

# **RIGHT-OF-WAY MONITORING AND RESPONSE PLAN FOR THE GRAND RAPIDS PIPELINE GP LTD. GRAND RAPIDS PIPELINE PROJECT**

**February 2015  
8395**

Prepared for:

**Grand Rapids  
Pipeline Project**

Grand Rapids Pipeline GP Ltd.  
in its capacity as a general partner on behalf of  
Grand Rapids Pipeline Limited Partnership

Prepared by:

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## 1.0 INTRODUCTION

Grand Rapids Pipeline GP Ltd. (Grand Rapids), in its capacity as general partner on behalf of Grand Rapids Pipeline Limited Partnership, applied to the Alberta Energy Regulator (AER) pursuant to Part 4 of the *Pipeline Act* to construct and operate pipelines and associated installations, collectively named the Grand Rapids Pipeline Project (the Project). The AER issued Decision 2014 ABAER 012 on October 9, 2014 granting approval for select Project applications subject to the conditions outlined in Appendix 1 of the AER Decision.

Grand Rapids commissioned TERA, a CH2M HILL Company (TERA) to prepare a Right-of-Way Monitoring and Response Plan (the Plan) as outlined in AER Decision 2014 ABAER 012 Condition No. 2. This Plan addresses the right-of-way monitoring and mitigation measures that Grand Rapids will implement during the construction phase of the Project and should be read in conjunction with the Green and White Area Environmental Protection Plans (EPP). This Plan also provides a list of areas at high risk of wind and water erosion, waterbody sedimentation, surface water ponding, weed establishment and watercourse crossing locations for the pipeline construction right-of-way within the White and Green Areas of Alberta.

Construction of the Project commenced October 2014 and is scheduled to be completed spring 2018, and will involve construction of the following components:

- one approximately 460.5 km pipeline, with an O.D. of 508 mm, from the Grand Rapids MacKay Terminal to terminals in the Edmonton area (the 508 mm pipeline) to:
  - initially transport approximately 90,000 barrels per day (bbl/d) of blended crude bitumen from the Grand Rapids MacKay Terminal at SE 34-89-14 W4M, approximately 30 km northwest of Fort McMurray, to the Edmonton area at 8-5-53-23 W4M; and
  - subsequently, transport approximately 330,000 bbl/d of diluents from the Edmonton area or Heartland areas to delivery points in the west Athabasca oil sands area;
- one approximately 460.5 km pipeline, with an O.D. of 914 mm, from the Grand Rapids MacKay Terminal to terminals in the Edmonton area to transport approximately 900,000 bbl/d of blended crude bitumen from the west of Athabasca oil sands area to the Edmonton and Heartland areas (the 914 mm pipeline);
- one 4.1 km, 610 mm O.D. pipeline to transport approximately 400,000 bbl/d of blended crude bitumen from the Grand Rapids MacKay Receipt Station to the Grand Rapids MacKay Terminal (the 610 mm lateral pipeline);
- one 4.1 km, 406 mm O.D. pipeline to transport approximately 200,000 bbl/d of diluents from the Grand Rapids MacKay Terminal to the Grand Rapids MacKay Receipt Station (the 406 mm lateral pipeline); and
- seven associated pipeline installations, which include two tank farms and five pump stations located at the following five pipeline installation sites:
  - Grand Rapids MacKay Terminal, located at NW 34-89-14 W4M, which includes a tank farm and pump station;
  - Grand Rapids Thornbury Terminal, located at NE 29-79-14 W4M, which includes a pump station;
  - Grand Rapids Wandering River Pump Station, located at NW 19-73-16 W4M;
  - Grand Rapids Grassland Pump Station, located at NE 15-67-18 W4M; and
  - Grand Rapids Heartland Terminal, located at SE 28-55-21 W4M, which includes a tank farm and pump station.

## **2.0 GREEN AREA**

Locations along the pipeline route that are at high risk of wind erosion, water erosion, waterbody sedimentation and surface water ponding in the Green Area were identified during environmental surveys for the Project and by Environmental Inspectors in the field. High risk areas identified during environmental surveys are listed in the Green Area EPP and on the Environmental Alignment Sheets for the Project. Associated mitigation for these high risk areas is included in the Green Area EPP and on the Environmental Alignment Sheets and will be implemented under the supervision of an Environmental Inspector, as appropriate. Additional areas of wind erosion, water erosion, waterbody sedimentation, surface water ponding or weed establishment will be identified in a timely manner and mitigated appropriately through monitoring of the pipeline right-of-way during construction.

### **2.1 Areas at High Risk of Wind Erosion**

Areas identified during the environmental field surveys as having sandy soils or slopes are considered areas at high risk of wind erosion and will be monitored during construction of the pipeline right-of-way.

#### **2.1.1 Mitigation for Areas at High Risk of Wind Erosion**

If wind erosion is observed during construction of the pipeline right-of-way the following techniques will be implemented:

- soil windrows will be seeded based on the construction timeline and reclamation schedule (*i.e.*, seeding will be completed during suitable conditions for seed germination);
- soil will be tackified, if appropriate;
- topsoil and subsoil windrows will be sprayed with water to reduce wind erosion potential (*i.e.*, water truck, pump and hose);
- soil will be stabilized with an alternative method (*i.e.*, hoe with an attachment to pack soil windrows); and
- measures outlined in the Soil Erosion Contingency Plan of the Green Area EPP will be implemented.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control soil erosion and other soil handling problems encountered, including the required equipment and materials.

### **2.2 Areas at High Risk of Water Erosion**

Areas identified during the environmental field surveys as having sandy soils or slopes are considered areas at high risk to water erosion, as well as watercourse crossings, fish-bearing drainages and nonfish-bearing drainages. Appendix B of this Plan provides a list of the watercourse crossings, fish-bearing drainages and nonfish-bearing drainages along the pipeline route in the Green Area of Alberta.

#### **2.2.1 Mitigation for Areas at High Risk of Water Erosion**

If water erosion is observed during construction of the pipeline right-of-way the following techniques will be implemented:

- water will be redirected from the source of erosion;
- erosion control measures will be re-established (*i.e.*, silt fence, berms, wattles, sten logs, erosion control matting, etc.);
- areas of water erosion will be backfilled and reclaimed (*e.g.*, seeded) as necessary; and

- measures outlined in the Soil Erosion Contingency Plan of the Green Area EPP will be implemented.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control soil erosion and other soil handling problems encountered, including the required equipment and materials.

## **2.3 Areas at High Risk of Waterbody Sedimentation**

Areas identified during the environmental field surveys with the potential for waterbody sedimentation include watercourse crossings, fish-bearing drainages, nonfish-bearing drainages and wetland crossings, as well as where the pipeline route lies in close vicinity to nearby waterbodies. Table 1 below lists the locations of waterbodies that are within 100 m of the pipeline right-of-way. Appendix B of this Plan provides lists of the watercourse, fish-bearing drainage and nonfish-bearing drainage crossings along the pipeline route in the Green Area of Alberta. Appendix C of this Plan provides a list of the wetland crossings along the pipeline route in the Green Area of Alberta.

**TABLE 1**  
**WATERBODY LOCATIONS WITHIN 100 M OF THE**  
**GRAND RAPIDS PIPELINE RIGHT-OF-WAY – GREEN AREA<sup>1</sup>**

7-11-90-14 W4M	5-2-90-14 W4M	12-17-89-14 W4M	2-18-89-14 W4M	8-12-89-15 W4M	16-17-88-15 W4M
15-17-88-15 W4M	11-17-88-15 W4M	13-29-87-16 W4M	12-2-84-18 W4M	12-7-81-15 W4M	9-23-80-15 W4M
2-24-80-15 W4M	6-6-79-14 W4M	8-7-76-15 W4M	1-7-76-15 W4M		

Note: 1 Determined from a desktop and aerial photo review.

### **2.3.1 Mitigation for Areas at High Risk of Waterbody Sedimentation**

If waterbody sedimentation is observed during construction of the pipeline right-of-way the following techniques will be implemented:

- water will be redirected from the source of erosion;
- erosion control measures will be re-established (*i.e.*, silt fence, berms, wattles, sten logs, erosion control matting, etc.);
- areas of erosion will be backfilled and reclaimed (*e.g.*, seeded) as necessary; and
- measures outlined in the Soil Erosion Contingency Plan of the Green Area EPP will be implemented.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control waterbody sedimentation, including the required equipment and materials.

## **2.4 Areas at High Risk of Surface Water Ponding**

Areas identified during the environmental field surveys with the potential for surface water ponding along the pipeline route include wetlands. A list of wetlands crossed by the pipeline route in the Green Area of Alberta is provided in Appendix C of this Plan.

### **2.4.1 Mitigation for Areas at High Risk of Surface Water Ponding**

If surface water ponding is observed during construction of the pipeline right-of-way the following techniques will be implemented:

- gaps will be placed in the roach and soil windrows at locations determined during monitoring to allow for right-of-way drainage. If a blocked drainage is observed during monitoring, equipment or manual techniques will be utilized to allow for proper right-of-way drainage; and
- areas of ponding water will be pumped on or off the right-of-way into a well vegetated area, if required.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control surface water ponding, including the required equipment and materials.

## **2.5 Areas at High Risk of Weed Establishment**

Areas susceptible to weed establishment in the Green Area of Alberta along the pipeline right-of-way include road and trail crossings, all-terrain vehicle and utility-terrain vehicle staging areas, wildlife corridor crossings and disturbed lands (e.g., cutblocks, industrial sites, pre-existing right-of-ways).

### **2.5.1 Mitigation for Areas at High Risk of Weed Establishment**

If weed establishment is observed during construction of the pipeline right-of-way the following techniques will be implemented:

- mowing, tilling or alternative methods, including seeding, spraying or hand-picking, will be implemented to mitigate weed establishment on the pipeline right-of-way and soil windrows.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control weed establishment, including the required equipment and materials.

### 3.0 WHITE AREA

Locations along the pipeline route that are at high risk of wind erosion, water erosion, waterbody sedimentation, surface water ponding and weed establishment in the White Area were identified during environmental surveys for the Project and by Environmental Inspectors in the field. High risk areas identified during environmental surveys are listed in the White Area EPP and on the Environmental Alignment Sheets for the Project. Associated mitigation for these high risk areas is included in the White Area EPP and on the Environmental Alignment Sheets and will be implemented under the supervision of an Environmental Inspector, as appropriate. Additional areas of wind erosion, water erosion, waterbody sedimentation, surface water ponding or weed establishment will be identified in a timely manner and mitigated appropriately through monitoring of the pipeline right-of-way during construction.

