferruginous Hawk	G4, S2B	Threatened (April 2008)	Threatened (Schedule 1)	Endangered	natural grasslands <sup>3</sup> ; open areas dominated by native grasses & scattered trees or shrubs <sup>2</sup>
<i>Calamospiza melanocorys</i>	Lark Bunting	G5, S1B	--	--	--	open landscapes such as grasslands; areas of scrub vegetation; grasslands with scattered trees <sup>1</sup>
<i>Calcarius ornatus</i>	Chestnut-collared Longspur	G5, S1S2B	Threatened (Nov 2009)	Threatened (Schedule 1)	Endangered	native prairie grasslands, typically breeding in recently grazed or mowed, arid, short- or mixed-grass prairie <sup>3</sup>
<i>Chaetura pelagica</i>	Chimney Swift	G5, S2B	Threatened (April 2007)	Threatened (Schedule 1)	Threatened	near waterbodies; associated with urban & rural areas with chimneys <sup>3</sup>
<i>Charadrius melodus curcumcinctus</i>	Piping Plover	G3, S1B	Endangered (Nov 2013)	Endangered (Schedule 1)	Endangered	lakeshores & river sandbars, nesting on gravel shores of shallow, saline lakes & of sandy shores or larger prairie lakes <sup>2</sup>
<i>Chlidonias niger</i>	Black Tern	G4, S4B	Not at Risk (April 1996)	--	--	open landscapes, including grasslands & coastal ponds; lakes, rivers, mudflats & ponds; marshes; open seas & rocky or sandy seashores <sup>1</sup>
<i>Chordeiles minor</i>	Common Nighthawk	G5, S3B	Threatened (April 2007)	Threatened (Schedule 1)	Threatened	nests in open, vegetation-free habitats including dunes, beaches, forest clearings, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks; also inhabits mixed & coniferous forests <sup>3</sup>
<i>Contopus cooperi</i>	Olive-sided Flycatcher	G4, S3S4B	Threatened (Nov 2007)	Threatened (Schedule 1)	--	open areas (forest clearings, forest edges near natural openings like rivers, bogs or swamps, or logged areas, burned forests or old-growth gaps) containing tall live trees or snags for perching <sup>3</sup>
<i>Coturnicops noveboracensis</i>	Yellow Rail	G4, S3S4B	Special Concern (Nov 2009)	Special Concern (Schedule 1)	--	marshes dominated by sedges, true grasses & rushes with little or no standing water (1-12 cm) & saturated substrate throughout summer; damp fields & meadows, river & stream floodplains, bog herbaceous vegetation, & at upper levels of estuarine & salt marshes <sup>3</sup>
<i>Cygnus buccinator</i>	Trumpeter Swan	G5, S1S2B	Not at Risk (April 1996)	--	Endangered	lakes, rivers & vicinity, sandspits, mudflats, ponds <sup>1</sup>

Species	Common Name	MBCDC Rank	COSEWIC Status	SARA Status	MBESA Status	Habitat
<i>Dolichonyx oryzivorus</i>	Bobolink	G5, S4B	Threatened (April 2010)	--	--	nesting in forage crops (hayfields & pastures dominated by a variety of species such as clover, Timothy, Kentucky Bluegrass & broadleaved plants), & various grassland habitats including wet prairie, graminoid peatlands & abandoned field dominated by tall grasses, prairie remnants, no-till cropland, small-grain fields, restored surface mining sites, & irrigated fields in arid regions <sup>3</sup>
<i>Empidonax traillii</i>	Willow Flycatcher	G5, S2S3B	--	--	--	brushland, shrubs, thickets & undergrowth; marshes; lakes, rivers & vicinity, sandspits, mudflats, ponds <sup>1</sup>
<i>Eremophila alpestris</i>	Horned Lark	G5, S3B	Endangered (Nov 2003)	Endangered (Schedule 1)	--	open landscapes, including grasslands & coastal ponds; grasslands with scattered trees <sup>1</sup>
<i>Falco peregrinus</i>	Peregrine Falcon	--	Special Concern (April 2007)	Special Concern (Schedule 1)	Endangered	open habitats such as grassland & marshes; nesting: on cliff edges or crevices, sometimes on ledges of tall buildings or bridges, usually near wetlands <sup>2,3</sup>
<i>Grus americana</i>	Whooping Crane	--	Endangered (April 2010)	Endangered (Schedule 1)	Endangered	overwinters in Texas & breeds in unique wetland complex in Wood Buffalo National Park near Alberta/NWT border consisting of substantial amount of open water <sup>3</sup>
<i>Hirundo rustica</i>	Barn Swallow	G5, S4B	Threatened (May 2011)	--	--	nesting: artificial structures including barns & other outbuildings, garages, houses, bridges, and road culverts; foraging: open habitats including grassy fields, pastures, agricultural crops, lake & river shorelines, cleared ROWs, cottage areas & farmyards, islands, & wetlands <sup>3</sup>
<i>Ixobrychus exilis</i>	Least Bittern	--	Threatened (April 2009)	Threatened (Schedule 1)	Endangered	breeds in marshes dominated by emergent vegetation interspersed with areas of open water <sup>3</sup>
<i>Lanius ludovicianus excubitorides</i>	Loggerhead Shrike	G4T4, S2B	Threatened (May 2014)	Threatened (Schedule 1)	Endangered	native prairie and pastureland habitats; wide variety of open habitats including grasslands, sagebrush stands, pastures, agricultural or open areas and thinly wooded areas with small trees and shrubs <sup>3</sup>

Species	Common Name	MBCDC Rank	COSEWIC Status	SARA Status	MBESA Status	Habitat
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	G5, S2B	Threatened (April 2007)	Threatened (Schedule 1)	Threatened	variety of habitats, including open oak & beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, & along beaver ponds & burms <sup>3</sup>
<i>Numenius americanus</i>	Long-Billed Curlew	--	Special Concern (May 2011)	Special Concern (Schedule 1)	Extirpated	breeding in extensive, flat areas of short native grassland <sup>3</sup>
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron	G5, S3S4B	--	--	--	freshwater marshes & swamps; lakes, rivers & vicinity, sandspits, mudflats, ponds; forest edge, oak & riparian <sup>1</sup>
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	G5, S5B	Not at Risk (April 1978)	--	--	lakes, rivers & vicinity, sandspits, mudflats, ponds; rocky & sandy seashores; rocky places or cliffs <sup>1</sup>
<i>Podiceps auritus</i>	Horned Grebe	G5, S3B	Special Concern (April 2009)	No Status (no schedule)	--	nests in freshwater (occasionally brackish) on small permanent or semi-permanent ponds which last until autumn; also uses marshes & shallow bays on lake borders; breeding: open water & emergent vegetation beds <sup>3</sup>
<i>Podiceps nigricollis</i>	Eared Grebe	G5, S4S5B	--	--	--	freshwater marshes & swamps; lakes, rivers & vicinity, sandspits, mudflats, ponds <sup>1</sup>
<i>Sayornis saya</i>	Say's Phoebe	G5, S2S3B	--	--	--	areas of scrub vegetation; open landscapes (grasslands & coastal ponds); grassland with scattered trees; semidesert; desert <sup>1</sup>
<i>Sterna forsteri</i>	Forster's Tern	G5, S4B	Data Deficient (April 1996)	--	--	freshwater marshes & swamps; open landscapes (grasslands & coastal ponds); lakes, rivers & vicinity, sandspits, mudflats, ponds; rocky or sandy seashores <sup>1</sup>
<i>Strix varia</i>	Barred Owl	G5, S3S4B	--	--	--	forest: coniferous, broadleaf, temperate; forest edge, oak or riparian; freshwater marshes & swamps <sup>1</sup>
<i>Tympanuchus cupido</i>	Greater Prairie-Chicken	--	Extirpated (Nov 2009)	Extirpated (Schedule 1)	Extirpated	native prairies <sup>3</sup>

Species	Common Name	MBCDC Rank	COSEWIC Status	SARA Status	MBESA Status	Habitat
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	G4, S3B	Threatened (April 2006)	Threatened (Schedule 1)	Threatened	areas of early successional scrub surrounded by mature forests; found in dry uplands, swamp forests & marshes; ROWs, field edges, recently logged areas, beaver marshes & areas that are burned or intermittently farmed <sup>3</sup>
<i>Wilsonia canadensis</i>	Canada Warbler	G5, S4B	Threatened (April 2008)	Threatened (Schedule 1)	Endangered	variety of forest types, but most abundant in wet, mixed forest with a well-developed shrub layer; riparian shrub forest on slopes & in ravines; in regenerating stands <sup>3</sup>

<sup>1</sup>Alsop II, F.J. 2002. Birds of Canada.

<sup>2</sup>Manitoba Conservation Species at Risk brochure. Wildlife and Ecosystem Protection Branch. Winnipeg, MB.

<sup>3</sup>COSEWIC reports

Table 10. List of mammal species of concern within Manitoba's Aspen Parkland Ecoregion and their respective status under 1) Manitoba Conservation Data Centre (MBCDC), 2) The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), 3) Species at Risk Act (SARA), and 4) Manitoba Endangered Species Act (MBESA). Status updated May 2015. (Adapted from: *North/South Consultants Inc. 2014*)

Species	Common Name	MBCDC Rank	COSEWIC Status	SARA Status	MBESA Status	Habitat
<i>Antilocapra americana</i>	Pronghorn	n/a	--	--	Extirpated	plains, steppes, deserts & foothills <sup>1</sup>
<i>Bison bison bison</i>	Plains Bison	n/a	Threatened (Nov 2013)	--	Extirpated	historically, across prairies, including grasslands, shrublands & some woodland areas, in suitable grassland & meadow habitat <sup>2</sup>
<i>Mustela frenata</i>	Long-tailed Weasel	G5, S3	Not at Risk (April 1993)	--	--	open grasslands, aspen parklands, & river bottom lands; prefers the vicinity of water <sup>1</sup>
<i>Odocoileus hemionus</i>	Mule or Black-tailed Deer	G5, S3	--	--	Threatened	open coniferous forests, subclimax brush, aspen parklands, steep broken terrain, & river valleys; avoids open prairie & deep coniferous forests <sup>1</sup>
<i>Ursus arctos</i>	Grizzly Or Brown Bear	n/a	--	--	Extirpated	open areas of alpine tundra & subalpine forests <sup>1</sup>
<i>Vulpes velox</i>	Kit or Swift Fox	n/a	--	--	Extirpated	short- or mixed-grass prairie on level terrain or gently rolling hills <sup>2</sup>

<sup>1</sup>Banfield, A.W.F. 1974. The Mammals of Canada

<sup>2</sup>COSEWIC reports



Table 11. List of amphibian and reptile species of concern within Manitoba's Aspen Parkland Ecoregion and their respective status under 1) Manitoba Conservation Data Centre (MBCDC), 2) The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), 3) Species at Risk Act (SARA), and 4) Manitoba Endangered Species Act (MBESA). (Adapted from: *North/South Consultants Inc. 2014*)

Species	Common Name	MBCDC Rank	COSEWIC Status	SARA Status	MBESA Status	Habitat
<b>AMPHIBIA</b>						
<i>Bufo cognatus</i>	Great Plains Toad	G5, S2	Special Concern (April 2010)	Special Concern (Schedule 1)	Threatened	associated with native grasslands; shallow, clean, clear, temporary pools & ditches of spring melt- & rainwater <sup>1</sup>
<i>Lithobates pipiens</i>	Northern Leopard Frog	--	Special Concern (April 2009)	Special Concern (Schedule 1)	--	Overwintering: well oxygenated waterbodies that don't freeze to bottom; Breeding: pools, ponds, marshes & lakes; Summering: moist upland meadows & native prairie <sup>1</sup>
<i>Spea bombifrons</i>	Plains Spadefoot	G5, S2S3	Not at Risk (May 2003)	--	--	grasslands, generally in areas of sandy or light-textured soils <sup>2</sup>
<b>REPTILIA</b>						
<i>Chelydra serpentina serpentina</i>	Common Snapping Turtle	G5T5, S3	Special Concern (Nov 2008)	Special Concern (Schedule 1)	--	slow-moving water with a soft-mud bottom and dense aquatic vegetation <sup>1</sup>
<i>Plestiodon septentrionalis</i>	Northern Prairie Skink	G5, S1	Endangered (May 2004)	Endangered (Schedule 1)	Endangered	mixed grass prairies with sandy soil <sup>1</sup>
<i>Heterodon nasicus</i>	Western Hognose Snake	G5, S1S2	--	--	Threatened	grasslands, preferring sandy soil habitat <sup>2</sup>
<i>Storeria occipitomaculata</i>	Northern Redbelly Snake	G5, S3S4	--	--	--	open areas & in marshes or meadows, found hibernating in ant hills <sup>2</sup>

<sup>1</sup>COSEWIC reports

<sup>2</sup>Preston, W. 1982. The Amphibians and Reptiles of Manitoba.

Table 12. Ranks and codes used by the Manitoba Conservation Data Centre to denote global and provincial status for species of conservation concern. (adapted from *North/South Consultants Inc. 2014*).

