APPENDIX 12

DECOMMISSIONING ENVIRONMENTAL TECHNICAL REPORT

DECOMMISSIONING ENVIRONMENTAL TECHNICAL REPORT FOR THE ENBRIDGE PIPELINES INC. LINE 3 REPLACEMENT PROGRAM

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ACRONYMS AND ABBREVIATIONS

Acronym	Statement
ACEP	Alberta Clipper Expansion Project
BRWA	Battle River Watershed Alliance
CEPA	Canadian Energy Pipeline Association
CLI	Canada Land Inventory
CPR	Canadian Pacific Railway
CSA	Canadian Standards Association
DEM	Digital Elevation Map
DNV	Det Norske Veritas
Enbridge	Enbridge Pipelines Inc.
EPP	Environmental Protection Plan
ESA	Environmental and Socio-Economic Assessment
GIS	Geographical Information Systems
IWMP	Integrated Watershed Management Plan
KP	Kilometre Post
L3RP	Line 3 Replacement Program
LMCI	Land Matters Consultation Initiative
MCWS	Manitoba Conservation and Water Stewardship
MD	Municipal District
MIT	Manitoba Infrastructure and Transportation
MKP	Mainline Kilometre Post
MLBV	mainline block valve
MSDS	Material Safety Data Sheet
NEB	National Energy Board
NGL	Natural Gas Liquids
NHN	National Hydrology Network
NORMs	Naturally Occurring Radioactive Materials
NEB OPR	*National Energy Board Onshore Pipeline Regulations*
O.D.	outside diameter
OMM	Operations and Maintenance Manuals
PCB	polychlorinated biphenyl
PHC	petroleum hydrocarbon
RM	Rural Municipality
RSV	remotely-actuated sectionalizing valve
SKP	Station Kilometre Post
TERA	TERA, a CH2M HILL Company
the Project	Line 3 Replacement Program

GLOSSARY

Abandon: Abandon with respect to pipelines as defined in the *National Energy Board Onshore Pipeline Regulations* (*NEB OPR*) means "*to permanently cease operation such that the cessation results in the discontinuation of service*".

Cathodic Protection: A technique used to control the corrosion of a metal surface, in this case a pipeline, by making it the cathode of an electrochemical cell. Most often this involves the application of a low level electrical current to the pipeline.

Deactivate: Deactivate as defined by *NEB OPR* means "*to temporarily remove from service*".

Decommission: Decommission as defined by the *NEB OPR* with respect to pipelines and facilities means to *"permanently cease operation such that the cessation does not result in the discontinuance of service*".

Environmentally Sensitive Area: An area containing a natural feature, which is protected by government (federal or provincial) regulations (Stantec Consulting Ltd. 2013). This may include, however, is not limited to: sandy soils; wetlands; valley/coulee breaks; significant woodlands; and endangered wildlife habitat.

Isolation: The physical separation of the decommissioned pipeline from active stations, terminals and crossover connections to clearly define the active from inactive portions of pipeline infrastructure.

Operate: Operate as defined by the *NEB OPR* with respect to pipelines means to "*repair, maintain, deactivate, reactivate and decommission*".

Other Crossings (Utilities): Other crossings include: sewage and water systems; septic treatment systems; waste management systems; electric power generation and transmission; communications/telecommunications; transit and transportation corridors and facilities; oil and gas pipelines; and associated facilities (Stantec Consulting Ltd. 2013).

Reclamation: The process of re-establishing a disturbed site to a former or other productive use, not necessarily to the same condition that existed prior to disturbance (NEB *Filing Manual* [NEB 2014]).

Segmentation: The installation of a plug, cutting and capping of the pipeline or closing of valves to permanently prevent the movement of water from one location to another within the pipeline.

Water Conduit: A channel for conveying water. In the context of pipeline abandonment or decommissioning, refers to a pipeline that has become corroded and perforated and transports ground or surface water to a different location (Pipeline Abandonment Steering Committee 1996).

Watercourse: A waterbody with defined bed and banks, whether or not water is continuously present, as defined for the purpose of this report by the Codes of Practice under the Alberta *Water Act* and determined in the field by a Qualified Aquatic Environment Specialist.

Water Crossing: A location where the existing pipeline crosses a watercourse.

Wetland: Land with the water table at, near or above the ground surface and/or saturated long enough to promote wetland or aquatic processes as indicated by hydric soils, hydrophytic vegetation and other biological activity adapted to wet environments (National Wetlands Working Group 1997).

1.0 INTRODUCTION

1.1 Project Description

The Enbridge Pipelines Inc. (Enbridge) Line 3 pipeline currently transports crude oil from the existing Enbridge Edmonton Terminal in Alberta to the Canada-United States border near Gretna, Manitoba. As part of the Enbridge Line 3 Replacement Program (referred to as "L3RP" or "the Project"), Enbridge is proposing to replace approximately 1,073 km of the existing Line 3 pipeline in the following two segments: from the Hardisty Terminal (Alberta) to the Cromer Terminal (Manitoba); and from NW 9-9-26 WPM (Manitoba) to Gretna Station (Manitoba).

Enbridge is applying to the National Energy Board (NEB) under Section 52 of the *NEB Act* to construct and operate the replacement pipeline; Section 58 of the *NEB Act* to install associated pumps, complete interconnection work at facility locations and construct new tanks at the Hardisty Terminal; and Section 45.1 of the *National Energy Board Onshore Pipeline Regulations* (*NEB OPR*) (NEB 2013) to decommission the corresponding existing Line 3 pipeline. Enbridge is currently exploring options regarding the existing pump stations and associated facilities. If the facilities will not experience flow for 12 months, an appropriate application will be submitted to the NEB at the appropriate time. Components of the Project generally consist of activities associated with the replacement pipeline, permanent facilities, temporary facilities and decommissioning.

The construction right-of-way for the replacement pipeline will typically be 45 m wide and will be composed of a new permanent easement, temporary workspace on areas outside the Enbridge mainline corridor and temporary workspace overlapping the Alberta Clipper Expansion Project (ACEP) right-of-way. Enbridge plans to decommission 1,046 km of the existing Line 3 pipeline. Decommissioning of the existing Line 3 pipeline will consist of pre-cleaning, fluid displacement, cleaning, isolation and segmentation. The existing Line 3 pipeline will be left in place within Enbridge's mainline corridor and subject to continued monitoring.

Pending regulatory approval, Enbridge plans to begin construction of the replacement pipeline in 2016 and place it into service in 2017. Decommissioning of the existing Line 3 pipeline will commence after the Line 3 Replacement pipeline is put into service.

Locations along the existing Line 3 pipeline and the proposed replacement route are referred to by Kilometre Posts (KPs). KPs are approximately 1 km apart and are primarily used to describe features along the pipeline route for construction, operation and maintenance purposes.

The system of KPs used along the Enbridge mainline corridor has a long history of use and is referred to as Mainline KPs (MKPs). Over the years, as subsequent pipelines have been added to the mainline corridor, both minor and major deviations have necessitated the need for a unique naming convention for each deviation from the mainline corridor.

For ease of reference, locations along the replacement pipeline route have been calibrated to each pump station/terminal and are referred to as Station KPs (SKPs). SKPs are numbered sequentially along the Line 3 replacement pipeline route, starting at SKP 176.0 at the Hardisty Terminal in Alberta and ending at Gretna Station in Manitoba at SKP 1279.0. Since the entire existing Line 3 pipeline is located within the Enbridge mainline corridor, locations along the existing pipeline in reference to decommissioning activities will continue to be referred to by MKPs.

Enbridge commissioned TERA, a CH2M HILL Company (TERA), to prepare an Environmental and Socio-Economic Assessment (ESA) for the Project (TERA 2014). To support the ESA, TERA prepared this Decommissioning Environmental Technical Report for the existing Line 3 pipeline. The results of this report were used in Project planning to identify and mitigate the potential long-term issues and effects of decommissioning the existing Line 3 pipeline on Environmentally Sensitive Areas and public safety. Specific Project details are included in the ESA (TERA 2014).

1.2 Regulatory Framework

The *NEB OPR* defines decommissioning as the permanent cessation of the operation of a pipeline without discontinuance of service, abandonment as the permanent cessation of the operation of a pipeline which

results in the discontinuance of service and deactivation as the temporary removal from service. Since Enbridge is replacing the existing Line 3 with a replacement pipeline, there will be no termination of service. As such, Enbridge has filed an application to decommission the existing Line 3 pipeline pursuant to Section 45.1 of the *NEB OPR.* In accordance with Canadian Standards Association (CSA) Z662-11 (CSA 2012) and subject to the conditions of the NEB approval, the decommissioning of the existing Line 3 pipeline will consist of operational pre-cleaning, product displacement, cleaning, isolation and segmentation. The existing Line 3 pipeline will be left in place within Enbridge's mainline corridor and subject to continued monitoring.

In addition, the following materials were consulted during the preparation of this report:

- Pipeline Abandonment - *A Discussion Paper on Technical and Environmental Issues* (Pipeline Abandonment Steering Committee 1996);
- Pipeline Abandonment Scoping Study (Det Norske Veritas [DNV] 2010);
- Pipeline Abandonment Assumptions: Technical and Environmental Considerations for Development of Pipeline Abandonment Strategies (Canadian Energy Pipeline Association [CEPA] 2007); and
- Land Matters Consultation Initiative (LMCI) Stream 3 Pipeline Abandonment – Financial Issues: Physical Plans for Abandonment (Enbridge 2011).

The Pipeline Abandonment Steering Committee was comprised of representatives of the Canadian Association of Petroleum Producers, CEPA, Alberta Energy and Utilities Board and NEB, and represented the input and views from a number of different industry and regulatory bodies. TERA and Enbridge conducted a review of the available information related to pipeline decommissioning and determined that decommissioning the existing Line 3 pipeline in place would reduce the risk to public safety and potential environmental effects of a decommissioned pipeline, to the greatest extent possible.

1.3 Objectives

The purpose of this report is to identify potential environmental issues and effects associated with a pipeline decommissioned in-place to be considered prior to the commencement of the existing Line 3 pipeline decommissioning. In addition, this report provides further discussion and proposes mitigation regarding potential effects associated with a pipeline decommissioned in-place to support the environmental and socio-economic effects assessment in the ESA.

According to the recommendations of the *Discussion Paper on Technical and Environmental Issues* (Pipeline Abandonment Steering Committee 1996), any decommissioning or abandonment plan should:

- be tailored to the specifics of the Project, including site-specific assessment, where necessary;
- include the opportunity for public and landowner input;
- comply with current regulatory requirements; and
- be broad in scope and encompass post-decommissioning responsibilities in terms of right-of-way monitoring and remediation.

The potential long-term issues associated with decommissioning in-place have been outlined in several studies regarding pipeline decommissioning or abandonment, including those prepared by DNV (2010), CEPA (2007) and Pipeline Abandonment Steering Committee (1996). According to the aforementioned studies, the primary considerations for decommissioning in-place can be summarized into the following categories:

- public safety;
- land use;

- ground subsidence;
- erosion and slope stability;
- the potential for the creation of water conduits;
- soil and groundwater contamination;
- pipe cleanliness; and
- watercourse crossings.

Each of these items has been considered as part of decommissioning planning and is discussed in detail in Sections 5.3 and 6.0.

Many of the potential effects associated with the physical process of decommissioning a pipeline are similar to the potential issues associated with pipeline construction, specifically, those related to activities that entail surface disturbance (*i.e.*, clearing, topsoil salvage, excavation, backfilling, topsoil replacement, revegetation, temporary access, spill prevention and clean-up). Environmental considerations and mitigation associated with surface disturbances necessary to decommission the existing Line 3 pipeline are provided in the ESA (TERA 2014) and are, therefore, not repeated in this report. This report is instead limited to addressing the environmental considerations exclusively associated with the decommissioning of the existing Line 3 pipeline in-place.

This report is further limited to the environmental and socio-economic concerns related to the decommissioning of the existing Line 3 pipeline, identified within applicable guidance documents described in Section 1.2 of this report and should be considered in conjunction with the discussion of the engineering risks and proposed treatments detailed in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).

2.0 DECOMMISSIONING LOCATIONS AND COMPONENTS

The segments of the existing Line 3 pipeline to be decommissioned are located from:

- Hardisty Terminal (E1/2 19-42-9 W4M) to Cromer Terminal (NE 17-9-28 WPM and SE 20-9-28 WPM); and
- NW 9-9-26 WPM to Gretna Station (SE 8-1-1 WPM).

Decommissioning the existing Line 3 pipeline will include the following activities which are further described in the subsections below:

- pipeline cleaning, including pre-cleaning of the pipeline prior to decommissioning, displacing fluids from the pipeline and post displacement cleaning;
- physical isolation of the pipeline from pump stations and terminals, and crossovers;
- the removal of above ground stand-alone valves which are not co-located with other Enbridge facilities associated with the pipeline;
- special treatment where warranted, including potential pipeline segmentation, to prevent the formation of water conduits;
- maintaining cathodic protection on the pipeline;
- ongoing monitoring and maintenance of the decommissioned pipeline right-of-way according to the standards and procedures for the safe and efficient operation activities managed in accordance with the Enbridge Operations and Maintenance Manuals (OMMs); and
- site-specific monitoring.

Enbridge is currently exploring options regarding the existing pump stations and associated facilities. If the facilities are not expected to experience flow for 12 months, an appropriate application will be submitted to the NEB regarding those facilities at the appropriate time. The physical isolation of the facilities associated with the existing Line 3 pipeline is described in Section 2.2.

2.1 Operational Pre-Cleaning, Fluid Displacement and Cleaning

The existing Line 3 pipeline will continue to be cleaned on a quarterly basis while still in-service from 2015 to 2018. The focus of this cleaning program will be to prevent the accumulation of trace water. Current cleaning tool runs have not reported any issues with solid build-ups within the existing Line 3 pipeline.

During decommissioning, all fluid within the pipeline will be displaced and the pipeline will be cleaned to reduce residual hydrocarbon deposits to the extent practical. A description of the fluid displacement and cleaning program is provided in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).

2.2 Isolation of Pump Stations, Terminals and Crossovers

The decommissioned pipeline will be physically separated from in-service piping according to CSA Z662-11 (CSA 2012) to prevent the reintroduction of product into the decommissioned pipeline. In addition, equipment and instrumentation on the decommissioned pipeline will be de-electrified for safety reasons. The pressure-containing side of any isolation location (as applicable) will be designed and installed according to all applicable industry and Enbridge standards. Isolation activities at each facility will be conducted upstream of the suction valve and downstream of the station discharge valve. It is anticipated that these activities will occur near the fenced boundaries of the pump stations and terminals to ensure that all auxiliary piping is isolated within the pump station or terminal. The precise location where these activities will occur will be evaluated on a site-specific basis to minimize disruption to any nearby infrastructure due to construction activities. The Hardisty Terminal and Gretna Station will only be isolated on the downstream

and upstream sides of the facility, respectively, as they are the initiating and terminating facilities of the Project.

The crossover piping that interconnects operating pipelines will be physically separated using cut and plate, blind-flange or other physical means which will be determined on a site-specific basis during the detailed engineering stage of the Project.

2.3 Removal of Remotely-Actuated Sectionalizing and Mainline Block Valves

Remotely-actuated sectionalizing valve (RSV) sites and mainline block valves (MLBVs) on the existing Line 3 pipeline will be closed and electrically isolated. They do not require physical separation from active piping associated with pipelines other than the proposed decommissioned Line 3 pipeline.

Above ground facilities that are to be decommissioned (*i.e.,* RSVs/MLBVs, instrumentation shelters, etc.) that are not co-located with other facilities along the right-of-way will be removed to a depth of 1 m below surface grade or to the top of the valve body, whichever is less, and the right-of-way will be restored.

An assessment of the cathodic protection system will be conducted at any location where the pipeline is physically separated to ensure the continuity and reliability of the cathodic protection system.

Ground disturbance activities will be necessary at locations where above ground facilities are removed.

2.4 Segmentation

Pipeline segmentation can be achieved in a number of ways.

- Exposing the pipeline in place, cutting the pipeline and installing caps to prevent the downslope flow of water within a subsection of the pipeline.

- Installing engineered fill to plug a section of the pipeline. An engineered fill can create an impermeable barrier to the flow of water, and may be installed with minimal surface disturbance. This method is based on new technology and Enbridge plans to conduct further literature reviews and testing prior to implementation. In the event that this (or other) method is not determined to be suitable, Enbridge will implement conventional excavation and cut and cap methods.

- The closure of mainline valves. Valves which are co-located with other Enbridge facilities will be closed, permanently disabled and de-energized. Stand-alone valves will be removed as described in Section 2.3.

- Facility isolation at select locations along the pipeline.

Any necessary ground disturbance activities are anticipated to occur in an area approximately 30 m wide by 12 m long, if conventional excavation and cut and cap methods are to be conducted. It is anticipated that most of the work will occur within the existing Enbridge right-of-way. In the event that ground disturbance is necessary for segmentation activities, Enbridge will meet all of the associated regulatory requirements.

Preliminary segmentation locations were selected based on environmental and engineering criteria, and are identified in Section 8.0. Final segmentation locations will be determined upon the completion of the field assessment, detailed engineering review and constructability assessment.

2.5 Cathodic Protection

Cathodic protection will be maintained on the decommissioned Line 3 pipeline in accordance with Enbridge's OMMs and commitments made by Enbridge to landowners. An evaluation of the cathodic protection system for the decommissioned pipeline will occur during detailed engineering. In the event that modifications to the system are necessary, they will be designed according to current regulatory requirements, industry standards and Enbridge design standards.

2.6 Ongoing Monitoring

Certain applicable and ongoing monitoring procedures outlined in Enbridge's OMMs will be extended to the decommissioned pipeline right-of-way and include:

- pipeline inspections during patrols;
- assessing areas of potential geotechnical instability;
- maintaining pipeline signage;
- performing depth-of-cover surveys;
- monitoring and maintaining the cathodic protection system;
- continuing maintenance of the right-of-way; and
- performing enhanced monitoring using ground penetrating radar or equivalent technology at primary highways and active railways.

The decommissioned pipeline will also remain part of Enbridge's programs for damage prevention and safe work practices, including:

- continuing Enbridge's public awareness program described in the Enbridge OMMs; and
- ensuring that ground disturbance activities by Enbridge or third-parties within the vicinity of the decommissioned pipeline are conducted in accordance with Enbridge construction specifications and OMMs. Typical requirements are:
  - specifying safe work distances during excavation;
  - surface locating and identifying the pipeline;
  - ensuring that the pipeline is crossed in a safe manner and applying temporary ramps or matting where warranted; and
  - verifying that construction activities will not negatively affect the integrity of the decommissioned pipeline or its cathodic protection system.

2.7 Site-Specific Monitoring

To ensure the safety of the general public, enhanced monitoring of primary highway and active railroad crossings for subsidence will be conducted using visual inspections as well as ground penetrating radar (or equivalent technology) of primary highways and active railways. The frequency of the monitoring program will be determined during detailed engineering. In the event that a deficiency, or area of concern, is discovered during the monitoring program, a risk assessment will be conducted to determine if remediation activities are necessary.

The methods used to identify, assess and treat those areas where subsidence is considered to be a potential risk to public safety are outside the scope of the Decommissioning Environmental Technical Report and are detailed in the Enbridge Engineering Chapter 7 of Volume 1 the Project application (Enbridge 2014).

3.0 METHODS

Decommissioning of the existing Line 3 pipeline was planned, and is based on, the steps outlined below.

- Step 1: Review all regulatory and environmental requirements for decommissioning activities.
- Step 2: Identify the scope of the decommissioning.
- Step 3: Obtain and review all pertinent operating history information for each planned decommissioned segment (*e.g.*, depth of cover surveys, pipeline operating history, historical incident records).
- Step 4: Review consultation records including landowner and public concerns in relation to the segments to be decommissioned.
- Step 5: Obtain and review all pertinent environmental data for the planned decommissioned segments (*e.g.*, land use, known Environmentally Sensitive Areas, etc.).
- Step 6: Complete a Risk Assessment.
- Step 7: Review the proposed segmentation locations for the existing Line 3 pipeline.
- Step 8: Prepare a high level overview of areas requiring additional study, special treatment (*i.e.,* areas that warrant segmentation or additional mitigation*)*, etc. as determined by Steps 3 to 7.
- Step 9: Complete any studies/assessments identified by Step 8.
- Step 10: Develop a decommissioning plan and submit an application for approval to the NEB.
- Step 11: Receive NEB approval.
- Step 12: Decommission the pipeline as proposed and amended according to any changes requested by the NEB.

This Decommissioning Environmental Technical Report focuses on the outcomes from Steps 3, 5, 8 and 9 (environmental evaluation of proposed decommissioning activities) and provides details on each recommended decommissioning treatment.

3.1 Data Sources

This decommissioning environmental technical report relied on a review of pre-existing data from the following four primary data sources.

- Historical information collected during previous projects along the Enbridge pipeline system as outlined in Section 3.1.1. This included biophysical and soils data collected from:
  - Enbridge ACEP (TERA Environmental Consultants 2007a,b, 2008);
  - Enbridge Alberta Southern Lights (TERA Environmental Consultants 2007c); and
  - Interprovincial Pipe Line Inc. Western Canada Pipeline Expansion (TERA Environmental Consultants [Alta.] Ltd. 1993).
- Geographical Information System (GIS) data provided by TERA. Datasets are summarized in Section 3.1.2.
- Field data collected as part of the L3RP where the replacement pipeline is adjacent or parallel to portions of the existing Line 3 pipeline to be decommissioned.
- Information from Enbridge regarding historical releases recorded for Line 3.

In addition, consultation records from the L3RP consultation program were reviewed and used to identify concerns related to decommissioning.

3.1.1 Historical Consultation Records from the Line 3 Replacement Program

A substantial amount of environmental information has been gathered through literature reviews, consultation with government agencies and field assessments conducted along the Enbridge mainline corridor. Much of this information has been compiled into technical reports that have been submitted to the NEB in support of various prior applications within the right-of-way shared with the existing Line 3 pipeline. Table 3.1.1-1 identifies areas and components of the Project where environmental information previously gathered has been incorporated into this decommissioning environmental technical report.