#### 3.1 Areas at High Risk of Wind Erosion

Detailed soil and topographic mapping on the White Area Environmental Alignment Sheets indicates which soil units are highly susceptible to wind erosion, where these soil units are found along the pipeline route and associated mitigation. Table 2 below describes the soil units which are highly susceptible to wind erosion along the pipeline route. These soil units consist of approximately 14 % of the pipeline route.

**TABLE 2**

#### **HIGH RISK WIND EROSION SOIL UNITS ALONG THE GRAND RAPIDS PIPELINE PROJECT**

Soil Symbol	Soil Name	Wind Erosion Hazard <sup>1</sup>
ELP	Elk Point	High
GBL	Gabriel	High
glGBL	Gleyed Gabriel	High
HLW	Helliwell	High
glHLW	Gleyed Helliwell	High
MDR	Mundare	High
shMDR	Shallow Mundare	High
MWI	Missawawi	High
NIT	Nicot	High
PHS	Peace Hills	High
glPHS	Gleyed Peace Hills	High
RCS	Rochester	High
ptRCS	Peaty Rochester	High
UKT	Ukalta	High
glUKT	Gleyed Ukalta	High

Source: Mentiga Pedology Consultants Ltd. 2013

Note: 1 All soils with LS, S or SL surface textures and containing at least 3% organic matter.

##### 3.1.1 Mitigation for Areas at High Risk of Wind Erosion

If wind erosion is observed during construction of the pipeline right-of-way the following techniques will be implemented:

- soil windrows will be seeded based on the construction timeline and reclamation schedule and in consultation with landowners (*i.e.*, seeding will be completed during suitable conditions for seed germination);
- soil will be tackified, if appropriate;
- topsoil and subsoil windrows will be sprayed with water to reduce wind erosion potential (*i.e.*, water truck, pump and hose);
- soil will be stabilized with an alternative method (*i.e.*, a hoe with an attachment to pack soil windrows, straw crimping, etc.);



- cover crops will be seeded to the approach slopes of all water crossings where there is a risk of wind erosion, in consultation with landowners, for immediate vegetation establishment to prevent erosion, as outlined in the White Area EPP; and
- measures outlined in the Soil Erosion Contingency Plan of the White Area EPP will be implemented.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control soil erosion and other soil handling problems encountered, including the required equipment and materials.

### 3.2 Areas at High Risk of Water Erosion

Detailed soil and topographic mapping on the White Area Environmental Alignment Sheets indicates which soil units are highly susceptible to water erosion, where these soil units are found along the pipeline route and associated mitigation, as well watercourse crossings, fish-bearing drainages and nonfish-bearing drainages. Table 3 below describes the soil unit that is highly susceptible to water erosion along the pipeline route, which consist of approximately 0.7% of the pipeline route. Appendix D of this Plan provides a list of the watercourse crossings, fish-bearing drainages and nonfish-bearing drainages along the pipeline route in the White Area of Alberta.

**TABLE 3**

#### **HIGH RISK WATER EROSION SOIL UNITS ALONG THE GRAND RAPIDS PIPELINE PROJECT**

Soil Symbol	Soil Name	Water Erosion Hazard Topographic Classes 5,6,7
RB	Rough Broken	High <sup>1</sup>

Source: Mentiga Pedology Consultants Ltd. 2013

Note: 1 All soils with SiL and SiCL surface textures occurring on greater than 9% slopes. All soils with L and SL surface textures occurring on greater than 15% slopes. Extensive gullyng can be expected when the protective vegetation is removed.

#### 3.2.1 Mitigation for Areas at High Risk of Water Erosion

If water erosion is observed during construction of the pipeline right-of-way the following techniques will be implemented:

- water will be redirected from the source of erosion;
- erosion control measures will be re-established (*i.e.*, silt fence, berms, wattles, sten logs, erosion control matting, etc.);
- areas of water erosion will be backfilled and reclaimed (*e.g.*, seeded) as necessary; and
- measures outlined in the Soil Erosion Contingency Plan of the White Area EPP will be implemented.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control soil erosion and other soil handling problems encountered, including the required equipment and materials.

### 3.3 Areas at High Risk of Waterbody Sedimentation

Areas identified during the environmental field surveys with the potential for waterbody sedimentation include watercourse crossings, fish-bearing drainages, nonfish-bearing drainages and wetland crossings, as well as where the pipeline route lies in close vicinity to nearby waterbodies. Table 4 below lists the locations of waterbodies that are within 100 m of the pipeline right-of-way. Appendix D of this Plan provides

lists of the watercourse, fish-bearing drainage and nonfish-bearing drainage crossings along the pipeline route in the White Area of Alberta. Appendix E of this Plan provides a list of the wetland crossings along the pipeline route in the White Area of Alberta.

**TABLE 4**  
**WATERBODY LOCATIONS WITHIN 100 M OF THE**  
**GRAND RAPIDS PIPELINE RIGHT-OF-WAY – WHITE AREA<sup>1</sup>**

14-30-67-17 W4M	12-10-67-18 W4M	11-2-66-19 W4M	15-21-65-19 W4M	10-21-65-19 W4M	3-21-65-19W4M
1-8-65-19 W4M	16-5-65-19 W4M	9-5-65-19 W4M	7-5-65-19 W4M	3-5-65-19 W4M	14-32-64-19 W4M
12-32-64-19 W4M	11-30-64-19 W4M	3-19-64-19 W4M	11-18-64-19W4M	6-18-64-19 W4M	3-18-64-19 W4M
8-12-64-20 W4M	1-12-64-20 W4M	7-1-64-20 W4M	2-10-62-20 W4M	15-28-61-20 W4M	2-4-60-20 W4M
15-17-58-20 W4M	10-17-58-20 W4M	4-12-57-20 W4M	8-27-56-20 W4M	1-27-56-20 W4M	15-22-56-20 W4M
10-22-56-20 W4M	7-22-56-20 W4M	2-22-56-20 W4M	13-15-56-20 W4M	16-16-56-20 W4M	10-16-56-20 W4M
4-8-56-20 W4M	16-6-56-20 W4M	9-6-56-20 W4M	7-6-56-20 W4M	2-6-56-20 W4M	2-35-55-21 W4M
11-26-55-21 W4M	12-26-55-21 W4M	5-26-55-21 W4M	8-27-55-21 W4M	7-27-55-21 W4M	3-27-55-21 W4M
1-28-55-21 W4M	9-21-55-21 W4M	8-21-55-21 W4M	13-15-55-21 W4M	13-10-55-21 W4M	8-7-55-21 W4M
5-7-55-21 W4M	7-34-54-22 W4M	3-24-54-22 W4M	6-17-54-22 W4M	15-31-53-22 W4M	3-31-53-22 W4M
2-35-53-23 W4M	15-26-53-23 W4M	10-26-53-23 W4M	9-21-53-23 W4M	6-9-53-23 W4M	

Note: 1 Determined from a desktop and aerial photo review.

### **3.3.1 Mitigation for Areas at High Risk of Waterbody Sedimentation**

If waterbody sedimentation is observed during construction of the pipeline right-of-way, the following techniques will be implemented:

- water will be redirected from the source of erosion;
- erosion control measures will be re-established (*i.e.*, silt fence, berms, wattles, sten logs, erosion control matting, etc.);
- areas of erosion will be backfilled and reclaimed (*e.g.*, seeded) as necessary; and
- measures outlined in the Soil Erosion Contingency Plan of the White Area EPP will be implemented.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control waterbody sedimentation, including the required equipment and materials.

## **3.4 Areas at High Risk of Surface Water Ponding**

Areas identified during the environmental field surveys with the potential for surface water ponding along the pipeline route include wetlands. A list of wetlands crossed by the pipeline route in the White Area of Alberta is provided in Appendix E of this Plan.

### **3.4.1 Mitigation for Areas at High Risk of Surface Water Ponding**

If surface water ponding is observed during construction of the pipeline right-of-way the following techniques will be implemented:

- gaps will be placed in the roach and soil windrows at locations determined during monitoring to allow for right-of-way drainage. If a blocked drainage is observed during monitoring, equipment or manual techniques will be utilized to allow for proper right-of-way drainage; and
- areas of ponding water will be pumped on or off the right-of-way into a well vegetated area, if required.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control surface water ponding, including the required equipment and materials.

### **3.5 Areas at High Risk of Weed Establishment**

Appendix F of this Plan outlines the areas of high risk of weed establishment and correspond with recommended weed cleaning stations determined during the 2013 and 2014 weed surveys, and locations determined in consultation with landowners and counties.

#### **3.5.1 Mitigation for Areas at High Risk of Weed Establishment**

If weed establishment is observed during construction of the pipeline right-of-way, the following techniques will be implemented:

- mowing, tilling or alternative methods, including seeding, spraying or hand-picking, will be implemented to mitigate weed establishment on the pipeline right-of-way and soil windrows; and
- cover crops will be seeded to assist in weed control where warranted, or where requested by the landowner, as outlined in the White Area EPP.

During the construction phase, the Environmental Inspector(s) in consultation with the Company's Environmental Advisor (see Appendix A) will determine appropriate procedures to be implemented to control weed establishment, including the required equipment and materials.

## **4.0 RIGHT-OF-WAY MONITORING METHODS AND FREQUENCY AND RESPONSE**

Several methods will be used to effectively monitor the pipeline right-of-way during construction. Additional pipeline right-of-way monitoring may be required due to weather conditions (e.g., heavy rainfall, draught conditions, high winds, heavy snowfall or unseasonal winter warm periods) or if additional areas are identified by the Environmental Inspectors, which will be reported to Grand Rapids (i.e., Environmental Inspectors' daily reports).

### **4.1 Aerial Reconnaissance**

Aerial reconnaissance of the right-of-way will be performed up to three times per year, beginning spring 2015. Aerial patrols will visually inspect the pipeline right-of-way for: evidence of pipeline damage; erosion and wash-out areas; areas of sparse vegetation; damage to permanent erosion and sediment control structures; exposed pipe; and other potential problems that may affect the integrity and safe operation of the pipeline.

### **4.2 Ground-based Inspections**

Ground-based monitoring of the pipeline right-of-way will be performed daily during active pipeline right-of-way construction and monthly during inactive pipeline right-of-way construction. Ground-based monitoring will be conducted by the Environmental Inspector(s), where accessible, and commenced winter 2014. Vegetation control (including weed control), if warranted, will be conducted along the pipeline construction right-of-way in accordance with requirements from the appropriate regulatory authority.

### **4.3 Landowner Observations**

Landowner observations of the pipeline right-of-way will be addressed as they are reported to Grand Rapids and landowner consultation is ongoing.