Rank/Code	Definition
1	Very rare throughout its range or in the province (5 or fewer occurrences, or very few remaining individuals). May be especially vulnerable to extirpation.
2	Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation.
3	Uncommon throughout its range or in the province (21 to 100 occurrences).
4	Widespread, abundant, and apparently secure throughout its range or in the province, with many occurrences, but the element is of long-term concern (>100 occurrences).
5	Demonstrably widespread, abundant, and secure throughout its range or in the province, and essentially impossible to eradicate under present conditions.
U	Possibly in peril, but status uncertain; more information needed.
H	Historically known; may be rediscovered.
X	Believed to be extinct; historical records only, continue search.
SNR	A species not ranked. A rank has not yet assigned or the species has not been evaluated.
SNA	A conservation status rank is not applicable to the element.
G#G#	Numeric range rank: A range between two of the numeric ranks. Denotes range of uncertainty about the exact rarity of the species.
S#S#	
T	Rank for subspecific taxon (subspecies, variety, or population); appended to the global rank for the full species, e.g. G4T3.
B	Breeding status of a migratory species. Example: S1B,SZN - breeding occurrences for the species are ranked S1 (critically imperilled) in the province, nonbreeding occurrences are not ranked in the province.
N	Non-breeding status of a migratory species. Example: S1B,SZN - breeding occurrences for the species are ranked S1 (critically imperilled) in the province, nonbreeding occurrences are not ranked in the province.
Q	Taxonomic questions or problems involved, more information needed; appended to the global rank.
T	Rank for subspecific taxon (subspecies, variety, or population); appended to the global rank for the full species.
#	A modifier to SX or SH; the species has been reintroduced but the population is not yet established.
?	Inexact or uncertain; for numeric ranks, denotes inexactness.

Table 13. Ranks and codes used by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to denote status for species of conservation concern. (adapted from *North/South Consultants Inc. 2014*).

<b>Rank/Code</b>	<b>Definition</b>
Extinct	A species that no longer exists.
Extirpated	A species that no longer exists in the wild in Canada, but exists elsewhere.
Endangered	A species facing imminent extirpation or extinction.
Threatened	A species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern	A species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.
Not at Risk	A species that has been evaluated and found to be not at risk of extinction given the current circumstances.

Table A7-1. Ranks and codes used by the Manitoba Endangered Species Act to denote status for species of conservation concern.

<b>Rank/Code</b>	<b>Definition</b>
Extinct	A species formerly indigenous to Manitoba that no longer exists either in Manitoba or elsewhere.
Extirpated	A species formerly indigenous to Manitoba that no longer exists in the wild in Manitoba but exists elsewhere.
Endangered	A species indigenous to Manitoba that is threatened with imminent extinction or with extirpation throughout all or a significant portion of its Manitoba range.
Threatened	A species indigenous to Manitoba that is likely to become endangered or is, because of low or declining numbers in Manitoba, particularly at risk if the factors affecting its vulnerability do not become reversed.

## **14.0 APPENDICES**

### **14.1 APPENDIX 1 – TETRA TECH MAY 2015 DESIGNS**

**1.1 – Proposed Project Plan Submitted for Environmental Review Sheet**

**1.2 – Traffic Management Plan/Detour Alignment**

### **14.2 APPENDIX 2 – ENVIRONMENTAL DESCRIPTION AND PROPOSED WORKS**

**2.1 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River**

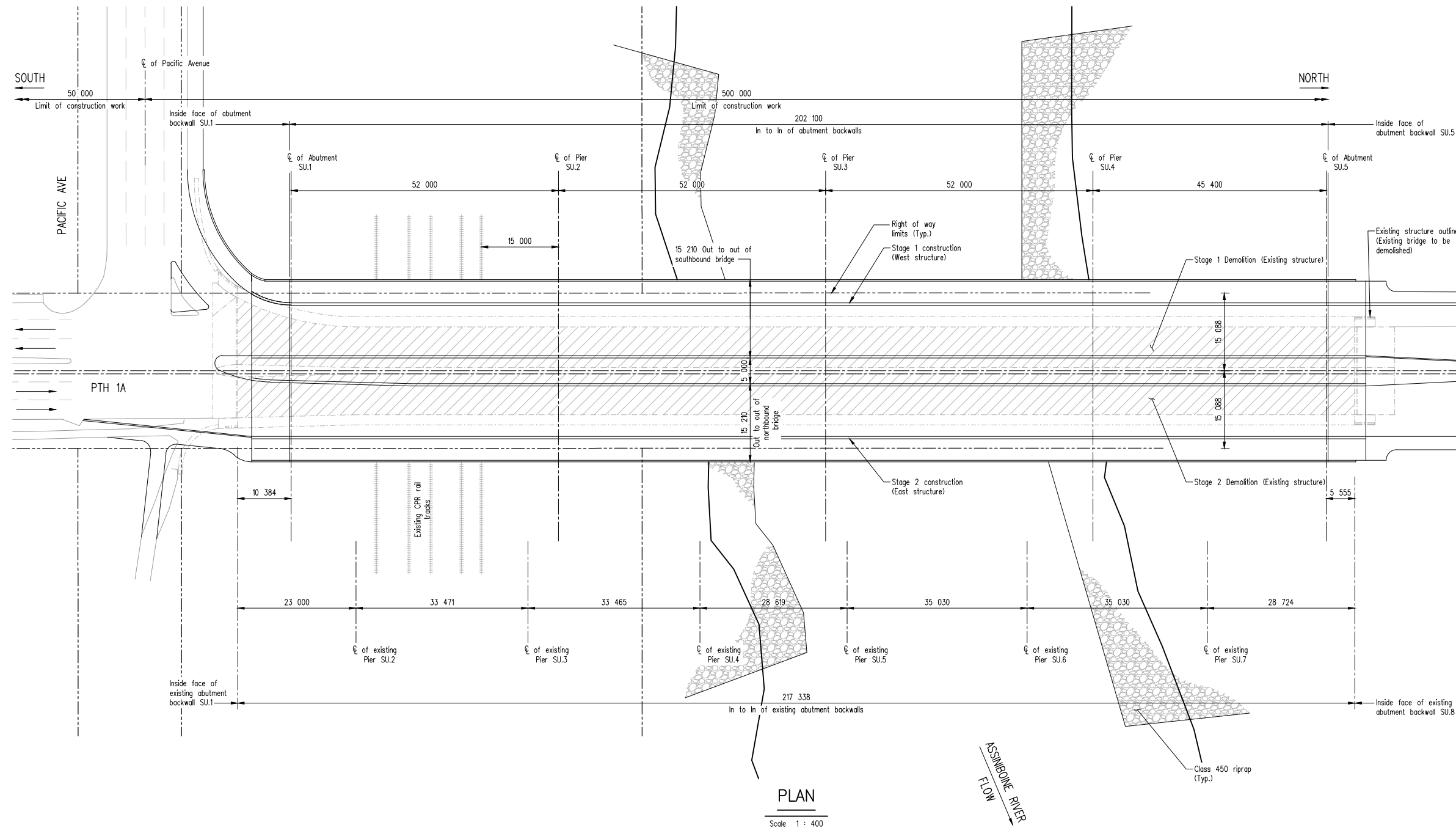
**2.2 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – NORTHEAST Abutment**

**2.3 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – SOUTHEAST Abutment**

**2.4 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – SOUTHWEST Abutment**

**2.5 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – NORTHWEST Abutment**

### **14.3 APPENDIX 3 – SIGNIFICANCE DETERMINATION**



PLAN

Scale 1 : 400

**PURPOSE OF THE PROJECT**

The existing bridge on PTH 1A (First Street) over Assinboine River/CPR, Site No. 2582-00, is a seven span (three simply supported and 1 four span continuous), 217.3 m in length, slab on girder bridge that was constructed in 1972. The existing bridge is proposed to be replaced by twin structures with longer spans and reducing the number of piers in the waterway. Bridge replacement works are scheduled to take place from fall of 2015 until winter of 2017/2018.

**LOCATION**

**East Structure:**  
 Latitude & Longitude UTM Coordinates Zone 14U (E,N)  
 49° 51' 2.53" 432502.678  
 99° 56' 20.15" 5522454.435

**West Structure:**  
 Latitude & Longitude UTM Coordinates Zone 14U (E,N)  
 49° 51' 2.52" 432484.970  
 99° 56' 21.05" 5522454.673

**NAVIGATION**

- Scheduled waterway.

**PROPOSED SCHEDULE**

Tentative: November 2015 - March 2018  
 Fall/winter construction

1<sup>st</sup> phase: Winter 2015 - fall 2016  
 Site mobilization  
 Phase 1 Deck and substructure demolition  
 West bridge deck, girders and substructure construction

2<sup>nd</sup> phase: Winter 2016 - fall 2017  
 Phase 2 Deck and substructure demolition  
 East bridge deck, girders and substructure construction

3<sup>rd</sup> phase: Fall 2017 - spring 2018  
 Channel riprap works

**PROPOSED WORK**

1. Pile foundations
  2. Concrete substructure (piers and abutments)
  3. Steel girders
  4. Channel excavation
  5. Channel riprap works
  6. Cast-in-place concrete deck and curb
  7. Galvanized steel expansion joints and railing
  8. Approach roadworks
- Staging and access will be limited to the right of way.

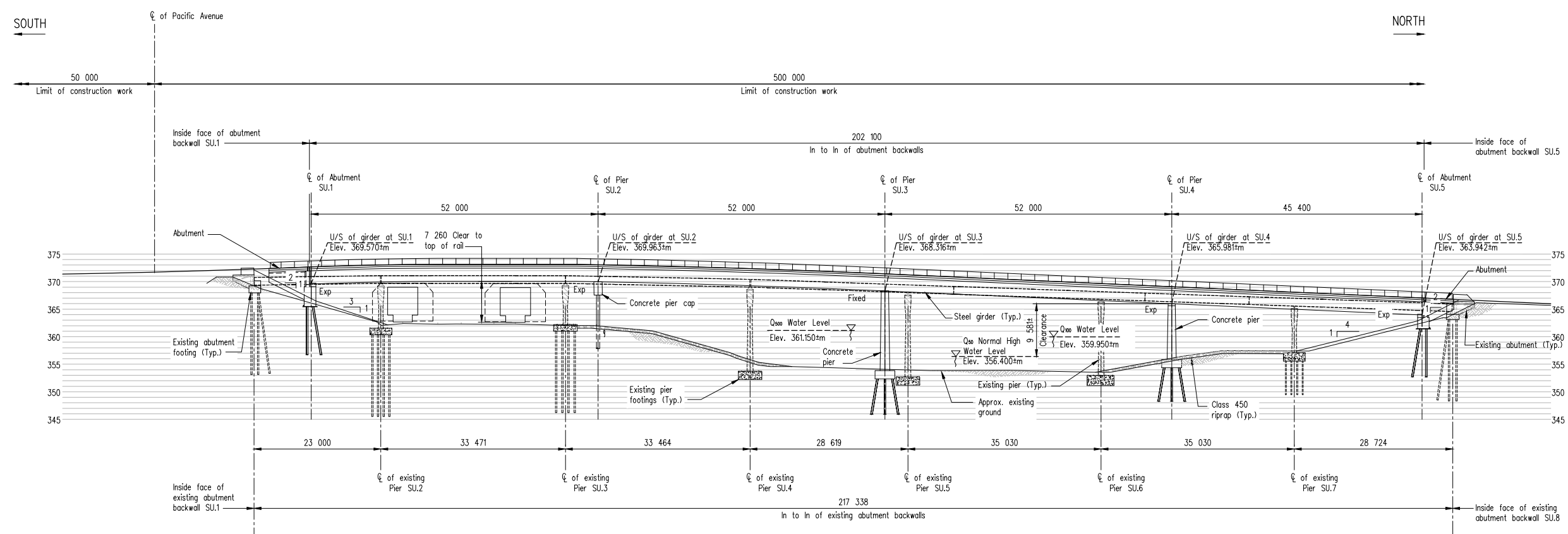
REVISIONS		
DATE	BY	DESCRIPTION

**PROPOSED PROJECT PLAN**  
 SUBMITTED FOR ENVIRONMENTAL REVIEW  
 MAY 2015  
 FOR BRIDGE REPLACEMENT TWIN STRUCTURES  
 OVER CPR AND ASSINBOINE RIVER ON PTH 1A  
 9 800 ROADWAY WIDTH  
 CITY OF BRANDON

ISSUED FOR INFORMATION ONLY

<p>Water Control &amp; Structures</p>		RELEASED FOR CONSTRUCTION BY: _____ _____ _____
DESIGN BY: S.A. CHECKED: V.B.	DIRECTOR STRUCTURES, DESIGN AND CONSTRUCTION BRANCH DATE: _____ SCALE: _____	SHEET No. 1 of 5 2582-11 & 2582-12
DETAILS BY: B.T. CHECKED: G.J.	1 : 400	SITE No. _____





**PROPOSED BRIDGE ELEVATION**

Scale 1 : 400

**PURPOSE OF THE PROJECT**

The existing bridge on PTH 1A (First Street) over Assiniboine River/CPR, Site No. 2582-00, is a seven span (three simply supported and 1 four span continuous), 217.3 m in length, slab on girder bridge that was constructed in 1972. The existing bridge is proposed to be replaced by twin structures with longer spans and reducing the number of piers in the waterway. Bridge replacement works are scheduled to take place from fall of 2015 until winter of 2017/2018.

**LOCATION**

**East Structure:**  
 Latitude & Longitude 49° 51' 2.53" 99° 56' 20.15" UTM Coordinates Zone 14U (E,N) 432502.678 5522454.435

**West Structure:**  
 Latitude & Longitude 49° 51' 2.52" 99° 56' 21.05" UTM Coordinates Zone 14U (E,N) 432484.970 5522454.673

**NAVIGATION**

- Scheduled waterway.


**PROPOSED SCHEDULE**

- Tentative: November 2015 - March 2018  
Fall/winter construction
- 1<sup>st</sup> phase: Winter 2015 - fall 2016  
Site mobilization  
Phase 1 Deck and substructure demolition  
West bridge deck, girders and substructure construction
- 2<sup>nd</sup> phase: Winter 2016 - fall 2017  
Phase 2 Deck and substructure demolition  
East bridge deck, girders and substructure construction
- 3<sup>rd</sup> phase: Fall 2017 - spring 2018  
Channel riprap works

**PROPOSED WORK**

1. Pile foundations
2. Concrete substructure (piers and abutments)
3. Steel girders
4. Channel excavation
5. Channel riprap works
6. Cast-in-place concrete deck and curb
7. Galvanized steel expansion joints and railing
8. Approach roadworks

- Staging and access will be limited to the right of way.