TABLE 3.1.1-1

SUMMARY OF APPLICABLE HISTORICAL STUDIES ALONG THE ENBRIDGE MAINLINE CORRIDOR AND REPLACEMENT PIPELINE ROUTE

Document	Associated Project Name	Locations Relevant to the Existing Line 3	Comments
• ESA (TERA Environmental Consultants 2007a) • Early and Late Summer Rare Vegetation Plant Survey (TERA Environmental Consultants 2007a) • Wildlife and Habitat Survey (TERA Environmental Consultants 2007a) • Wetland Report (TERA Environmental Consultants 2007a,b, 2008) • Soil Survey (TERA Environmental Consultants 2007a) • Fish Population and Ravine Habitat Inventory (TERA Environmental Consultants 2007a)	ACEP (2007)[1]	MKP 175.7 to MKP 1245.2	Environmental data from the Alberta Clipper Project ESA, including the listed technical reports, were used to create a baseline of information for the purpose of identifying Environmentally Sensitive Areas, including watercourses with fish habitat potential, Class IV and greater wetlands, as well as sensitive wildlife and native vegetation habitat areas. Soils data were also used to identify soil types and topography along the route for the purpose of identifying saline and sodic soils, and topographically steep slopes with erosion potential.
• ESA (TERA Environmental Consultants 2007c) • Soil Survey (TERA Environmental Consultants 2007c) • Fish, Bivalve and Aquatic Habitat Surveys (TERA Environmental Consultants 2007c) • Wetland Characterization (TERA Environmental Consultants 2007c) • Early and Late-Summer Rare Vascular Plant and Plant Community Surveys (TERA Environmental Consultants 2007c) • Fish Population and Ravine Habitat Inventory (TERA Environmental Consultants 2007c) • Wildlife and Wildlife Habitat Surveys for Species of Concern (TERA Environmental Consultants 2007c)	Alberta Southern Lights (2007)	MKP 959.2 to MKP 1245.2	Environmental data from the Alberta Southern Lights Project ESA, including the listed technical reports, were used to create a baseline of information for the purpose of identifying Environmentally Sensitive Areas, including watercourses with fish habitat potential, Class IV and greater wetlands, as well as sensitive wildlife and native vegetation habitat areas. Soils data were also used to identify soil types and topography along the route for the purpose of identifying saline and sodic soils, and topographically steep slopes with erosion potential.
• Fisheries Assessment (TERA Environmental Consultants [Alta.] Ltd. 1993) • Soil Survey (Pedocan Land Evaluation Ltd. 1993, 1994)	Capacity Expansion Program (Western Canada Pipeline Extension) (1993)	MKP 175.7 to MKP 704.7	Soils data from the Capacity Expansion Program (Western Canada Pipeline Extension) Project were used to identify soil types along the existing Line 3 for the purpose of saline and sodic soil conditions, and topographically steep slopes with erosion potential. Fish and fish habitat information was used to identify watercourses containing sportfish species along the existing Line 3 for the purpose of identifying potential segmentation locations.

Note: 1 Due to limited land access and the varied construction schedule, there were numerous reports for most biophysical studies during the ACEP.

3.1.2 Geographic Information System Data Sources

A combination of federal, provincial and proprietary GIS datasets were used in the formation of this technical report. These datasets are described in Table 3.1.2-1.

TABLE 3.1.2-1

SUMMARY OF GIS DATA

Attribute	Attribute Description	Data Source
Municipal Areas	Town and city boundaries.	Alberta: AltaLIS. 2014. Alberta Municipal Boundaries (digital file). Calgary, AB. Available: http://www.altalis.com. Acquired: January 2014. Last Update Check: October 16, 2014. Saskatchewan: Information Services Corporation of Saskatchewan. 2013. Sask Cartographic Rural Municipality (digital file). Regina, SK. Available: https://www.geosask.ca/Portal/ptk. Acquired: March 2013. Last Update Check: October 16, 2014. Manitoba: Manitoba Community Planning Services. 2007. Manitoba Municipal Boundaries (digital file). Winnipeg, MB. Available: https://mli2.gov.mb.ca/adminbnd/index.html. Acquired: June 2011. Last Update Check: October 16, 2014.
Natural and Ecologically Significant Areas	Natural and ecologically significant areas designated by regional, provincial, federal or internationally recognized programs (such as conservation areas, nature reserves, and International Biological Program sites). Includes federal and provincial parks.	Alberta: Alberta Tourism, Parks and Recreation (ATPR) - Parks Division. 2012. Protected Areas (pashape_ocsites_10tm) (digital file). Edmonton, AB. Available: http://albertaparks.ca/albertaparksca/library/downloadable-data-sets.aspx. Acquired: February 2013. Last Update Check: October 16, 2014. Saskatchewan: Saskatchewan Environment. 2013. Planning - Representative Areas Network (digital file). Regina, SK. Available: https://www.geosask.ca/Portal/. Acquired: March 2013. Last Update Check: October 16, 2014. Saskatchewan: Information Services Corporation of Saskatchewan. 2013. SaskAdmin 2013 Parks (digital file). Regina, SK. Available: https://www.geosask.ca/Portal/ptk. Acquired: March 2013. Last Update Check: October 16, 2014. Manitoba: Manitoba Department of Conservation. 2010. Wildlife Management Areas (digital file). Winnipeg, MB. Available: https://mli2.gov.mb.ca/mli_data/index.html. Acquired: December 2011. Last Update Check: October 16, 2014. Manitoba: Manitoba Department of Conservation. 1997. Conservation Lands Administrative Boundary (digital file). Winnipeg, MB. Available: https://mli2.gov.mb.ca/mli_data/index.html. Acquired: June 2010. Last Update Check: October 16, 2014. Manitoba: Manitoba Department of Conservation. 2011. Protected Areas Boundaries (digital file). Winnipeg, MB. Available: https://mli2.gov.mb.ca/mli_data/index.html. Acquired: December 2011. Last Update Check: October 16, 2014.
Wetlands and Wetland Complexes	All Class IV and V, including wetland complexes, as well as Class VI wetlands with a semi-permanent or permanent presence of surface water, that are located in close proximity to the Line 3 pipeline.	Wetlands data collection occurred during field surveys and was assisted by satellite imagery interpretation. Specific survey techniques and methodology are provided in in the ESA Appendix 8 – Wetland Technical Report.
Groundwater Considerations	Permeable (sandy) soils and areas with a high water table.	Sandy soils and areas with a high water table were identified in the field as part of soil surveys. Specific survey techniques and methodology are provided in the ESA Appendix 4 - Soil Survey.
Watercourses	Fish bearing watercourses crossed by the pipeline. Identified during field surveys.	Fish habitat, watercourses and waterbodies were identified in the field. Specific survey techniques and methodology are provided in the ESA Appendix 7 - Aquatics Technical Report.
Connected Drainage Areas	Small watercourses or overland drainages which are connected to fish bearing watercourses or wetland complexes. Identified using the National Hydrology Network (NHN) by Environment Canada and Digital Elevation Map (DEM).	NHN Data, All Provinces: Natural Resources Canada. 2007-2011. National Hydro Network (digital files). Sherbrooke, QC. Available: http://www.geobase.ca/geobase/en/data/nhn/index.html. Acquired: April 2012. Last Update Check: October 16, 2014. DEM, All Provinces: ESRI, World Terrain Base Map. http://www.arcgis.com/home/item.html?id=c61ad8ab017d49e1a82f580ee1298931
Unstable Slopes	Slopes which are vulnerable to subsidence and scouring or with compromised structural integrity (*e.g.,* valley and coulee crossings). Identified using topographic data obtained during soil surveys, aerial imagery and a DEM.	Profile, Existing Line 3 Pipeline and Aerial Data: Provided by Enbridge, 2013/Soils Topography: Clipper Project/2013 DEM, All Provinces: ESRI, World Terrain Base Map. http://www.arcgis.com/home/item.html?id=c61ad8ab017d49e1a82f580ee1298931

3.1.3 Field Data Collection

Biophysical data were collected in the field along the proposed L3RP route in 2013 and 2014 in support of the ESA. These data are also relevant to the existing Line 3 pipeline since the replacement pipeline route parallels or adjoins both the ACEP right-of-way and the mainline corridor for the majority of its length. Biophysical data collected for the existing Line 3 pipeline were also considered in preparation of this report.

Survey methods, sampling protocols and the timing of biophysical surveys are provided in the following technical reports included in the ESA:

- ESA Appendix 3 – Pipeline and Facility Soil Survey;
- ESA Appendix 7 - Aquatics Technical Report;
- ESA Appendix 8 - Wetland Technical Report;
- ESA Appendix 9 - Vegetation Technical Report; and
- ESA Appendix 10 - Wildlife Technical Report.

4.0 CONSULTATION

Enbridge has implemented and continues to conduct open, extensive and thorough public consultation, as well as Aboriginal engagement and landowner relations programs. These programs are based on Aboriginal groups, landowner and stakeholder groups' interests and inputs, knowledge levels, time and preferred methods of engagement. Please refer to Section 3.0 of the ESA (TERA 2014) for a complete overview and results of the stakeholder consultation and Aboriginal engagement programs.

Stakeholder consultation was initiated by Enbridge in June 2013. The concerns identified by landowners regarding the decommissioning of the existing Line 3 pipeline are summarized in Table 4.0-1.

TABLE 4.0-1

LANDOWNER CONCERNS

Issues/Concerns	Mitigation	Section Where Issue is Addressed
Landowners are concerned with leaving the decommissioned pipeline in-place.	The decommissioned pipeline will be safely and permanently removed from operation. By leaving the decommissioned pipeline in-place, Enbridge reduces landowner, environmental and community disturbance. Enbridge will remain responsible and monitor the decommissioned right-of-way at no cost to the landowner.	N/A
Landowners were concerned that the pipeline would become the responsibility of the landowner.	Enbridge will remain responsible and monitor all of its pipelines, whether active or decommissioned. Enbridge will be responsible for any ongoing maintenance costs and will ensure that the right-of-way remains safe for both landowners and the environment. Enbridge will obtain an order from the NEB prior to decommissioning and will follow all applicable conditions.	See Sections 2.6 and 2.7, and Table 4.0-2 of this report.
Landowners were concerned about pipeline abandonment funding, meaning how Enbridge will ensure that appropriate funding is set aside to continue maintenance of abandoned pipelines.	Enbridge will begin collecting abandonment funding from its shippers in 2015 in accordance with the NEB's decision in MH-001-2012. The calculation of amounts required to be collected assumed that abandoned pipelines would be monitored in perpetuity, including any remediation required as a result of events occurring post-abandonment. Enbridge will ensure that the decommissioned pipeline will be safely and permanently removed from operation. Enbridge will remain responsible and monitor the decommissioned right-of-way at no cost to the landowner.	N/A
Landowner is concerned with the decommissioned pipeline affecting land value and future services.	The decommissioned line will remain in an active pipeline corridor and is not expected to affect property values. Enbridge will maintain the decommissioned right-of-way in the same manner as its active rights-of-way. Enbridge land agents will be available to the landowner to discuss issues.	N/A
Landowner raised concerns about continuing to be paid on the decommissioned pipeline.	Landowner will be contacted by the local Enbridge Land Agent to resolve. Enbridge will not be providing ongoing payments on the decommissioned pipeline.	N/A
Landowners have concerns with pipe deterioration.	Enbridge will be responsible for any ongoing maintenance costs and will ensure the pipeline remains safe for both landowners and the environment. Enbridge will utilize cathodic protection in accordance with Enbridge's OMM practices on the decommissioned pipeline.	See Sections 2.5, 2.6 and 2.7 of this report. See Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).

TABLE 4.0-1 Cont'd

Issues/Concerns	Mitigation	Section Where Issue is Addressed
Landowner raised concerns regarding the collapse of the decommissioned pipeline.	The decommissioning of the pipeline will comply with regulatory guidelines and industry accepted practices. Enbridge will regularly monitor the decommissioned pipeline in perpetuity. Enbridge will ensure that the pipeline remains safe for both landowners and the environment. Enbridge will continue to study the causes and effects of pipeline corrosion. Areas of potential subsidence will continue to be routinely monitored until abandonment and remediated, where warranted. Cathodic protection will be maintained along the decommissioned pipeline.	See Sections 5.3 and 6.0 of this report. See the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).
Landowner is concerned with water causing pipeline corrosion.	Enbridge will be responsible for any ongoing maintenance costs and will ensure the decommissioned pipeline remains safe for both landowners and the environment. Enbridge will utilize cathodic protection in accordance with Enbridge OMM practices on the decommissioned pipeline.	See the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).
Landowner requested that the decommissioned pipeline be cleaned properly.	Decommissioning of the pipeline will comply with regulatory guidelines and industry accepted practices.	See Sections 5.3.7 and 7.1.2 of this report. See the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).
Landowner is concerned with how Enbridge monitors the segmented decommissioned line.	Enbridge will remain responsible and monitor the decommissioned pipeline at no cost to the landowner. Enbridge will be responsible for any ongoing maintenance costs and will ensure that the right-of-way remains safe for both landowners and the environment.	See Sections 2.6 and 2.7 of this report.
Landowners requested Enbridge ensure that the decommissioned pipeline continues to be monitored.	Enbridge will remain responsible and monitor the decommissioned pipeline at no cost to the landowner. Enbridge will be responsible for any ongoing maintenance costs and will ensure that the right-of-way remains safe for both landowners and the environment.	See Sections 2.6 and 2.7 of this report.
Landowners expressed concerns regarding responsibilities for weed control on the decommissioned right-of-way.	Enbridge will ensure that the mainline right-of-way will continue to be maintained as before.	See Appendix G of the Pipeline EPP.
Landowners had concerns about Enbridge's existing operations and unresolved issues from past projects.	Enbridge land representatives have been and will continue to work with landowners impacted by integrity digs and past projects. Enbridge invites landowners to continue to communicate and work with their respective land representatives to resolve any outstanding issues.	N/A

Note: - For a complete list of concerns regarding the L3RP identified during the consultation process, see Section 3.0 and Appendix 3 of the ESA.

The concerns regarding the decommissioning of the existing Line 3 pipeline raised by provincial and municipal stakeholders are summarized in Table 4.0-2.

TABLE 4.0-2

DECOMMISSIONING ISSUES FROM PROVINCIAL AND MUNICIPAL STAKEHOLDERS

Stakeholder Group/Agency Name	Method of Contact	Date of Consultation Activity	Consultation Outcomes/Issues/Concerns	Commitments/ Follow-ups/Comments
Government - Provincial				
Saskatchewan Ministry of Highways and Infrastructure	Meeting	July 9, 2014	Enbridge representatives explained the decommissioning process. Saskatchewan Highways and Infrastructure representatives inquired as to why Enbridge would choose to segment parts of the decommissioned line. Enbridge representatives explained that this would be done to reduce environmental and safety risk while being much less invasive than removing the pipeline.	None.
Manitoba Conservation and Water Stewardship (MCWS)	Email	April 14, 2014	A MCWS representative sent an email to Enbridge detailing feedback on the Project from the technical advisory committee. Topics outlined in the email included: water use licensing; hydrostatic testing; waterways; waterbodies; water crossings; groundwater management; drinking water; rare species data; decommissioning; and land use regulations and planning.	Enbridge requested responses to questions regarding the wetland permits under various Government of Manitoba acts. On May 8, 2014, MCWS informed Enbridge that an application for a licence under the *Environment Act* is not required for the Project because it is interprovincial and, therefore, regulated by the NEB.
	Email	April 14, 2014	Enbridge received the copies of the letters sent by MCWS - Environmental Application Branch to MCWS - Environmental Assessment and Licensing Branch.	
	Email	April 24, 2014	Enbridge emailed MCWS regarding a discussion that occurred during the Glenboro Coffee Talk on April 15, 2014. Enbridge requested additional information from MCWS on local aquifers and a data set with public wells and water sources. Enbridge confirmed that they had copies of regional watershed plans. Enbridge explained that a MCWS representative had identified concerns with aquifers and drinking water quality through one of the MCWS groups. Enbridge provided MCWS a preliminary shapefile of the proposed route. MCWS provided a link to the Integrated Watershed Management Plan (IWMP) and brought up several points associated with the West Souris IWMP that included reclamation and decommissioning. MCWS provided Enbridge with the contact information for the local Drinking Water Officer. In addition, MCWS provided a link to the IWMP and brought up several points associated with the West Souris IWMP. • Oil development should minimize habitat impacts by avoiding natural areas (pg. 45 of the IWMP). There is an area shown on the map which shows a "*mixed grass prairie corridor*". This area is the area to which the action is targeted and specifically speaks to avoidance of the current mixed grass prairie ecosystem. • Create a formal plan for removal of abandoned pipelines to satisfy stakeholders in the watershed (pg. 45 of the IWMP). • Encourage oil companies to set aside funding for reclamation for abandoned pipelines to restore the area to conditions previous to pipeline installation. • Work with partnering agencies to develop invasive species management plans. MCWS explained that the water planning authority carries out Source Water Protection Planning for public water systems within the watershed plan boundary. A link to the West Souris Watershed Management Plan was provided.	None.
	Email	May 13, 2014		

TABLE 4.0-2 Cont'd

Stakeholder Group/Agency Name	Method of Contact	Date of Consultation Activity	Consultation Outcomes/Issues/Concerns	Commitments/ Follow-ups/Comments
Manitoba Infrastructure and Transportation (MIT)	Meeting	June 12, 2014	MIT representatives indicated that they were concerned about liability for environmental damage and will provide Enbridge with conditions that are required for decommissioning the pipeline within the MIT right-of-way. MIT representatives expressed concern about the depth of cover over existing pipelines when modifications to the existing drainage or highway expansion occur. If the highway right-of-way is increased, MIT and Enbridge will need to discuss mitigation measures for depth-of-cover, which could have cost implications and may require an agreement be signed between MIT and Enbridge. The letter dated April 1, 2014 indicated MIT had reviewed the documents circulated for the Project and offered the comments relating to the *Highways and Transportation Act* permits and the *Highways Protection Act* permits. The letter dated April 14, 2014 indicated that in addition to the comments provided on April 1, 2014 letter, MIT would require all decommissioned pipeline within the Department's right-of-way to be removed. MIT representatives will assess their 5 year plan and may request extra depth of cover or extra length of heavy-wall pipe in areas where future highway expansion or drainage infrastructure is currently planned along Enbridge's mainline corridor. MIT representatives inquired as to how wide the right-of-way could become as other pipes require replacement over time. MIT representatives agreed to re-issue their letter regarding their position on pipe removal, which had changed due to the understanding that Line 3 is within the mainline corridor that is comprised of four to six other active pipelines located in close proximity to one another and that Enbridge is responsible for the decommissioned pipe.	Enbridge met with a MIT representative on June 12, 2014. As a result of the meeting, MIT has a more complete understanding of the Project and, therefore, no longer requires Enbridge to remove decommissioned pipelines from the MIT right-of-way. A letter dated June 14, 2014 further affirmed this position.
Government - Municipal				
Town of Kerrobert, Saskatchewan	Meeting	May 1, 2014	Enbridge representatives conducted a socio-economic technical discussion with representatives from of the Town of Kerrobert. The topics discussed were: development and land use; hunting; trapping; outfitting; outdoor recreation; decommissioning; steady population growth; water supply; waste management; commercial accommodation; services; recreational amenities; economy; employment; tourism; parks and protected areas; weeds and vegetation; roads; airports; power supply; health care; and emergency services.	None.
Rural Municipality (RM) of Fertile Valley, Saskatchewan	Meeting	May 6, 2014	Enbridge representatives conducted a socio-economic technical discussion with representatives from the RM of Fertile Valley. The topics discussed were: emergency response; economic impact; and social and cultural well-being. It was indicated that one community member (from the Canadian Association of Energy and Pipeline Landowner Associations) was concerned with the potential effects on drinking water quality from the decommissioned pipeline at the South Saskatchewan River crossing.	Standard mitigation measures will be employed to reduce the potential effects on groundwater and surface water.
RM of South Qu'Appelle, Saskatchewan	Meeting	August 7, 2013	Enbridge representatives met with the RM to provide an overview of the Project and associated consultation activities, and to address any questions or concerns. This Project will only involve decommissioning in this RM. The decrease in taxes may be of concern to the council. RM representative will address this at their next meeting.	Enbridge does not pay property tax on decommissioned pipelines.

TABLE 4.0-2 Cont'd

Stakeholder Group/Agency Name	Method of Contact	Date of Consultation Activity	Consultation Outcomes/Issues/Concerns	Commitments/ Follow-ups/Comments
Town of Kipling, Saskatchewan	Meeting	August 7, 2013	Enbridge representatives met with the Town of Kipling to provide an overview of the Project and associated consultation activities, and to address any questions or concerns. Meeting topics included: possible mitigation measures to prevent the pipe from slumping or from acting as a conduit for water; integrity digs; and losses in pipeline revenue for Town. Project will be put on agenda for council to review.	Enbridge is responsible for all of its pipelines, whether or not those pipelines are active or decommissioned. Enbridge will monitor the decommissioned pipeline right-of-way in perpetuity. In follow up conversations, Enbridge confirmed that it does not pay property tax on decommissioned pipelines, however, it does pay property tax on the replacement pipelines. There will be little, if any, revenue loss.
RM of Walpole, Saskatchewan	Meeting	September 6, 2013	Enbridge conducted a socio-economic technical discussion. The topics discussed included population, emergency services, planning, hunting and trapping, navigable waters, recreation, schools, tourism and events, traffic, air access, health care, water supply, waste management – water, solid waste management, accommodation and services, past issues with projects in the area, employment and economy, parks and protected areas. The municipal representative mentioned concern amongst residents in the RM of Walpole regarding responsibility for the old pipeline following decommissioning. The municipal representative noted that she was not aware of any past issues with pipeline work interfering with land use. Impacts to harvest and seeding activities were possible depending on the time of year that construction would take place. The municipal representative noted that the RM of Walpole was also concerned about road closures and their potential impact during harvest and seeding activities.	General industry-accepted standards to mitigate for any potential interference with traffic and farm access during harvest and seeding activities will be implemented. Enbridge is responsible for all its pipelines, whether or not those pipelines are active or decommissioned. Enbridge will monitor the decommissioned pipeline right-of-way in perpetuity. Enbridge will be responsible for any ongoing maintenance costs and will ensure that the segments remain safe for both landowners and the environment. Enbridge will obtain approval from the NEB prior to decommissioning and will follow all applicable conditions as long as the pipeline remains in place.
RM of Lorne, Manitoba	Meeting	May 29, 2014	Enbridge representative had an in-person meeting with a RM of Lorne representative. The topics discussed were: soil – clubroot; groundwater quality and quantity; water well quality and quantity; emergency response; pipeline integrity; spill prevention and management; heritage resources; compensation; traffic; and dust. No future issues or concerns arose during this discussion.	None.
RM of Glenwood, Manitoba	Meeting	July 9, 2013	Enbridge representative provided project overview of project to the RM of Glenwood. Enbridge representative covered decommissioning facts, confirmed that Enbridge maintains responsibility for pipe in perpetuity once decommissioned. Explained specific integrity issues with this line. The RM voiced concerns about weed control, clubroot, uneven land and subsidence. On a previous Enbridge project, weed control was not performed long enough. Enbridge will assist and advise with these issues. RM would like the integrity digs to stop occurring if possible.	Enbridge has developed a comprehensive identification, prevention, treatment and monitoring program for weeds. This includes a complete weed survey, development of mitigation to prevent the spread and introduction of weeds, and specific construction practices. These practices are developed in consultation with counties, regulators and landowners. Mitigation may involve cleaning stations, pre-construction treatment of problem areas, seeding and reclamation, and post-construction monitoring and treatment.