### **4.4 Logistics and Timing**

If an issue is observed or reported a site inspection and assessment will be conducted immediately with the Environmental Inspector(s) and representatives from Grand Rapids and Contractor Management. After completion of the site inspection and assessment, on-site personnel will develop a response plan, including appropriate mitigation measures, based on the severity of the issue, weather conditions, access requirements and resources available. Upon approval of the response plan from Grand Rapids and Contractor Management, equipment and personnel will be mobilized to the site and the response plan will be implemented. During implementation of the response plan, daily reports will be sent to Grand Rapids to communicate with all applicable regulators.

If an issue is identified during monitoring of the pipeline right-of-way, equipment and personnel will be mobilized to the pipeline right-of-way if locations are accessible. If locations are inaccessible or remote, helicopters or all-terrain vehicles will be used to mobilize equipment and personnel to the pipeline right-of-way. Materials and equipment to be used for effective right-of-way response will be located at Sherwood Park, Redwater, Boyle, Lac La Biche and Wandering River.

## **5.0 DOCUMENTATION**

All monitoring and mitigation measures completed will be documented in a written report which will include the details of work completed, photographs and follow up requirements. The written reports will be completed by the Environmental Inspector(s) and filed with Grand Rapids.

## **6.0 REFERENCES**

### **6.1 Literature Cited**

CH2M HILL Energy Canada, Ltd. 2014a. Results of the Supplemental Aquatics Surveys along the Grand Rapids Pipeline Ltd. Grand Rapids Pipeline Project. Prepared for Grand Rapids Pipeline GP Ltd. Calgary, AB.

CH2M HILL Energy Canada, Ltd. 2014b. Supplemental Weed Survey for the Proposed Grand Rapids Pipeline Ltd. Grand Rapids Pipeline Project. Prepared for Grand Rapids Pipeline GP Ltd. Calgary, AB.

Mentiga Pedology Consultants Ltd. 2013. Soil Survey and Reclamation Suitability Evaluation for the Grand Rapids Pipeline Project. Prepared for TERA Environmental Consultants on behalf of Grand Rapids. Calgary, AB.

TERA Environmental Consultants. 2014. Wetlands Evaluation for the Proposed Grand Rapids Pipeline Ltd. Grand Rapids Pipeline Project. Prepared for Grand Rapids Pipeline GP Ltd. Calgary, AB.

## **APPENDIX A**

### **PROJECT CONTACT LIST**

#### **Project Contacts**

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## APPENDIX B

### WATERCOURSE, FISH-BEARING DRAINAGE AND NONFISH-BEARING DRAINAGE CROSSINGS – GREEN AREA

TABLE B-1

#### WATERCOURSE AND FISH-BEARING DRAINAGES CROSSINGS ALONG THE GRAND RAPIDS PIPELINE PROJECT – GREEN AREA

Site No.	Name	Legal Location (W4M), UTM Coordinates (NAD 83, Zone 12), Latitude/Longitude (DD-MM-SS)	Watercourse Class and Restricted Activity Period	Open Water Mean Channel Morphology (m)
FD1	Fish-bearing drainage	SE 28-89-14 428722E, 6289943N 56° 44' 52.8" N/112° 9' 55.8" W	N/A	Bankfull Width: N/A Wetted Width: 8.8 Water Depth: 1.0
WC1	Buffalo Creek	NE 18-87-17 395673E, 6268713N 56° 33' 4.1" N/112° 41' 49.5" W	Mapped Class C April 16 to July 15	Bankfull Width: 11.8 Wetted Width: 9.4 Water Depth: 0.4
WC2	Unnamed tributary to the Athabasca River	SW 2-87-18 391554E, 6264516N 56° 30' 45.1" N/112° 45' 44.3" W	Mapped Class C April 16 to July 15	Bankfull Width: 3.9 Wetted Width: 12.0 Water Depth: 1.5
WC3	Livock River	SW 18-86-18 386467E, 6257779N 56° 27' 2.9" N/112° 50' 31.2" W	Mapped Class C April 16 to July 15	Bankfull Width: 11.0 Wetted Width: 9.0 Water Depth: 0.5
WC4	Unnamed tributary to the Livock River	NE 6-86-18 386916E, 6255355N 56° 25' 45.0" N/112° 50' 1.2" W	Unmapped Class C None	Bankfull Width: 1.8 Wetted Width: 15.6 Water Depth: 0.5
WC5	Unnamed tributary to the Athabasca River	NW 19-85-18 386188E, 6250962N 56° 23' 22.4" N/112° 50' 36.8" W	Mapped Class C April 16 to July 15	Bankfull Width: 3.6 Wetted Width: 3.2 Water Depth: 0.4
WC6	Unnamed tributary to Loon Creek	SE 3-84-18 391816E, 6236325N 56° 15' 33.9" N/112° 44' 47.2" W	Unmapped Class C April 16 to July 15	Bankfull Width: 11.0 Wetted Width: 11.2 Water Depth: 0.6
WC7	Loon Creek	SE 25-83-28 394282E, 6232595N 56° 13' 35.4" N/112° 42' 18.6" W	Mapped Class C April 16 to July 15	Bankfull Width: 8.7 Wetted Width: 9.0 Water Depth: 0.9
FD2	Fish-bearing drainage	SE 18-83-17 395342E, 6229097N 56° 11' 43.1" N/112° 41' 12.1" W	N/A	Bankfull Width: N/A Wetted Width: 200 Water Depth: 0.5
WC8	Athabasca River	SW 27-82-17 401992E, 6222003N 56° 7' 58.9" N/112° 34' 37.0" W	Mapped Class C September 16 to July 15	Bankfull Width: 301.9 Wetted Width: 276.3 Water Depth: 2.0
WC9	Boivin Creek	SE 11-82-17 403359E, 6216983N 56° 5' 17.5" N/112° 33' 11.3" W	Mapped Class C April 16 to July 15	Bankfull Width: 12.0 Wetted Width: 9.0 Water Depth: 1.1
WC10	House River	SE 29-81-16 408268E, 6211945N 56° 2' 38.1" N/112° 28' 21.2" W	Mapped Class C September 16 to July 15	Bankfull Width: 34.7 Wetted Width: 35.6 Water Depth: 1.0
FD3	Fish-bearing drainage	SW 23-81-16 412934E, 6210722N 56° 2' 1.7" N/112° 23' 50.2" W	N/A	Bankfull Width: N/A Wetted Width: 121.4 Water Depth: 0.7
FD4	Fish-bearing drainage	SE 23-81-16 413374E, 6210322N 56° 1' 49.0" N/112° 23' 24.3" W	N/A	Bankfull Width: N/A Wetted Width: 23.4 Water Depth: 0.6
WC11	Dropoff Creek	SE 4-81-15 W4M 419120E, 6205175N 55° 59' 6.2" N/112° 17' 46.9" W	Mapped Class C April 16 to July 15	Bankfull Width: 7.4 Wetted Width: 8.7 Water Depth: 1.2
WC12	Unnamed tributary to Dropoff Creek	SE 13-80-15 425104E, 6199304N 55° 55' 59.8" N/112° 11' 55.8" W	Unmapped Class C April 16 to July 15	Bankfull Width: 0.8 Wetted Width: 18.0 Water Depth: 0.4
WC13	Unnamed tributary to Dropoff Creek	NW 5-80-14 427297E, 6196078N 55° 54' 16.7" N/112° 9' 46.3" W	Unmapped Class C April 16 to July 15	Bankfull Width: 1.9 Wetted Width: 1.5 Water Depth: 0.4



**TABLE B-1 Cont'd**

Site No.	Name	Legal Location (W4M), UTM Coordinates (NAD 83, Zone 12), Latitude/Longitude (DD-MM-SS)	Watercourse Class and Restricted Activity Period	Open Water Mean Channel Morphology (m)
WC14	Unnamed tributary to Dropoff Creek	SW 29-79-14 427442E, 6192177N 55° 52' 10.6" N/112° 9' 34.3" W	Unmapped Class C April 16 to July 15	Bankfull Width: 0.7 Wetted Width: 0.8 Water Depth: 0.2
WC15	Unnamed tributary to Dropoff Creek	NE 19-79-14 426574E, 6191211N 55° 51' 39.0" N/112° 10' 6.0" W	Unmapped Class C April 16 to July 15	Bankfull Width: 0.7 Wetted Width: 1.7 Water Depth: 0.1
WC16	Unnamed tributary to Dropoff Creek	NE 18-79-14 426115E, 6190351N 55° 51' 10.9" N/112° 10' 48.8" W	Unmapped Class C April 16 to July 15	Bankfull Width: 0.6 Wetted Width: 0.9 Water Depth: 0.2
FD5	Fish-bearing drainage	SW 18-79-14 425682E, 6189008N 55° 50' 27.2" N/112° 11' 12.4" W	N/A	Bankfull Width: N/A Wetted Width: 80.6 Water Depth: 0.8
WC17	House River	SW 10-78-15 421805E, 6178337N 55° 44' 39.9" N/112° 14' 44.2" W	Mapped Class C September 16 to July 15	Bankfull Width: 24.4 Wetted Width: 25.2 Water Depth: 0.8
WC18	Unnamed tributary to the House River	SE 32-77-15 419046E, 6174378N 55° 42' 30.2" N/112° 17' 18.1" W	Unmapped Class C None	Bankfull Width: 1.1 Wetted Width: 4.5 Water Depth: 0.4
WC19	Unnamed tributary to the House River	NE 12-76-15 418474E, 6165939N 55° 37' 57.0" N/112° 17' 41.9" W	Mapped Class C April 16 to July 15	Bankfull Width: 5.6 Wetted Width: 5.6 Water Depth: 1.1
WC20	Unnamed tributary to the House River	NW 20-76-15 418021E, 6162313N 55° 35' 59.4" N/112° 18' 3.9" W	Mapped Class C April 16 to July 15	Bankfull Width: 3.2 Wetted Width: 17.4 Water Depth: 0.7
WC21	Unnamed tributary to the Wandering River	NW 2-75-16 413109E, 6148078N 55° 28' 16.0" N/112° 22' 28.3" W	Mapped Class C April 16 to July 15	Bankfull Width: 2.9 Wetted Width: 2.8 Water Depth: 0.4
WC22	Unnamed tributary to the Wandering River	SW 21-74-16 410978E, 6142711N 55° 25' 21.1" N/112° 24' 23.5" W	Mapped Class C April 16 to July 15	Bankfull Width: 10.9 Wetted Width: 20.1 Water Depth: 0.9
WC23	Unnamed tributary to the Wandering River	NW 5-74-16 408895E, 6138312N 55° 22' 57.4" N/112° 26' 16.7" W	Mapped Class C April 16 to July 15	Bankfull Width: 9.4 Wetted Width: 8.6 Water Depth: 0.5
FD6	Fish-bearing drainage	NE 31-73-16 407965E, 6137279N 55° 22' 23.4" N/112° 27' 8.3" W	N/A	Bankfull Width: N/A Wetted Width: 200.0 Water Depth: 0.6
WC24	Unnamed tributary to the Wandering River	NE 31-73-16 407823E, 6137192N 55° 22' 20.5" N/112° 27' 16.3" W	Unmapped Class C April 16 to July 15	Bankfull Width: 2.2 Wetted Width: 3.1 Water Depth: 0.7
WC25	Wandering River	NW 18-73-16 407244E, 6132030N 55° 19' 33.2" N/112° 27' 43.0" W	Mapped Class C April 16 to July 15	Bankfull Width: 13.6 Wetted Width: 13.6 Water Depth: 1.3
WC26	Unnamed tributary to the Wandering River	NE 12-73-17 406185E, 6130347N 55° 18' 38.0" N/112° 28' 41.1" W	Mapped Class C April 16 to July 15	Bankfull Width: 1.6 Wetted Width: 1.2 Water Depth: 0.2

Source: CH2M HILL Energy Canada, Ltd. (CH2M HILL) 2014a

Notes: N/A Not Applicable.