REVISIONS			PROPOSED PROJECT PLAN SUBMITTED FOR ENVIRONMENTAL REVIEW MAY 2015 FOR BRIDGE REPLACEMENT TWIN STRUCTURES OVER CPR AND ASSINIBOINE RIVER ON PTH 1A 9 800 ROADWAY WIDTH CITY OF BRANDON	
DATE	BY	DESCRIPTION	RELEASED FOR CONSTRUCTION BY:	
		Issued for environmental review		
ISSUED FOR INFORMATION ONLY			 Water Control & Structures	
			DESIGN	BY: S.A. CHECKED: V.B.
			DETAILS	BY: B.T. CHECKED: C.I.
			DIRECTOR STRUCTURES, DESIGN AND CONSTRUCTION BRANCH SCALE: 1 : 400 SHEET No. 2 of 5 2582-11 & 2582-12 SITE No.	



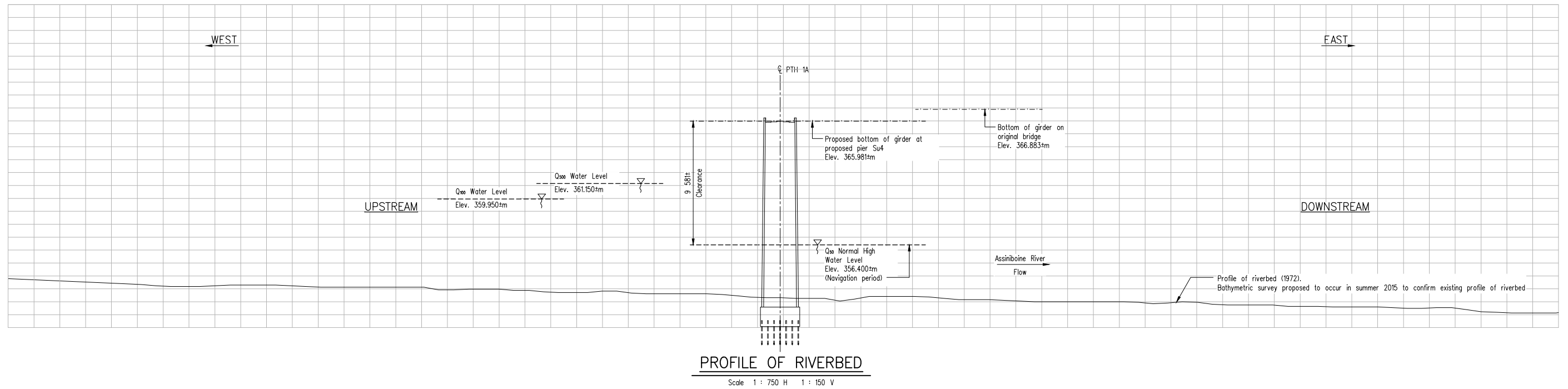


Photo 1 - Looking South (Upstream view of existing bridge) (2013)



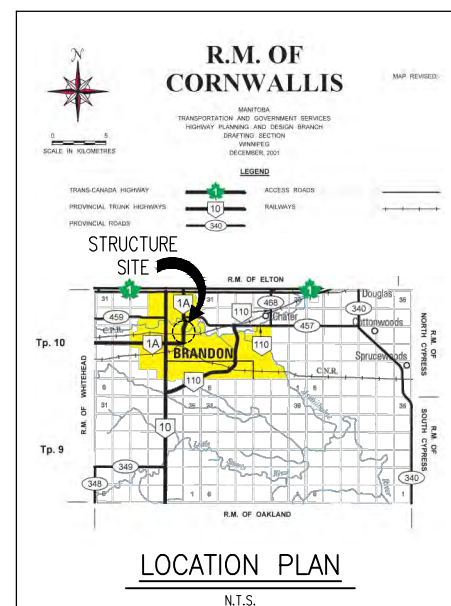
Photo 2 - Looking East (Downstream view of existing bridge) (2013)



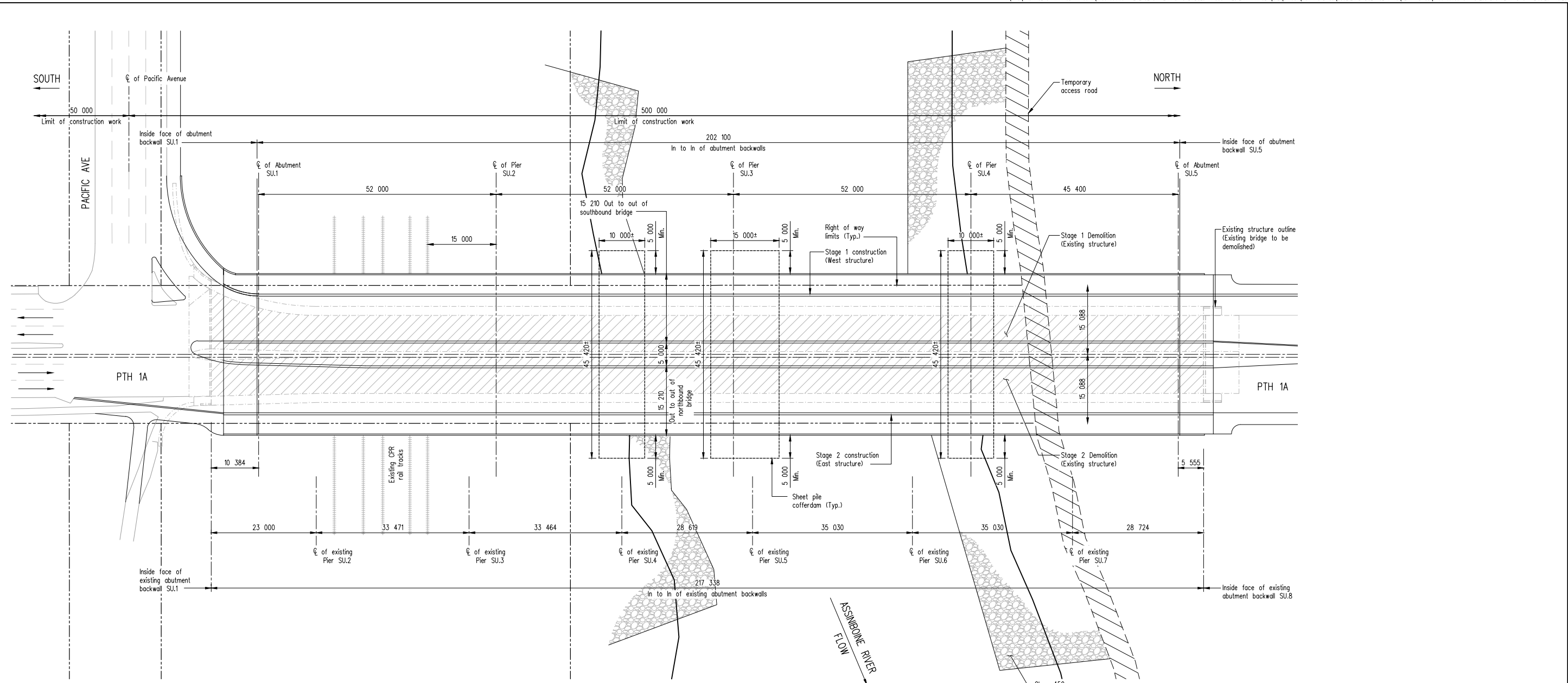
Photo 3 - Looking West (Upstream view) (2013)



Photo 4 - Looking East (Downstream view) (2013)



REVISIONS		PROPOSED PROJECT PLAN SUBMITTED FOR ENVIRONMENTAL REVIEW MAY 2015 FOR BRIDGE REPLACEMENT TWIN STRUCTURES OVER CPR AND ASSINIBOINE RIVER ON PTH 1A 9 800 ROADWAY WIDTH CITY OF BRANDON	
DATE	BY	DESCRIPTION	RELEASED FOR CONSTRUCTION BY:
		Issued for environmental review	
ISSUED FOR INFORMATION ONLY			
		Water Control & Structures	
		DESIGN	BY: S.A. CHECKED: V.B.
		DETAILS	BY: B.T. CHECKED: G.L.
		DIRECTOR STRUCTURES, DESIGN AND CONSTRUCTION BRANCH	DATE SCALE: 1 : 750 SHEET No. 3 of 5 2582-11 & 2582-12 SITE No.



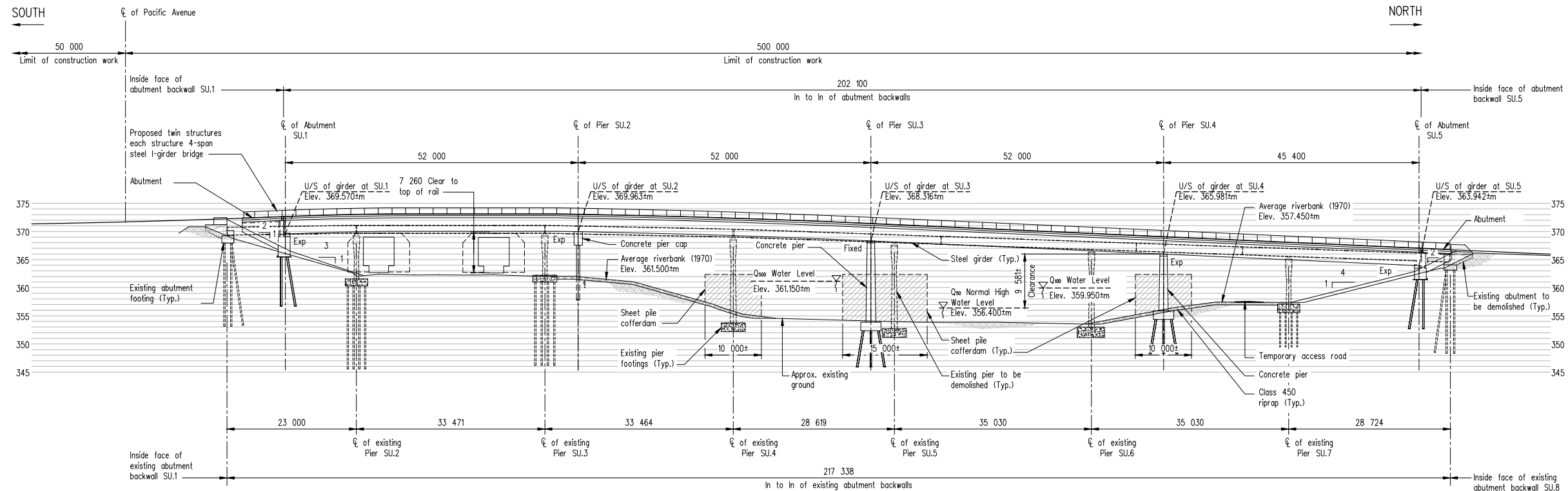
**PROPOSED BRIDGE PLAN SHOWING TEMPORARY WORKS**

Scale 1 : 400



REVISIONS		PROPOSED PROJECT PLAN SUBMITTED FOR ENVIRONMENTAL REVIEW MAY 2015 FOR BRIDGE REPLACEMENT TWIN STRUCTURES OVER CPR AND ASSINIBOINE RIVER ON PTH 1A 9 800 ROADWAY WIDTH CITY OF BRANDON	
DATE	DESCRIPTION		
	Issued for environmental review	<b>Manitoba</b> Infrastructure and Transportation Water Control & Structures	
ISSUED FOR INFORMATION ONLY		BY: S.A. CHECKED: V.B.	RELEASED FOR CONSTRUCTION BY:  DIRECTOR DATE STRUCTURES, DESIGN AND CONSTRUCTION BRANCH
		BY: B.T. CHECKED: G.J.	SCALE:  SHEET No. 4 of 5 2582-11 & 2582-12



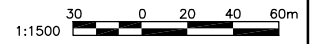
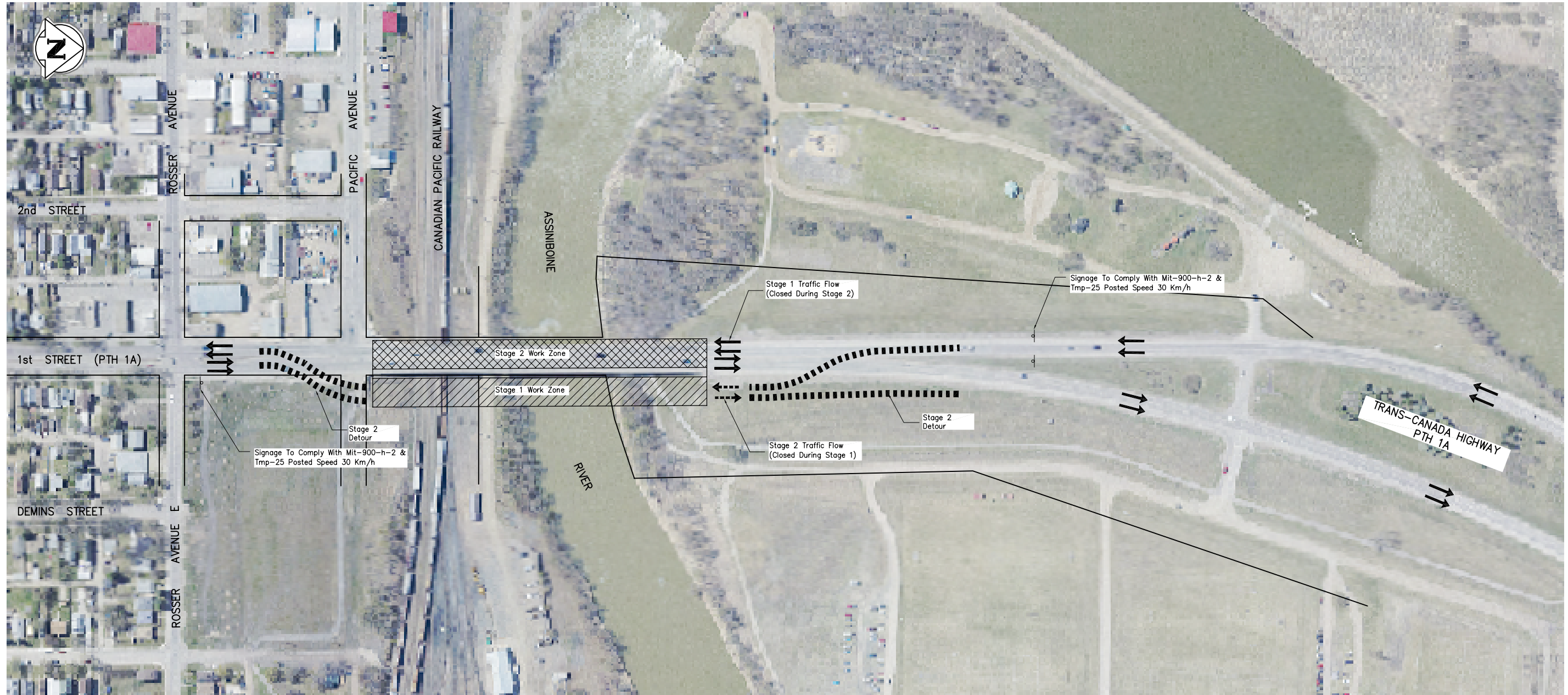