TABLE 4.0-2 Cont'd

Stakeholder Group/Agency Name	Method of Contact	Date of Consultation Activity	Consultation Outcomes/Issues/Concerns	Commitments/ Follow-ups/Comments
Environmental Non-Government Organizations				
Battle River Watershed Alliance (BRWA)	Phone	August 12, 2013	Enbridge returned BRWA's call and reviewed the Project details. BRWA requested a detailed map of the section proposed for replacement in Alberta so that BRWA's executive board could review on August 14, 2013. BRWA inquired as to why the line was not being removed and Enbridge responded according to public consultation materials.	None.
Saskatchewan Eco-Network	Email	August 26, 2013	The Saskatchewan Eco-Network indicated that it would forward the Project information to its members. The Saskatchewan Eco-Network indicated that if the line is to be decommissioned, it should be dug up, as liability for pipe corrosion and collapse should not rest with the farmer. The Saskatchewan Eco-Network indicated that the Project was circumventing the proper approval process.	Enbridge emailed the Saskatchewan Eco-Network to explain the required regulatory approvals for decommissioning and stated that Enbridge is responsible for all of its pipelines, whether or not those pipelines are active or decommissioned.

5.0 RESULTS AND CONCLUSIONS OF THE DESKTOP/LITERATURE REVIEW

5.1 Environmental Setting Summary

A summary of the environmental setting for select environmental considerations along the existing Line 3 pipeline and reference to where greater detail can be found, is provided in Table 5.1-1. Greater detail regarding land use and the environmental setting is provided in Section 5.0 of the ESA (TERA 2014).

TABLE 5.1-1

SUMMARY OF ENVIRONMENTAL SETTING AND CONSIDERATIONS FOR THE LINE 3 PIPELINE

Subject	Summary of Setting and Considerations
Alberta (E1/2 19-42-9 W4M to NE 25-37-1 W4M)	
Municipal Authority (Municipal District [MD])	MD of Provost No. 52
Ownership	The existing pipeline crosses both privately-owned and Crown lands as identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Wetland Crossings[1] (Classification[2]/ Number of Crossings)	Class V – 1
Watercourse Crossings	Ribstone Creek, Eyehill Creek and two unnamed tributaries are encountered by the existing Line 3 pipeline; specific information regarding the watercourse crossings is provided in the Aquatics Technical Report prepared for the Project (Appendix 7 of the ESA)
Groundwater	Locations where water was identified at trench depth are identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Soils	Locations of sandy soils, as well as saline and sodic soils, are identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Steep Slopes, Valley and Coulee Crossings	Areas of steep slopes (slopes greater than 10%), and valley and coulee crossings are identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Pipeline Depth of Cover	Areas where depth of cover surveys completed by Enbridge identified pipe depth of < 0.6 m are shown on the Decommissioning Environmental Alignment Sheets (Appendix B)
Land Use	Land use encountered by the existing Line 3 pipeline in Alberta is shown on the Decommissioning Environmental Alignment Sheets (Appendix B) and includes cultivated, disturbed, hay, hay/pasture, tame pasture, native prairie and treed pasture lands
Saskatchewan (NE 25-37-29 W3M to NE 1-10-30 WPM)	
Municipal Authority (RM)	Eye Hill No. 382, Heart's Hill No. 352, Progress No. 351, Mariposa No. 350, Oakdale No. 320, Winslow No. 319, Mountain View No. 318, Marriott No. 317, St. Andrews No. 287, Milden No. 286, Fertile Valley No. 285, Loreburn No. 254, Willner No. 253, Huron No. 223, Craik No. 222, Dufferin No. 190, Pense No. 160, Sherwood No. 159, Edenwood No. 158, Lajord No. 128, Francis No. 127, Montmartre No. 126, Chester No. 125, Kingsley No. 124, Silverwood No. 123, Wawken No. 93, Walpole No. 92, Maryfield No. 91
Ownership	The existing Line 3 pipeline crosses both privately-owned and Crown lands as identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Wetland Crossings[1] (Classification[2]/ Number of Crossings)	Class V – 26
Watercourse Crossings	The existing Line 3 pipeline crosses a total of 53 rivers, creeks and drainages; specific information regarding the watercourse crossings is provided in the Aquatics Technical Report prepared for the Project (Appendix 7 of the ESA)
Groundwater	Locations where water was identified at trench depth are identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Soils	Locations of sandy soils, as well as saline and sodic soils, are identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Steep Slopes, Valley and Coulee Crossings	Areas of steep slopes (slopes greater than 10%), and valley and coulee crossings are identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Pipeline Depth of Cover	Areas where depth of cover surveys completed by Enbridge identified pipe depth of < 0.6 m are shown on the Decommissioning Environmental Alignment Sheets (Appendix B)
Land Use	Land use encountered by the existing Line 3 pipeline in Saskatchewan is shown on the Decommissioning Environmental Alignment Sheets (Appendix B) and includes cultivated, disturbed land, hay, hay/pasture, tame pasture, native prairie, shrub pasture, treed, treed pasture, open water and river crossings
Manitoba (NW 6-10-29 WPM to NE 17-9-28 WPM and NW 9-9-26 WPM to SE 8-1-1 WPM)	
Municipal Authority (RM)	Wallace No. 199, Pipestone No. 162, Sifton No. 184, Glenwood No. 131, Oakland No. 157, South Cypress No. 187, Argyle No. 102, Lorne No. 144, Pembina No. 161, Thompson No. 195, Stanley No. 190, Rhineland No. 164
Ownership	The existing Line 3 pipeline crosses both privately-owned and Crown lands as identified on the Decommissioning Environmental Alignment Sheets (Appendix B)

TABLE 5.1-1 Cont'd

Subject	Summary of Setting and Considerations
Wetland Crossings[1] (Classification[2]/ Number of Crossings)	Class V – 2
Watercourse Crossings	The existing Line 3 pipeline crosses Pipestone Creek, Black Creek, the Souris River, Spring Brook, Oak Creek, the Cypress River, Mary Jane Creek, Thornhill Coulee, Deadhorse Creek, Hespeler Drain, Rosenhiem Drain, Buffalo Creek and various unnamed waterbodies; specific information regarding the watercourse crossings is provided in the Aquatics Technical Report prepared for the Project (Appendix 7 of the ESA)
Groundwater	Locations where water was identified at trench depth are identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Soils	Locations of sandy soils, as well as saline and sodic soils, are identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Steep Slopes, Valley and Coulee Crossings	Areas of steep slopes (slopes greater than 10%), and valley and coulee crossings are identified on the Decommissioning Environmental Alignment Sheets (Appendix B)
Pipeline Depth of Cover	Areas where depth of cover surveys completed by Enbridge identified pipe depth of < 0.6 m are shown on the Decommissioning Environmental Alignment Sheets (Appendix B)
Land Use	Land use encountered by the existing Line 3 pipeline in Manitoba is shown on the Decommissioning Environmental Alignment Sheets (Appendix B) and includes cultivated land, disturbed land, hay, tame pasture, native prairie, treed and treed pasture

Notes: 1 Wetlands within 10 m of the Line 3 pipeline, on the north side or the south side of the centre line, were considered.

2 Definitions of wetland classes are provided in the Wetland Technical Report (TERA 2014*)* prepared for the Project.

5.2 Historical Releases

Locations and volumes of historical releases documented by Enbridge related to the existing Line 3 pipeline are included in Table 5.2-1.

TABLE 5.2-1

HISTORIC RELEASES OF LINE 3

Province	MKP	Date	Estimated Volume Released (m^3)
Alberta	176.1	January 17, 2001	3,800
Alberta	207.6	October 22, 1992	0.48
Alberta	207.8	October 22, 1975	1.4
Alberta	209.4	November 22, 1992	0.48
Alberta	225.1	July 21, 1967	2,861.8
Saskatchewan	286.9	July 26, 1967	397.5
Saskatchewan	407.5	July 28, 1975	1,674
Saskatchewan	458.0	March 31, 1990	15.9
Saskatchewan	504.1	January 19, 1970	238.5
Saskatchewan	589.0	July 26, 1974	39.8
Saskatchewan	603.4	August 21, 1997	0
Saskatchewan	636.0	December 6, 1993	0.04
Saskatchewan	714.9	May 20, 1999	3,123
Saskatchewan	769.1	September 10, 1994	3.2
Saskatchewan	770.7	September 10, 1999	3.2
Saskatchewan	814.2	April 15, 2007	990
Saskatchewan	815.4	February 27, 1996	800
Saskatchewan	835.0	June 16, 1995	1,768
Saskatchewan	856.6	July 15, 1994	23
Saskatchewan	857.0	June 28, 1993	0.005
Saskatchewan	883.3	November 13, 1995	768
Saskatchewan	884.3	September 1, 1989	3,136.8
Manitoba	1023.4	October 22, 1984	3.2
Manitoba	1061.0	November 5, 1967	2,702.8
Manitoba	1063.2	October 14, 1967	4,928.6
Manitoba	1140.2	August 30, 1972	0.8

TABLE 5.2-1 Cont'd

Province	MKP	Date	Estimated Volume Released (m^3)
Manitoba	1147.9	October 19, 1964	7.9
Manitoba	1157.7	April 18, 1997	1.0
Manitoba	1163.2	October 17, 1990	0.5
Manitoba	1181.6	October 12, 1968	0.8
Manitoba	1226.8	October 2, 1964	7.9
Manitoba	1227.0	January 22, 1973	0.8

If residual contamination from a historical release is discovered during decommissioning activities, it will be assessed and remediated according to the NEB *Remediation Process Guide* (NEB 2011).

5.3 Potential Effects of Decommissioning In-Place

The potential effects of decommissioning in-place as identified within the guideline documents are listed in Section 1.2 are summarized in Sections 5.3.1 to 5.3.8. Each of these potential effects and the proposed mitigation measures (if required) are outlined below and are based on the data sources described herein.

Public safety is identified as the most important concern when considering pipeline decommissioning and many of the potential effects of decommissioning a pipeline in-place are also identified as public safety concerns. However, the category of public safety cannot be considered in isolation of the potential effects of decommissioning. Therefore, while a general discussion of public safety is included below, public safety concerns specific to each potential long-term effect of decommissioning are discussed within the appropriate subsection below.

This report intends to present the issues identified within the guideline documents and is limited to the environmental and socio-economic concerns related to the decommissioning of the existing Line 3 pipeline. The complete discussion of the engineering risks and proposed treatments are detailed in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).

5.3.1 Public Safety

Public safety is the primary consideration in the identification of potential effects associated with a decommissioned pipeline. Public safety concerns include: utility and road crossings; long-term development; ground subsidence; and pipeline exposure (CEPA 2007, DNV 2010, Pipeline Abandonment Steering Committee 1996).

The crossing of primary and secondary roads, railways and utilities (including other pipelines), power and communications lines by pipelines are subject to specific agreements, which are put in place during pipeline construction and operation to ensure public safety. Since decommissioning a pipeline at a crossing may have consequences for infrastructure integrity and public safety (Pipeline Abandonment Steering Committee 1996) due to ground subsidence, special considerations must be made to reduce the potential effects of decommissioning. These issues are discussed in Section 5.3.3.

In addition, pipelines have the potential to be exposed, particularly at watercourse crossings as a result of flooding, erosion and/or buoyancy issues with the pipeline. Exposed pipelines are a concern for public safety, particularly at navigable watercourse crossings. These issues are discussed in Section 5.3.8 in consideration of the potential effects associated with watercourse crossings.

The effects of frost heaving may also increase the potential for decommissioned pipelines to become exposed and are further discussed in Section 5.3.3.

Contaminants from previous pipeline activities and the possible introduction of a water conduit which could cause contaminant migration were also identified as areas of concern for public safety. These concerns are discussed in the Sections 5.3.6 and 5.3.7.

Public safety issues associated with long-term development plans are described in Sections 5.3.2 and 7.2 and are summarized in Table 7.2-3.

5.3.2 Land Use

According to the Pipeline Abandonment Steering Committee (1996), land use is one of the most important factors to consider when determining whether a section of pipeline should be decommissioned, abandoned in-place or removed. Therefore, land use assessment is a key component of pipeline decommissioning planning, particularly for the determination of areas vulnerable to land disturbance, such as native prairie, parks and ecological reserves, unstable or highly erodible slopes and irrigated land. In addition, future land use may be affected by pipelines left in place (*e.g.,* by causing a physical obstruction to future excavations, pilings, underground utilities or additional pipelines and future projects).

Land uses that are vulnerable to ground disturbance and may benefit from decommissioning in-place include (Pipeline Abandonment Steering Committee 1996):

- parks and natural areas;
- unstable or highly erodible surfaces;
- water crossings;
- flood irrigated fields;
- road and railway crossings;
- foreign pipeline crossings;
- extra depth burial of pipe (*i.e.,* depth in excess of 1 m);
- native prairie and parkland;
- forest cutblocks;
- designated waterfowl and wildlife habitat; and
- areas exhibiting poor and/or limited access.

In addition to the land uses identified as vulnerable to ground disturbance above, CEPA (2007) also identified agricultural areas under cultivation with special conditions as land uses where ground disturbance associated with pipe removal would adversely affect sensitive areas or existing infrastructure. The future land use was also considered by CEPA (2007) in its assessment of risk of removing a pipeline or abandoning it in-place.

CEPA (2007) refined a pipeline abandonment matrix adapted from a 1985 NEB paper (NEB Staff 1985) to provide industry with guidance for making decisions regarding whether inactive pipelines should be abandoned in-place or be removed. This matrix was reviewed in the Pipeline Abandonment Scoping Study conducted by DNV (2010). The pipeline abandonment matrix provides a recommendation for pipeline abandonment based on the diameter of the pipeline, and both existing and potential future land use considerations (broken down into 10 usage categories). CEPA (2007) cautions that a risk-based, comprehensive site-specific assessment is needed to validate the abandonment strategies chosen for specific pipelines. The CEPA (2007) Abandonment Matrix was used for guidance purposes in the preparation of this report. A summary of the CEPA (2007) Retirement Option Matrix which is applicable to the decommissioning of Line 3 is provided in Table 5.3.2-1.

TABLE 5.3.2-1

PIPELINE ABANDONMENT MATRIX

Land Use		Primary Option for Abandonment Pipe Diameter > 660 mm (> 26 in)
Agricultural	Pipe Diameter > 660 mm (> 26 in)	Abandon in-place
	Cultivated with Special Features[1]	Removal
	Non-cultivated	Abandon in-place
Non-agricultural	Existing Developed Lands	Abandon in-place with treatment measures
	Prospective Future Development[2]	Removal
	No Future Development	Abandon in-place
Other	Public Road Crossings	Abandon in-place with special treatment, as needed
	Rail Crossing	
	Other Crossing	
Environmentally Sensitive Area	Environmentally Sensitive Areas	Abandon in-place with treatment measures

Notes: 1 The CEPA Abandonment Matrix specifies removal as the preferred abandonment option only for specific cultivated locations where depth-of-cover is of special concern (*e.g.,* tree farms and deep-tilling operations) or where there is potential for prospective future development.

2 CEPA states that the preferable option for future land development is to abandon the pipeline in-place until the land is developed. This option is meant to lessen the overall impact to the area.

The abandonment matrix was used by TERA and Enbridge in the preliminary planning stages for the decommissioning of the existing Line 3 pipeline. It was determined by TERA and Enbridge that the existing Line 3 pipeline could safely be decommissioned in-place with special treatment and monitoring to ensure public safety and environmental protection. The potential long-term effects and treatments associated with land use concerns are discussed further in the land use assessment (Section 7.2).

5.3.3 Ground Subsidence and Frost Heave

This report is limited to the environmental risks associated with the decommissioning of the existing Line 3 pipeline. Greater detail regarding the public safety concerns associated with ground subsidence at road and railway crossings, and land under cultivation are discussed in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014). A general discussion and relevant environmental considerations related to ground subsidence is provided below.

The rate and amount of ground subsidence over time is difficult to predict, since it is influenced by a number of site-specific factors, including corrosion. However, the corrosion of a pipeline is normally restricted to those isolated areas where there are defects in the coating or where the coating has become disbonded from the pipe. For most pipelines, this occurs on less than 1% of the pipeline length and is unlikely to occur over large enough areas of the pipeline as to cause complete structural failure or collapse (Pipeline Abandonment Steering Committee 1996). In-line inspection data collected in 2011 on the most severely corroded section of the existing Line 3 pipeline revealed that within approximately 99% of the inspected pipe joints corrosion was less-than 10% of the pipe's total surface area.

The long-term deterioration of a pipeline decommissioned in-place poses a risk for ground subsidence if the pipeline becomes corroded over time and perforations eventually form. Corrosion occurs as a result of an electrochemical reaction, whereby metal ions flow from the anode (*i.e.,* the steel pipe) to the cathode (*i.e.,* the surrounding soil/water matrix). Corrosion of steel pipelines is controlled by the application of coatings and the use of cathodic protection. Cathodic protection works by connecting the metal to be protected with another more easily corroded "*sacrificial metal*" which acts as the anode of the electrochemical cell. The rate of corrosion will vary depending upon surrounding soil conditions and will not uniformly occur over the length of the pipeline (Pipeline Abandonment Steering Committee 1996).

For larger pipe sizes, such as the existing Line 3 pipeline (863.6 mm O.D.) subject to certain conditions (*e.g.,* depth of burial, soil types and land uses), the limited amount of settlement associated with pipeline corrosion would be within a tolerable range.

The potential long-term effects and treatments associated with ground subsidence concerns are summarized in Section 7.1.1 of this report and discussed in detail in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).

Pipe movement resulting from frost heaving or buoyancy issues can result in pipeline exposure. A discussion of buoyancy issues is provided in Section 5.3.8. No literature was found related to the potential for frost heave on abandoned pipelines (DNV 2010). However, an assumption could be made that if frost depth rebounded due to a reduction of heat from the pipeline and if uplift forces were great enough, pipeline movement and soil disturbance could occur. Frost heave and thawing effects on pipelines are generally of a concern in more northern site settings, where permafrost interacts with a water source at the freezing front. In the context of the proposed Line 3 pipeline decommissioning, these effects would likely be negated as the pipeline is located within an existing right-of-way, adjacent to active pipelines that continue to influence the soil thermal regime. In addition, pipeline depth and snow insulation during winter conditions are considerations in regards to the potential development of ice lenses closer to the surface, as air temperature has been identified as an important factor influencing soil depth freezing (Vermette and Kanack 2012). Potential pipe movement due to changes in the soil thermal balance will be assessed through depth of cover surveys and monitoring of the pipeline right-of-way.

5.3.4 Erosion and Slope Stability

Decommissioning a pipeline in-place may help to maintain long-term slope stability since the pipeline can provide structural support for the slope (CEPA 2007, Pipeline Abandonment Steering Committee 1996). However, in cases of severe erosion, pipeline exposure is a potential risk associated with unstable slopes. Exposed pipe is vulnerable to accelerated corrosion and may present a safety hazard or pose a physical barrier to land use and wildlife movements (DNV 2010).

Decommissioning activities entailing ground disturbance such as excavations necessary for segmentation may destabilize the soil and increase the risk of erosion at specific locations, thereby increasing the risk of slope instability. These risks and treatments of erosion-related slope stability concerns are discussed in greater detail in Section 6.0 of the ESA (TERA 2014).

The potential effects and treatments associated with erosion and slope stability concerns related to a pipeline decommissioned in-place are summarized in the engineering assessment included in Section 7.1 and in Sections 7.3.3 through 7.3.7 of this report. The potential effects and treatments are also discussed in detail in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).

5.3.5 Potential for Creation of Water Conduits

A buried pipeline may function as a conduit to transport water, soil or residual contaminants in a downslope direction if the pipeline is perforated by either decommissioning activities, such as above ground facility removal or due to pipeline corrosion over time. If the pipeline is compromised, water and surrounding materials may infiltrate the pipe and travel downslope, unimpeded, and exit the pipe at another location.

The rate and volume of fluids to be considered are dependent upon local topography, the hydraulic conductivity of surrounding soils, the extent of pipeline perforation and the hydrostatic pressure at the entry and exit points.

Water conduits may present risks to environmental features due to:

- potential displacement of water to or from areas of potential concern thereby flooding or draining features such as sodic and saline soils, agricultural fields, wetlands, watercourse crossings, areas of high groundwater and aquifers; and
- potential contamination risks in which a compromised pipe acts as a fluid conduit and transports and releases contaminants that would otherwise be immobile in groundwater to or from select locations (DNV 2010).

The key mitigation measures identified to reduce the effects of the creation of water conduits are pipeline cleanliness (to address potential contamination from within the pipeline), isolation and pipeline segmentation. Pipeline segmentation prevents the movement of fluids and materials within the decommissioned pipeline (Pipeline Abandonment Steering Committee 1996). Segmentation can also mitigate water migration to or from areas sensitive to drainage by water conduits such as wetlands, watercourses, water supply areas such as aquifers, areas with sodic/saline or sandy soils, agricultural lands and areas with a high water table.