**TABLE B-2**

**NONFISH-BEARING DRAINAGE CROSSINGS  
ALONG THE GRAND RAPIDS PIPELINE PROJECT – GREEN AREA**

Name	Legal Location (W4M)	UTM Coordinates (NAD 83, Zone 12)
Drainage	SE 28-89-14	428553E 6289739N
Drainage	SE 28-88-15	419112E 6279929N

**TABLE B-2 Cont'd**

Name	Legal Location (W4M)	UTM Coordinates (NAD 83, Zone 12)
Drainage	NE 7-88-15	415578E 6276344N
Drainage	NW 29-87-16	406380E 6271582N
Drainage	NW 29-87-16	406131E 6271479N
Drainage	SW 17-85-18	388062E 6248646N
Drainage	SW 4-85-18	389573E 6245532N
Drainage	SE 2-83-18	393039E 6234911N
Drainage	NW 26-82-17	403158E 6222483N
Drainage	NW 26-82-17	403131E 6222659N
Drainage	SW 26-82-17	403037E 6221944N
Drainage	NW 14-82-17	403476E 6219462N
Drainage	SE 1-82-17	405210E 6215341N
Drainage	SW 29-81-16	407603E 6212217N
Drainage	SW 29-79-14	427627E 6192337N
Drainage	SW 6-79-14	425458E 6185885N
Drainage	SW 36-78-15	425224E 6184266N
Drainage	SW 25-78-15	424688E 6182819N
Drainage	NW 11-78-15	423059E 6179306N
Drainage	SW 10-78-15	421294E 6177998N
Drainage	NW 5-77-15	418273E 6167164N
Drainage	NE 29-76-15	418396E 6164408N
Drainage	NE 31-75-15	416768E 6156369N
Drainage	SW 31-75-15	416339E 6155541N
Drainage	NW 30-75-15	416069E 6154846N
Drainage	NW 31-73-16	407557E 6136643N

Source: CH2M HILL 2014a

## APPENDIX C

### WETLAND CROSSINGS ALONG THE GRAND RAPIDS PIPELINE PROJECT – GREEN AREA

Start UTM (Zone 12) <sup>1</sup>		End UTM (Zone 12) <sup>1</sup>		Approximate Length of Wetland Crossed (km)	Legal Location (W4M) <sup>1</sup>	Wetland Group	Wetland Classification – Subclass and Class
Easting	Northing	Easting	Northing				
430123	6291437	430103	6291415	0.03	SE 34-89-14	Mossy-peat	Treed Fen
430024	6291330	429720	6291003	0.45	SE and SW 34-89-14	Mossy-peat	Treed Fen
429643	6290920	429558	6290829	0.12	SW 34-89-14	Mossy-peat	Shrubby Fen
429336	6290590	429150	6290389	0.27	NW 27-89-14	Mossy-peat	Shrubby Fen
429009	6290238	428918	6290140	0.13	NE 28-89-14	Mossy-peat	Treed Fen
428793	6290005	428709	6289915	0.12	NE and SE 28-89-14	Mossy-peat	Non-woody Fen
428577	6289773	428472	6289660	0.15	SE 28-89-14	Mossy-peat	Non-woody Fen
428477	6289665	428087	6289246	0.57	SE and SW 28-89-14	Mossy-peat	Treed Fen
427975	6289125	427751	6288883	0.33	NW 21-89-14	Mossy-peat	Treed Fen
426616	6287661	426437	6287470	0.26	SW 20-89-14 to NW 17-89-14	Mossy-peat	Treed Fen
426187	6287200	425937	6286931	0.37	NW 17-89-14	Mossy-peat	Treed Fen
425940	6286934	425788	6286771	0.22	NW 17-89-14 to NE 18-89-14	Mossy-peat	Shrubby Fen
425793	6286776	425549	6286514	0.36	NE and SE 18-89-14	Mossy-peat	Treed Fen
425183	6286120	423989	6284834	1.76	SE 18-89-14 to SE 12-89-15	Mossy-peat	Treed Fen
423684	6284506	422925	6283702	1.11	SE 12-89-15 to NW 1-89-15	Mossy-peat	Treed Fen
422684	6283463	422351	6283132	0.47	SW 1-89-15 to SE 2-89-15	Mossy-peat	Treed Fen
421036	6281825	420649	6281440	0.55	SW 35-88-15 to SE 34-88-15	Mossy-peat	Treed Fen
419195	6279995	419097	6279898	0.14	SE 28-88-15	Mossy-peat	Shrubby Fen
417459	6278206	417416	6278163	0.06	SE 20-88-15	Mossy-peat	Treed Fen
416220	6276970	416119	6276869	0.14	SW 17-88-15	Mossy-peat	Treed Bog
415655	6276406	415421	6276173	0.33	SE 18-88-15 to NE 7-88-15	Mossy-peat	Non-woody Fen
415349	6276101	415217	6275969	0.19	NE 7-88-15	Mossy-peat	Treed Fen
415073	6275826	414834	6275587	0.34	NE and SW 7-88-1	Mossy-peat	Treed Fen
414533	6275335	414303	6275226	0.25	SW 7-88-15	Mossy-peat	Treed Fen
413976	6275070	413922	6275045	0.06	SE 12-88-16	Mossy-peat	Treed Fen
413698	6274938	413596	6274890	0.11	SE 12-88-16	Mossy-peat	Treed Fen
413482	6274836	412474	6274357	1.12	SE 12-88-16 to NE 2-88-16	Mossy-peat	Shrubby Fen
412397	6274320	411759	6274017	0.71	NE and SE 2-88-16	Mossy-peat	Shrubby Fen
411586	6273935	411420	6273856	0.18	SW 2-88-16	Mossy-peat	Shrubby Fen
411296	6273798	411157	6273732	0.15	SW 2-88-16	Mossy-peat	Shrubby Fen
411031	6273672	410739	6273533	0.32	SW 2-88-16 to SE 3-88-16	Mossy-peat	Treed Fen
410562	6273449	410370	6273358	0.21	SE 3-88-16	Mossy-peat	Shrubby Fen
410288	6273319	410108	6273233	0.09	SE 3-88-16 to NE 34-87-16	Mossy-peat	Shrubby Fen
409943	6273155	409355	6272875	0.65	NW 34-87-16	Mossy-peat	Shrubby Fen
409211	6272807	407674	6272077	1.70	NE and SW 33-87-16	Mossy-peat	Treed Fen
407696	6272088	407406	6271950	0.33	SW 33-87-16 to SE 32-87-16	Mossy-peat	Shrubby Fen
407424	6271958	407225	6271864	0.22	SE 32-87-16	Mossy-peat	Treed Fen
407239	6271870	407223	6271863	0.02	SE 32-87-16	Mossy-peat	Shrubby Fen
406681	6271667	404818	6270720	2.14	NW 29-87-16 to SW 30-87-16	Mossy-peat	Treed Fen
404546	6270590	404297	6270472	0.27	SW 30-87-16 to SE 25-87-17	Mossy-peat	Treed Fen