**PROPOSED BRIDGE ELEVATION SHOWING TEMPORARY WORKS**

Scale 1 : 400

REVISIONS			PROPOSED PROJECT PLAN SUBMITTED FOR ENVIRONMENTAL REVIEW MAY 2015 FOR BRIDGE REPLACEMENT TWIN STRUCTURES OVER CPR AND ASSINIBOINE RIVER ON PTH 1A 9 800 ROADWAY WIDTH CITY OF BRANDON	
DATE	BY	DESCRIPTION		
		Issued for environmental review	RELEASED FOR CONSTRUCTION BY:	
ISSUED FOR INFORMATION ONLY			DIRECTOR STRUCTURES, DESIGN AND CONSTRUCTION BRANCH	
			SCALE:	
DESIGN BY: S.A. CHECKED: V.B.			DATE:	
DETAILS BY: B.T. CHECKED: C.I.			SHEET No. 5 of 5 2582-11 & 2582-12	
			1 : 400 SITE No.	





**APEGM**  
Certificate of Authorization  
**TETRA TECH WEI Inc.**  
No. 5313 Date: April 30, 2016

**TETRA TECH**

REVISIONS	
DATE	DESCRIPTION

**DETOUR ALIGNMENT**

FOR BRIDGE REPLACEMENT STRUCTURE  
OVER CPR AND ASSINBOINE RIVER ON PTH 1A  
9 800 ROADWAY WIDTH  
CITY OF BRANDON

**PRELIMINARY DRAWING**  
NOT TO BE USED FOR CONSTRUCTION

DESIGN	BY: GC	RELEASED FOR CONSTRUCTION BY:
CHECKED:	GC	
DETAILS	BY: CMD	DIRECTOR DATE
CHECKED:	GC	STRUCTURES, DESIGN AND CONSTRUCTION BRANCH
SCALE: 1 : 1 500		SHEET No. 1
		SITE No. 2582-10

**Appendix 2.1 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River (as of May 25, 2015)**

**BRIDGE**



Photo 1 – Looking north at Site#2582-00 on PTH 1A, May 29, 2013 (Inspection Report).



Photo 2 – Looking (east) downstream from structure, May 29, 2013 (Inspection Report).



Photo 3 – Looking (west) upstream from structure, May 29, 2013 (Inspection Report).



Photo 4 – Looking (west) at the east elevation, May 29, 2013 (Inspection Report).



Photo 5 – Looking (west) at the east elevation, May 29, 2013 (Inspection Report).



Photo 6 – Looking (north) at the southern pier near CP rail, May 29, 2013 (Inspection Report).

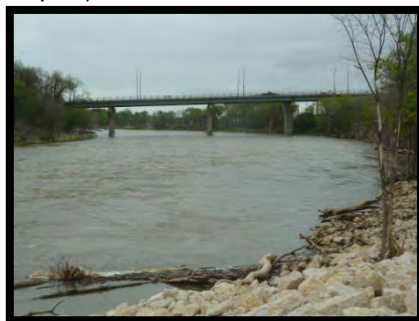


Photo 7 – Looking (east) at the west elevation, May 29, 2013 (Inspection Report).



Photo 8 – Looking (east) at the west elevation, May 29, 2013 (Inspection Report).



Photo 9 – South embankment with severe erosion trough, May 29, 2013 (Inspection Report).



Photo 10 – Looking south east at Site#2582-00 from the northwest bank, April 21, 2015.



Photo 11 – Looking south from the northwest bank, April 21, 2015.



Photo 12 – Looking south from the northeast bank, April 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e. northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; mud/sand banks and shorelines; existing rock from previous armouring and stabilization efforts.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- Indicator species at (or through) waterway at various life stages and times. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.
- On the south end of the structure beyond the river bank there are several CP rail lines which travel under the existing structure. This habitat is bare with the presence of primarily grasses and gravel, but river is lined with steep banks and some deciduous trees.
- Embankments have experienced severe erosion, which has produced several troughs.
- 3<sup>rd</sup> Street Dam (City of Brandon) upstream of the site, and the river channel shows obvious and extensive scour.
- There is an existing storm sewer on the south side of the site that runs towards the Assiniboine River.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and/or aquatic species.
- The construction and placement of new concrete piers may cause temporary instream disturbance.

**Terrestrial Habitat:**

- Some alteration.
- Re-vegetation efforts, as well as, preventative erosion controls should be used as the existing site in the past has experienced severe erosion.

**Armouring (hard):**

- Altered instream habitat; change in diversity; likely to fill in with finer material.

**UTM and Legal Description**

**UTM:** 14U 432491E 5522461N (Inspection Report 2013-05-29)

**LEGAL:** E23-10-19W

<b>Municipality</b>	R.M. of Cornwallis
<b>Designated Watershed</b>	DWS 98
<b>Topographic Map</b>	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
<b>DFO Fish Habitat Classification Map</b>	DFO 62G13
<b>DFO Habitat Type</b>	Type A (2007 and 2013)
<b>Transport Canada</b>	Navigable (Assiniboine River)

**Appendix 2.2 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – NORTHEAST Abutment (as of May 25, 2015)**



Photo 1 – Looking (east) downstream from Site#2582-00 on PTH 1A, May 21, 2015.



Photo 2 – Looking (north) at PTH 1A from structure, May 21, 2015.



Photo 3 – Looking (northeast) at the northeast bank from structure, May 21, 2015.



Photo 4 – Looking (northeast) at the northeast bank along the Assiniboine River from structure, May 21, 2015.



Photo 5 – Looking (east) under the structure at the northeast bank from the pedestrian path, May 21, 2015.



Photo 6 – Looking (south) at the east side of the structure and the Assiniboine River, May 21, 2015.



Photo 7 – Looking (east) at the northeast bank, May 21, 2015.



Photo 8 – Looking (east) at the deciduous treed area on the northeast bank, May 21, 2015.



Photo 9 – Looking (southwest) at the downstream elevation, May 21, 2015.



Photo 10 – Looking south at vegetation along the northeast bank (approx. 50 m downstream), May 21, 2015.



Photo 11 – Looking (south) at the culvert and drain/water intersecting the Assiniboine River downstream Site#2582-00, May 21, 2015.



Photo 12 – Looking (north) at the drain/water that intersects the Assiniboine River downstream Site#2582-00, May 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e. northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; low slope mud/sand banks and shorelines (Mud silt bank approx. 3 m).
- Northeast bank is lined with trees, mixture of dead and live deciduous trees.
- There are several concrete slabs on the northeast bank near the bridge structure.
- Manicured lawn and pedestrian path north of tree line that curves northward towards Optimist Soccer Park.
- Downstream of structure there is a ditch outlets towards the Assiniboine River, and a gas pipeline crossing/sign.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- Indicator species at (or through) waterway at various life stages and times. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.
- Embankments have experienced severe erosion, which has produced several troughs near abutment.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and aquatic species.
- The construction and placement of new concrete piers may cause temporary instream disturbance.

**Terrestrial Habitat:**

- Alteration
- Re-vegetation efforts, as well as, preventative erosion controls should be used as the existing site in the past has experienced severe erosion.

**Armouring (hard):**

- Diversified habitat; altered; no serious harm

**UTM and Legal Description**

**UTM:** 14U 432491E 5522461N (Inspection Report 2013-05-29)

**LEGAL:** E23-10-19W

<b>Municipality</b>	R.M. of Cornwallis
<b>Designated Watershed</b>	DWS 98
<b>Topographic Map</b>	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
<b>DFO Fish Habitat Classification Map</b>	DFO 62G13
<b>DFO Habitat Type</b>	Type A (2007 and 2013)
<b>Transport Canada</b>	Navigable (Assiniboine River)

**Appendix 2.3 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – SOUTHEAST Abutment (as of May 25, 2015)**



Photo 1 – Looking (east) downstream from Site#2582-00 on PTH 1A, May 21, 2015.



Photo 2 – Looking (southeast) at the southeast bank from structure, May 21, 2015.



Photo 3 – Looking (southeast) at the southeast bank and CP rail from structure, May 21, 2015.



Photo 4 – Looking (southeast) at the southeast bank, CP rail and severe bank erosion from structure, May 21, 2015.



Photo 5 – Looking (east) along the southeast bank from structure, May 21, 2015.



Photo 6 – Looking (east) at the CP rail (south of bank) from structure, May 21, 2015.



Photo 7 – Looking (southeast) at the secondary grassed bank south of CP rail, May 21, 2015.



Photo 8 – Looking (south) from the southeast abutment at PTH 1A, May 21, 2015.



Photo 9 – Looking (northwest) at Site#2582-00, May 21, 2015.



Photo 10 – Looking at an erosion trough on the north side of the pedestrian path (south of grassed secondary slope), May 21, 2015.



Photo 11 – Looking (northwest) at the downstream elevation (approx. 50 m downstream) and CP rail, May 21, 2015.



Photo 12 – Looking (northeast) at the downstream elevation (approx. 50 m downstream), May 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e. northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; steep slope mud banks.
- Southeast bank is lined with trees, mixture of dead and live deciduous trees.
- Bank adjacent to structure has experienced severe bank failure/erosion (i.e. loss of vegetation).
- Beyond the short steep river slope, CP gravel road access and 5 rail tracks run east-west under the structure.
- Power line south of tracks run up towards and appears to travel under the bridge structure.
- South of CP rail, there is a secondary grassed slope (moderately slope and lined with a fence).
- Secondary slope appears to have experienced a tree removal, as approx. 100 m east there is sudden line of tree growth, and erosion (major trough approx. 20 m east of bridge).
- Manicured lawn and pedestrian path south of CP rail curves eastwards towards a park.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- Indicator species at (or through) waterway at various life stages and times. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and fish species.
- The construction and placement of new concrete piers will cause alteration/disturbance (No Residual or Serious)

**Terrestrial Habitat:**

- With the demolition of one structure and the construction of two new structures, new terrestrial habitat will become occupied by the new structures, i.e. loss of habitat and treed areas.
- Re-vegetation efforts, as well as, preventative erosion controls will be used.

**Armouring (hard):**

- Continual 'hard' armouring could result in transfer of energy and possibly upstream and downstream erosion/de-stabilization. Measures should be taken to adopt 'bio-engineering approaches.

**UTM and Legal Description**

UTM: 14U 432491E 5522461N (Inspection Report 2013-05-29)

LEGAL: E23-10-19W

Municipality	R.M. of Cornwallis
Designated Watershed	DWS 98
Topographic Map	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
DFO Fish Habitat Classification Map	DFO 62G13
DFO Habitat Type	Type A (2007 and 2013)
Transport Canada	Navigable (Assiniboine River)

**Appendix 2.4 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – SOUTHWEST Abutment (as of May 25, 2015)**



Photo 1 – Looking (west) upstream from Site#2582-00 on PTH 1A, May 21, 2015.



Photo 2 – Looking (west) at the southwest bank from structure, May 21, 2015.



Photo 3 – Looking (southwest) at the southwest bank from structure, May 21, 2015.



Photo 4 – Looking (north) at PTH 1A from the southwest abutment, May 21, 2015.



Photo 5 – Looking (south) at PTH 1 and Pacific Ave. from the southwest abutment, May 21, 2015.



Photo 6 – Looking (southwest) at the CP access road and rail, May 21, 2015.



Photo 7 – Looking (northwest) at the CP road access and Assiniboine River bank, May 21, 2015.



Photo 8 – Looking (west) at the CP rail, May 21, 2015.



Photo 9 – Looking (southwest) at the secondary slope south of the CP rail, May 21, 2015.



Photo 10 – Looking north at the upstream elevation, May 21, 2015.



Photo 11 – Looking (northeast) at the upstream elevation (approx. 50 m west), May 21, 2015.



Photo 12 – Looking (southwest) at the southwest bank from Site#2582-00, May 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e. northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; steep slope mud banks. Southwest bank is lined with deciduous trees, and lined with rock.
- Beyond the short steep river slope, CP gravel road access and 5 rail tracks run east-west under the structure.
- Power line south of tracks run up towards and appears to travel under the bridge structure.
- There are also concrete building remains located between the gravel access road and the CP rail tracks.
- South of CP rail, there is a secondary grassed slope (moderately slope) with few shrubs and deciduous trees.
- Pedestrian access is limited (i.e. no paths or sideways), and there is one bus stop approx. 50 m west of the bridge structure.
- At the bottom of the secondary slope there is a warning sign for underground lines, and the slope has several animal burrows.
- Manicured lawn and pedestrian path north of tree line that curves northward towards Optimist Soccer Park.
- Downstream of structure there is a ditch outlets towards the Assiniboine River, and a gas pipeline crossing/sign.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- 3<sup>rd</sup> Street Dam (City of Brandon) upstream of the site, and the river channel shows obvious and extensive scour. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.
- Indicator species at (or through) waterway at various life stages and times.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and fish species.
- The construction and placement of new concrete piers will cause temporary instream disturbance.