The creation of water conduits along the outside of pipelines has not been identified as a historical problem. The decommissioned pipeline will be monitored as part of the Enbridge OMM program and if evidence of water conduit formation is observed, similar mitigation measures to those used for operating pipelines will be implemented.

The potential effects and treatments associated with a pipeline decommissioned in-place acting as a water conduit are discussed further in Section 7.3.

5.3.6 Soil and Groundwater Contamination

Enbridge will be undertaking a research and development program to establish cleaning criteria including a review of published literature and will provide updates to the NEB in the event that results of the research and development deviate from the approach filed with the NEB.

The DNV Pipeline Abandonment Scoping Study submitted to the NEB in 2010 (DNV 2010) identified two general groups of potential contaminants that could arise from pipeline abandonment (from a physical perspective abandonment is equivalent to decommissioning). The first group is contaminants from the operation of the pipeline (*i.e.,* product, treatment chemicals and lubricants) and the second group is contaminants from the corrosion of the pipeline (*i.e.,* pipeline coatings and their degradation products). Pipelines which have been emptied of service fluids, cleaned and decommissioned have the potential to contain residual contaminants from the product, treatment chemicals and lubricants (DNV 2010). In addition, soil and groundwater contamination resulting from historical leaks and spills that remain from operation of the pipeline at the time of decommissioning need to be addressed. The potential types of contaminants that may be a concern from the operation and decommissioning of the pipelines include:

- petroleum hydrocarbons (PHCs);
- polychlorinated biphenyls (PCBs) and Naturally Occurring Radioactive Materials (NORMs);
- metals from degradation of the pipelines; and
- pipeline coatings and their degradation products.

The Remediation Process Guide (NEB 2011) recommends that a risk management approach be followed involving the selection and implementation of a risk control strategy based on site-specific objectives. Risk management may include direct remedial actions or other strategies that reduce the probability, intensity, frequency or duration of exposure to contamination through soil, water or air/vapour pathways. The latter may include controls such as zoning designations, land use restrictions or orders. The decision to select a specific risk-based strategy will be informed by risk assessment information (DNV 2010).

Pipelines may be comprised of a combination of metals (iron, copper, nickel, molybdenum, chromium and others) and potentially have synthetic coatings (coal tar or enamel, polyethylene tape, asbestos, asphalt, fusion bonded epoxy or bitumen and glass-fibre for older pipelines). Of these materials, only carcinogenic compounds such as asbestos and coal tar are considered to be potential environmental or human health concerns (DNV 2010).

Metals potentially released from the decommissioned pipeline as a result of corrosion are generally not considered a threat to the environment since they have a low environmental mobility (DNV 2010). Metal contamination of soil resulting from cathodic protection has been considered, however, cathodic protection of pipelines is standard industry practice. Metals released due to the corrosion of cathodic protection surfaces are not anticipated to occur within accessible pathways or in sufficient concentrations to affect the environment or human health.

When constructed, the existing Line 3 pipeline was coated with Polyken 960 tape. Polyken 960 tape is no longer manufactured and, consequently, a Material Safety Data Sheet (MSDS) for Polyken 960 tape is not available, however, an MSDS for Trenton Corporation Poly Ply tape (a similar product) is available (Trenton Corporation 2008). The MSDS for Trenton Corporation Poly Ply Tape indicates that it does not contain any hazardous components in sufficient concentrations to require a hazardous classification. The MSDS indicates that the tape does not require special handling procedures, that it is not soluble in water and that it is not expected to migrate from the pipe. Bioaccumulation of hazardous components is not expected due to the physiochemical properties of the tape. The tape can be considered inert as a result of these characteristics and is not considered a risk.

The potential risks associated with soil and groundwater contamination as a result of residual contamination and their treatment are discussed in Section 5.3.7. The pipeline cleaning program is described in detail in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).

5.3.7 Pipe Cleanliness

Pipeline cleanliness during decommissioning is a concern because of the potential for pipeline corrosion and structural failure to release contaminants into the environment. Furthermore, if the water conduit effect is insufficiently mitigated, residual materials left in the pipeline after cleaning could be transported within the pipeline and result in general soil and groundwater contamination either below or above ground in vulnerable locations such as wetlands and watercourses crossed by the pipeline. There are a variety of mechanisms by which organic compounds degrade but it remains unclear whether the rate of pipeline corrosion and deterioration are greater than the natural degradation rate of contaminants left as internal residue (Pipeline Abandonment Steering Committee 1996).

Pipeline cleaning procedures and methods, as discussed in Appendix D of the *Pipeline Abandonment Discussion Paper on Technical and Environmental Issues* (Pipeline Abandonment Steering Committee 1996) should be considered in the development of customized cleaning procedures to the specific circumstances of the pipeline being decommissioned and should include any relevant environmental protection measures such as spill contingency and containment procedures as well as the collection, storage and proper disposal of cleaning fluids.

The question of *how clean is clean*, specifically related to pipelines, has not been resolved in the literature or by regulators. The methodology for the accurate determination of the concentration of residual contaminants present in a pipeline at the time of abandonment is not as well established as the methodology for determining the concentration of known contaminants in soil and water resulting from spills from operating pipelines. While it is understood that soil, groundwater and air contamination should be remediated to currently applicable standards, the development of a methodology to accurately measure the presence and quantity of contaminants remaining as residue within a section of pipeline remains unclear (DNV 2010).

The existing Line 3 pipeline will be cleaned with an engineered cleaning solution (water and/or water and biodegradable cleaning agents) either immediately following fluid displacement or separately with its own propellant. Complete details of the pipeline cleaning protocol are discussed in detail in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014). Enbridge will be undertaking a research and development program to establish cleanliness criteria, including a review of published literature and will provide updates to the NEB in the event that the results of the research and development deviate from the approach filed with the NEB.

The Pipeline Abandonment Steering Committee (1996) suggested that PCB contamination is possible if PCBs were historically used in the pump or compressor lubricants during the operation of the pipeline. However, PCBs do not occur naturally in oil and there is no history of PCBs in the products carried by the existing Line 3 pipeline.

The presence of NORMs was identified as another potential source of contamination (Pipeline Abandonment Steering Committee 1996). NORMs flow with the oil, gas and water mixture and can accumulate in the scale sludge and scrapings within pipelines, however, "*…past experience suggests that NORM contamination in oilfield pipe, fittings and tanks is more likely to be found in upstream oil and gas activities than in the transmission and distribution systems regulated by the NEB*" (DNV 2010).

To confirm the presence or absence of PCBs and NORMs within the existing Line 3 pipeline, Enbridge will be undertaking a research and development program to test PCB and NORM concentrations on a segment of the existing Line 3 pipeline that will be deactivated as part of the Line 3 Replacement Project (NEB filing A50617). If either PCBs or NORMs are detected in levels high enough to be considered contamination they will be assessed further and, if warranted, remediated according to the NEB *Remediation Process Guide* (NEB 2011).

5.3.8 Watercourse and Wetland Crossings

Watercourse crossings include streams and rivers, wetlands, and lakes. Decommissioned pipelines may affect watercourses and waterbodies through pipeline exposure or contamination of the watercourse due to the water conduit effect. If the pipeline overburden is eroded or scoured sufficiently as to expose the pipeline, either through natural watercourse dynamics, slope failure or other unforeseen natural events such as flooding, the exposed pipeline may be a navigation or fish migration hazard or pose a risk to public safety, if not identified and remediated. Exposed pipelines are also prone to accelerated degradation (Pipeline Abandonment Steering Committee 1996). Should perforation of the pipeline occur, there is a potential for the release of water from inside the pipeline to surface water or for water to drain from a watercourse or waterbody into the pipeline and through it to another catchment area nearby. This has the potential to adversely affect the hydrological characteristics of surface water. Therefore, for pipelines decommissioned in-place, preventing the pipeline from becoming a water conduit is an important consideration when determining treatment methods at and near water crossings. Pipeline segmentation is considered an appropriate treatment where the threat of water movement or contamination is a concern (*e.g.,* for watercourses with important fish habitat).

Buoyancy forces acting on a pipeline in a water crossing can result in potential pipeline movement. The buoyancy of the pipeline at watercourse crossings may change once emptied of fluids and burial depth or buoyancy control mechanisms used during pipeline operation may no longer be adequate to prevent the pipe from becoming exposed. The potential for the pipeline to float can be mitigated by appropriately planning fluid displacement from the pipeline, installing pipeline weights or continuing to monitor for buoyancy issues and remediating, where warranted. The potential effects and treatments are also discussed in detail in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014). Where possible, decommissioning in-place (as opposed to pipeline removal) is preferred at water crossings to avoid disturbance of the bed and banks of watercourses and waterbodies, particularly those known to support important fisheries.

6.0 PROPOSED MITIGATION MEASURES

Table 6.0-1 provides a summary of the potential environmental and socio-economic issues associated with a decommissioned pipeline and how Enbridge plans to address each of the potential concerns. These issues are included in the assessment of potential effects and cumulative effects detail in Section 6.0 of the ESA (TERA 2014).

TABLE 6.0-1

SUMMARY OF MITIGATION MEASURES

Concern	Decommissioning Mitigation
Land use	• Most of the existing Line 3 pipeline is located on agricultural land. In addition, the Line 3 pipeline being decommissioned is surrounded by or adjacent to operating pipelines. In these circumstances the right-of-way is not available for most alternate land uses or future development due to safety concerns regarding working on, between or adjacent to the operating pipelines. Should any of the developments listed in Table 7.2-3 occur, they will be evaluated as they arise in negotiations with the developer. It is not anticipated that any conflicts will arise, however, any mitigation measures that are needed will be implemented.
Ground subsidence	• Enbridge will complete ongoing right-of-way surveillance and maintenance of the pipeline right-of-way, and will address any areas of ground subsidence that are identified. • Ongoing cathodic protection and right-of-way monitoring programs will be maintained to identify and mitigate future ground subsidence concerns, in accordance with Enbridge OMMs.
Erosion and slope stability	• Areas with potential slope stability concerns will be identified and monitored on an ongoing basis. Mitigation for erosion may include monitoring, gabion matting, segmentation, revegetation and/or replacement of soils.
Potential for creation of water conduits	• The pipeline will be monitored or segmented at select locations as per the decommissioning treatment assessment, detailed engineering assessment and site conditions to mitigate the potential flow of water into or out of identified Environmentally Sensitive Areas (*e.g.,* fish-bearing watercourses, municipalities, wetlands and aquifers).
Potential for soil and groundwater contamination	• The pipeline will be cleaned (as described in Chapter 7 of Volume 1 of the Project application) prior to decommissioning such that any materials formerly transported by the pipeline and potentially remaining in the pipeline are at acceptable levels (Enbridge 2014). • If previously identified contaminated areas or contamination outside of the pipeline are discovered while conducting ground disturbance activities associated with decommissioning they will be addressed according to the standards set within the *Remediation Process Guide* (NEB 2011). • The potential for contaminants from within the pipeline to be released through the water conduit effect will be mitigated by cleaning. • Should any PCBs be found, appropriate remediation will be carried out. • There is no history of NORMs in the products carried by Line 3, however, if any NORM is found, disposal will be conducted in accordance with the 2011 *Canadian Guidelines for the Management of NORMs* (Canadian NORM Working Group of the Federal Provincial Territorial Radiation Protection Committee 2011).
Watercourse and wetland crossings	• The potential for contaminants from within the pipeline to be released through the water conduit effect into a waterbody will be mitigated through cleaning as described in Chapter 7 of Volume 1 of the Project application. • Enbridge will continue ongoing right-of-way surveillance and maintenance of the pipeline right-of-way and will address any areas of concern. • Enbridge will assess the need for buoyancy control measures for buried pipe at watercourse crossings, wetlands and locations where soil density is low when saturated (and the water table is high for some or all of the year) prior to decommissioning and implement mitigation where needed. • The potential for the pipeline to float will be mitigated by appropriately planning fluid displacement from the pipeline, installing pipeline weights or continuing to monitor for buoyancy issues and, where warranted, remediating. • The potential for frost heave will be mitigated by monitoring the pipeline and through depth of cover surveys to identify locations where frost heave has caused the pipeline to move in the ground. • Enbridge will decommission the existing Line 3 pipeline in-place at watercourse crossings and will, where warranted, implement segmentation measures to prevent water conduits as per the decommissioning treatment and detailed engineering design assessments (Section 7.0). Enbridge will continue to monitor the decommissioned pipeline right-of-way as part of ongoing maintenance of the Enbridge mainline corridor as per the Enbridge OMM programs.

Note: - Additional details regarding the criteria used to select and apply these mitigation measures are provided in Section 7.0.

7.0 DECOMMISSIONING TREATMENT ASSESSMENT

There were three levels of assessment used to determine the most appropriate decommissioning treatment. As described in detail in Section 2.0, possible treatments considered were:

- pipeline cleaning;
- pipe removal;
- pipeline segmentation or segment and fill; and
- site-specific monitoring.

7.1 Level 1 Decommissioning Treatment - Engineering Assessment

The first level of assessment for decommissioning was completed by Enbridge and is included within the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014). Enbridge's assessment identified all active railway crossings and major transportation corridors (paved highways) that are crossed by the pipeline and any above ground facilities where removal and/or isolation (in the case of facilities) or treatment (*i.e.,* pipeline segmentation or segmentation and fill) would be required according to CSA Z662-11 (CSA 2012). The assessment also included a determination of locations where treatments would be applied at existing facilities and locations requiring additional consideration for other engineering and/or regulatory reasons.

Enbridge will segment the decommissioned pipeline to prevent the downslope flow of material within the pipeline at locations selected based on engineering and environmental factors. Engineering factors include locations where the decommissioned pipeline is isolated from actively operating facilities, where facilities (such as valves) must be removed, and locations subjected to mitigation to ensure public safety or the continued operation of adjacent pipelines. Environmental factors were determined using specific assessment criteria further described in Section 7.3 in relation to Environmentally Sensitive Areas.

A summary of the environmental risks assessed by Enbridge and their treatments is provided below. A complete discussion of the engineering risks and proposed treatments is provided within Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).

7.1.1 Public Safety and Subsidence

The decommissioned pipeline is expected to have a very long life as a load-bearing structure once out of operation. Information in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application suggests that the time for a pipeline under cathodic protection to collapse would vary from decades to thousands of years.

The use of modelling indicated that the magnitude of subsidence, predicted for an 864 mm O.D. pipeline at the most conservative depth of cover (0.6 m) was approximately 17.25 cm decreasing to 11.95 cm of subsidence at 2.0 m of cover. This assumes a scenario where there is complete soil infill of the pipeline or total degradation of the pipe. On many cultivated lands, it is anticipated that the effect of subsidence due to the eventual decomposition of the pipeline will be minimized as a result of regular farming activities. Any resulting low spots will be identified and mitigated by Enbridge depth of cover surveys and under regular OMM procedures.

For treatments of roads, railways and utilities, Enbridge is proposing to decommission the existing Line 3 pipeline in place. A complete discussion of the engineering risks and proposed treatment measures for ground subsidence and roads, railways and utility crossings is included in the Enbridge Engineering Chapter 7 of Volume 1 of the Project application (Enbridge 2014).

7.1.2 Pipe Cleanliness

Contaminants that could potentially result from pipeline decommissioning include those originating from the operation of the pipeline (*i.e.,* pipeline, product, treatment chemicals and lubricants). Residual contaminants may still be present once the pipeline has been emptied of service fluids, cleaned and decommissioned. A thorough discussion of the potential risks for contamination is found in Sections 5.3.6 and 5.3.7.

While general direction is documented in literature concerning guidelines to determine *how clean is clean* (DNV 2010, NEB 1996), an objective determination of an allowable threshold criteria for contaminants does not exist. Enbridge will be undertaking a research and development program to establish cleanliness criteria, including a review of published literature and will provide updates to the NEB in the event the results of the research and development deviate from the approach filed with the NEB.

7.2 Level 2 Decommissioning Treatment – Land Use Assessment

The second level of assessment for decommissioning is based on land use along the existing pipeline. Agricultural and non-agricultural types of land use were used to identify portions of the pipeline which would be decommissioned in-place, decommissioned in-place with special treatment measures (*e.g.,* segmentation*)* or decommissioned in-place with the potential for segment removal in the future.

Land use definitions for this assessment were based on the LMCI – Land Use Classification Report prepared by Stantec Consulting Ltd. and Enbridge Pipelines (Norman Wells) Inc. (Stantec Consulting Ltd. 2013). Decommissioning base case assumptions were used to guide the selected treatment methods and were initially based on the Method of Abandonment Assumptions defined by the NEB (2009) in Reasons for Decision, LMCI Stream 3 and Pipeline Abandonment – Financial Issues. These base case assumptions were amended by the Stantec LMCI report (Stantec Consulting Ltd. 2013), however, the assumptions were intentionally established for the specific purpose of assisting with estimates of future abandonment costs and were used as guidelines only, with several changes made to ensure that pipeline treatment is specific and applicable to decommissioning. The base case assumptions from the LMCI report and those used in establishing the decommissioning plan for Line 3 are outlined in Table 7.2-1 for comparison.

Land use definitions, descriptions, decommissioning treatment methods and evaluation criteria are summarized in Table 7.2-2.

TABLE 7.2-1

BASE CASE ASSUMPTION CRITERIA BASED ON LAND USE

Land Use		Base Case Assumptions for the Decommissioning of Line 3
Agricultural	Cultivated	Decommission in-place
	Cultivated with Special Features	Decommission in-place with mitigation treatment or removal
	Non-Cultivated	Decommission in-place
Non-Agricultural	Existing Developed Lands	Decommission in-place with treatment measures
	Prospective Future Development	Removal or decommission in-place
	No Future Development	Decommission in-place
Other	Public Road Crossings	Decommission in-place with special treatment measures, if warranted
	Rail Crossings	
	Water Crossings	
	Other Crossings	
Environmentally Sensitive Areas	Environmentally Sensitive Areas	Decommission in-place with treatment measures

Land use definitions were derived for six base cases using the LMCI report (Stantec Consulting Ltd. 2013) for both agricultural (cultivated, cultivated with special features and non-cultivated) and non-agricultural (developed lands, future development lands and lands protected from development) land uses. However, one additional category of land use ("other") was defined for Environmentally Sensitive Areas. The definitions for each land use type and the decommissioning method selected to address the potential effect of decommissioning on each land use are included in Table 7.2-2.

TABLE 7.2-2

LAND USE ASSESSMENT FOR DECOMMISSIONING LINE 3

Land Use Attribute	Description	Treatment	Criteria	Datasets
Agricultural	Cultivated - agricultural land under cultivation in annual crop, hay land, tame pasture or other non-native land that has been seeded in the past and is used for crop or livestock.	Decommission in-place	Canada Land Inventory (CLI) Class 1-4 Soils.	CLI and aerial photo interpretation
	Cultivated with special features - agricultural land where depth of cover is a concern such as tree farms, turf farms or deep tillage applications.	Removal or decommission in-place with mitigation	CLI Class 1-4 soils where depth of cover is less than 0.6 m of cover.	CLI and aerial photo interpretation
	Non-cultivated - native prairie or rangeland used for agricultural purposes (*e.g.,* grazing leases) and soils that restrict cultivation.	Decommission in place	CLI Class 5-7.	CLI and aerial photo interpretation
Non-Agricultural	Existing developed lands - urban and rural settlement areas within municipalities (cities, towns, villages, and hamlets) that are built-up areas where development is concentrated with a mix of land uses. Excludes the footprint of Enbridge valves, pump stations, terminals, etc., as well as foreign pipeline or utility crossings.	Decommission in-place with additional mitigation	Existing developed land, cities, towns, villages, urban services areas, special municipal areas, rural residential areas, representative areas network, runways, industrial developments and commercial development.	Aerial photo interpretation, municipal boundaries and representative areas (commercial areas)
	Prospective future development - undeveloped areas located in urban areas and rural settlement areas within municipal boundaries.	Removal or decommission in-place	Mining areas/claims, neighborhood development areas and future project areas.	Aerial photo interpretation, mining claims and title ownerships
	No future development anticipated - areas where potential for future development is low (*e.g.,* forest, landfills, mine sites, federal and provincial parks, conservation areas with land use protection, Crown lands and other already developed lands).	Decommission in-place	Exploration restricted areas, landfills, mines and woodlands.	Aerial photo interpretation, landfill data, Crown lands, federal and provincial parks
Other	Environmentally Sensitive Areas and public safety concerns such as areas containing a natural feature, which is protected by government regulations or features with specific public safety concerns. Includes provincially or federally-protected natural areas, watercourses, rivers, streams and small inland lakes or waterbodies that have a measurable or predictable response to a single runoff event, highways, railway crossings and urban centres or residential neighborhoods.	Decommission in-place with additional treatment, as needed	Wetlands (including marshes/fens, bogs and swamps, sensitive plant and animal species locations, representative and ecologically significant natural areas, wildlife habitat protected areas, conservation and other protected areas/reserves, sandy soils/sand dunes and topography.	See Tables 8.2.1-1 and 8.1.2-1

Note: - Descriptions are based on the land use classifications determined in the LMCI (Stantec Consulting Ltd. 2013).

An understanding of the current and potential future land uses along the pipeline right-of-way is essential for identifying areas along the pipeline which are sensitive to land disturbance, such as native prairie, parks and other protected areas, as well as unstable or highly erodible slopes, areas susceptible to severe wind or water erosion, soils which may be difficult to reclaim such as saline and sodic soils, and irrigated land. Future land use may be affected by pipeline decommissioning if the pipeline presents a physical obstruction to development, including future excavations, pilings, underground utilities, transportation corridors, protected lands or additional pipelines and projects.

Issues associated with current land use will be addressed according to the criteria identified in Sections 7.3.1 to 7.3.8 of this report, depending upon the land use to which the potential effect may apply.