Start UTM (Zone 12) <sup>1</sup>		End UTM (Zone 12) <sup>1</sup>		Approximate Length of Wetland Crossed (km)	Legal Location (W4M) <sup>1</sup>	Wetland Group	Wetland Classification – Subclass and Class
Easting	Northing	Easting	Northing				
403284	6269991	402787	6269754	0.55	NW 24-87-17	Mossy-peat	Treed Fen
402675	6269701	402271	6269682	0.40	NW 24-87-17 to NE 23-87-17	Mossy-peat	Treed Fen
402278	6269682	401783	6269695	0.50	NE and NW 23-87-17	Mossy-peat	Shrubby Fen
401841	6269699	400340	6269685	1.51	NW 23-87-17 to NE 22-87-17	Mossy-peat	Treed Fen
400128	6269690	399838	6269697	0.29	NW 22-87-17	Mossy-peat	Shrubby Fen
399472	6269706	398992	6269718	0.48	NW 22-87-17 to NE 21-87-17	Mossy-peat	Shrubby Fen
398563	6269728	397871	6269702	0.70	NW 21-87-17	Mossy-peat	Treed Fen
397781	6269670	397635	6269617	0.02	NW 21-87-17 to NE 20-87-17	Mossy-peat	Non-woody Fen
397648	6269622	395921	6268996	1.84	NE 20-87-17 to SE 19-87-17	Mossy-peat	Treed Fen
395703	6268731	395640	6268650	0.10	NE 18-87-17	Mossy-peat	Shrubby Fen
395485	6268457	395235	6268203	0.36	NE and NW 18-87-17	Mossy-peat	Treed Fen
395107	6268073	394107	6267057	1.43	NW 18-87-17 to NE 12-87-18	Mossy-peat	Treed Fen
394108	6267058	393988	6266936	0.17	NE 12-87-18	Mossy-peat	Shrubby Fen
394019	6266967	393644	6266586	0.54	NE 12-87-18	Mossy-peat	Treed Fen
393526	6266466	393356	6266293	0.24	NW and SW 12-87-18	Mossy-peat	Shrubby Fen
393370	6266307	393176	6266110	0.28	SW 12-87-18	Mossy-peat	Treed Fen
393087	6266019	392898	6265828	0.26	SW 12-87-18	Mossy-peat	Treed Fen
392902	6265832	392818	6265746	0.12	SW 12-87-18	Mossy-peat	Shrubby Fen
392832	6265761	392509	6265432	0.46	SW 12-87-18 to NE 2-87-18	Mossy-peat	Treed Fen
392518	6265441	392332	6265252	0.27	NE 2-87-18	Mossy-peat	Shrubby Fen
392337	6265257	391832	6264744	0.72	NE and SW 2-87-18	Mossy-peat	Treed Fen
391837	6264748	391441	6264432	0.51	SW 2-87-18	Mossy-peat	Shrubby Fen
391444	6264435	391208	6264247	0.30	SW 2-87-18	Mossy-peat	Treed Fen
390893	6263856	389166	6262201	2.39	NE 33-86-18 to NE 29-86-18	Mossy-peat	Treed Fen
389175	6262210	388338	6261408	1.16	NE and SW 29-86-18	Mossy-peat	Shrubby Fen
388345	6261415	387568	6260670	1.08	SW 29-86-18 to NE 19-86-18	Mossy-peat	Treed Fen
387066	6260190	386819	6259953	0.34	NE and SW 19-86-18	Mossy-peat	Treed Bog
386914	6255460	386922	6255386	0.08	NE 6-86-18	Mossy-peat	Shrubby Fen
386921	6255394	386925	6255361	0.03	NE 6-86-18	Shallow open water	Open Water Pond
386924	6255373	386930	6255316	0.06	NE 6-86-18	Mossy-peat	Shrubby Fen
386956	6255221	386983	6255101	0.13	SE 6-86-18	Woody-peat to mineral	Broad-leaf Treed Swamp
386325	6254419	386051	6254210	0.35	NW 31-85-18	Mossy-peat	Treed Fen
386012	6254172	385092	6253203	1.34	NW 31-85-18 to SE 36-85-19	Mossy-peat	Treed Fen
384906	6252809	384902	6252691	0.12	NW 25-85-19	Mossy-peat	Treed Fen
384887	6252271	384882	6252120	0.15	NW 25-85-19	Woody-peat to mineral	Mixedwood treed Swamp
385010	6251870	385173	6251715	0.22	SE 25-85-19	Mossy-peat	Shrubby Fen
385159	6251729	385963	6250975	1.10	SE 25-85-19 to NW 19-85-18	Mossy-peat	Treed Fen
386135	6250814	387290	6249525	1.74	NW 19-85-18 to NE 18-85-18	Mossy-peat	Treed Bog
387745	6249014	388029	6248696	0.43	NW and SW 17-85-18	Mossy-peat	Treed Fen
388025	6248699	388107	6248608	0.12	SW 17-85-18	Mossy-peat	Shrubby Fen
388400	6248279	388610	6248043	0.32	SE 17-85-18	Mossy-peat	Shrubby Fen
388601	6248054	389190	6246993	1.26	SE 17-85-18 to SW 9-85-18	Mossy-peat	Treed Fen

Start UTM (Zone 12) <sup>1</sup>		End UTM (Zone 12) <sup>1</sup>		Approximate Length of Wetland Crossed (km)	Legal Location (W4M) <sup>1</sup>	Wetland Group	Wetland Classification – Subclass and Class
Easting	Northing	Easting	Northing				
389217	6246861	389233	6246785	0.08	SW 9-85-18	Woody-peat to mineral	Shrubby Swamp
389269	6246608	389331	6246305	0.31	SW 9-85-18	Mossy-peat	Treed Fen
389329	6246311	389676	6244664	1.68	SW 9-85-18 to SW 4-85-18	Mossy-peat	Shrubby Fen
389694	6244587	390174	6242590	2.05	NW 33-84-18 to NE 28-84-18	Mossy-peat	Treed Fen
390171	6242602	390302	6242058	0.56	NE and SE 28-84-18	Mossy-peat	Non-woody Fen
390301	6242060	390584	6240240	1.84	SE 28-84-18 to SW 22-84-18	Mossy-peat	Treed Fen
390582	6240253	390629	6239895	0.36	SW 22-84-18	Mossy-peat	Non-woody Fen
390628	6239907	390763	6238881	1.04	SW 22-84-18 to SW 15-84-18	Mossy-peat	Treed Fen
390782	6238735	390847	6238274	0.47	SW 15-84-18	Mossy-peat	Treed Fen
390924	6238127	391544	6236774	1.50	SW 15-84-18 to SE 10-84-18	Mossy-peat	Treed Fen
392887	6234980	393103	6234662	0.38	SE 2-84-18 to NE 35-83-18	Mossy-peat	Shrubby Fen
393089	6234682	394040	6233281	1.69	NE 35-83-18 to SW 36-83-18	Mossy-peat	Treed Fen
394101	6233190	394251	6232959	0.28	NW 25-83-18	Mossy-peat	Treed Fen
394279	6231682	394483	6230981	0.73	SE 25-83-18 to NE 24-83-18	Mossy-peat	Shrubby Fen
394478	6231001	394516	6230850	0.16	NE 24-83-18	Mossy-peat	Treed Fen
394510	6230875	394559	6230680	0.20	NE and SE 24-83-18	Mossy-peat	Shrubby Fen
394559	6230680	394593	6230545	0.14	SE 24-83-18	Mossy-peat	Treed Fen
394593	6230545	394773	6229836	0.73	SE 24-83-18 to NE 13-83-18	Mossy-peat	Shrubby Fen
394773	6229837	395196	6229210	0.78	NE 13-83-18 to NW 18-83-17	Mossy-peat	Treed Fen
395180	6229228	395625	6228736	0.66	NW and SW 18-83-17	Mossy-peat	Shrubby Fen
395590	6228775	396649	6227607	1.57	SW 18-83-17 to NW 8-83-17	Mossy-peat	Treed Fen
396647	6227610	396990	6227231	0.51	NW and SW 8-83-17	Mossy-peat	Non-woody Fen
396973	6227250	401026	6223055	5.90	SW 8-83-17 to NE 28-82-17	Mossy-peat	Treed Fen
403143	6222627	403195	6222515	0.13	NW 26-82-17	Mossy-peat	Non-woody Fen
403034	6222102	403018	6221991	0.12	SW 26-82-17	Shallow open water	Open Water Pond
403473	6218916	403528	6218590	0.33	SW 14-82-17	Mossy-peat	Treed Fen
402928	6217383	403142	6217132	0.35	SW 11-82-17	Mossy-peat	Treed Fen
403451	6216866	404677	6215812	1.62	SW 11-82-17 to SW 1-82-17	Mossy-peat	Treed Fen
405103	6215445	405512	6215092	0.54	SW and SE 1-82-17	Mossy-peat	Shrubby Fen
405687	6214941	406900	6213320	2.07	NE 36-81-17 to NE 30-81-16	Mossy-peat	Treed Fen
406899	6213285	406885	6212615	0.67	NE and SE 30-81-16	Mossy-peat	Treed Fen
407028	6212474	407343	6212334	0.34	SE 30-81-16	Mossy-peat	Treed Fen
407622	6212208	408014	6212033	0.44	SW 29-81-16	Mossy-peat	Treed Fen
410797	6211650	412333	6210965	1.68	NW and NE 22-81-16	Mossy-peat	Treed Fen
412393	6210938	412461	6210908	0.08	NW 23-81-16	Mossy-peat	Treed Fen
412565	6210861	413063	6210639	0.55	SW 23-81-16	Mossy-peat	Treed Fen
412943	6210693	413032	6210653	0.10	SW 23-81-16	Mossy-peat	Shrubby Fen
413027	6210656	413079	6210632	0.06	SW 23-81-16	Mossy-peat	Treed Fen
413304	6210396	413332	6210336	0.07	SE 23-81-16	Mineral	Seasonal Emergent Marsh
413331	6210338	414227	6208950	1.67	SE 23-81-16 to SW 3-81-16	Mossy-peat	Treed Fen
414218	6208958	415342	6207943	1.52	SW 3-81-16 to NE 12-81-16	Mossy-peat	Treed Bog