**Terrestrial Habitat:**

- Re-vegetation efforts, as well as, preventative erosion controls will be used.

**Armouring (hard):**

- Continual 'hard' armouring could result in transfer of energy and possibly upstream and downstream erosion/de-stabilization. Measures should be taken to adopt 'bio-engineering approaches.

**UTM and Legal Description**

**UTM:** 14U 432491E 5522461N (Inspection Report 2013-05-29)

**LEGAL:** E23-10-19W

<b>Municipality</b>	R.M. of Cornwallis
<b>Designated Watershed</b>	DWS 98
<b>Topographic Map</b>	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
<b>DFO Fish Habitat Classification Map</b>	DFO 62G13
<b>DFO Habitat Type</b>	Type A (2007 and 2013)
<b>Transport Canada</b>	Navigable (Assiniboine River)

**Appendix 2.5 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – NORTHWEST Abutment (as of May 25, 2015)**



Photo 1 – Looking (west) upstream from Site#2582-00 on PTH 1A, May 21, 2015.



Photo 2 – Looking (northwest) at the northwest bank from structure, May 21, 2015.



Photo 3 – Looking (northwest) at the northwest bank from structure, May 21, 2015.



Photo 4 – Looking (northwest) at pedestrian walkway and Dinsdale Park (north of bank tree line), May 21, 2015.



Photo 5 – Looking (west) at Dinsdale Park (north of bank tree line), May 21, 2015.



Photo 6 – Looking (northeast) at the northwest abutment, May 21, 2015.



Photo 7 – Looking (south) at pedestrian path, structure and Assiniboine River, May 21, 2015.



Photo 8 – Looking (west) at the deciduous forested area, May 21, 2015.



Photo 9 – Looking (west) upstream along northwest bank, May 21, 2015.



Photo 10 – Looking south at Site#2582-00 from the northwest bank, May 21, 2015.



Photo 11 – Looking (west) at the deciduous forested area along pedestrian path, May 21, 2015.



Photo 12 – Looking northeast under the structure at erosion from the northwest bank, May 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e., northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; low slope mud/sand banks and shorelines (Mud silt bank approx. 10 m).
- Dead trees in silt followed by a densely forested area of deciduous trees which widens westward.
- Manicured lawn and pedestrian path north of tree line (Dinsdale Park and child playground).
- Thistle and burdock observed within forested area, and several gopher holes along abutment.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- Indicator species at (or through) waterway at various life stages and times. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.
- Embankments have experienced severe erosion, which has produced several troughs.
- 3<sup>rd</sup> Street Dam (City of Brandon) upstream of the site, and the river channel shows obvious and extensive scour.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and fish species.
- The construction and placement of new concrete piers will cause temporary instream disturbance.

**Terrestrial Habitat:**

- With the demolition of one structure and the construction of two new structures, new terrestrial habitat will become occupied by the new structures, i.e. loss of habitat and treed areas.
- No long-term or residual impacts from construction

**Armouring (hard):**

- Continual 'hard' armouring could result in transfer of energy and possibly upstream and downstream erosion/de-stabilization. Measures should be taken to adopt 'bio-engineering approaches.

**UTM and Legal Description**

**UTM:** 14U 432491E 5522461N (Inspection Report 2013-05-29)

**LEGAL:** E23-10-19W

<b>Municipality</b>	R.M. of Cornwallis
<b>Designated Watershed</b>	DWS 98
<b>Topographic Map</b>	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
<b>DFO Fish Habitat Classification Map</b>	DFO 62G13
<b>DFO Habitat Type</b>	Type A (2007 and 2013)
<b>Transport Canada</b>	Navigable (Assiniboine River)

**APPENDIX 3 – SIGNIFICANCE DETERMINATION**

The significance approach framework is guided by the “Reference Guide for the *Canadian Environmental Assessment Act*” and includes the identification of adverse environmental effects, followed by the determination of the significance and likelihood of the residual adverse effects as outlined in the tables below (*North/South Consultants Inc., 2014-04 – “Rapid City Dam – Environmental Assessment Screening Report: Proposed Dredging of the Rapid City Reservoir*):

**Significance Determination**

Environmental Component	EFFECT	Significance Criteria						Significance
		Magnitude	Geographic Extent	Duration	Frequency	Permanence / reversibility	Ecological Context	

S: Significant adverse environmental effect  
 ME: Minor Adverse Effect/ Mitigable Effect (Not Significant)

NS: Not significant adverse environmental effect  
 UN: Uncertain/ Unknown Effect



## Significance Criteria Definitions

<b>Criterion</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>
<b>Magnitude</b> (of the effect)	<ul style="list-style-type: none"> <li>Effect is evident only at or nominally above baseline conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Effect exceeds baseline conditions however is less than regulatory criteria or published guideline values.</li> </ul>	<ul style="list-style-type: none"> <li>Effect exceeds regulatory criteria or published guideline values.</li> </ul>
<b>Geographic Extent</b> (of the effect)	<ul style="list-style-type: none"> <li>Effect is limited to the project site/footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Effect extends into areas beyond the project site/footprint boundary.</li> </ul>	<ul style="list-style-type: none"> <li>Effect is trans-boundary in nature.</li> </ul>
<b>Duration</b> (of the effect)	<ul style="list-style-type: none"> <li>Effect is evident only during the construction phase of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Effect is evident during construction and/or the operational phase of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Effects will be evident beyond the operational life of the project.</li> </ul>
<b>Frequency</b> (of conditions causing the effect)	<ul style="list-style-type: none"> <li>Conditions or phenomena causing the effect occur infrequently (i.e. &lt; once per year).</li> </ul>	<ul style="list-style-type: none"> <li>Conditions or phenomena causing the effect occur at regular intervals although infrequent intervals (i.e. &lt; once per month).</li> </ul>	<ul style="list-style-type: none"> <li>Conditions or phenomena causing the effect occur at regular and frequent intervals (i.e. &gt; once per month).</li> </ul>
<b>Permanence</b> (of effect)	<ul style="list-style-type: none"> <li>Effect is readily reversible over a short period of time (i.e. one growing season).</li> </ul>	<ul style="list-style-type: none"> <li>Effect is not readily reversible during the life of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Effect is permanent.</li> </ul>
<b>Ecological Context</b> (of effect)	<ul style="list-style-type: none"> <li>Evidence of environmental effects by human activities. Effect results in minimal disruption of ecological functions and relationships in the impacted area.</li> </ul>	<ul style="list-style-type: none"> <li>Relatively pristine area. Effect results in some disruption of non-critical ecological functions and relationship in the impacted area.</li> </ul>	<ul style="list-style-type: none"> <li>Pristine area / not affected by human activity. Effect results in disruption of critical ecological functions and relationship in the impacted area.</li> </ul>

## **14.0 APPENDICES**

### **14.1 APPENDIX 1 – TETRA TECH MAY 2015 DESIGNS**

**1.1 – Proposed Project Plan Submitted for Environmental Review Sheet**

**1.2 – Traffic Management Plan/Detour Alignment**

### **14.2 APPENDIX 2 – ENVIRONMENTAL DESCRIPTION AND PROPOSED WORKS**

**2.1 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River**

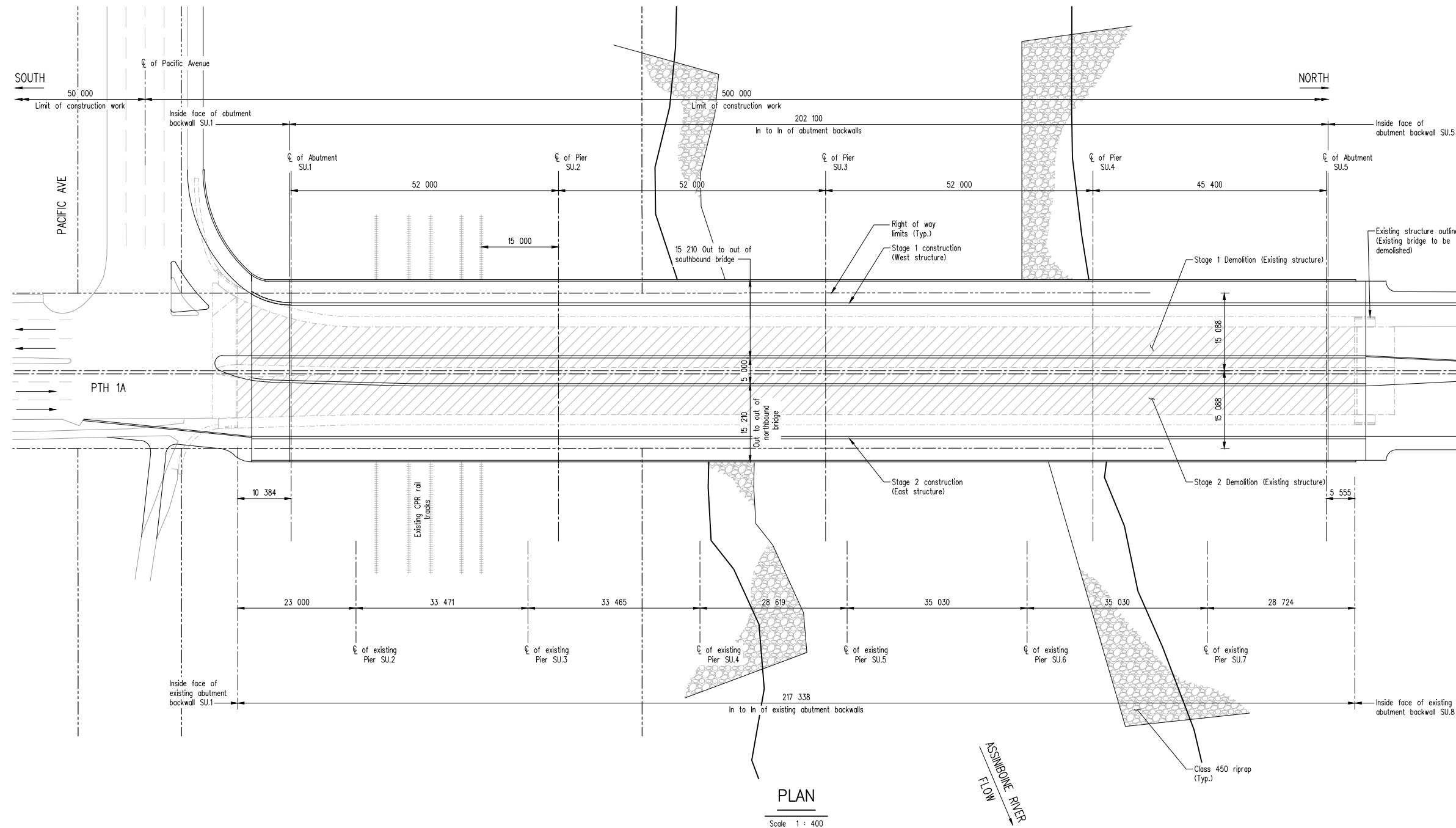
**2.2 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – NORTHEAST Abutment**

**2.3 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – SOUTHEAST Abutment**

**2.4 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – SOUTHWEST Abutment**

**2.5 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – NORTHWEST Abutment**

### **14.3 APPENDIX 3 – SIGNIFICANCE DETERMINATION**



**PURPOSE OF THE PROJECT**

The existing bridge on PTH 1A (First Street) over Assinboine River/CPR, Site No. 2582-00, is a seven span (three simply supported and 1 four span continuous), 217.3 m in length, slab on girder bridge that was constructed in 1972. The existing bridge is proposed to be replaced by twin structures with longer spans and reducing the number of piers in the waterway. Bridge replacement works are scheduled to take place from fall of 2015 until winter of 2017/2018.

**LOCATION**

**East Structure:**  
Latitude & Longitude 49° 51' 2.53" 99° 56' 20.15" UTM Coordinates Zone 14U (E,N) 432502.678 5522454.435

**West Structure:**  
Latitude & Longitude 49° 51' 2.52" 99° 56' 21.05" UTM Coordinates Zone 14U (E,N) 432484.970 5522454.673

**NAVIGATION**

- Scheduled waterway.