Future projects in the vicinity of the existing Line 3 pipeline were assessed with the same methodology used to identify the Reasonably Foreseeable Developments that may act cumulatively with the Project in the Cumulative Effects Assessment of the ESA (see Section 7.1.3 of the ESA). For the purpose of assessing future projects that may be affected by the decommissioning of the existing Line 3 pipeline, a study area extending 1 km from the pipeline centre line (*i.e.,* a 2 km wide band centred on the pipeline centre line) was selected and applied to identify existing and future activities related to:

- utility developments (transmission and gas distribution lines);

- rural and urban residential development;
- transportation infrastructure and corridors (highways, utility corridors);
- future power generation projects (wind and hydro-electricity energy);
- oil and gas exploration and development activities; and
- future parks and protected spaces.

Reasonably foreseeable developments include future developments which have been proposed (public disclosure) and/or are approved to be built, however, which have not yet been built in the vicinity of Line 3. Sources used to identify these projects include those which were used in the cumulative effects assessment of the ESA (see Section 7.1.3 of the ESA). All identified future projects or developments which may be effected by the decommissioning of Line 3 are listed in Table 7.2-3.

TABLE 7.2-3

REASONABLY FORESEEABLE DEVELOPMENTS WITHIN 1 KM OF THE EXISTING LINE 3 PIPELINE

Project Name	Approval Status	Proponent	Location (Legal Subdivision, Lat./ Long. or Nearest Town)	Components	Distance to Pipeline[1]	Description
Highway 600 to Highway 899	Proposed	Alberta Transportation	1-1-39-3 W4M to 4-4-39-2 W4M	Highway realignment	1-3 km	Highway 600 to Highway 899 south of the Town of Provost. The project involves the realignment of a section of Highway 600 to improve the highway network links south of Provost.
Flow Reversal on Cochin Pipeline	Proposed	Kinder Morgan Canada Inc.	Fort Saskatchewan to Elkmore, Saskatchewan	Pipeline flow reversal	--	Flow Reversal on Cochin Pipeline and Capacity Increase (Elmore, Saskatchewan to Fort Saskatchewan, Alberta).
Keystone XL Pipeline	Proposed	TransCanada Keystone Pipeline GP Ltd.	Hardisty, Alberta to Monchy, Saskatchewan	Oil pipeline	0 km	The proposed Keystone XL Pipeline is a 529 km oil pipeline that would originate in Alberta and traverse southwestern Saskatchewan before entering the United States. The proposal will require 69 km of new, non-contiguous right-of-way.
Energy East Oil Pipeline	Pre-submission	TransCanada PipeLines Limited	52°39'49"N, 111°16'16"W (12-32-42-9 W4M) to 50°40'47"N, 109°58'36"W (5-9-20-29 W3M); 50°40'43"N, 109°58'25"W (8-8-20-29 W3M) to 49°43'38"N, 95°9'12"W	Oil pipeline	0 km	TransCanada PipeLines Limited is proposing to construct and operate a 4,500 km oil pipeline to transport up to 1.1 billion barrels/day of crude from Hardisty, Alberta to Saint John, New Brunswick. The proposal consists of converting 3,000 km of existing natural gas pipelines to oil and constructing 1,500 km of new pipeline. The proposal will also include over 70 new pump stations, 4 tank terminals, 2 marine terminals and loading facilities at Cacouna, Quebec and Saint John, New Brunswick. UTM/legal subdivision locations: • Alberta Segment: 52°39'49"N, 111°16'16"W (12- 32- 42- 9 W4M) to 50°40'47"N, 109°58'36"W (5-9-20-29 W3M); • Prairies Segment: 50°40'43"N, 109°58'25"W; and • 8-8-20-29 W3M to 49°43'38" N, 95°9'12" W (Highway 17 - Kenora, Ontario).
Rural Water Distribution System - Emerald Park	Active/in progress	Infrastructure Canada	5-22-17-18 W2M	Water distribution system	0 km	Rural water distribution system.

TABLE 7.2-3 Cont'd

Project Name	Approval Status	Proponent	Location (Legal Subdivision, Lat./ Long. or Nearest Town)	Components	Distance to Pipeline[1]	Description
Remediation of Old Firing Range	Active/in progress	Environment Canada	9-4-18-20 W2M	Firing range	0 km	The Government of Canada has developed a long-term Federal Contaminated Sites Action Plan to systematically assess, remediate and monitor sites for which it is responsible.
Sewage Lagoon Expansion	Active/in progress	Infrastructure Canada	14-21-13-5 W2M	Sewage lagoon	0.6 km	Sewage lagoon expansion.
Water Treatment Plant Upgrade	Active/in progress	Infrastructure Canada	11-17-10-30 W2M	Water treatment plant	0.4 km	Water treatment plant upgrade.
New Housing and Community Development	Active/in progress	Clear Vistas	17-18 W3M	Residential construction	0.5 km	New housing and community development.
The Legacy Project	Active/in progress	K+S Potash Canada	3-20-25 W2M, 4- 20-25 W2M, 33-19-25 W2M, 34-19-25 W2M	Potash mine	0.5-4 km	Located in the RM of Dufferin No. 190, near Bethune and Findlater, the Legacy Project is Saskatchewan's first new potash mine in nearly 40 years. Potash production from the mine is anticipated for 2016, ramping to its full capacity of 2.86 million tonnes per year by 2023.
Site Development of Canadian Pacific Railway (CPR) Land	Active/In progress	City of Regina	Regina	Railway construction	--	Site development of CPR land.
Paul Dojack Centre Roadways	Design	Saskatchewan Government Services/ Social Services	Regina	Road work	--	Paul Dojack Centre roadways.
Road construction - hot mix surfacing along a Municipal Road in Heart's Hill	Active/in progress	Infrastructure Canada	Heart's Hill	Road construction	0-20 km	Road construction - hot mix surfacing along a municipal road in Heart's Hill. No further information on location or footprint.
Sewage pumping station upgrade and expansion - Hamlet of Kronau	Active/in progress	Infrastructure Canada	Kronau	Sewage system	--	Sewage pumping station upgrade and expansion - Hamlet of Kronau.
Bridge replacement in Milden	Active/in progress	Infrastructure Canada	SW 29-11 W3M	Construction	--	Bridge replacement. No further information on location or footprint.
Municipal drinking water system construction and upgrades	Active/in progress	Infrastructure Canada	Pilot Butte	Water treatment plant	--	Municipal drinking water system construction and upgrades. No further information on footprint or location.

TABLE 7.2-3 Cont'd

Project Name	Approval Status	Proponent	Location (Legal Subdivision, Lat./ Long. or Nearest Town)	Components	Distance to Pipeline[1]	Description
Regina Bypass Environmental Review (South Regina Bypass)	Technical Proposal	Government of Saskatchewan Department of Highways and Transportation	33-16-20 W2M to 3-18-17 W2M	Road construction	0 km	Crosses pipeline right-of-way at MKP 717 and MKP 720. An environmental review is being conducted for the segment of the Regina Bypass that will connect Highway 1 West at the West Regina Bypass to Highway 1 East in the vicinity to Tower Road, and the corridor along Highway 1 East from Tower Road to Balgonie. The study is being conducted to prepare a Technical Proposal for submission to the Ministry of Environment's Environmental Assessment Branch for review and further direction as part of the environmental review process for the Regina Bypass Project.
Overpass - Highway 1 and Pilot Butte Access	Study	Highways and Infrastructure	9-20-17-18 W2M and 12-21-17-18 W2M	Overpass	0.3 km	A functional study is underway for the future overpass at Highway 1 and the Pilot Butte Access Road. The study is required to confirm future traffic volumes and movements for the area, and develop a design layout that will accommodate all vehicle movements 20 to 30 years into the future.
Highway 1 East Service Road	Study	Highways and Infrastructure	Regina to Balgonie	Road Construction	0.8-9 km	With overpasses proposed along Highway 1 East and the proposed development of the Southeast Regina Bypass, the Ministry is conducting a study to determine the service road network from Tower Road to Balgonie.
West Regina Bypass	Active/in progress	Highways and Infrastructure	29-17-20 W2M to 22-18-20 W2M	Bypass	0 km	The Saskatchewan Ministry of Highways and Infrastructure is conducting a planning study for the next phase of the Bypass from Dewdney Avenue to Highway 11.
K+S Legacy 230 kV Transmission Line Project	Active/in progress	SaskPower	NE 32-16-25 W2M to NW 35-19-25 W2M	Power line	0.5-31 km	A new 230 kV transmission line originating from the Pasqua Station at NE 32-16-25 W2M, is proposed to provide service to the K+S Potash Mine 8.5 km northwest of Buffalo Pound.
Kennedy-Tantalon 230 kV Transmission Line Project	Active/in progress	SaskPower	6-13-3 W2M to 13-33 W1M to 19-32 W1M	Power line	0 km	Crosses right-of-way approximately at MKP 900. A new 230 kV transmission line will connect the Kennedy Switching Station, northwest of Kennedy, to the Tantalon Switching Station northwest of Kennedy, to the Tantalon Switching Station, north of Tantalon.
Superb 138 kV Area Reinforcement Project	Active/in progress	SaskPower	34-33-24 W3M to 26-33-22 W3M	Power line	0 km	Adjacent to pipeline right-of-way at MKP 365. To serve the growing need for electricity in the Superb and surrounding area, SaskPower is proposing the construction of a new 138-25 kV substation to be located approximately 14 km southwest of the Town of Kerrobert. The new substation will be energized from a new 138 kV transmission line that will connect to the existing Ermine Switching Station southeast of Kerrobert. The transmission line will be single-circuit and constructed with tubular steel, H-frame structures. The total length of the line is approximately 2 km. Current scheduled in-service date is May 2015.

TABLE 7.2-3 Cont'd

Project Name	Approval Status	Proponent	Location (Legal Subdivision, Lat./ Long. or Nearest Town)	Components	Distance to Pipeline[1]	Description
Highway 10	Active/in progress	Infrastructure Canada	--	Road Works	--	Highway 10. No further information on location or footprint.
Manitoba Minnesota Transmission Project	Active/in Progress	Manitoba Hydro	3-7-14 WPM	Power line and facility upgrades at Dorsey, Riel, and Glenboro	0 km	The Manitoba-Minnesota Transmission Project includes construction of a 500 kV alternating current transmission line in southeastern Manitoba and upgrades to associated stations at Dorsey, Riel and Glenboro. Although distant from the proposed transmission line, modifications to Glenboro Station will also be required, including extending the current switch yard and installing additional equipment. Several towers on existing lines will be relocated to accommodate the station expansion. The proposed route will: • originate at the Dorsey Converter Station (located near Rosser, northwest of Winnipeg); • travel south around Winnipeg and pass near the Riel Station (east of the city) along what is known as the Southern Loop; • continue south to the Manitoba-Minnesota border, where four border crossing areas are under consideration; and • connect to the Great Northern Transmission Line.
Penn West Exploration , Waskada to Cromer Crude Oil and Natural Gas Liquid (NGL) Pipelines	In progress	Penn West Exploration	12-30-1-25 WPM to 13-17-9-28 WPM	Oil and NGL pipelines	0.5-10 km	Application was approved for two pipelines: • starts at Penn West Exploration's 12-30-1-25 WPM oil loading facility and terminates at the Enbridge Cromer Terminal at 13-17-9-28 WPM; and • the second line will move NGL from Penn West Exploration's; and 12-30-1-25 WPM oil loading facility and terminates at the Pembina Pipeline Corporation's NGL Terminal located at 13-17-10-28 WPM.

Note: 1 The exact locations of future projects could not be determined in most cases, and the distances to the existing Line 3 pipeline should, therefore, be considered approximate. Distances of 0 represent projects that cross the existing Line 3 pipeline.

The development and implementation of treatments will be conducted on an as-needed basis in the event that any of the potential developments listed in Table 7.2-3 proceed and a re-evaluation of the potential land use issues associated with the decommissioned Line 3 pipeline is necessary.

The existing Line 3 pipeline currently shares a congested right-of-way with up to six existing pipelines and is generally within 3 m of adjacent, active pipelines. Given these circumstances the right-of-way will not be available for most alternate land uses or future development due to the public safety, environmental and operational concerns associated with working between or immediately adjacent to operating pipelines.

Activities within the existing Line 3 right-of-way are, and will remain, regulated by the *NEB Act* after Line 3 is decommissioned. The NEB's *Pipeline Crossing Regulations* outline the regulatory requirements for proponents planning to construct pipelines on or near federally regulated rights-of-way. As such, while future land use is not directly limited, permission from all stakeholders within the right-of-way is required for construction or installation of a facility across, on or under an existing right-of-way. If any additional

proposed developments not listed in Table 7.2-3 require the re-evaluation of land use, Enbridge will be notified and treatments for the decommissioned pipeline will be conducted as the need arises in negotiations with the developer.

Based on the land use assessment performed, the existing Line 3 will be decommissioned in-place for the entire length.

7.3 Level 3 Decommissioning Treatment – Environmental Evaluation

As part of the third level of assessment, Environmentally Sensitive Areas (*i.e.,* "other" land uses) were delineated based on specific environmental concerns or features related to decommissioning, including: municipal areas and municipal drinking water sources; areas of historic releases related to the existing Line 3 pipeline; watercourse crossings; Class IV, V and VI wetlands; areas with saline and/or sodic soils; and areas with steep slopes at risk for erosion or slope instability. These are the areas where special treatment (*i.e.,* areas requiring additional mitigation*)* were potentially considered to be warranted at the time of decommissioning.

A decision-making process was created and used to determine potential segmentation locations along the existing Line 3 pipeline, or where other special treatments should be applied in order to protect sensitive features (Appendix A).

The decision-making process used is two-tiered. The first tier defined the at-risk resource and provided a consistent definition of at-risk resources in relation to the existing pipeline. The second tier presented potential alternative considerations that were included in the development of treatment measures. Ultimately, assessment and monitoring, or segmentation was prescribed for all at-risk resources.

Sections 7.3.1 to 7.3.7 describe the environmental decision-making processes illustrated in Appendix A for the identification of potential at-risk resource locations and their respective proposed treatment.

At locations where the decision-making process determined that segmentation is recommended, the selected locations will be ground-truthed and subject to further refinement based on additional information, detailed engineering assessment and constructability review. The potential segmentation locations will be assessed on a site-by-site basis. If environmental considerations outweigh the benefits of the proposed mitigation at a location, modifications to the mitigation may be necessary.

The decision-making process relies on the implementation of select criteria to determine where special treatment, specifically segmentation, would be applied. The criteria and their justifications are outlined below.

1. 400 m Rule – 400 m was derived from a review of the Manitoba provincial guidelines for the protection of groundwater wells from known contaminated sites (Government of Manitoba 2013). Upon review of guidance documents in relation to the protection of water wells, very little specific information related to setbacks is available, and there is no information related specifically to pipeline setbacks from water wells. Therefore, the rule is based on the most conservative recommendation from the Manitoba guidelines, that water wells be located a minimum distance of 400 m from a contaminated site (a waste disposal ground [*i.e.,* a landfill]), to prevent contamination. While pipelines decommissioned in-place in a clean condition are different than contaminated sites, this approach is believed to be sufficiently conservative to protect groundwater resources. In the case of potential municipal groundwater, the 400 m rule was doubled to make it more conservative. The 400 m rule was also applied to connected drainages. Where a drainage crossing the existing Line 3 was connected to a higher risk waterbody, it was conservatively assumed that a 400 m distance was adequate to protect the higher risk water body from the water conduit effect.
2. Topographical highs – Highs and lows exist along the pipeline, which are associated with natural topographic conditions of the right-of-way and depth of the pipeline within the ground as the pipeline crosses a land area. Topographical highs are areas where the combined topographical relief creates a high point which effectively divides the pipeline into hydrostatically independent segments.
3. Groundwater – For water conduits to form, groundwater must be in contact with the pipeline. If groundwater is assessed and is not found to be in contact with the pipeline, it is considered unlikely that sufficient groundwater could permeate within the pipeline to form a water conduit. The groundwater

rule does not preclude the possible transport of water through areas with low water tables within the pipeline, merely the possible locations of inflows.

7.3.1 Communities

Municipal areas were identified by municipal boundaries such as town and city limits using GIS data and are identified on the Decommissioning Environmental Alignment Sheets (Appendix B). In summary, the following criteria were considered.

- Where municipal boundaries are located within 800 m of the existing Line 3 pipeline (twice the 400 m rule), they were further assessed to consider if the municipal water supply was at risk due to the proximity of groundwater or surface water supplies to the existing pipeline.
- Potential topographical highs or isolation locations were used, wherever feasible, as alternatives to segmentation.
- If a potential water conduit discharge point from the existing Line 3 was identified within 400 m of a community water supply, segmentation is recommended.

A summary of the municipal areas crossed by, or within 800 m of the pipeline, and whether the communities rely on groundwater wells as a source of drinking water within 400 m of the pipeline is provided in Table 7.3.1-1.

TABLE 7.3.1-1

COMMUNITY WATER WELLS

Community Name	Community Water Wells within 800 m of Pipeline
Town of Amisk	Yes
Town of Kerrobert	Yes
Town of Dodsland	Yes
Town of Milden	No
City of Regina	Yes
Town of White City	No
Hamlet of Davin	Yes
Town of Vibank	Yes
Town of Odessa	Yes
Town of Kendal	Yes
Village of Montmartre	Yes
Town of Glenavon	No
Hamlet of Peebles	Yes
Town of Kipling	No
Village of Fairlight	No
Village of Maryfield	Yes
Village of Wawanesa	No
Town of Morden	No
Town of Gretna	Unknown[1]

Notes: 1 Consultation with municipal representatives of the Town of Gretna was attempted on multiple occasions throughout the 2013/2014 socio-economic consultation program; communication was not established.

The proposed segmentation locations are subject to further refinement based on additional information, detailed engineering assessment and constructability review. The decision process tree showing the assessed criteria for decommissioning treatment in the vicinity of communities is provided in Detail A-1 in Appendix A.

7.3.2 Historic Reported Releases of the Existing Line 3

In areas where historic reported incidents have been recorded along the existing Line 3 pipeline (see Table 5.2-1), the risks of historical contamination being carried downstream or locally destabilized by

increased water in soil were identified as potential areas of concern. In summary, the following criteria were considered.

- Incidents were identified from the Enbridge Line 3 list of historical releases and cross-referenced to the NEB incident register.
- Potential local topographical highs or isolation locations were used in place of segmentation to address the risk of possible water conduit formation, wherever feasible.
- If the risk of water conduit formation bringing water to or from the decommissioned pipeline in areas of historical releases were inadequately addressed through topographical highs and segmentation for both upgradient and downgradient areas of the release is proposed.

The proposed segmentation locations are subject to further refinement based on additional information, detailed engineering assessment and constructability review. The decision process tree showing the assessed criteria for decommissioning treatment of historical releases is provided in Detail A-2 in Appendix A.

7.3.3 Watercourse Crossings

The criteria used to define water crossing risks considered both the location and characteristics (*i.e.,* fish-bearing versus nonfish-bearing) of the water in the evaluation of their relative significance. In summary, the following criteria were considered:

- watercourses were identified from the results of biophysical studies conducted in 2013 and 2014 in relation to the Line 3 replacement pipeline as well as review of previous biophysical studies conducted in relation to the existing Line 3 pipeline;
- potential drainages were determined using a DEM and a NHN spatial dataset;
- site-specific assessments considered whether the waterbody supported sportfish, and/or non-sportfish, and the elevation profile at and in the vicinity of the watercourse;
- waterbodies crossed but determined to have little or no fish habitat potential were further assessed, where warranted, as connected drainages subject to the conditions identified in Section 7.3.6;
- potential local topographical highs or isolation locations in proximity to the sensitive area were considered, wherever feasible, in place of segmenting; and
- segmentation is recommended at locations where topographic controls do not mitigate the risk of water conduit formation at water crossings.

The proposed segmentation locations are subject to further refinement based on additional information, detailed engineering assessment and constructability review. The decision-making tree showing the assessed criteria for decommissioning treatment of watercourse crossings is provided in Detail A-3 in Appendix A.

7.3.4 Class V Wetlands and Class V Wetland Complexes

Wetlands along the existing Line 3 pipeline were classified according to the same criteria established within the ESA and the Wetland Technical report. The Class V wetlands and Class V wetland complexes (herein referred to as Class V wetlands) were identified based on previous studies, satellite imagery interpretation and data from field work conducted in 2013 and 2014. Due to differences in alignment between the existing Line 3 pipeline and the proposed Line 3 replacement pipeline, in some cases the wetlands identified on the Decommissioning Environmental Alignment Sheets are different than those shown on the Environmental Alignment Sheets prepared for the Line 3 replacement pipeline. In summary Class V wetlands were:

- Considered as potential risks when in direct contact with, or in close proximity to (*i.e.,* 10 m) the existing Line 3 pipeline.
- If a Class V wetland is intersected by or located in close proximity (*i.e.,* 10 m) to the existing Line 3 pipeline, segmentation on both sides of the wetland was considered in order to mitigate the potential

effects of water flowing into or out of the wetland via the decommissioned pipeline (*i.e.,* the water conduit effect).

- Segmentation is recommended at locations where topographic controls do not mitigate the risk of water conduit formation which could potentially move water into or out of Class V wetlands.

The proposed segmentation locations are subject to further refinement based on additional information, detailed engineering assessment and constructability review. The decision-making process showing the assessed criteria for decommissioning treatment of Class V wetlands and wetlands complexes is provided in Detail A-4 in Appendix A.

7.3.5 Connected Drainages

Connected drainages were assessed using the same process as described within Section 7.3.4.

- If a drainage is connected to a higher risk waterbody (*i.e.,* watercourses or Class V wetlands) within 400 m of the existing Line 3 pipeline, and the connected drainage is in contact with the existing Line 3 pipeline, the connected drainage was treated according to the related more stringent decision-making process.

- If the connected drainage is not connected to a higher risk wetland or waterway within 400 m of the existing Line 3 pipeline, then segmentation is not recommended.

The proposed segmentation locations are subject to further refinement based on additional information, detailed engineering assessment and constructability review. The decision-making process showing the assessed criteria for decommissioning treatment of connected drainages is provided in Detail A-5 in Appendix A.

7.3.6 Topographic Risk Areas

Topographic risk areas are areas with steep slopes which are vulnerable to subsidence and scouring or potentially have compromised structural integrity and include select valley and coulee crossings. The risk areas were identified using pipeline profile mapping, drainage networks, aerial imagery and surface topography through visual assessment along the length of the pipeline. Locations vulnerable to slope instability due to steep surface topography where there was no valley or coulee present, were categorized using surface topography classes determined at the time of soil sampling. Locations with surface topography slope classes greater than slope Class 5 (*i.e.,* > 10% slope as determined using soil investigations conducted for various Enbridge projects) were considered steep enough to warrant discussion for future slope stability concerns.