Start UTM (Zone 12) <sup>1</sup>		End UTM (Zone 12) <sup>1</sup>		Approximate Length of Wetland Crossed (km)	Legal Location (W4M) <sup>1</sup>	Wetland Group	Wetland Classification – Subclass and Class
Easting	Northing	Easting	Northing				
415331	6207953	415388	6207902	0.08	NE 12-81-16	Mossy-peat	Shrubby Fen
415903	6207436	419040	6205194	3.88	SW 7-81-15 to SW 4-81-15	Mossy-peat	Treed Fen
419036	6205196	419321	6205034	0.33	SW 4-81-15 to NW 33-80-15	Mossy-peat	Shrubby Fen
420178	6204548	422771	6201891	3.81	NE 33-80-15 to SE 26-80-15	Mossy-peat	Treed Fen
423697	6200877	424479	6200019	1.16	SW 24-80-15 to NE 13-80-15	Mossy-peat	Treed Fen
424472	6200027	425132	6199290	0.99	NE and SE 13-80-15	Mossy-peat	Shrubby Fen
425828	6198521	426747	6197506	1.38	SW 18-80-14 to SW 8-80-14	Mossy-peat	Treed Fen
427140	6196748	427279	6196131	0.63	NW 5-80-14	Mossy-peat	Treed Fen
427297	6196055	427527	6195002	1.08	NW 5-80-14 to NW 32-79-14	Mossy-peat	Treed Fen
427644	6194327	427817	6193495	0.88	SE 32-79-14 to NE 29-79-14	Mossy-peat	Treed Fen
426478	6191078	426287	6190868	0.28	SE 19-79-14	Mossy-peat	Shrubby Fen
425349	6184958	425256	6184371	0.60	NE and SE 36-78-15	Mossy-peat	Treed Bog
424745	6182904	424699	6182802	0.11	SW 25-78-15	Mossy-peat	Shrubby Fen
423470	6180079	423327	6179768	0.34	NW and SW 14-78-15	Mossy-peat	Shrubby Fen
421152	6177917	420901	6177713	0.33	SW 10-78-15 to SE 9-78-15	Mossy-peat	Shrubby Fen
420911	6177721	420582	6177453	0.43	SE 9-78-15 to NE 4-78-15	Mossy-peat	Treed Fen
419438	6175463	419088	6174574	0.97	NW 33-77-15 to SE 32-77-15	Mossy-peat	Treed Fen
418897	6173986	418898	6173738	0.25	NE 29-77-15	Mossy-peat	Treed Fen
418899	6173564	418900	6173238	0.33	NE and SE 29-77-15	Mossy-peat	Treed Fen
418900	6172373	418714	6171331	1.15	NE and SE 20-77-15	Mossy-peat	Treed Bog
418618	6170602	418467	6169362	1.25	NE 17-77-15 to NW 8-77-15	Mossy-peat	Treed Fen
418469	6169382	418435	6169040	0.34	NW 8-77-15	Mossy-peat	Non-woody Fen
418438	6169077	418400	6168692	0.39	NW and SW 8-77-15	Mossy-peat	Treed Fen
418308	6167761	418281	6167487	0.28	NW 5-77-15	Mossy-peat	Treed Fen
418260	6167270	418231	6166958	0.31	NW and SW 5-77-15	Mossy-peat	Treed Fen
418316	6166257	418421	6166019	0.26	NW and NE 32-76-15	Mossy-peat	Treed Fen
418411	6166041	418533	6165769	0.30	NW and NE 32-76-15	Mossy-peat	Shrubby Fen
418513	6165812	418413	6164463	1.54	NE 32-76-15 to NE 29-76-15	Mossy-peat	Treed Fen
418415	6164475	418403	6164400	0.08	NE 29-76-15	Mossy-peat	Shrubby Fen
418405	6164415	418345	6164045	0.38	NW and NE 29-76-15	Mossy-peat	Treed Fen
418347	6164057	418320	6163893	0.17	NW 29-76-15	Mossy-peat	Shrubby Fen
418321	6163897	418283	6163666	0.23	NW and SW 29-76-15	Mossy-peat	Treed Fen
418039	6162409	417942	6162217	0.22	NW and SW 20-76-15	Mossy-peat	Shrubby Fen
417959	6162237	417600	6161336	1.01	SW 20-76-15 to NW 17-76-15	Mossy-peat	Treed Fen
417559	6160976	417506	6160513	0.47	NW and SW 17-76-15	Mossy-peat	Treed Fen
417444	6159131	417336	6159009	0.17	NE 7-76-15	Mossy-peat	Shrubby Fen
417012	6158213	416716	6157074	1.35	SE 7-76-15 to SE 6-76-15	Mossy-peat	Treed Fen
416908	6156935	417075	6156724	0.34	SE 6-76-15	Mossy-peat	Treed Fen
416771	6156400	416447	6155744	0.74	NE and SW 31-75-15	Mossy-peat	Treed Fen
416220	6155236	415604	6153944	1.43	SW 31-75-15 to SW 25-75-16	Mossy-peat	Treed Fen
415443	6153625	415050	6151670	2.15	SW 25-75-16 to NE 13-75-16	Mossy-peat	Treed Fen
414420	6151341	412685	6145980	5.76	NW 13-75-16 to SW 34-74-16	Mossy-peat	Treed Fen

Start UTM (Zone 12) <sup>1</sup>		End UTM (Zone 12) <sup>1</sup>		Approximate Length of Wetland Crossed (km)	Legal Location (W4M) <sup>1</sup>	Wetland Group	Wetland Classification – Subclass and Class
Easting	Northing	Easting	Northing				
412618	6145359	412612	6145235	0.12	SW 34-74-16 to NW 27-74-16	Shallow open water	Open Water Pond
412598	6144938	412575	6144449	0.49	NW and SW 27-74-16	Mossy-peat	Treed Fen
411578	6142960	411262	6142741	0.39	NE and SE 21-74-16	Mossy-peat	Treed Bog
409851	6139889	409543	6139405	0.57	NE and SE 8-74-16	Mossy-peat	Treed Fen
409133	6138973	408897	6138644	0.41	SW 8-74-16 to NW 5-74-16	Mossy-peat	Treed Fen
408095	6137378	407486	6136391	1.24	SE 6-74-16 to SW 31-73-16	Mossy-peat	Shrubby Fen
407490	6136407	407432	6136154	0.26	SW 31-73-16	Mossy-peat	Treed Fen
407247	6135229	407216	6134900	0.33	NW and SW 30-73-16	Mossy-peat	Treed Bog
407202	6134218	407171	6134089	0.14	SW 30-73-16 to NW 19-73-16	Mossy-peat	Treed Fen
407153	6134009	407131	6133916	0.09	NW 19-73-16	Mossy-peat	Treed Fen
407098	6133768	406949	6133121	0.67	NW and SW 19-73-16	Mossy-peat	Treed Fen
406918	6132968	406967	6132827	0.15	SW 19-73-16	Mossy-peat	Treed Fen
407111	6131751	406293	6130403	1.63	NW 18-73-16 to NE 12-73-17	Mossy-peat	Treed Fen
406134	6130342	406023	6130203	0.18	NE 12-73-17	Mossy-peat	Treed Fen
405903	6130005	405740	6128000	2.10	SW 12-73-17 to SW 1-73-17	Mossy-peat	Treed Fen

Source: TERA Environmental Consultants 2014

Note: 1 The delineated start and end locations provided are intended to identify the moisture regime transition zone as accurately as possible and are as precise as feasible.

## APPENDIX D

### WATERCOURSE, FISH-BEARING DRAINAGE AND NONFISH-BEARING DRAINAGE CROSSINGS – WHITE AREA

TABLE D-1

#### WATERCOURSE AND FISH-BEARING DRAINAGES CROSSINGS ALONG THE GRAND RAPIDS PIPELINE PROJECT – WHITE AREA

Site No.	Name	Legal Location (W4M), UTM Coordinates (NAD 83, Zone 12) Latitude/Longitude (DD-MM-SS)	Watercourse Class and Restricted Activity Period	Open Water Mean Channel Morphology (m)
WC27	Unnamed tributary to the Wandering River	SE 30-71-16 408066E, 6115123N 55° 10' 26.9" N/112° 26' 36.5" W	Mapped Class C April 16 to July 15	Bankfull Width: 8.7 Wetted Width: 6.6 Water Depth: 0.4
FD7	Fish-bearing drainage	NW 23-70-17 405178E, 6104407N 55° 4' 38.5" N/112° 29' 6.9" W	N/A	Bankfull Width: N/A Wetted Width: 14.3 Water Depth: 0.5
WC28	La Biche River	SW 35-68-17 404565E, 6087930N 54° 55' 45.2" N/112° 29' 21.6" W	Mapped Class C April 16 to July 15	Bankfull Width: 31.2 Wetted Width: 27.1 Water Depth: 1.1
WC29	Unnamed tributary to Pine Creek	SE 31-66-18 390159E, 6068580N 54° 45' 8.8" N/112° 42' 24.1" W	Unmapped Class C None	Bankfull Width: 2.0 Wetted Width: 1.9 Water Depth: 0.1
WC30	Unnamed tributary to Flat Lake	SW 34-65-19 384330E, 6058936N 54° 39' 52.2" N/112° 47' 36.2" W	Unmapped Class C April 16 to July 15	Bankfull Width: 2.6 Wetted Width: 5.7 Water Depth: 0.5
WC31	Unnamed tributary to Flat Lake	NE 8-65-19 381738E, 6052952N 56° 36' 36.5" N/112° 49' 52.1" W	Mapped Class C April 16 to July 15	Bankfull Width: 10.1 Wetted Width: 18.8 Water Depth: 0.9
WC32	Unnamed tributary to Flat Creek	SW 30-64-19 379202E, 6047757N 54° 33' 46.4" N/112° 52' 5.7" W	Unmapped Class C April 16 to July 15	Bankfull Width: 0.8 Wetted Width: 2.1 Water Depth: 0.1
WC33	Unnamed tributary to Flat Creek	SW 19-64-19 379149E, 6046184N 54° 32' 55.5" N/112° 52' 6.3" W	Unmapped Class C April 16 to July 15	Bankfull Width: 1.4 Wetted Width: 1.2 Water Depth: 0.1
WC34	Unnamed tributary to Flat Creek	NW 7-64-19 378517E, 6043658N 54° 31' 33.8" N/112° 52' 2.6" W	Unmapped Class C April 16 to July 15	Bankfull Width: 1.8 Wetted Width: 1.5 Water Depth: 0.1
WC35	Flat Creek	NW 25-63-20 376802E, 6038383N 54° 28' 41.2" N/112° 54' 5.2" W	Mapped Class C April 16 to July 15	Bankfull Width: 2.8 Wetted Width: 12.6 Water Depth: 0.8
WC36	Namepi Creek	SE 32-58-20 373368E, 5991088N 54° 3' 8.8" N/112° 56' 3.8" W	Mapped Class C April 16 to June 30	Bankfull Width: 12.5 Wetted Width: 16.0 Water Depth: 0.9
WC37	Unnamed tributary to the North Saskatchewan River	SW 2-58-20 377427E, 5983162N 53° 58' 56.0" N/112° 52' 9.2" W	Unmapped Class C April 16 to July 31	Bankfull Width: 1.4 Wetted Width: 3.8 Water Depth: 0.2
WC38	North Saskatchewan River	NW 36-57-20 378902E, 5982201N 53° 58' 26.2" N/112° 50' 46.9" W	Mapped Class C April 16 to July 31	Bankfull Width: 276.5 Wetted Width: 272.4 Water Depth: 1.4
WC39	Beaverhill Creek	SE 16-56-20 374185E, 5966679N 53° 50' 0.2" N/112° 54' 42.7" W	Mapped Class C April 16 to July 31	Bankfull Width: 8.7 Wetted Width: 7.4 Water Depth: 0.8
WC40	Unnamed tributary to Beaverhill Creek	SW 8-56-20 372095E, 5965141N 53° 49' 8.6" N/112° 56' 34.7" W	Unmapped Class C April 16 to July 31	Bankfull Width: 5.8 Wetted Width: 5.8 Water Depth: 0.3
WC41	Astotin Creek	SW 22-55-21 364977E, 5958812N 53° 45' 37.4" N/113° 2' 53.7" W	Mapped Class C April 16 to June 30	Bankfull Width: 3.3 Wetted Width: 2.6 Water Depth: 0.3
WC42	Ross Creek	SE 28-54-22 355910E, 5950988N 53° 41' 15.7" N/113° 10' 55.4" W	Mapped Class C April 16 to June 30	Bankfull Width: 3.8 Wetted Width: 3.8 Water Depth: 0.6