**PROPOSED SCHEDULE**

Tentative: November 2015 - March 2018  
Fall/winter construction

1<sup>st</sup> phase: Winter 2015 - fall 2016  
Site mobilization  
Phase 1 Deck and substructure demolition  
West bridge deck, girders and substructure construction

2<sup>nd</sup> phase: Winter 2016 - fall 2017  
Phase 2 Deck and substructure demolition  
East bridge deck, girders and substructure construction

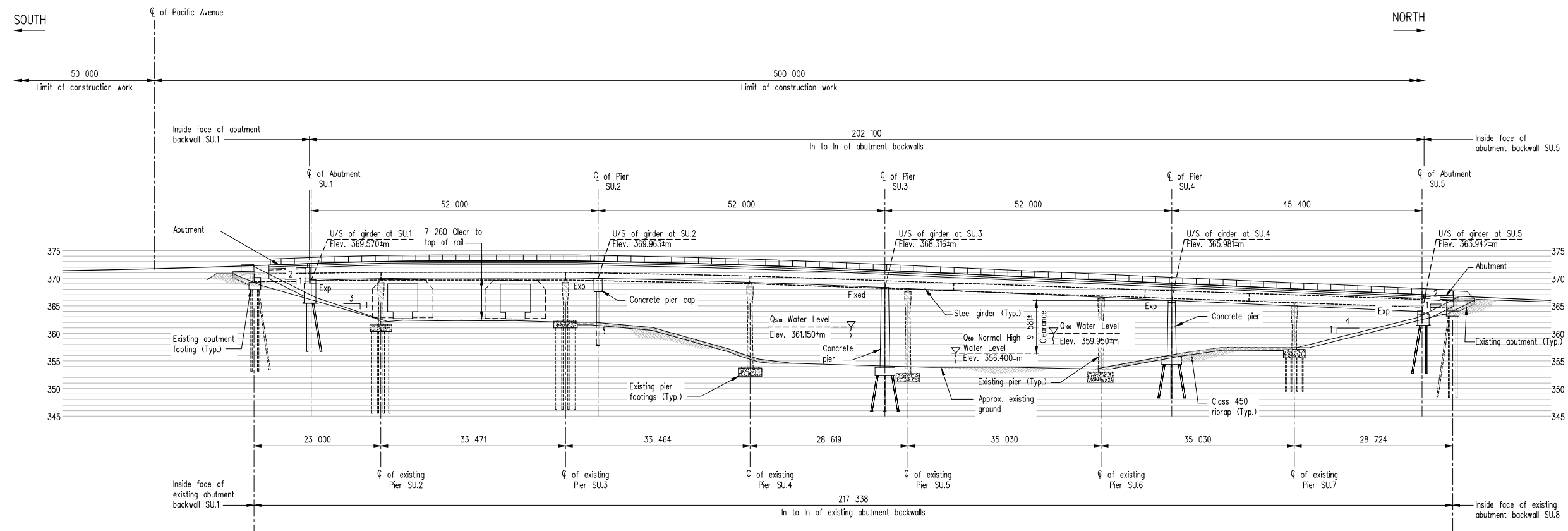
3<sup>rd</sup> phase: Fall 2017 - spring 2018  
Channel riprap works

**PROPOSED WORK**

1. Pile foundations
  2. Concrete substructure (piers and abutments)
  3. Steel girders
  4. Channel excavation
  5. Channel riprap works
  6. Cast-in-place concrete deck and curb
  7. Galvanized steel expansion joints and railing
  8. Approach roadworks
- Staging and access will be limited to the right of way.



REVISIONS		PROPOSED PROJECT PLAN SUBMITTED FOR ENVIRONMENTAL REVIEW MAY 2015 FOR BRIDGE REPLACEMENT TWIN STRUCTURES OVER CPR AND ASSINBOINE RIVER ON PTH 1A 9 800 ROADWAY WIDTH CITY OF BRANDON	
DATE	BY	DESCRIPTION	RELEASED FOR CONSTRUCTION BY:
		Issued for environmental review	
ISSUED FOR INFORMATION ONLY			
		Water Control & Structures	
DESIGN	BY: S.A.	DIRECTOR	DATE
CHECKED: V.B.		STRUCTURES, DESIGN AND CONSTRUCTION BRANCH	
DETAILS	BY: B.T.	SCALE:	SHEET No. 1 of 5
CHECKED: G.J.		1 : 400	2582-11 & 2582-12



**PROPOSED BRIDGE ELEVATION**

Scale 1 : 400

**PURPOSE OF THE PROJECT**

The existing bridge on PTH 1A (First Street) over Assiniboine River/CPR, Site No. 2582-00, is a seven span (three simply supported and 1 four span continuous), 217.3 m in length, slab on girder bridge that was constructed in 1972. The existing bridge is proposed to be replaced by twin structures with longer spans and reducing the number of piers in the waterway. Bridge replacement works are scheduled to take place from fall of 2015 until winter of 2017/2018.

**LOCATION**

**East Structure:**  
 Latitude & Longitude 49° 51' 2.53" 99° 56' 20.15"  
 UTM Coordinates Zone 14U (E,N) 432502.678 5522454.435

**West Structure:**  
 Latitude & Longitude 49° 51' 2.52" 99° 56' 21.05"  
 UTM Coordinates Zone 14U (E,N) 432484.970 5522454.673

**NAVIGATION**


- Scheduled waterway.

**PROPOSED SCHEDULE**

- Tentative: November 2015 - March 2018  
Fall/winter construction
- 1<sup>st</sup> phase: Winter 2015 - fall 2016  
Site mobilization  
Phase 1 Deck and substructure demolition  
West bridge deck, girders and substructure construction
- 2<sup>nd</sup> phase: Winter 2016 - fall 2017  
Phase 2 Deck and substructure demolition  
East bridge deck, girders and substructure construction
- 3<sup>rd</sup> phase: Fall 2017 - spring 2018  
Channel riprap works

**PROPOSED WORK**

- Pile foundations
  - Concrete substructure (piers and abutments)
  - Steel girders
  - Channel excavation
  - Channel riprap works
  - Cast-in-place concrete deck and curb
  - Galvanized steel expansion joints and railing
  - Approach roadworks
- Staging and access will be limited to the right of way.

REVISIONS			PROPOSED PROJECT PLAN SUBMITTED FOR ENVIRONMENTAL REVIEW MAY 2015 FOR BRIDGE REPLACEMENT TWIN STRUCTURES OVER CPR AND ASSINIBOINE RIVER ON PTH 1A 9 800 ROADWAY WIDTH CITY OF BRANDON	
DATE	BY	DESCRIPTION	RELEASED FOR CONSTRUCTION BY:	
ISSUED FOR INFORMATION ONLY			 Water Control & Structures	
DESIGN	BY: S.A.	CHECKED: V.B.	DIRECTOR STRUCTURES, DESIGN AND CONSTRUCTION BRANCH	DATE
DETAILS	BY: B.T.	CHECKED: C.I.	SCALE: 1 : 400	SHEET No. 2 of 5
			2582-11 & 2582-12	



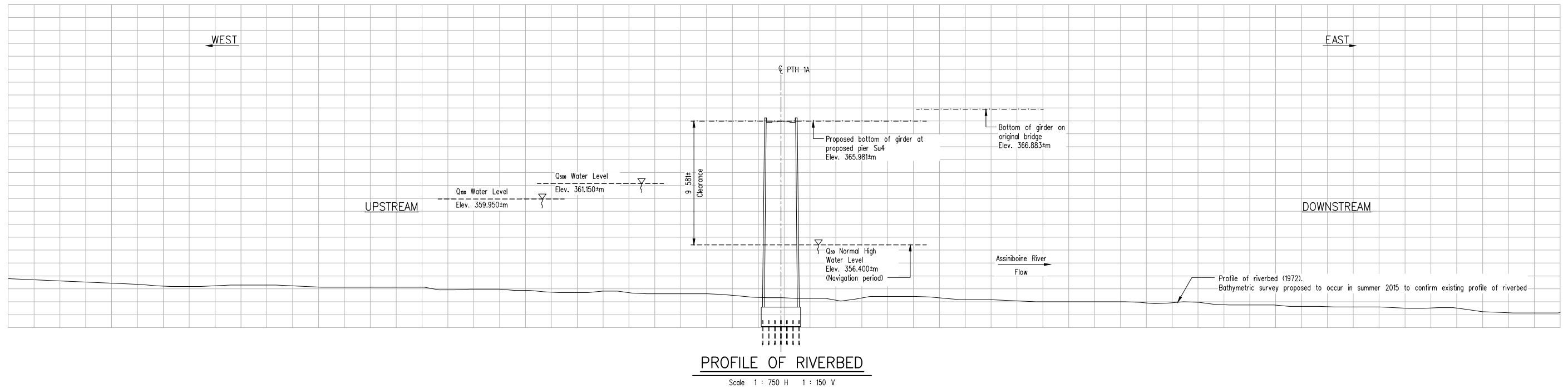


Photo 1 - Looking South (Upstream view of existing bridge) (2013)



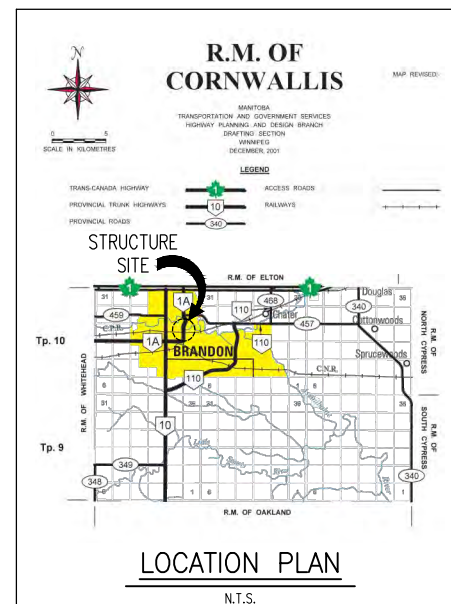
Photo 2 - Looking East (Downstream view of existing bridge) (2013)




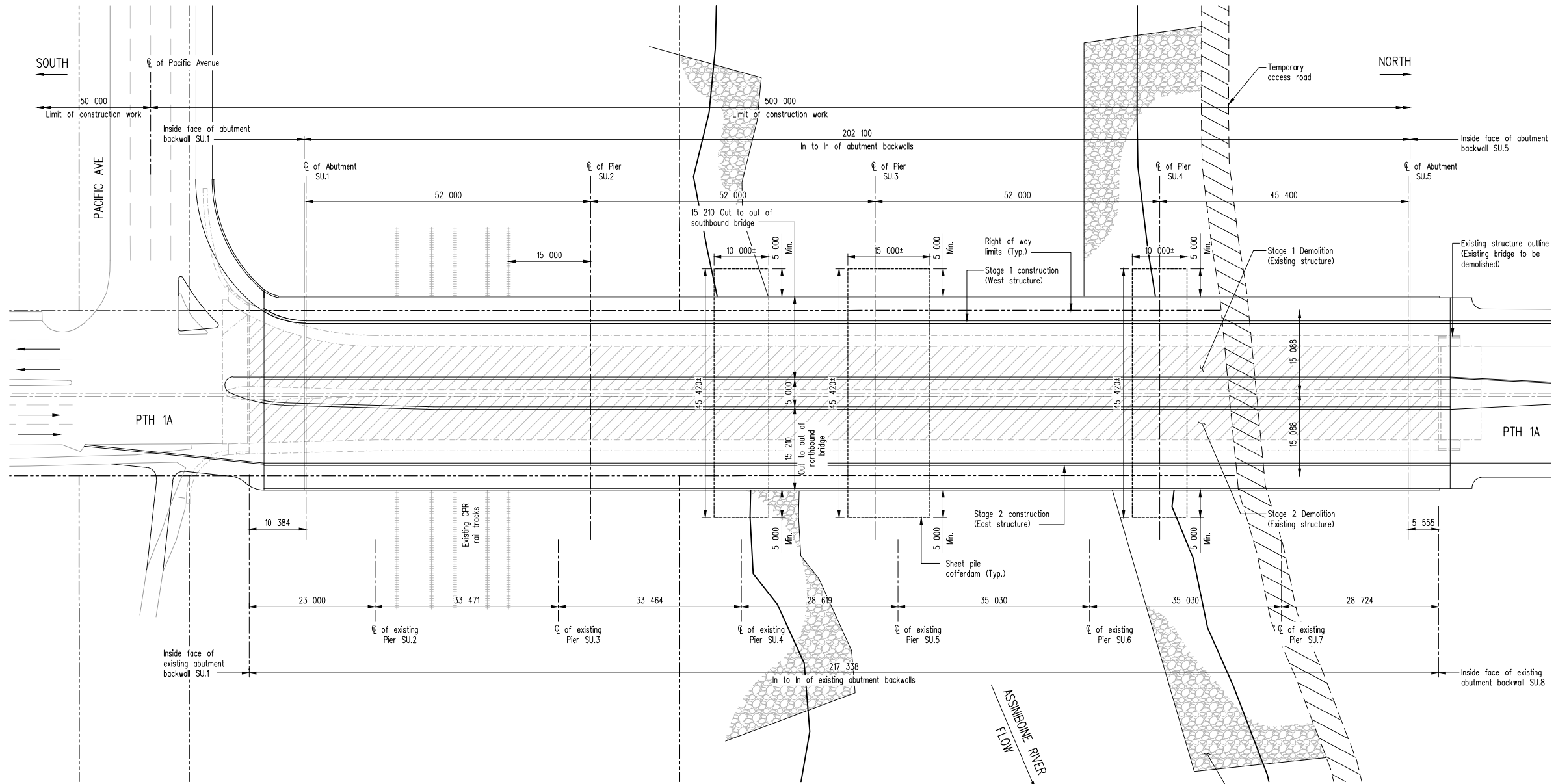
Photo 3 - Looking West (Upstream view) (2013)



Photo 4 - Looking East (Downstream view) (2013)



REVISIONS		PROPOSED PROJECT PLAN SUBMITTED FOR ENVIRONMENTAL REVIEW MAY 2015 FOR BRIDGE REPLACEMENT TWIN STRUCTURES OVER CPR AND ASSINIBOINE RIVER ON PTH 1A 9 800 ROADWAY WIDTH CITY OF BRANDON	
DATE	BY	DESCRIPTION	RELEASED FOR CONSTRUCTION BY:
		Issued for environmental review	
ISSUED FOR INFORMATION ONLY		 Water Control & Structures	
		DESIGN	BY: S.A. CHECKED: V.B.
		DETAILS	BY: B.T. CHECKED: G.L.
		DIRECTOR STRUCTURES, DESIGN AND CONSTRUCTION BRANCH SCALE: 1 : 750 SHEET No. 3 of 5 2582-11 & 2582-12 or as shown SITE No.	