Unstable slopes pose a concern for decommissioning if they present a risk for pipeline exposure. Furthermore, ground disturbance for pipeline segmentation, removal or other treatment may increase the risk of slope failure. As a result, potentially unstable slopes will be assessed as part of the Enbridge monitoring program in the field for pipeline exposure risk and treatment will be implemented, if warranted. Treatments intended to stabilize slopes and preclude pipeline exposure may include, however, are not limited to gabion mats, selective infill or other erosion control measures.

If an area of high topographic risk was identified in contact with the existing Line 3 pipeline, it was considered for special treatment (*i.e.,* additional mitigation). A description of the methodology used to determine topography slope classes is provided in Appendix 4 of the ESA (Soil Survey). The decision-making process for topographical areas of concern was as follows.

- At locations where slope movement was monitored during pipeline operation, the monitoring program will be re-evaluated and continued according to Enbridge OMM practices.

- If the slope is classified as topographical slope Class 5 or less, ongoing monitoring was prescribed in accordance with Enbridge OMM practices. This was considered adequate to address risk.

- If the slope was classified at greater than topographical slope Class 5, the slope will be assessed in accordance with Enbridge OMM practices, and mitigation measures will be implemented if warranted.

- Mitigation may include increased monitoring, gabion matting, segmentation, revegetation and/or replacement of soils.

The proposed segmentation locations are subject to further refinement based on additional information, detailed engineering assessment and constructability review. The decision-making process showing the assessed criteria for decommissioning treatment of topographical slopes Class 5-6 and above is provided in Detail A-6 in Appendix A.

7.3.7 Other Environmentally Sensitive Areas

Environmentally Sensitive Areas were defined as areas protected by regional, provincial, federal or internationally recognized programs and included, however, were not limited to: provincial and federal parks or wildlife preserves; provincial conservation areas or wildlife habitat areas; fish and wildlife fund protected areas; wildlife habitat protection lands; private conservation lands; private fish and game preserves, areas with sandy, sodic or saline soils, Class IV or Class VI wetlands or wetland complexes and areas of the existing Line 3 pipeline where the depth of cover is less than 0.6 m. These areas were identified using GIS data and field assessment.

Site-specific mitigation in relation to ecologically sensitive areas, sandy, sodic or saline soils or Class IV or VI wetlands is not considered to be warranted unless the decommissioning treatment assessment identified a specific area where segmentation is recommended. In general, the risk of disturbance to sensitive areas resulting from segmentation activities is considered to be greater than the risk associated with decommissioning the pipeline in-place. Site-specific treatments or commitments may also be implemented based on consultation with relevant provincial and municipal authorities, and in consideration of local conditions. Ground disturbance will be avoided within these areas, if feasible.

Where inadequate depth of cover (less than 0.6 m of cover) has been identified or where the potential for pipeline exposure has been a concern during pipeline operation, treatment may consist of either burial to a depth of greater than 0.6 m using additional topsoil (if reburial would not impede current land use) or continued monitoring of the location according to Enbridge OMM practices.

Protected Species at Risk and Critical Habitat

Documented occurrences and locations of protected species at risk and critical wildlife habitat (as defined by the *Species at Risk Act*) were identified from data collected for previous Enbridge projects in the Project area and biophysical surveys conducted in 2013 and 2014. Documented species at risk were assessed on a case-specific basis to determine if potential effects would occur from the decommissioned pipeline. Ground subsidence and contamination were identified as potential effects of decommissioning a pipeline in-place. Treatments for ground subsidence are described in Section 5.3.3 and treatments for contamination are described in Sections 5.3.5 and 5.3.6.

Site-specific mitigation in relation to protected species at risk and critical habitat beyond mitigation for site-specific risks (*i.e.,* water crossings) is not considered to be warranted. The final location of segmentation sites will take into account protected species at risk and critical habitat in relation to ground disturbance. Ground disturbance will be avoided within these areas if feasible or appropriate mitigation will be implemented.

8.0 DECOMMISSIONING TREATMENT

The proposed mitigation measures that will be applied to the pipeline during the decommissioning of Line 3 include pipeline segmentation, maintaining of cathodic protection and ongoing assessment and monitoring.

Where these proposed treatments will be applied, a description of the feature requiring mitigation and the treatment method selected are identified in Tables 8.1.1-1 and 8.1.2-1. The segmentation and removal locations are separated according to the criteria used to select the treatment (*i.e.,* according to the engineering Level 1 assessment) or an assessment of land use and Environmentally Sensitive Areas (Levels 2 and 3 assessments). Engineering isolation and segmentation locations are identified on the Decommissioning Environmental Alignment Sheets (Appendix B) as are areas identified for consideration of special treatment (*i.e.,* requiring additional mitigation) due to environmental concerns.

8.1 Pipeline Segmentation and Removal Locations

8.1.1 Engineering Segmentation Locations

Based on the assessment completed to date, 63 locations (including pump stations, facility isolation sites, as well as the initiating terminal and terminal station) have been identified where segmentation locations are recommended due to engineering considerations (Table 8.1.1-1). Final segmentation locations are subject to further refinement based on additional information, detailed engineering and constructability review.

TABLE 8.1.1-1

SEGMENTATION LOCATIONS DUE TO ENGINEERING CONSIDERATIONS

From MKP	To MKP	Rationale/Description	Activity
175.3	176.0	Initiating terminal	Isolate at downstream fence line
207.8	207.8	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
209.0	209.1	Stand-alone valve	Remove to a depth of 1 m below surface and restore right-of-way
229.7	230.0	Metiskow Station boundary	Isolate at upstream and downstream fence lines
263.6	263.6	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
275.0	275.0	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
279.1	279.1	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
290.0	290.2	Cactus Lake Station boundary	Isolate at upstream and downstream fence lines
335.1	335.1	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
351.3	351.6	Kerrobert Station boundary	Isolate at upstream and downstream fence lines
397.2	397.2	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
413.6	413.9	Herschel Station boundary	Isolate at upstream and downstream fence lines
458.0	458.0	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
475.0	475.4	Milden Station boundary	Isolate at upstream and downstream fence lines
504.2	504.2	Stand-alone Valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
506.5	506.5	Stand-alone Valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
523.9	524.0	Stand-alone Valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
538.1	538.1	Loreburn Station boundary	Isolate at upstream and downstream fence lines
573.2	573.2	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
581.2	581.3	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
590.6	590.8	Craik Station boundary	Isolate at upstream and downstream fence lines

TABLE 8.1.1-1 Cont'd

From MKP	To MKP	Rationale/Description	Activity
637.4	637.5	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
652.9	653.2	Bethune Station boundary	Isolate at upstream and downstream fence lines
660.9	660.9	Stony Beach take off valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
691.7	691.7	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
704.2	705.2	Regina Station boundary	Isolate at upstream and downstream fence lines
704.8	704.8	Valve within Regina Station	Close, permanently disable and de-energize
732.5	732.7	White City flow through station	Segment if valve is on mainline
740.2	740.2	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
749.2	749.2	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
762.0	762.4	Odessa Station boundary	Isolate at upstream and downstream fence lines
774.6	774.7	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
800.6	800.6	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
812.1	812.6	Glenavon Station boundary	Isolate at upstream and downstream fence lines
855.7	855.7	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
856.6	856.6	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
875.1	875.4	Langbank Station boundary	Isolate at upstream and downstream fence lines
899.9	900.0	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
929.1	929.2	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
946.7	946.8	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
958.7	958.8	Cromer Station boundary	Isolate at upstream and downstream fence lines
998.0	999.0	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1009.2	1009.2	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1023.4	1023.4	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1031.6	1031.8	West Souris Station boundary	Isolate at upstream and downstream fence lines
1040.0	1040.2	Souris flow through station	Segment if valve is on mainline
1069.5	1069.5	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1073.9	1073.9	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1082.3	1082.3	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1087.3	1087.3	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1092.3	1092.3	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1103.3	1103.4	Glenboro Station boundary	Isolate at upstream and downstream fence lines
1131.0	1131.0	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1139.2	1139.3	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1144.4	1144.5	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1148.1	1148.2	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less, and restore right-of-way
1155.6	1155.8	St. Leon Station boundary	Isolate at upstream and downstream fence lines

TABLE 8.1.1-1 Cont'd

From MKP	To MKP	Rationale/Description	Activity
1165.0	1165.2	Manitou Station boundary	Isolate at upstream and downstream fence lines
1190.6	1190.7	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less and restore right-of-way
1201.9	1201.9	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less and restore right-of-way
1206.3	1206.4	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less and restore right-of-way
1227.0	1227.0	Stand-alone valve	Remove to a depth of 1 m below surface or to the top of the valve body, whichever is less and restore right-of-way
1242.4	1243.0	Gretna Station boundary	Isolate at upstream fence line

8.1.2 Environmentally Sensitive Locations

Areas where special treatment was specifically considered are identified on the Decommissioning Environmental Alignment Sheets (Appendix B). Following a review of these locations, as well as the considerations described in Section 7.0 including the presence or absence of topographical highs, segmentation is recommended at 58 environmentally sensitive locations (Table 8.1.2-1). Final segmentation locations are subject to further refinement based on additional information, detailed engineering and constructability review.

TABLE 8.1.2-1

ENVIRONMENTALLY SENSITIVE LOCATIONS

Location (MKP)[1]	Reason for Segmentation
176.2	East side of area with historic release
206.9	West side of area with historic release
213.1	West side of Ribstone Creek
215.1	East side of Ribstone Creek
225.2	East side of historic release area
244.9	East side of Class V wetland
270.4	West side of Eyehill Creek
273.0	East side of Eyehill Creek
286.3	West side of area with historic release
296.5	West side of Class V wetland
299.5	East side of Class V wetland
301.0	West side of connected drainage
358.8	West side of connected drainage
369.2	East side of Dodsland
393.0	West side of Eagle Creek
394.5	East side of Eagle Creek
445.6	West side of Class V wetland
577.7	East side of Class V wetland
586.1	West side of Iskwao Creek
587.0	East side of Iskwao Creek
589.1	East side of historic release area
604.0	East side of historic release area
657.4	East side of the Qu'Appelle River
690.0	East side of Wascana Creek
740.7	East side of Class V wetland
760.1	East side of Class V wetland
769.3	West side of area with historic release
771.2	East side of area with historic release
780.2	East side of Kendal
789.7	West side of Montmare

TABLE 8.1.2-1 Cont'd

Location (MKP)[1]	Reason for Segmentation
793.1	East side of Montmare
807.0	East side of Class V wetland
810.4	East side of Class V wetland
815.5	East side of area with historic release
818.8	West side of Class V wetland
845.7	West side of Class V wetland
860.8	West side of Class V wetland
862.4	East side of Class V wetland
882.9	West side of area with historic release
884.4	East side of area with historic release
890.8	West side of Class V wetland
901.2	East side of Class V wetland
917.2	West side of Class V wetland
917.6	East side of Class V wetland
932.1	West side of connected drainage
933.0	East side of connected drainage
934.4	West side of Maryfield
950.3	West side of Pipestone Creek
951.8	East side of Pipestone Creek
994.7	East side of Class V wetland
1051.3	East side of Class V wetland
1077.4	West side of Spring Brook
1110.9	East side of Oak Creek
1132.1	East side of the Cypress River
1140.9	East side of area with historic release
1163.7	East side of area with historic release
1195.9	West side of Deadhorse Creek
1198.0	East side of Deadhorse Creek

Note: 1 The precise location of segmentation at environmentally sensitive locations will be determined upon completion of field surveys.

Additional Environmentally Sensitive Areas to be considered for special treatment (*i.e.*, additional mitigation warranted) may be added based on ongoing consultation with stakeholders, as well as ongoing engineering and environmental field work (see Section 9.0).

8.1.3 Pipeline Removal Locations

Based on the results of the land use assessment completed to date, no segments of the pipeline have been identified as requiring removal. The existing Line 3 pipeline and the Line 3 right-of-way are surrounded or adjacent to operating pipelines. In these circumstances, the right-of-way is not available for alternate land uses or future development due to safety concerns regarding working between or adjacent to the operating pipelines.

8.2 Summary

Using the criteria applied as described in Section 7.0 of this report and in accordance with the NEB decommissioning provisions under the *NEB OPR* (NEB 2013), potential special treatment areas have been identified on the Decommissioning Environmental Alignment Sheets and mitigation measures defined in each case. In accordance with CSA Z662-11 (CSA 2012) and subject to the conditions of the NEB approval, the proposed decommissioned segments of the existing Line 3 pipeline will be purged, cleaned, segmented, where warranted, and left in place. Factors affecting pipeline segmentation include segment isolation, facility removal and assurance of public safety (Section 7.0). Consultation will take place with relevant railway companies and governmental authorities to ensure decommissioning activities maintain the integrity of existing transportation infrastructure encountered by the pipeline.

Agricultural and non-agricultural types of land use were assessed to determine if the pipeline is to be decommissioned in-place, decommissioned in-place with mitigation measures or decommissioned in-place with the potential for segment removal at the broad scale (Section 7.2). The results of the land use assessment and consideration of special treatments in Environmentally Sensitive Areas found that the entirety of the existing Line 3 pipeline can be safely decommissioned in-place.

Using the criteria applied as per Section 7.0 of this report, a total of 58 potential special treatment areas for environmentally sensitive locations have been identified on the Decommissioning Environmental Alignment Sheets. Environmentally sensitive locations selected for potential segmentation were locations where there were no local topographical highs to prevent the movement of material into or out of these areas. Environmentally Sensitive Areas deemed to warrant potential environmental segmentation included: Class V wetlands (19 segmentation locations); watercourses (17 segmentation locations); areas with historical releases (13 segmentation locations); municipalities (5 segmentation locations); and drainages into watercourses and/or Class V wetlands (4 segmentation locations).

A total of 21 existing facilities will be isolated from the pipeline to ensure that the pipeline is not contaminated following cleaning (Section 2.0). A total of 42 stand-alone valve sites and piping components will be removed and engineered to reduce the potential for soil or water contamination during removal and transportation.

Additional Environmentally Sensitive Areas to be considered for special treatment may be added based on ongoing consultation with stakeholders, as well as ongoing engineering and environmental field work.

Following the completion of all decommissioning activities, Enbridge will restore areas disturbed by segmentation activities.

Enbridge, within its mainline corridor, operates several pipelines adjacent to the existing Line 3 pipeline. As a result, Enbridge is committed to ongoing monitoring and maintenance of all pipelines within the corridor, including the decommissioned Line 3. This monitoring and maintenance will continue to be carried out as part of the Enbridge Integrity Program. Enbridge will also be maintaining cathodic protection on the existing Line 3, once it is decommissioned, and will address any future concerns of landowners that might arise as a result of Line 3 being decommissioned.

9.0 ADDITIONAL STUDIES

Environmental field work for Line 3 is continuing throughout the remainder of 2014. The Decommissioning Environmental Technical Report will be a living document, which will be updated as new information is obtained, until decommissioning activities are complete. Additional information, which will inform the decommissioning plan, includes, however, is not limited to:

- data obtained through the ongoing Enbridge Integrity Program, the ongoing post-construction monitoring of Line 3 and other Enbridge pipelines in the same corridor;
- data obtained from ongoing mitigation of identified contaminated sites adjoining Line 3;
- Enbridge detailed engineering assessment; and
- results of stakeholder consultation, which was initiated in February 2014 and will be ongoing.

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10.2 GIS Data and Mapping References

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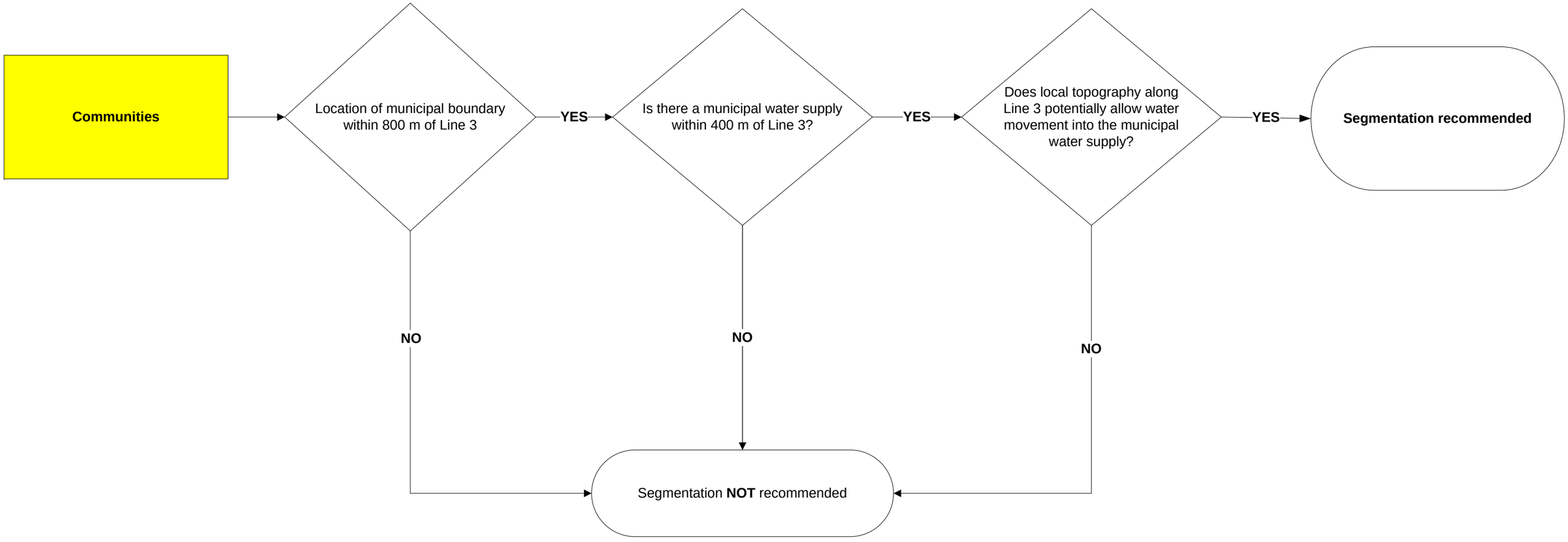
APPENDIX A

SPECIAL TREATMENT DECISION-MAKING FLOW CHARTS



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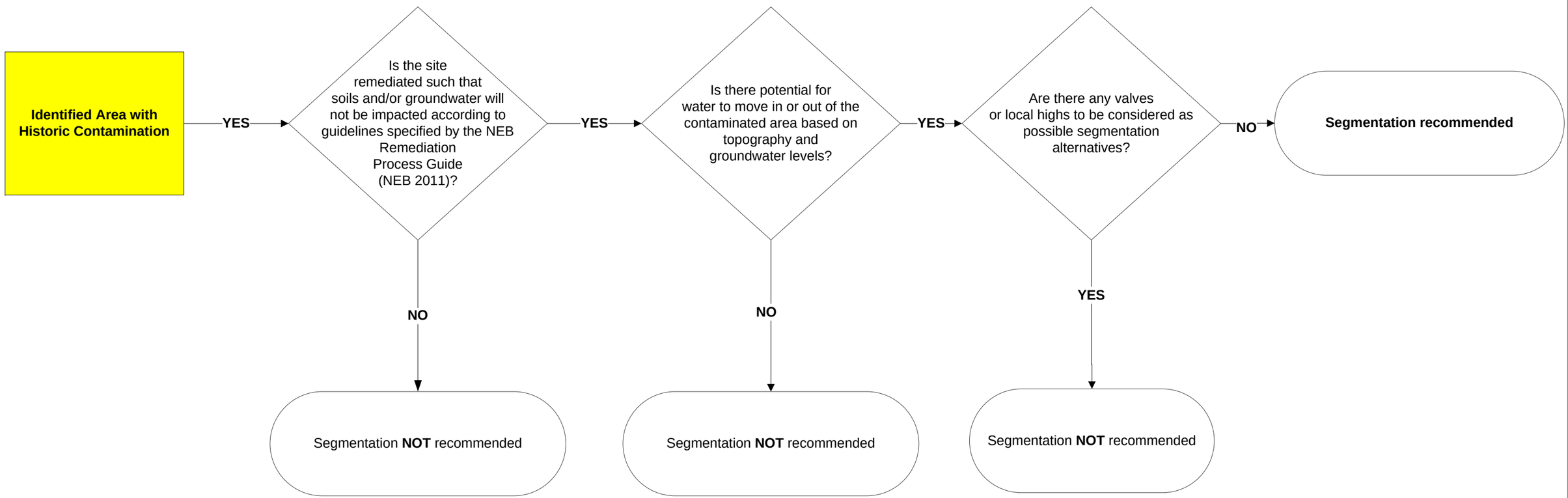
ENBRIDGE
LINE 3 REPLACEMENT PROGRAM