**TABLE D-1 Cont'd**

Site No.	Name	Legal Location (W4M), UTM Coordinates (NAD 83, Zone 12) Latitude/Longitude (DD-MM-SS)	Watercourse Class and Restricted Activity Period	Open Water Mean Channel Morphology (m)
WC43	Pointe-Aux-Pins Creek	SW 31-53-22 352119E, 5943492N 53° 37' 9.6" N/113° 14' 8.8" W	Mapped Class C April 16 to June 30	Bankfull Width: 4.2 Wetted Width: 5.7 Water Depth: 0.6
WC44	Oldman Creek	SW 26-53-23 348337E, 5941965N 53° 36' 16.3" N/113° 17' 32.0" W	Mapped Class C April 16 to June 30	Bankfull Width: 3.1 Wetted Width: 10.0 Water Depth: 0.9
WC45	Unnamed tributary to the North Saskatchewan River	NE 22-53-23 347456E, 5941380N 53° 35' 56.4" N/113° 18' 18.9" W	Mapped Class C April 16 to June 30	Bankfull Width: 1.1 Wetted Width: 4.5 Water Depth: 0.4
FD8	Fish-bearing drainage	NE 21-53-23 346414E, 5940702N 53° 35' 33.4" N/113° 19' 14.3" W	N/A	Bankfull Width: N/A Wetted Width: 284.5 Water Depth: 0.4
WC46	Unnamed tributary to Clover Bar Creek	SE 21-53-23 346006E, 5940591N 53° 35' 29.2" N/113° 19' 36.2" W	Unmapped Class C April 16 to June 30	Bankfull Width: 2.4 Wetted Width: 1.7 Water Depth: 0.9
WC46.1	Clover Bar Creek	SE 21-53-23 345843E, 5940537N 53° 35' 27.5" N/113° 19' 45.1" W	Unmapped Class C April 16 to June 30	Bankfull Width: 4.9 Wetted Width: 9.3 Water Depth: 0.5
WC46.2	Clover Bar Creek	SE 21-53-23 345680E, 5940333N 53° 35' 20.7" N/113° 19' 53.5" W	Unmapped Class C April 16 to June 30	Bankfull Width: 1.0 Wetted Width: 18.3 Water Depth: 0.8
WC47	Clover Bar Creek	SW 21-53-23 345494E, 5939871N 53° 35' 5.5" N/113° 20' 2.8" W	Unmapped Class C April 16 to June 30	Bankfull Width: 1.2 Wetted Width: 2.4 Water Depth: 0.6
FD9	Fish-bearing drainage	SW 4-53-23 345266E, 5935471N 53° 32' 43.0" N/113° 20' 7.4" W	N/A	Bankfull Width: N/A Wetted Width: 18.4 Water Depth: 0.2

Source: CH2M HILL 2014a

Note: N/A Not Applicable.

**TABLE D-2**

**NONFISH-BEARING DRAINAGE CROSSINGS  
ALONG THE GRAND RAPIDS PIPELINE PROJECT – WHITE AREA**

Name	Legal Location (W4M)	UTM Coordinates (NAD 83, Zone 12)
Drainage	SE 1-71-17	405865E 6108468N
Drainage	SE 35-69-17	405497E 6097333N
Drainage	NE 23-69-17	405497E 6094743N
Drainage	NW 22-68-17	402616E 6084762N
Drainage	NE 8-68-17	399838E 6081574
Drainage	NE 25-67-18	397070E 6076920N
Drainage	SE 24-66-19	388475E 6065152N
Drainage	NW 27-65-19	388475E 6058201N
Drainage	NE 12-64-20	378333E 6043353N
Drainage	NE 14-63-20	376247E 6035769N

**TABLE D-2 Cont'd**

Name	Legal Location (W4M)	UTM Coordinates (NAD 83, Zone 12)
Drainage	NE 2-63-20	376195E 6032332N
Drainage	SE 15-62-20	376085E 6025224N
Drainage	SE 10-62-20	375960E 6023444N
Drainage	SE 10-62-20	375797E 6023120N
Drainage	NW 3-62-20	375528E 6022692N
Drainage	SE 33-61-20	374290E 6020395N
Drainage	SE 28-61-20	374026E 6018918N
Drainage	NE 21-61-20	373935E 6017930N
Drainage	NE 25-57-20	379299E 5980547N
Drainage	SW 12-57-20	378624E 5974656N
Drainage	SE 22-56-20	375818E 5968577N
Drainage	NE 6-56-20	371188E 5964524N
Drainage	NW 31-55-20	370185E 5963116N
Drainage	NE 36-55-21	369653E 5962802N
Drainage	SW 9-55-21	363152E 5956350N
Drainage	SW 1-55-22	358475E 5954177N
Drainage	SW 34-54-22	357170E 5952783N
Drainage	SW 34-54-22	356881E 5952479N
Drainage	NE 28-54-22	356352E 5951925
Drainage	NE 17-54-22	354303E 5948533N
Drainage	NW 8-54-22	353627E 5947518N
Drainage	SW 8-54-22	353242E 5946266N
Drainage	SW 31-53-22	351964E 5943044N
Drainage	NW 26-53-23	348980E 5942446N
Drainage	SE 27-53-23	347792E 5941586N
Drainage	SE 21-53-23	345901E 5940473N
Drainage	SW 9-53-23	345045E 5937446N
Drainage	SW 9-53-23	345188E 5937130N
Drainage	SW 9-53-23	345292E 5936780N

**TABLE D-2 Cont'd**

Name	Legal Location (W4M)	UTM Coordinates (NAD 83, Zone 12)
Drainage	SE 5-53-23	344619E 5935513N

Source: CH2M HILL 2014a

## APPENDIX E

### WETLAND CROSSINGS ALONG THE GRAND RAPIDS PIPELINE PROJECT – WHITE AREA

Start UTM (Zone 12) <sup>1</sup>		End UTM (Zone 12) <sup>1</sup>		Approximate Length of Wetland Crossed (km)	Legal Location (W4M) <sup>1</sup>	Wetland Group	Wetland Classification – Subclass and Class
Easting	Northing	Easting	Northing				
407158	6123790	407234	6122936	0.86	NW and SW 19-72-16	Mossy-peat	Treed Fen
405204	6104444	405202	6104374	0.07	NW 23-70-17	Woody-peat to mineral	Shrubby Swamp
405203	6104404	405201	6104318	0.09	NW 23-70-17	Shallow open water	Open Water Pond
405147	6101689	405104	6099800	1.89	NW 11-70-17 to NW 2-70-17	Mossy-peat	Treed Fen
405104	6099812	405274	6098840	1.04	NW and SE 2-70-17	Mossy-peat	Treed Bog
405503	6097374	405505	6097239	0.13	SE 35-69-17	Shallow open water	Open Water Pond
405512	6096461	405519	6095625	0.84	NE and SE 26-69-17	Mossy-peat	Treed Fen
405519	6095633	405493	6094674	0.43	SE 26-69-17 to NE 23-69-17	Mossy-peat	Shrubby Fen
405498	6094694	405185	6093328	1.40	NE 23-69-17 to NE 14-69-17	Mossy-peat	Treed Fen
404869	6091949	404633	6090918	1.06	NW and SW 11-69-17	Mossy-peat	Treed Fen
404486	6089991	404559	6089757	0.25	NW 2-69-17	Mossy-peat	Shrubby Fen
404561	6089456	404563	6089012	0.44	SW 2-69-17	Mossy-peat	Treed Fen
404564	6088789	404564	6088727	0.06	SW 2-69-17 to NW 35-68-17	Woody-peat to mineral	Seasonal Emergent Marsh
404565	6088656	404565	6088606	0.05	NW 35-68-17	Woody-peat to mineral	Seasonal Emergent Marsh
404578	6087859	404579	6087679	0.18	SW 35-68-17	Mossy-peat	Shrubby Swamp
404381	6087353	404002	6086852	0.63	SW 35-68-17 to NE 27-68-17	Mossy-peat	Treed Fen
403972	6086813	403342	6085979	1.57	NE and SE 27-68-17	Mossy-peat	Treed Fen
403111	6085649	402906	6085379	0.34	SW 27-68-17 to NW 22-68-17	Woody-peat to mineral	Treed Fen
400261	6081609	400186	6081610	0.07	NE 8-68-17	Woody-peat to mineral	Seasonal Emergent Marsh
400190	6081610	399786	6081618	0.40	NE and NW 8-68-17	Mossy-peat	Shrubby Swamp
397436	6077086	397273	6076932	0.22	NW 30-67-17	Woody-peat to mineral	Treed Fen
397133	6076899	397059	6076900	0.07	NE 25-67-18	Mossy-peat	Shrubby Swamp
393471	6074058	393468	6073922	0.14	NE 15-67-18	Mossy-peat	Treed Fen
393373	6073487	393112	6073014	0.56	SE 15-67-18	Woody-peat to mineral	Treed Fen
390123	6067903	390122	6067855	0.05	NE 30-66-18	Woody-peat to mineral	Seasonal Emergent Marsh
390112	6067411	390092	6067382	0.04	NE 30-66-18	Woody-peat to mineral	Seasonal Emergent Marsh
389628	6066886	389600	6066856	0.04	SE 30-66-18	Woody-peat to mineral	Seasonal Emergent Marsh
388338	6064993	388237	6064850	0.18	SE 24-66-19	Mossy-peat	Treed Bog
388172	6064734	388080	6064568	0.19	NE 13-66-19	Mossy-peat	Treed Bog
387928	6064294	387801	6064068	0.26	NE and NW 13-66-19	Mossy-peat	Treed Bog
387339	6063173	387326	6063147	0.03	NW 12-66-19	Woody-peat to mineral	Shrubby Swamp
386010	6061627	385868	6061386	0.28	NW 2-66-19	Woody-peat to mineral	Shrubby Swamp
385834	6061328	385779	6061225	0.12	NW 2-66-19	Woody-peat to mineral	Shrubby Swamp
385348	6060407	385046	6060039	0.48	SW 2-66-19 to SE 3-66-19	Mossy-peat	Treed Bog