**PROPOSED BRIDGE PLAN SHOWING TEMPORARY WORKS**

Scale 1 : 400



REVISIONS		

PROPOSED PROJECT PLAN  
 SUBMITTED FOR ENVIRONMENTAL REVIEW  
 MAY 2015  
 FOR BRIDGE REPLACEMENT TWIN STRUCTURES  
 OVER CPR AND ASSINIBOINE RIVER ON PTH 1A  
 9 800 ROADWAY WIDTH  
 CITY OF BRANDON

DATE	BY	DESCRIPTION

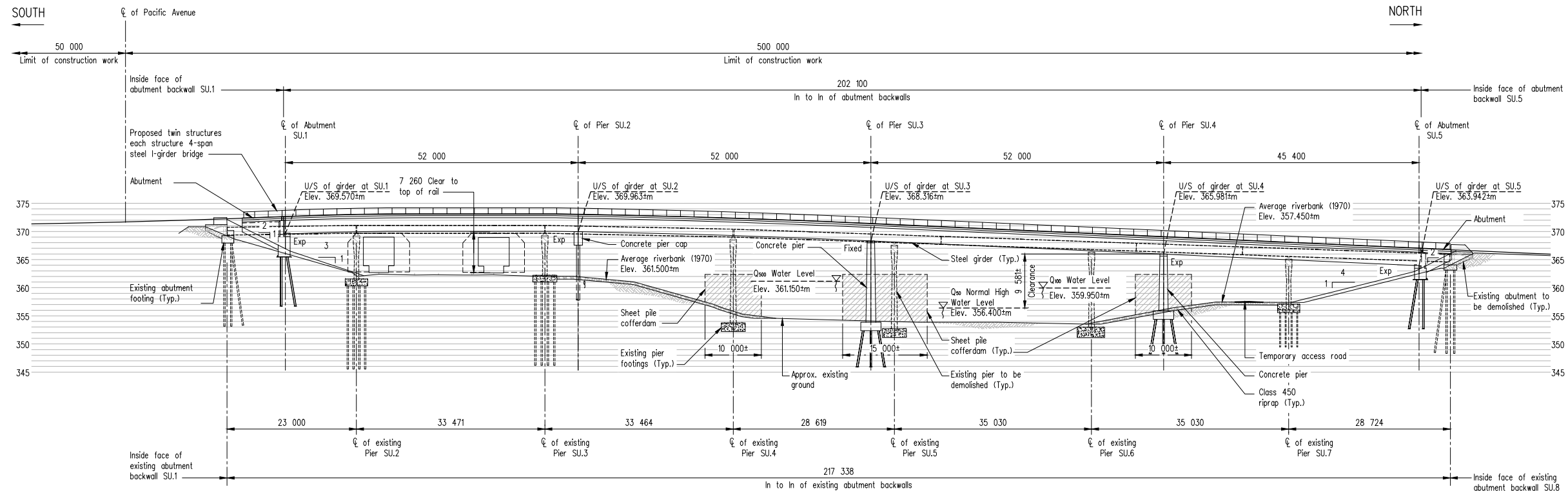
ISSUED FOR INFORMATION ONLY

**Manitoba**  
 Infrastructure and Transportation  
 Water Control & Structures

DESIGN BY: S.A.  
 CHECKED: V.B.

DETAILS BY: B.T.  
 CHECKED: G.J.

RELEASED FOR CONSTRUCTION BY:	DIRECTOR	DATE
	STRUCTURES, DESIGN AND CONSTRUCTION BRANCH	
SCALE:	SHEET No.	4 of 5
1 : 400		2582-11 & 2582-12

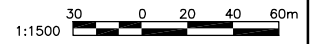
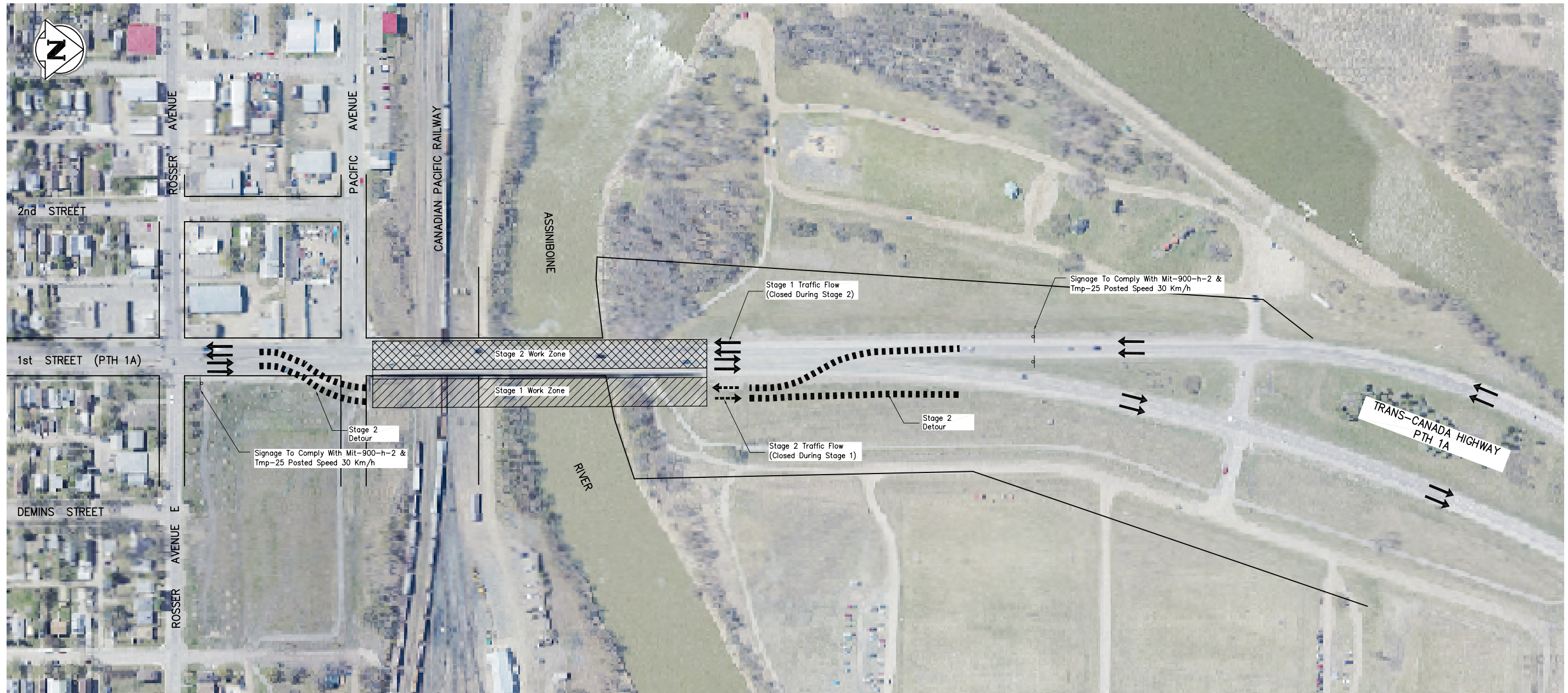


**PROPOSED BRIDGE ELEVATION SHOWING TEMPORARY WORKS**

Scale 1 : 400

REVISIONS			PROPOSED PROJECT PLAN SUBMITTED FOR ENVIRONMENTAL REVIEW MAY 2015 FOR BRIDGE REPLACEMENT TWIN STRUCTURES OVER CPR AND ASSINIBOINE RIVER ON PTH 1A 9 800 ROADWAY WIDTH CITY OF BRANDON	
DATE	BY	DESCRIPTION		
		Issued for environmental review	RELEASED FOR CONSTRUCTION BY:	
ISSUED FOR INFORMATION ONLY				
Water Control & Structures			DESIGN BY: S.A. CHECKED: V.B.	DIRECTOR STRUCTURES, DESIGN AND CONSTRUCTION BRANCH DATE:
			DETAILS BY: B.T. CHECKED: C.I.	SCALE: 1 : 400 SHEET No. 5 of 5 2582-11 & 2582-12 SITE No.





REVISIONS	
DATE	DESCRIPTION

**DETOUR ALIGNMENT**

FOR BRIDGE REPLACEMENT STRUCTURE  
OVER CPR AND ASSINBOINE RIVER ON PTH 1A  
9 800 ROADWAY WIDTH  
CITY OF BRANDON

**APEGM**  
Certificate of Authorization  
**TETRA TECH WEI Inc.**  
No. 5313 Date: April 30, 2016

**TETRA TECH**

**PRELIMINARY DRAWING**  
NOT TO BE USED FOR CONSTRUCTION

DESIGN	BY: GC	CHECKED: GC	RELEASED FOR CONSTRUCTION BY:
DETAILS	BY: CMD	CHECKED: GC	DIRECTOR DATE
			STRUCTURES, DESIGN AND CONSTRUCTION BRANCH
			SCALE: 1 : 1 500
			SHEET No. 1
			SITE No. 2582-10



**Appendix 2.1 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River (as of May 25, 2015)**

**BRIDGE**



Photo 1 – Looking north at Site#2582-00 on PTH 1A, May 29, 2013 (Inspection Report).



Photo 2 – Looking (east) downstream from structure, May 29, 2013 (Inspection Report).



Photo 3 – Looking (west) upstream from structure, May 29, 2013 (Inspection Report).



Photo 4 – Looking (west) at the east elevation, May 29, 2013 (Inspection Report).



Photo 5 – Looking (west) at the east elevation, May 29, 2013 (Inspection Report).



Photo 6 – Looking (north) at the southern pier near CP rail, May 29, 2013 (Inspection Report).



Photo 7 – Looking (east) at the west elevation, May 29, 2013 (Inspection Report).



Photo 8 – Looking (east) at the west elevation, May 29, 2013 (Inspection Report).



Photo 9 – South embankment with severe erosion trough, May 29, 2013 (Inspection Report).



Photo 10 – Looking south east at Site#2582-00 from the northwest bank, April 21, 2015.



Photo 11 – Looking south from the northwest bank, April 21, 2015.



Photo 12 – Looking south from the northeast bank, April 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e. northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; mud/sand banks and shorelines; existing rock from previous armouring and stabilization efforts.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- Indicator species at (or through) waterway at various life stages and times. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.
- On the south end of the structure beyond the river bank there are several CP rail lines which travel under the existing structure. This habitat is bare with the presence of primarily grasses and gravel, but river is lined with steep banks and some deciduous trees.
- Embankments have experienced severe erosion, which has produced several troughs.
- 3<sup>rd</sup> Street Dam (City of Brandon) upstream of the site, and the river channel shows obvious and extensive scour.
- There is an existing storm sewer on the south side of the site that runs towards the Assiniboine River.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and/or aquatic species.
- The construction and placement of new concrete piers may cause temporary instream disturbance.

**Terrestrial Habitat:**

- Some alteration.
- Re-vegetation efforts, as well as, preventative erosion controls should be used as the existing site in the past has experienced severe erosion.

**Armouring (hard):**

- Altered instream habitat; change in diversity; likely to fill in with finer material.

**UTM and Legal Description**

**UTM:** 14U 432491E 5522461N (Inspection Report 2013-05-29)

**LEGAL:** E23-10-19W

<b>Municipality</b>	R.M. of Cornwallis
<b>Designated Watershed</b>	DWS 98
<b>Topographic Map</b>	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
<b>DFO Fish Habitat Classification Map</b>	DFO 62G13
<b>DFO Habitat Type</b>	Type A (2007 and 2013)
<b>Transport Canada</b>	Navigable (Assiniboine River)

**Appendix 2.2 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – NORTHEAST Abutment (as of May 25, 2015)**



Photo 1 – Looking (east) downstream from Site#2582-00 on PTH 1A, May 21, 2015.



Photo 2 – Looking (north) at PTH 1A from structure, May 21, 2015.



Photo 3 – Looking (northeast) at the northeast bank from structure, May 21, 2015.



Photo 4 – Looking (northeast) at the northeast bank along the Assiniboine River from structure, May 21, 2015.



Photo 5 – Looking (east) under the structure at the northeast bank from the pedestrian path, May 21, 2015.



Photo 6 – Looking (south) at the east side of the structure and the Assiniboine River, May 21, 2015.



Photo 7 – Looking (east) at the northeast bank, May 21, 2015.



Photo 8 – Looking (east) at the deciduous treed area on the northeast bank, May 21, 2015.



Photo 9 – Looking (southwest) at the downstream elevation, May 21, 2015.



Photo 10 – Looking south at vegetation along the northeast bank (approx. 50 m downstream), May 21, 2015.



Photo 11 – Looking (south) at the culvert and drain/water intersecting the Assiniboine River downstream Site#2582-00, May 21, 2015.



Photo 12 – Looking (north) at the drain/water that intersects the Assiniboine River downstream Site#2582-00, May 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e. northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; low slope mud/sand banks and shorelines (Mud silt bank approx. 3 m).
- Northeast bank is lined with trees, mixture of dead and live deciduous trees.
- There are several concrete slabs on the northeast bank near the bridge structure.
- Manicured lawn and pedestrian path north of tree line that curves northward towards Optimist Soccer Park.
- Downstream of structure there is a ditch outlets towards the Assiniboine River, and a gas pipeline crossing/sign.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- Indicator species at (or through) waterway at various life stages and times. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.
- Embankments have experienced severe erosion, which has produced several troughs near abutment.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and aquatic species.
- The construction and placement of new concrete piers may cause temporary instream disturbance.

**Terrestrial Habitat:**

- Alteration
- Re-vegetation efforts, as well as, preventative erosion controls should be used as the existing site in the past has experienced severe erosion.

**Armouring (hard):**

- Diversified habitat; altered; no serious harm

**UTM and Legal Description**

**UTM:** 14U 432491E 5522461N (Inspection Report 2013-05-29)

**LEGAL:** E23-10-19W

<b>Municipality</b>	R.M. of Cornwallis
<b>Designated Watershed</b>	DWS 98
<b>Topographic Map</b>	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
<b>DFO Fish Habitat Classification Map</b>	DFO 62G13
<b>DFO Habitat Type</b>	Type A (2007 and 2013)
<b>Transport Canada</b>	Navigable (Assiniboine River)

**Appendix 2.3 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – SOUTHEAST Abutment (as of May 25, 2015)**



Photo 1 – Looking (east) downstream from Site#2582-00 on PTH 1A, May 21, 2015.