COMMUNITIES

10427	NOVEMBER 2014	DETAIL A-1



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LINE 3 REPLACEMENT PROGRAM

HISTORICAL INCIDENT AREAS

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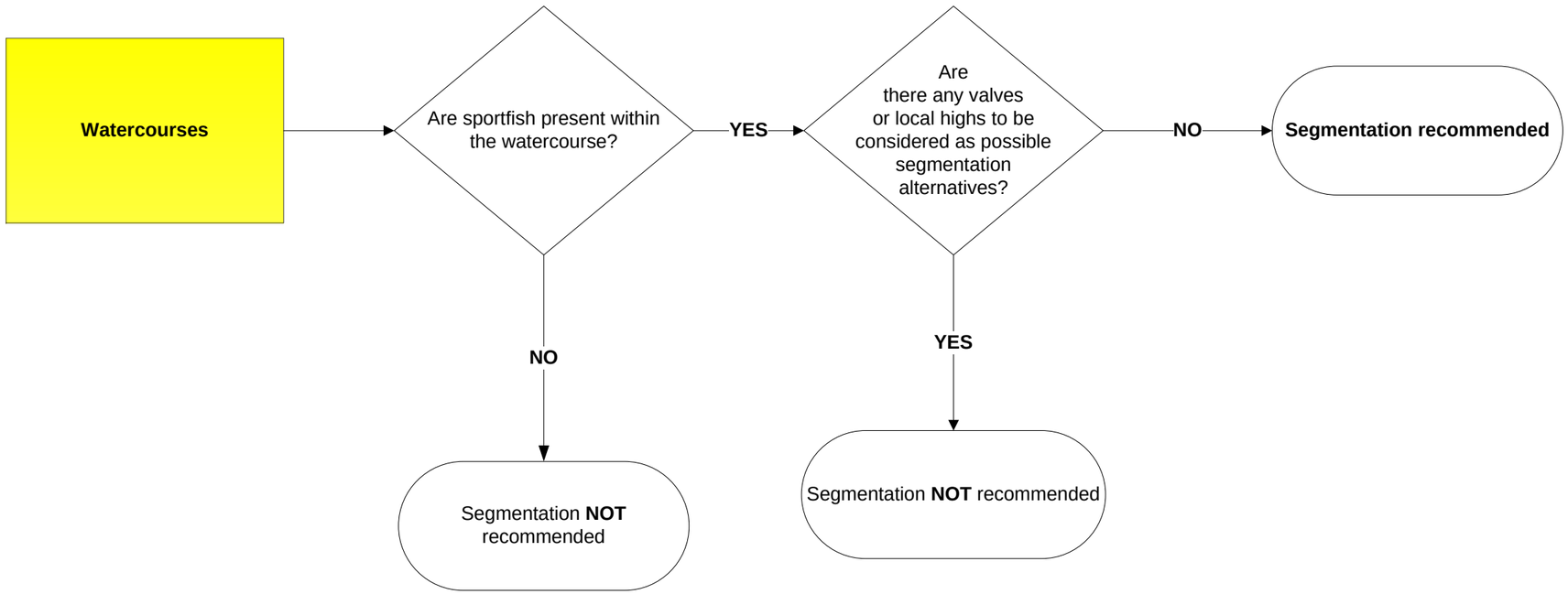

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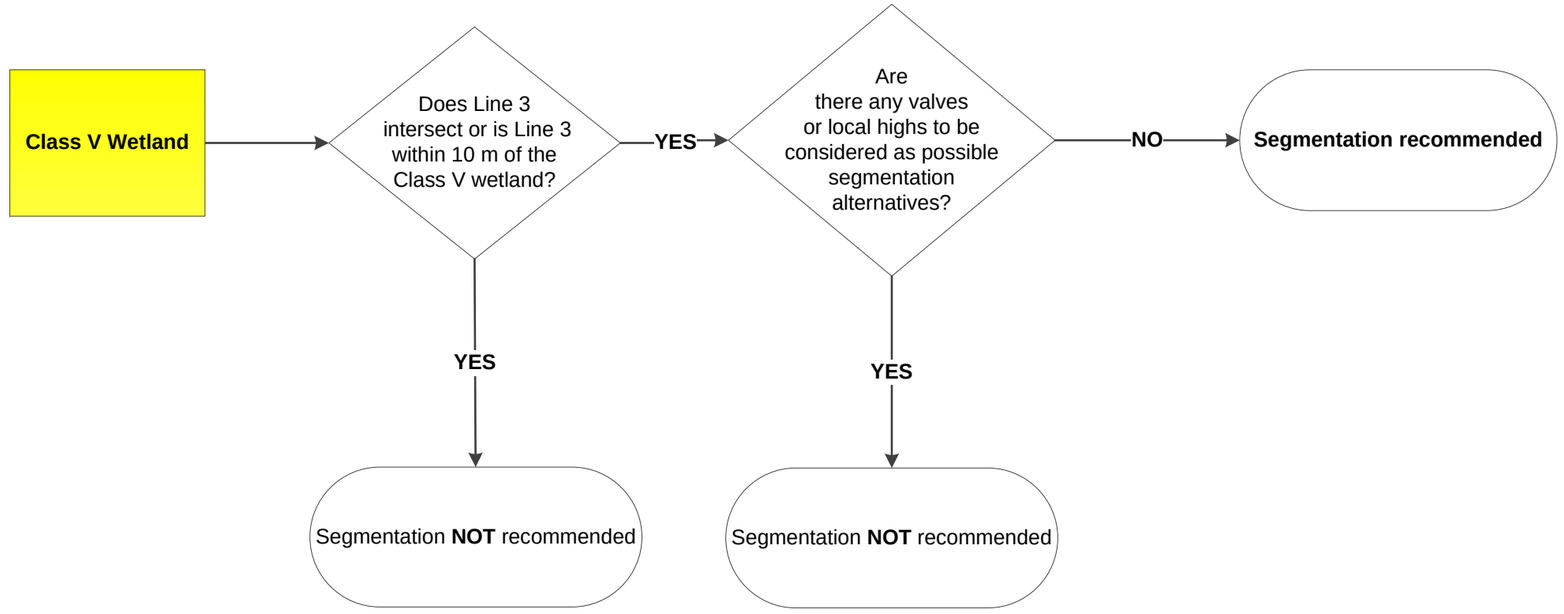
LINE 3 REPLACEMENT PROGRAM

WATERCOURSE

10427	NOVEMBER 2014	DETAIL A-3



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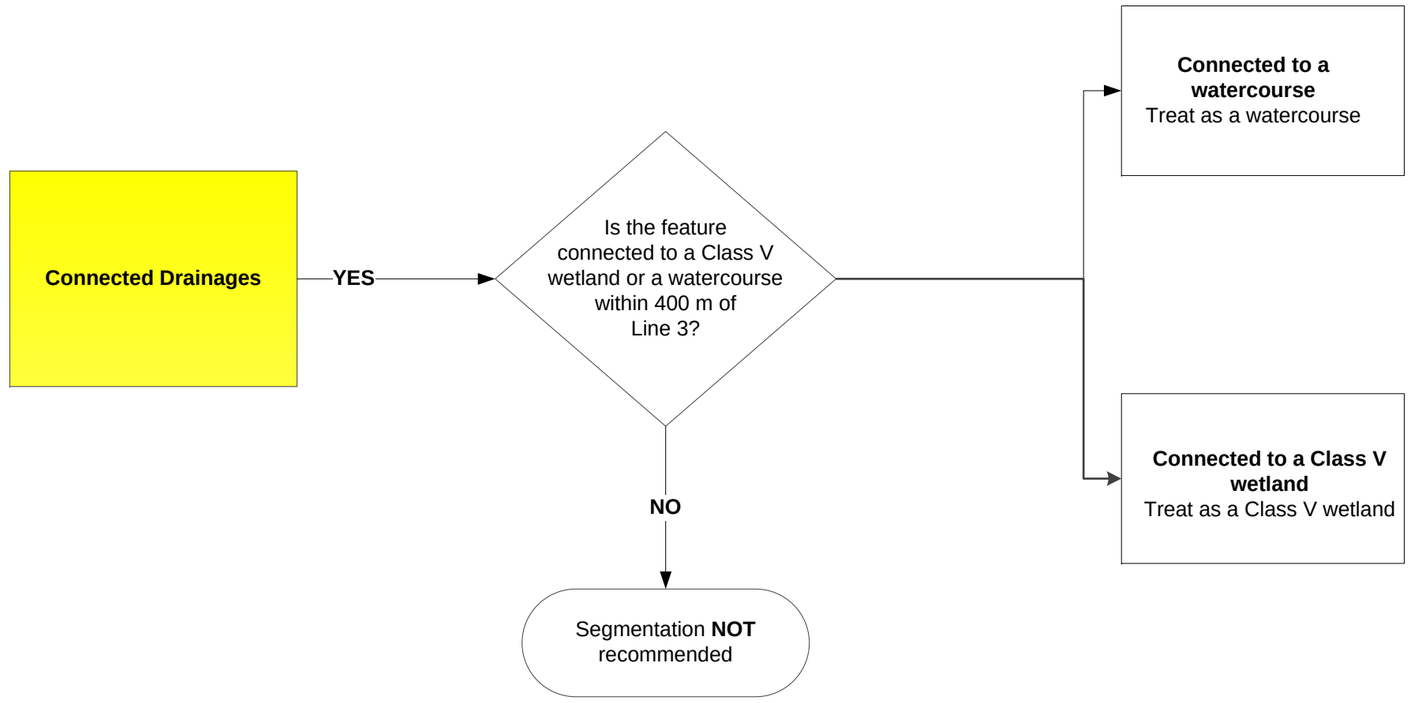
LINE 3 REPLACEMENT PROGRAM

CLASS V WETLANDS

10427	NOVEMBER 2014	DETAIL A-4



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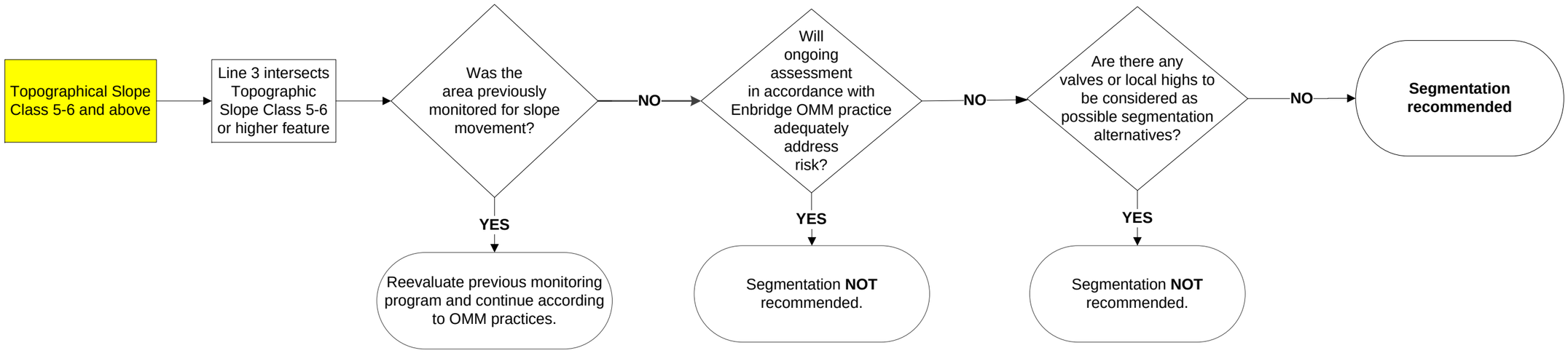
LINE 3 REPLACEMENT PROGRAM

CONNECTED DRAINAGES

10427	NOVEMBER 2014	DETAIL A-5

Slope Class definition: Slopes which are vulnerable to subsidence and scouring or with compromised structural integrity (valley and coulee crossings). Identified using topographic data obtained during soil surveys, aerial imagery and DEM.
1 – 0-0.5% level
2 – 0.5-2% nearly level
3- >2-5% very gentle slopes
4- >5-10% gentle slopes
5 - >10-15% moderate slopes
6- >15-30% strong slopes
7- >30-45% very strong slopes



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LINE 3 REPLACEMENT PROGRAM

TOPOGRAPHICAL SLOPE CLASS 5-6 AND ABOVE

10427	NOVEMBER 2014	DETAIL A-6

APPENDIX B

DECOMMISSIONING ENVIRONMENTAL ALIGNMENT SHEETS

DECOMMISSIONING ALIGNMENT SHEET PACKAGE FOR THE ENBRIDGE PIPELINES INC. LINE 3 REPLACEMENT PROGRAM

November 2014

Prepared for:

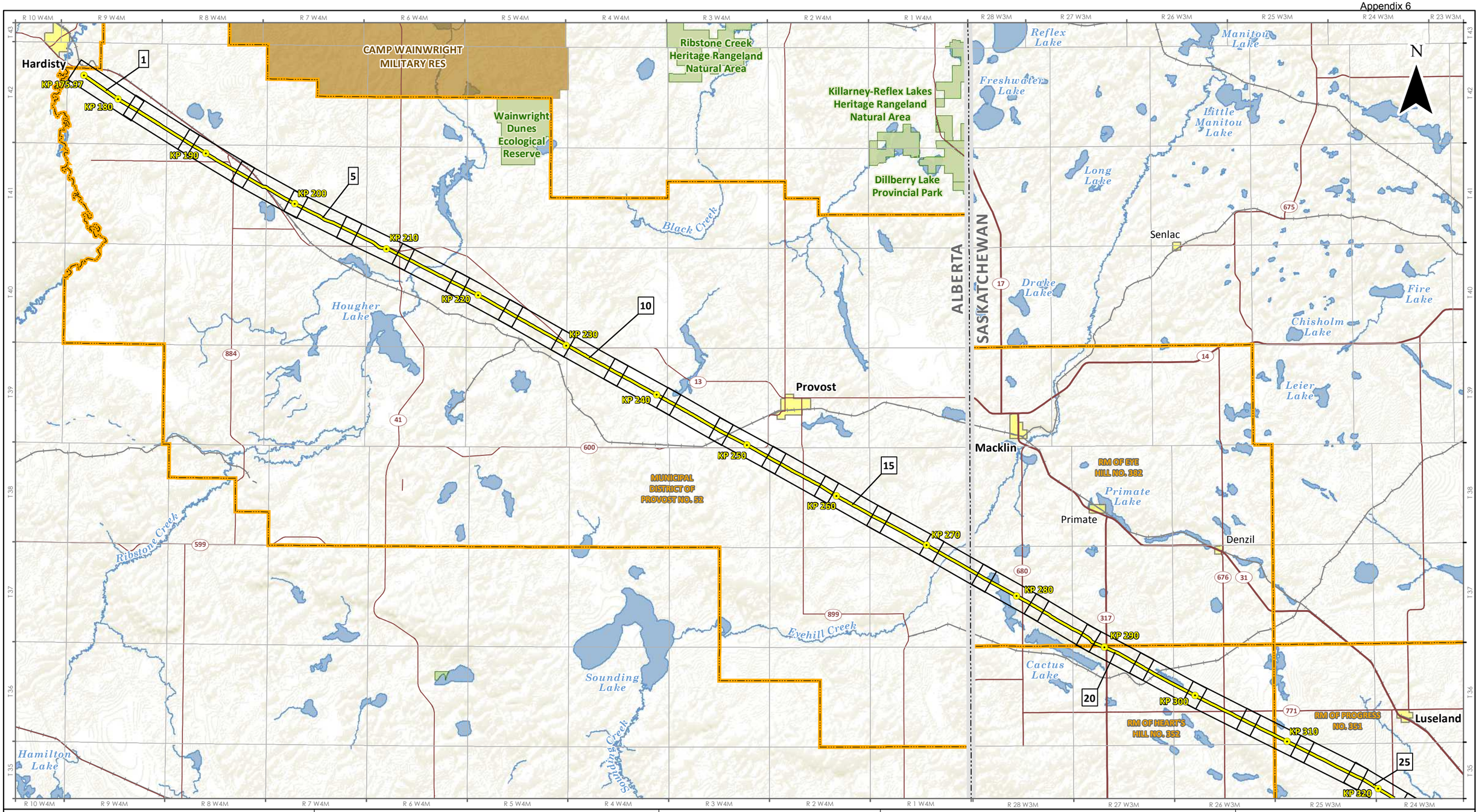
Enbridge Pipelines Inc.
10130 103rd Street Edmonton, Alberta T5J 3N9
Ph: 780-969-6207

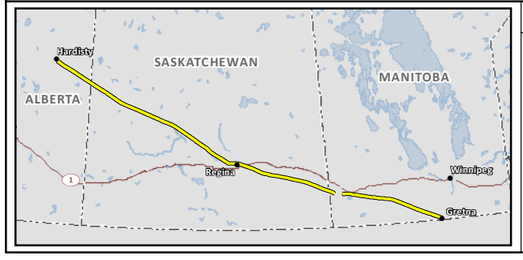
Revisions		
Ver.	**Date**	**Description**
Rev 1	November 2014	Submission to the National Energy Board

Prepared by:

A CH2M HILL Company

CH2M HILL Energy Canada, Ltd.
Suite 1100, 815 - 8th Avenue S.W. Calgary, Alberta T2P 3P2
Ph: 403-265-2885





LEGEND

- Mainline Kilometre Post
- Existing Line 3 Pipeline
- Highway
- Paved Road
- Railway
- Municipal Boundary
- Provincial Boundary
- Watercourse
- Decommissioning Alignment Sheet
- City / Town Boundary
- Indian Reserve
- Military
- Park / Protected Area
- Waterbody

SOURCES

UTM Zones 12N, 13N & 14N
Pipeline Current to September 2013; Grids: AltaLIS 2009, ISCS 2014, MDC 2002; Roads: NRCan 2014; Railways: NRCan 2012; Rural Municipalities/Cities/Towns: NR Can 2003, ISCS 2014, MCPS 2007, AltaLIS 2014; Hydrology: IHS Inc. 2004, ESRI 2005; First Nation Lands: Government of Canada 2014, IHS Inc. 2013; Parks & Protected Areas: ATPR 2012, ISCS 2014, MDC 2011; Military: IHS Inc. 2013; Provincial Boundaries: ESRI 2005; Hillshade: TERA Environmental Consultants 2008.

ENBRIDGE

LINE 3 REPLACEMENT PROGRAM

DECOMMISSIONING ALIGNMENT SHEETS
INDEX MAP

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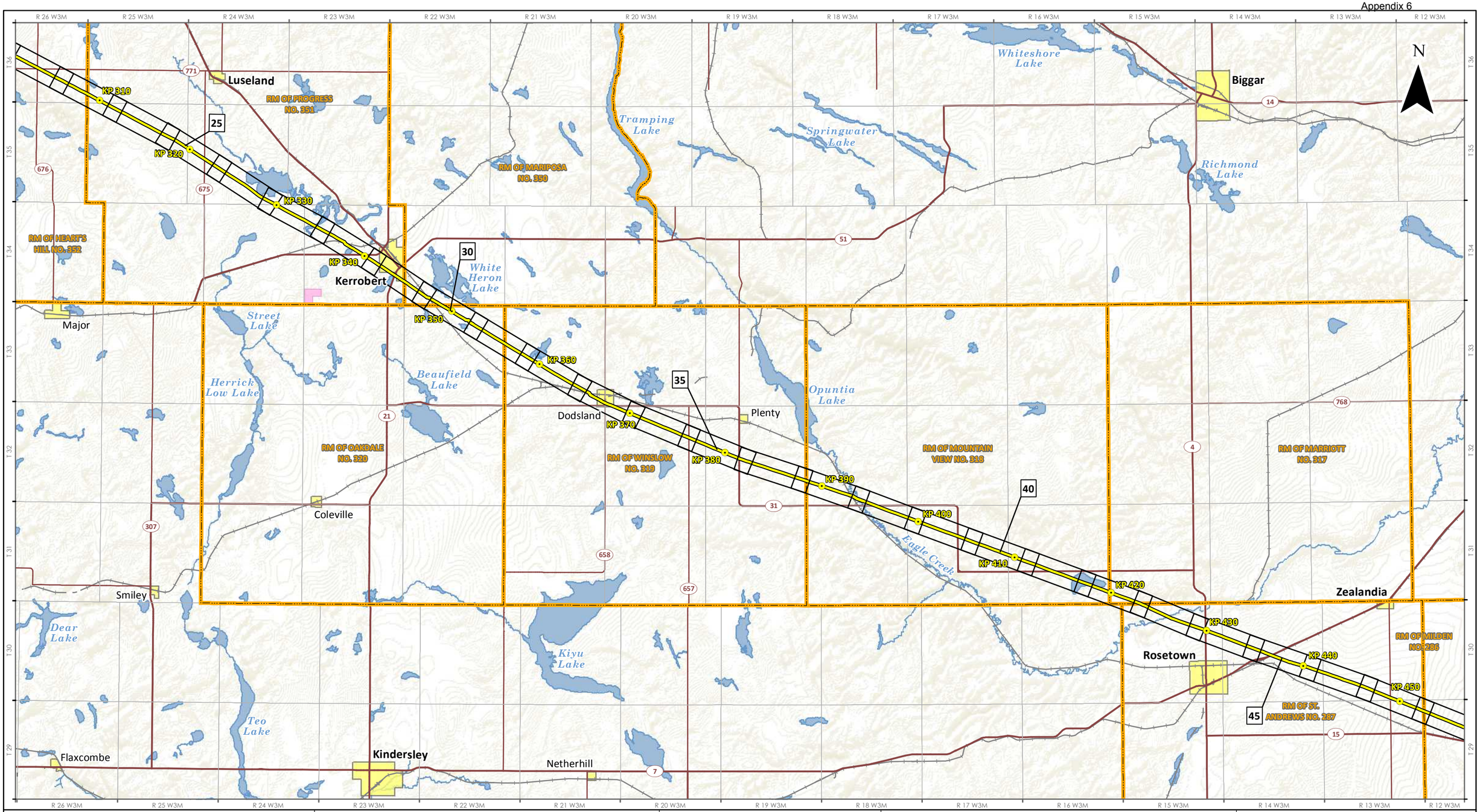