Start UTM (Zone 12) <sup>1</sup>		End UTM (Zone 12) <sup>1</sup>		Approximate Length of Wetland Crossed (km)	Legal Location (W4M) <sup>1</sup>	Wetland Group	Wetland Classification – Subclass and Class
Easting	Northing	Easting	Northing				
384104	6058206	384079	6058155	0.06	NW 27-65-19	Woody-peat to mineral	Seasonal Emergent Marsh
382625	6055732	382619	6055632	0.10	SW 21-65-19	Mossy-peat	Shrubby Fen
382361	6054811	382163	6054451	0.41	NW 16-65-19	Woody-peat to mineral	Shrubby Swamp
381746	6052440	381745	6052395	0.05	SE 8-65-19	Woody-peat to mineral	Seasonal Emergent Marsh
381446	6051287	381417	6051219	0.07	NE and SE 5-65-19	Woody-peat to mineral	Shrubby Swamp
381032	6050694	381001	6050677	0.04	SE and SW 5-65-19	Woody-peat to mineral	Seasonal Emergent Marsh
380935	6050629	380923	6050611	0.02	SW 5-65-19	Woody-peat to mineral	Seasonal Emergent Marsh
380912	6050593	380908	6050578	0.02	SW 5-65-19	Woody-peat to mineral	Seasonal Emergent Marsh
379412	6048489	379381	6048438	0.06	NE 30-64-19	Woody-peat to mineral	Seasonal Emergent Marsh
379166	6047948	379165	6047908	0.04	SW 30-64-19	Woody-peat to mineral	Seasonal Emergent Marsh
379194	6047805	379220	6047766	0.05	SW 30-64-19	Woody-peat to mineral	Seasonal Emergent Marsh
379161	6045379	379118	6045112	0.27	NW 18-64-19	Woody-peat to mineral	Shrubby Swamp
378400	6043414	378320	6043293	0.07	NW 7-64-19 to NE 12-64-20	Mossy-peat	Shrubby Swamp
377738	6041900	377724	6041766	0.13	NE 1-64-20	Woody-peat to mineral	Treed Bog
377705	6041585	377689	6041431	0.16	SE 1-64-20	Woody-peat to mineral	Deep Marsh
377680	6041340	377674	6041285	0.06	SE 1-64-20	Woody-peat to mineral	Deep Marsh
377667	6041220	377662	6041169	0.05	SE 1-64-20	Woody-peat to mineral	Seasonal Emergent Marsh
377655	6041100	377629	6040849	0.25	SE 1-64-20	Woody-peat to mineral	Shrubby Swamp
376846	6038428	376812	6038355	0.08	NW and SW 25-63-20	Woody-peat to mineral	Shrubby Swamp
376812	6037124	376803	6037056	0.07	NW 24-63-20	Woody-peat to mineral	Wet Meadow
376257	6035942	376118	6035540	0.43	NE 14-63-20	Mossy-peat	Deep Marsh
375928	6032889	376234	6031345	1.61	SE 11-63-20 to SE 2-63-20	Mossy-peat	Treed Fen
376209	6031080	376164	6030593	0.49	NE 34-62-20	Mossy-peat	Treed Fen
376085	6029868	376082	6029751	0.12	SE 34-62-20	Mossy-peat	Shrubby Fen
376089	6029176	376074	6028598	0.58	NE and SE 27-62-20	Mossy-peat	Shrubby Fen
376043	6027249	376037	6027027	0.22	NE and SE 22-62-20	Mossy-peat	Shrubby Fen
376086	6025706	376092	6025551	0.16	NE 15-62-20	Woody-peat to mineral	Shrubby Swamp
376093	6025530	376105	6025228	0.30	NE and SE 15-62-20	Woody-peat to mineral	Deep Marsh
375580	6022731	375539	6022672	0.07	NW 3-62-20	Woody-peat to mineral	Seasonal Emergent Marsh
373828	6016373	373774	6016221	0.17	NW and NE 16-61-20	Woody-peat to mineral	Shrubby Swamp
374148	6009088	374147	6009052	0.04	SE 28-60-20	Woody-peat to mineral	Deep Marsh
374107	6008085	374105	6008028	0.06	NE 21-60-20	Woody-peat to mineral	Seasonal Emergent Marsh
376126	5983491	376193	5983489	0.07	SE 3-58-20	Woody-peat to mineral	Seasonal Emergent Marsh

Start UTM (Zone 12) <sup>1</sup>		End UTM (Zone 12) <sup>1</sup>		Approximate Length of Wetland Crossed (km)	Legal Location (W4M) <sup>1</sup>	Wetland Group	Wetland Classification – Subclass and Class
Easting	Northing	Easting	Northing				
377852	5973542	377846	5973467	0.07	SE 2-57-20	Woody-peat to mineral	Seasonal Emergent Marsh
377817	5973107	377812	5973021	0.09	SE 2-57-20	Woody-peat to mineral	Wet Meadow
377084	5971509	377082	5971442	0.07	SW 35-56-20	Woody-peat to mineral	Wet Meadow
376946	5970592	376873	5970496	0.12	NW and SW 26-56-20	Woody-peat to mineral	Seasonal Emergent Marsh
375356	5968027	375250	5968030	0.11	NW 15-56-20	Woody-peat to mineral	Seasonal Emergent Marsh
375003	5967928	375002	5967877	0.05	NW 15-56-20	Woody-peat to mineral	Seasonal Emergent Marsh
371429	5964789	371401	5964763	0.04	NE 6-56-20	Woody-peat to mineral	Seasonal Emergent Marsh
371177	5964567	371166	5964500	0.07	NE 6-56-20	Woody-peat to mineral	Seasonal Emergent Marsh
370866	5963485	370844	5963416	0.07	SE 6-56-20 to NE 31-55-20	Woody-peat to mineral	Seasonal Emergent Marsh
364806	5960061	364804	5959971	0.09	NE 21-55-21	Woody-peat to mineral	Deep Marsh
364920	5957424	364916	5957291	0.13	SW 15-22-21	Woody-peat to mineral	Seasonal Emergent Marsh
357202	5952798	357142	5952780	0.06	SW 34-54-22	Woody-peat to mineral	Shrubby Swamp
356406	5951990	356335	5951927	0.07	NE 28-54-22	Woody-peat to mineral	Seasonal Emergent Marsh
354122	5948295	354079	5948234	0.07	SE 17-54-22	Woody-peat to mineral	Shrubby Swamp
352576	5944532	352576	5944513	0.02	SE 6-54-22	Woody-peat to mineral	Seasonal Emergent Marsh
352133	5943506	352066	5943324	0.19	SW 31-53-22	Woody-peat to mineral	Seasonal Emergent Marsh
348979	5942524	348973	5942334	0.19	NE 26-53-23	Woody-peat to mineral	Deep Marsh
347504	5941420	347443	5941371	0.08	SE 27-53-23 to NE 22-53-23	Woody-peat to mineral	Seasonal Emergent Marsh
345684	5940382	345698	5940216	0.17	SE 21-53-23	Woody-peat to mineral	Shrubby Swamp
345523	5939932	345521	5939928	0.01	SW 21-53-23	Woody-peat to mineral	Shrubby Swamp
345156	5937150	345285	5937060	0.16	SW 9-53-23	Woody-peat to mineral	Deep Marsh
345295	5936894	345292	5936803	0.09	SW 9-53-23	Woody-peat to mineral	Deep Marsh
345263	5935489	345250	5935458	0.04	SW 4-53-23	Woody-peat to mineral	Deep Marsh

Source: TERA Environmental Consultants 2014

Note: 1 The delineated start and end locations provided are intended to identify the moisture regime transition zone as accurately as possible and are as precise as feasible.

## APPENDIX F

### 2013/2014 WEED SURVEY SUMMARY ALONG THE GRAND RAPIDS PIPELINE PROJECT – WHITE AREA

Legal Location (W4M)	Land Use	Weeds
NW 6-72-16	Cultivated	common dandelion <b>perennial sow-thistle</b>
	Pasture	common dandelion
SE 6-72-16	Cultivated	common dandelion common horsetail <b>white cockle</b> cleavers lamb's-quarters <b>Canada thistle</b> yellow whitlow grass hemp-nettle <b>perennial sow-thistle</b> common nettle common plantain shepherd's-purse grass species <b>scentsless chamomile</b> annual hawk's-beard volunteer canola
NE 12-71-17	Hay	common horsetail annual hawk's-beard <b>perennial sow-thistle</b> common dandelion white clover wild buckwheat curled dock stinkweed hemp-nettle
SE 35-70-17	Cultivated	white clover <b>white cockle</b> annual hawk's-beard common plantain wild buckwheat Russian pigweed common dandelion common goat's-beard flixweed common horsetail stinkweed hemp-nettle <b>Canada thistle</b> shepherd's-purse cleavers
SE 23-63-20	Treed	stinkweed
NE 14-63-20*	Treed	stinkweed flixweed lamb's-quarters
SE 2-58-20	Treed/pasture	northern bedstraw <b>Canada thistle</b> common chickweed common dandelion

Legal Location (W4M)	Land Use	Weeds
NE 35-57-20	Cultivated	bluebur hemp-nettle Northern bedstraw <b>Canada thistle</b> <b>white cockle</b> common plantain wild buckwheat common dandelion <b>perennial sow-thistle</b> annual hawk's-beard lamb's-quarters
NW 36-57-20	Tame pasture	Northern bedstraw common plantain clover/alfalfa <b>perennial sow-thistle</b> common dandelion <b>Canada thistle</b> lamb's-quarters
SE 27-56-20	Tame pasture	annual hawk's-beard <b>white cockle</b> common horsetail <b>Canada thistle</b> common dandelion scentless chamomile wild mustard
	Hay	absinthe wormwood wild mustard stinkweed <b>white cockle</b> maple-leaved goosefoot bluebur flixweed hemp-nettle
	Treed	--
NW 5-56-20	--	--
NE 6-56-20	Cultivated	common horsetail common dandelion <b>Canada thistle</b> common plantain volunteer canola hemp-nettle wild buckwheat annual hawk's-beard
NW 10-55-21	Tame pasture	<b>Canada thistle</b> <b>perennial sow-thistle</b> common dandelion
	Cultivated	<b>perennial sow-thistle</b> <b>Canada thistle</b> wild buckwheat volunteer canola cleavers
SE 9-55-21	Cultivated	volunteer canola wild buckwheat common dandelion <b>Canada thistle</b>
SW 9-55-21	Cultivated	hemp-nettle <b>Canada thistle</b> wild buckwheat volunteer canola stinkweed quack grass common dandelion



Legal Location (W4M)	Land Use	Weeds
SE 8-55-21	Cultivated	common plantain volunteer canola stinkweed common dandelion lamb's-quarters <b>Canada thistle</b>
NE 22-53-23	Hay	common dandelion northern bedstraw wild mustard <b>Canada thistle</b> <b>white cockle</b> <b>scentless chamomile</b> stinkweed cleavers lamb's-quarters flixweed <b>common toadflax</b> bluebur hemp-nettle
SW 21-53-23	Native Prairie	wild mustard volunteer canola alfalfa common dandelion <b>Canada thistle</b> <b>scentless chamomile</b> cleavers stinkweed hemp-nettle lamb's-quarters absinthe wormwood flixweed <b>common toadflax</b> <b>white cockle</b>

Source: CH2M HILL 2014b

Notes: - **Bold** font indicates Noxious weed species.  
-- No data.