Photo 2 – Looking (southeast) at the southeast bank from structure, May 21, 2015.



Photo 3 – Looking (southeast) at the southeast bank and CP rail from structure, May 21, 2015.



Photo 4 – Looking (southeast) at the southeast bank, CP rail and severe bank erosion from structure, May 21, 2015.



Photo 5 – Looking (east) along the southeast bank from structure, May 21, 2015.



Photo 6 – Looking (east) at the CP rail (south of bank) from structure, May 21, 2015.



Photo 7 – Looking (southeast) at the secondary grassed bank south of CP rail, May 21, 2015.



Photo 8 – Looking (south) from the southeast abutment at PTH 1A, May 21, 2015.



Photo 9 – Looking (northwest) at Site#2582-00, May 21, 2015.



Photo 10 – Looking at an erosion trough on the north side of the pedestrian path (south of grassed secondary slope), May 21, 2015.



Photo 11 – Looking (northwest) at the downstream elevation (approx. 50 m downstream) and CP rail, May 21, 2015.



Photo 12 – Looking (northeast) at the downstream elevation (approx. 50 m downstream), May 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e. northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; steep slope mud banks.
- Southeast bank is lined with trees, mixture of dead and live deciduous trees.
- Bank adjacent to structure has experienced severe bank failure/erosion (i.e. loss of vegetation).
- Beyond the short steep river slope, CP gravel road access and 5 rail tracks run east-west under the structure.
- Power line south of tracks run up towards and appears to travel under the bridge structure.
- South of CP rail, there is a secondary grassed slope (moderately slope and lined with a fence).
- Secondary slope appears to have experienced a tree removal, as approx. 100 m east there is sudden line of tree growth, and erosion (major trough approx. 20 m east of bridge).
- Manicured lawn and pedestrian path south of CP rail curves eastwards towards a park.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- Indicator species at (or through) waterway at various life stages and times. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and fish species.
- The construction and placement of new concrete piers will cause alteration/disturbance (No Residual or Serious)

**Terrestrial Habitat:**

- With the demolition of one structure and the construction of two new structures, new terrestrial habitat will become occupied by the new structures, i.e. loss of habitat and treed areas.
- Re-vegetation efforts, as well as, preventative erosion controls will be used.

**Armouring (hard):**

- Continual 'hard' armouring could result in transfer of energy and possibly upstream and downstream erosion/de-stabilization. Measures should be taken to adopt 'bio-engineering approaches.

**UTM and Legal Description**

UTM: 14U 432491E 5522461N (Inspection Report 2013-05-29)

LEGAL: E23-10-19W

Municipality	R.M. of Cornwallis
Designated Watershed	DWS 98
Topographic Map	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
DFO Fish Habitat Classification Map	DFO 62G13
DFO Habitat Type	Type A (2007 and 2013)
Transport Canada	Navigable (Assiniboine River)

**Appendix 2.4 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – SOUTHWEST Abutment (as of May 25, 2015)**



Photo 1 – Looking (west) upstream from Site#2582-00 on PTH 1A, May 21, 2015.



Photo 2 – Looking (west) at the southwest bank from structure, May 21, 2015.



Photo 3 – Looking (southwest) at the southwest bank from structure, May 21, 2015.



Photo 4 – Looking (north) at PTH 1A from the southwest abutment, May 21, 2015.



Photo 5 – Looking (south) at PTH 1 and Pacific Ave. from the southwest abutment, May 21, 2015.



Photo 6 – Looking (southwest) at the CP access road and rail, May 21, 2015.



Photo 7 – Looking (northwest) at the CP road access and Assiniboine River bank, May 21, 2015.



Photo 8 – Looking (west) at the CP rail, May 21, 2015.



Photo 9 – Looking (southwest) at the secondary slope south of the CP rail, May 21, 2015.



Photo 10 – Looking north at the upstream elevation, May 21, 2015.



Photo 11 – Looking (northeast) at the upstream elevation (approx. 50 m west), May 21, 2015.



Photo 12 – Looking (southwest) at the southwest bank from Site#2582-00, May 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e. northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; steep slope mud banks. Southwest bank is lined with deciduous trees, and lined with rock.
- Beyond the short steep river slope, CP gravel road access and 5 rail tracks run east-west under the structure.
- Power line south of tracks run up towards and appears to travel under the bridge structure.
- There are also concrete building remains located between the gravel access road and the CP rail tracks.
- South of CP rail, there is a secondary grassed slope (moderately slope) with few shrubs and deciduous trees.
- Pedestrian access is limited (i.e. no paths or sideways), and there is one bus stop approx. 50 m west of the bridge structure.
- At the bottom of the secondary slope there is a warning sign for underground lines, and the slope has several animal burrows.
- Manicured lawn and pedestrian path north of tree line that curves northward towards Optimist Soccer Park.
- Downstream of structure there is a ditch outlets towards the Assiniboine River, and a gas pipeline crossing/sign.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- 3<sup>rd</sup> Street Dam (City of Brandon) upstream of the site, and the river channel shows obvious and extensive scour. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.
- Indicator species at (or through) waterway at various life stages and times.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and fish species.
- The construction and placement of new concrete piers will cause temporary instream disturbance.

**Terrestrial Habitat:**

- Re-vegetation efforts, as well as, preventative erosion controls will be used.

**Armouring (hard):**

- Continual 'hard' armouring could result in transfer of energy and possibly upstream and downstream erosion/de-stabilization. Measures should be taken to adopt 'bio-engineering approaches.

**UTM and Legal Description**

**UTM:** 14U 432491E 5522461N (Inspection Report 2013-05-29)

**LEGAL:** E23-10-19W

<b>Municipality</b>	R.M. of Cornwallis
<b>Designated Watershed</b>	DWS 98
<b>Topographic Map</b>	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
<b>DFO Fish Habitat Classification Map</b>	DFO 62G13
<b>DFO Habitat Type</b>	Type A (2007 and 2013)
<b>Transport Canada</b>	Navigable (Assiniboine River)

**Appendix 2.5 – First Street Bridge (PTH 1A) Replacement/Expansion: Site #2582-00 at the Assiniboine River – NORTHWEST Abutment (as of May 25, 2015)**



Photo 1 – Looking (west) upstream from Site#2582-00 on PTH 1A, May 21, 2015.



Photo 2 – Looking (northwest) at the northwest bank from structure, May 21, 2015.



Photo 3 – Looking (northwest) at the northwest bank from structure, May 21, 2015.



Photo 4 – Looking (northwest) at pedestrian walkway and Dinsdale Park (north of bank tree line), May 21, 2015.



Photo 5 – Looking (west) at Dinsdale Park (north of bank tree line), May 21, 2015.



Photo 6 – Looking (northeast) at the northwest abutment, May 21, 2015.



Photo 7 – Looking (south) at pedestrian path, structure and Assiniboine River, May 21, 2015.



Photo 8 – Looking (west) at the deciduous forested area, May 21, 2015.



Photo 9 – Looking (west) upstream along northwest bank, May 21, 2015.



Photo 10 – Looking south at Site#2582-00 from the northwest bank, May 21, 2015.



Photo 11 – Looking (west) at the deciduous forested area along pedestrian path, May 21, 2015.



Photo 12 – Looking northeast under the structure at erosion from the northwest bank, May 21, 2015.

**Environmental Description and Proposed Works**

**Proposed Works**

- The existing structure was built in 1972 in the City of Brandon, and the structure now requires the existing bridge deck, railing and sidewalk needs to be replaced. The substructure conditions were found to be poor and there is extensive scour within river channel.
- The structure was planned as a major rehabilitation (girder strengthening and deck/railing replacement); however, more extensive pier modifications would be needed. The structure is now required to be demolished and replaced.
- Construction will take place over 2-2.5 years with construction beginning late 2015
  - There will be two (2) construction stages, in which a detour will only allow one (1) lane to be open in each direction.
  - There will be two (2) bridge structures (i.e., northbound and southbound) each with two (2) lanes and a walkway.
  - Superstructure – four (4) continuous spans of steel girders and reinforced concrete deck.
  - Substructure – two (2) reinforced concrete abutments, one (1) reinforced concrete pile cap with reinforced concrete filled steel pipe pile bents and two (2) reinforced concrete piers with HP steel piles.

**Site Evaluation(s)**

- Type A Habitat throughout (i.e., complex with indicator species).
- Mixed riparian (beyond ordinary high water marks and bank full widths) of large deciduous trees; flood tolerant vegetation; willow species; low slope mud/sand banks and shorelines (Mud silt bank approx. 10 m).
- Dead trees in silt followed by a densely forested area of deciduous trees which widens westward.
- Manicured lawn and pedestrian path north of tree line (Dinsdale Park and child playground).
- Thistle and burdock observed within forested area, and several gopher holes along abutment.
- Perennial flows often at high stage except at annual drawdown event (~mid-October).
- Indicator species at (or through) waterway at various life stages and times. The 3<sup>rd</sup> Street Dam upstream was replaced in 2012/2013, which incorporated a new fish ladder.
- Embankments have experienced severe erosion, which has produced several troughs.
- 3<sup>rd</sup> Street Dam (City of Brandon) upstream of the site, and the river channel shows obvious and extensive scour.

**Impacts to Aquatic and Immediate Terrestrial (Riparian) Habitat**

**In-Stream:**

- NO RESIDUAL and NO SERIOUS HARM to fish and fish species.
- The construction and placement of new concrete piers will cause temporary instream disturbance.

**Terrestrial Habitat:**

- With the demolition of one structure and the construction of two new structures, new terrestrial habitat will become occupied by the new structures, i.e. loss of habitat and treed areas.
- No long-term or residual impacts from construction

**Armouring (hard):**

- Continual 'hard' armouring could result in transfer of energy and possibly upstream and downstream erosion/de-stabilization. Measures should be taken to adopt 'bio-engineering approaches.

**UTM and Legal Description**

**UTM:** 14U 432491E 5522461N (Inspection Report 2013-05-29)

**LEGAL:** E23-10-19W

<b>Municipality</b>	R.M. of Cornwallis
<b>Designated Watershed</b>	DWS 98
<b>Topographic Map</b>	Assiniboine River; City of Brandon; CPR rail travels underneath structure (W-E); residential living/housing (south); Assiniboine Avenue runs under structure; Drop-like structure upstream of site; nearby highways - PTH 1 (north), PTH 10 (west), PR 457 (north), PR 459 (north), PR 344 (south)
<b>DFO Fish Habitat Classification Map</b>	DFO 62G13
<b>DFO Habitat Type</b>	Type A (2007 and 2013)
<b>Transport Canada</b>	Navigable (Assiniboine River)

### APPENDIX 3 – SIGNIFICANCE DETERMINATION

The significance approach framework is guided by the “Reference Guide for the *Canadian Environmental Assessment Act*” and includes the identification of adverse environmental effects, followed by the determination of the significance and likelihood of the residual adverse effects as outlined in the tables below (*North/South Consultants Inc., 2014-04 – “Rapid City Dam – Environmental Assessment Screening Report: Proposed Dredging of the Rapid City Reservoir*):

#### Significance Determination

Environmental Component	EFFECT	Significance Criteria						Significance
		Magnitude	Geographic Extent	Duration	Frequency	Permanence / reversibility	Ecological Context	

S: Significant adverse environmental effect  
 ME: Minor Adverse Effect/ Mitigable Effect (Not Significant)

NS: Not significant adverse environmental effect  
 UN: Uncertain/ Unknown Effect

## Significance Criteria Definitions

Criterion	Low	Moderate	High
<b>Magnitude</b> (of the effect)	<ul style="list-style-type: none"> <li>Effect is evident only at or nominally above baseline conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Effect exceeds baseline conditions however is less than regulatory criteria or published guideline values.</li> </ul>	<ul style="list-style-type: none"> <li>Effect exceeds regulatory criteria or published guideline values.</li> </ul>
<b>Geographic Extent</b> (of the effect)	<ul style="list-style-type: none"> <li>Effect is limited to the project site/footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Effect extends into areas beyond the project site/footprint boundary.</li> </ul>	<ul style="list-style-type: none"> <li>Effect is trans-boundary in nature.</li> </ul>
<b>Duration</b> (of the effect)	<ul style="list-style-type: none"> <li>Effect is evident only during the construction phase of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Effect is evident during construction and/or the operational phase of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Effects will be evident beyond the operational life of the project.</li> </ul>
<b>Frequency</b> (of conditions causing the effect)	<ul style="list-style-type: none"> <li>Conditions or phenomena causing the effect occur infrequently (i.e. &lt; once per year).</li> </ul>	<ul style="list-style-type: none"> <li>Conditions or phenomena causing the effect occur at regular intervals although infrequent intervals (i.e. &lt; once per month).</li> </ul>	<ul style="list-style-type: none"> <li>Conditions or phenomena causing the effect occur at regular and frequent intervals (i.e. &gt; once per month).</li> </ul>
<b>Permanence</b> (of effect)	<ul style="list-style-type: none"> <li>Effect is readily reversible over a short period of time (i.e. one growing season).</li> </ul>	<ul style="list-style-type: none"> <li>Effect is not readily reversible during the life of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Effect is permanent.</li> </ul>
<b>Ecological Context</b> (of effect)	<ul style="list-style-type: none"> <li>Evidence of environmental effects by human activities. Effect results in minimal disruption of ecological functions and relationships in the impacted area.</li> </ul>	<ul style="list-style-type: none"> <li>Relatively pristine area. Effect results in some disruption of non-critical ecological functions and relationship in the impacted area.</li> </ul>	<ul style="list-style-type: none"> <li>Pristine area / not affected by human activity. Effect results in disruption of critical ecological functions and relationship in the impacted area.</li> </ul>