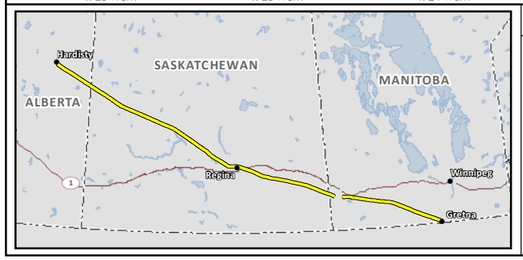

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ENBRIDGE

LINE 3 REPLACEMENT PROGRAM

DECOMMISSIONING ALIGNMENT SHEETS
INDEX MAP

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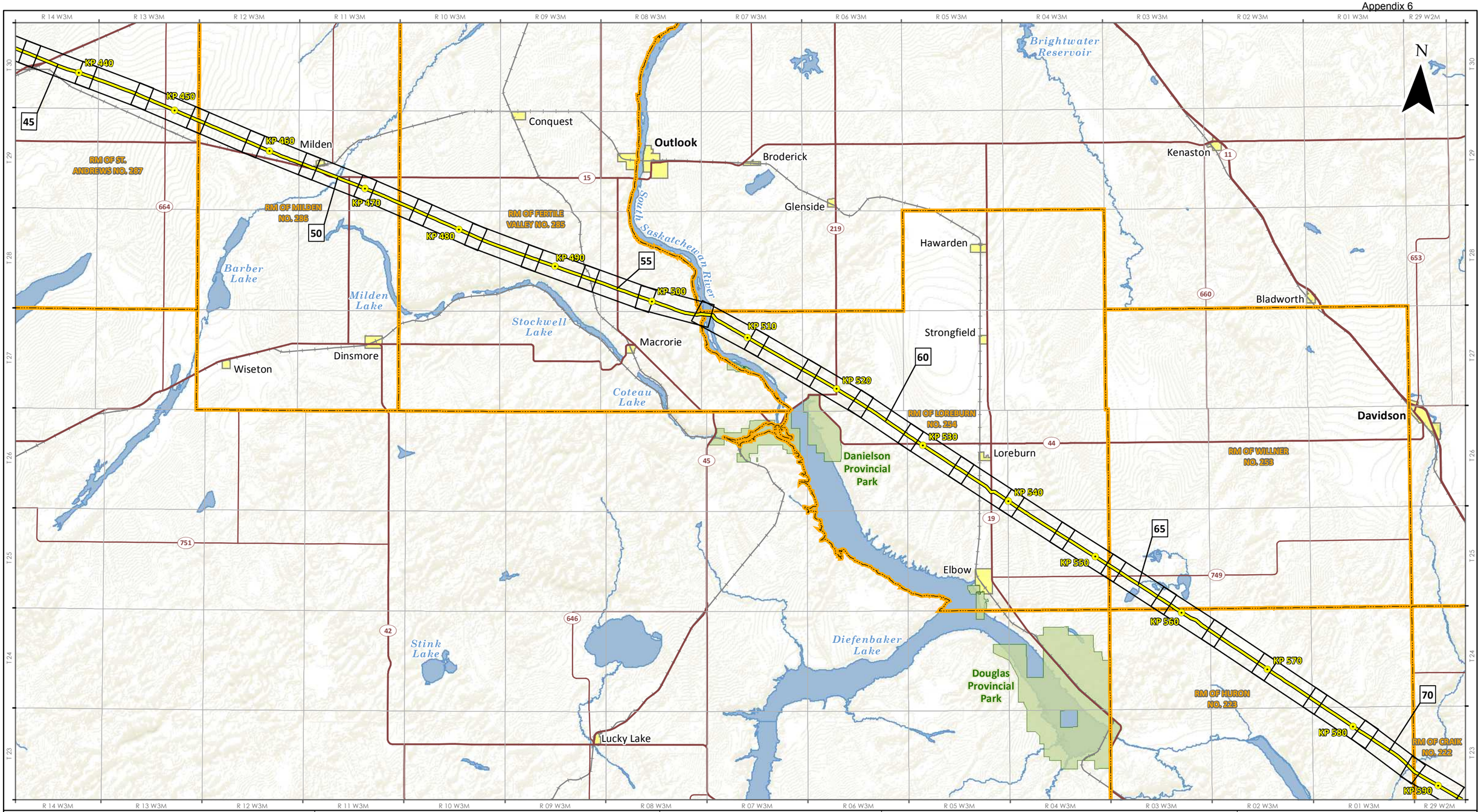

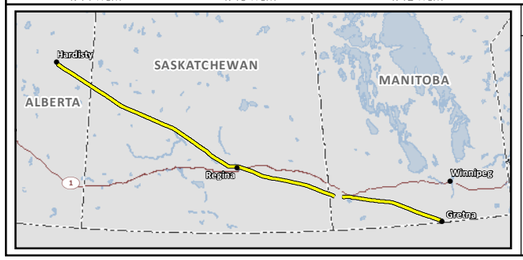

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ENBRIDGE

LINE 3 REPLACEMENT PROGRAM

DECOMMISSIONING ALIGNMENT SHEETS
INDEX MAP

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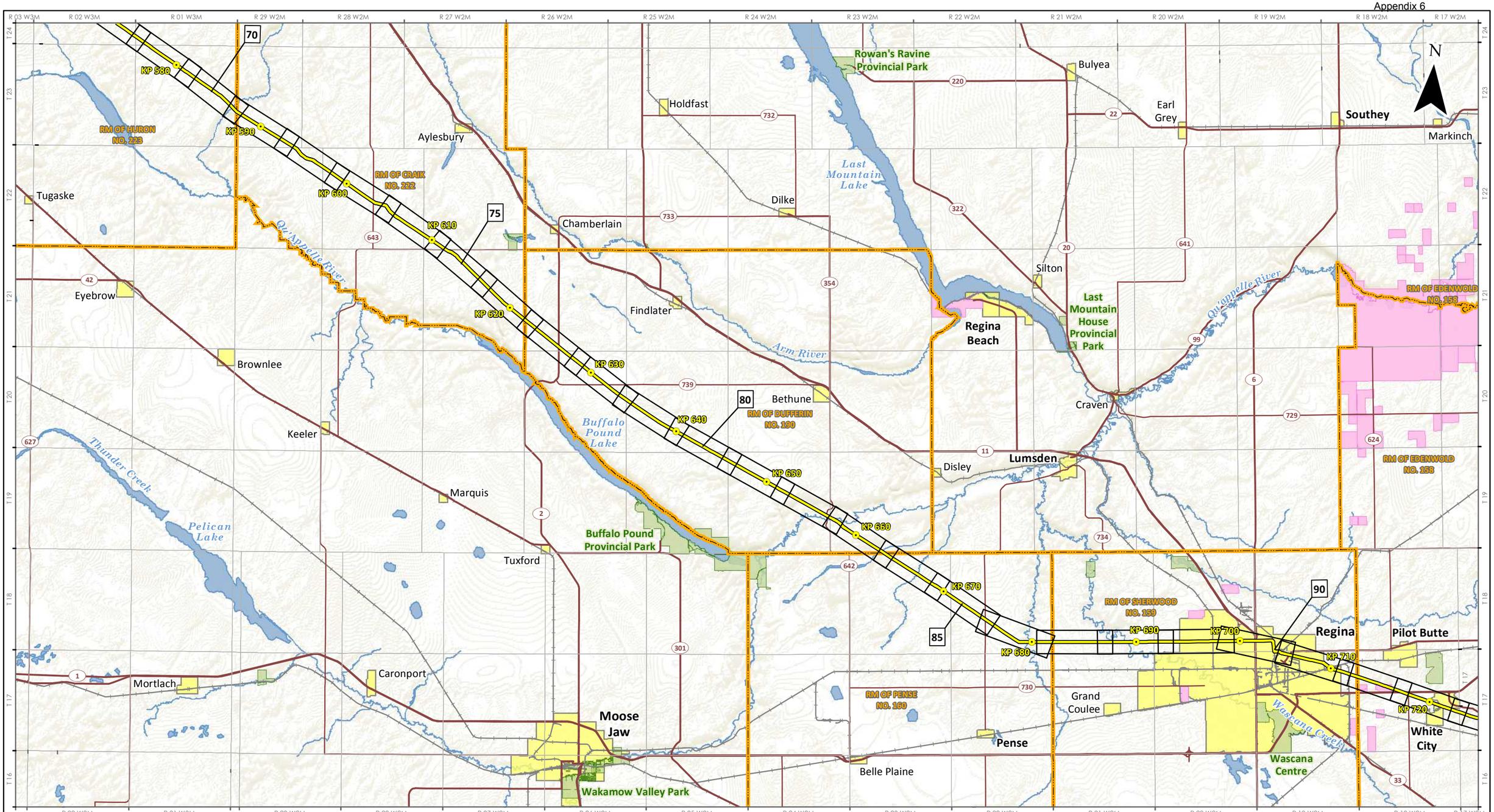

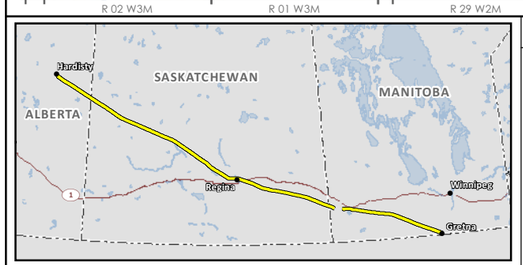

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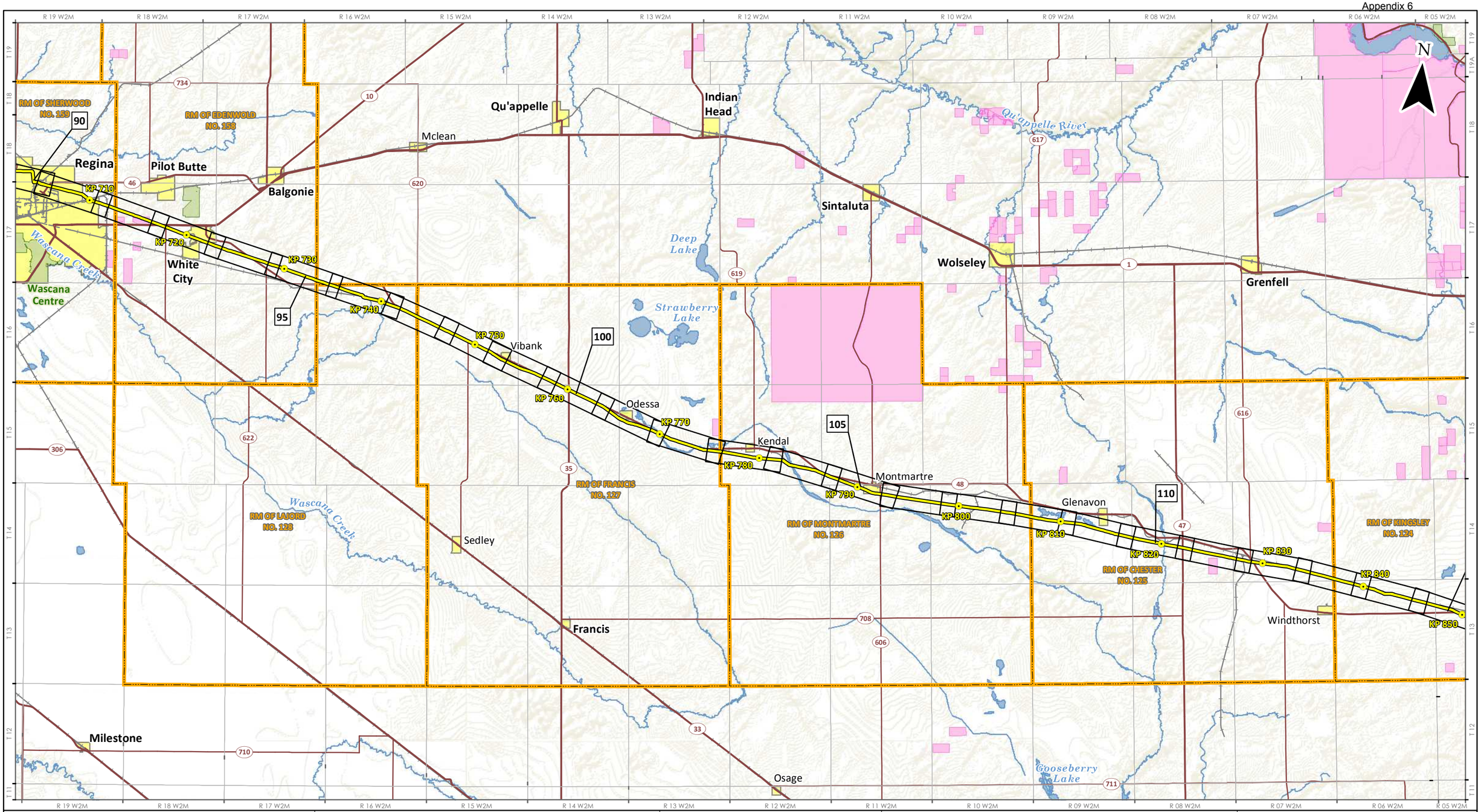

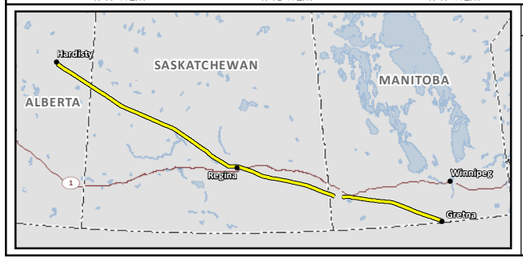

LEGEND

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RM OF CHESTER NO. 125
RM OF KINGSLEY NO. 124
RM OF SILVERWOOD NO. 123
RM OF ARCHIE NO.101
RM OF MINIOTA NO.138
RM OF WOODWORTH NO.307
RM OF WAWKEN NO. 93
RM OF WALPOLE NO. 92
RM OF MARYFIELD NO. 91
RM OF WALLACE NO.139
RM OF PIPESTONE NO.162

SASKATCHEWAN
MANITOBA

Kipling
Kennedy
Wawota
Moosomin
Fleming
Elkhorn
Virden
Fairlight
Maryfield
Kisbey
Arcola
Carlyle
Manor
Redvers

Moosoman Lake
Assiniboine River
Gopher Creek
Pipestone Creek
Kenosee Lake
Hewitt Lake
White Bear Indian Res 70 Lake
Moose Mountain Provincial Park

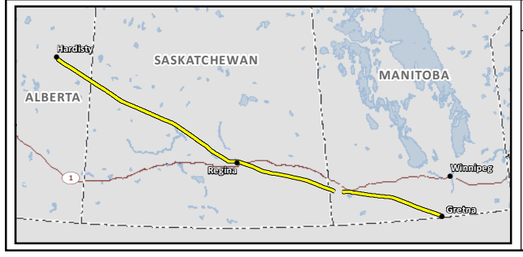
KP 840
KP 850
KP 860
KP 870
KP 880
KP 890
KP 900
KP 910
KP 920
KP 930
KP 940
KP 950
KP 959.64
KP 980.23

115
120
125
130
134
135

N

R 06 W2M R 05 W2M R 04 W2M R 03 W2M R 02 W2M R 01 W2M R 33 W1M R 33 W1M R 32 W1M R 31 W1M R 30 W1M R 29 W1M R 28 W1M R 27 W1M R 26 W1M R 25 W1M

T 15 T 14 T 13 T 12 T 11 T 10 T 09 T 08 T 07 T 14 T 13 T 12 T 11 T 10 T 09 T 08 T 07



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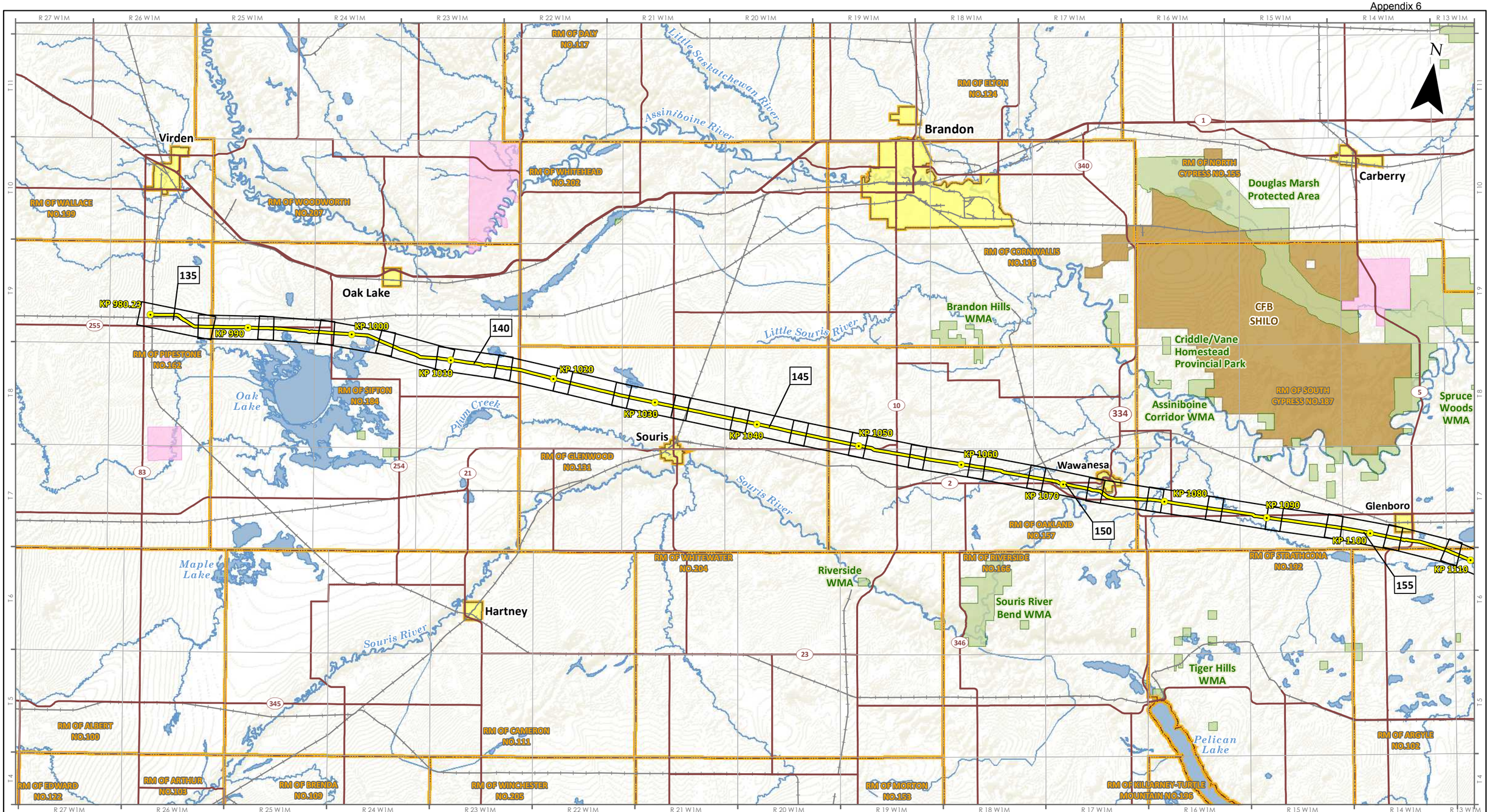

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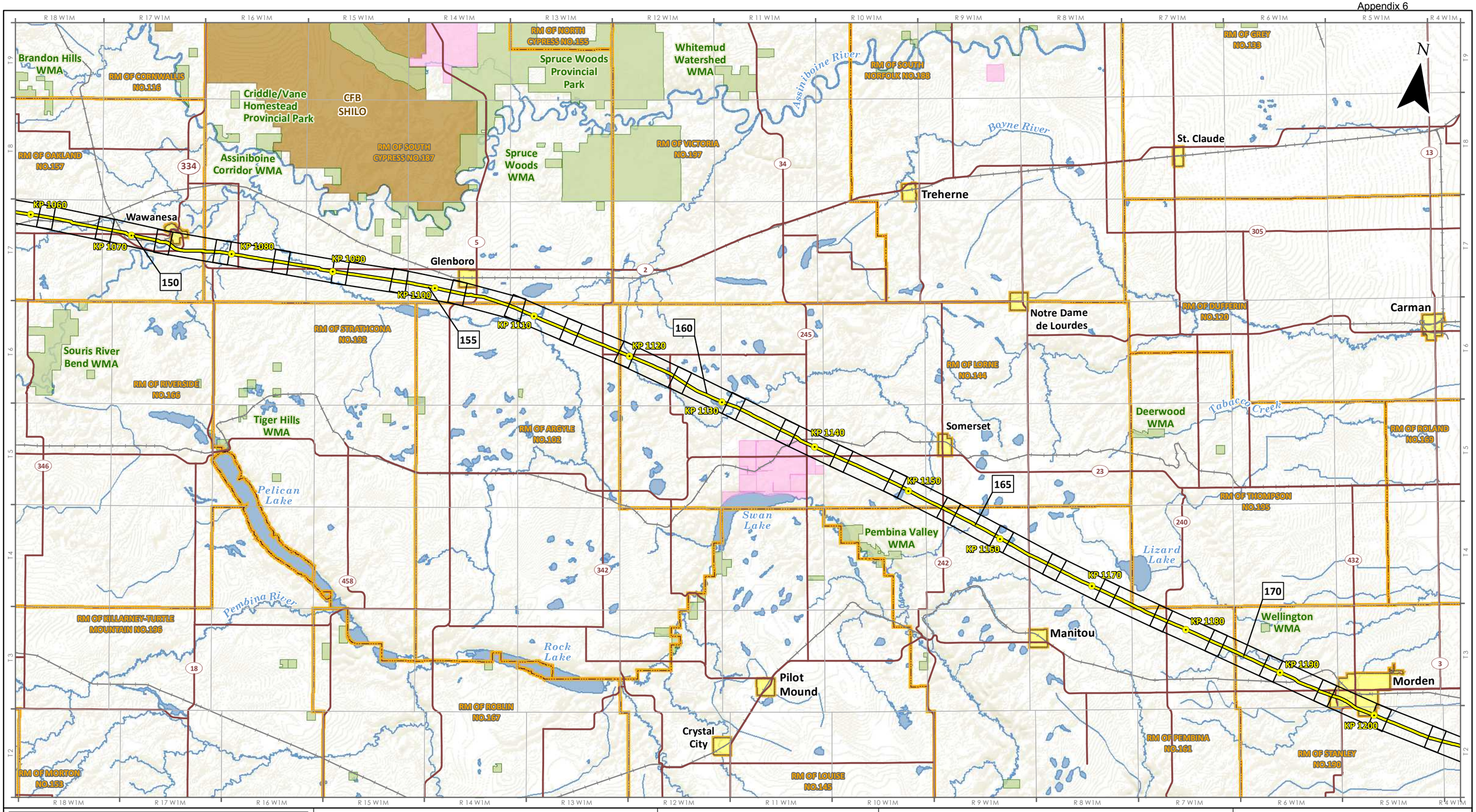

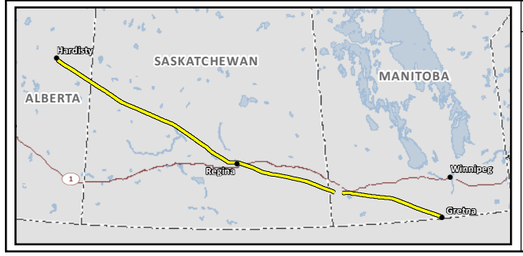

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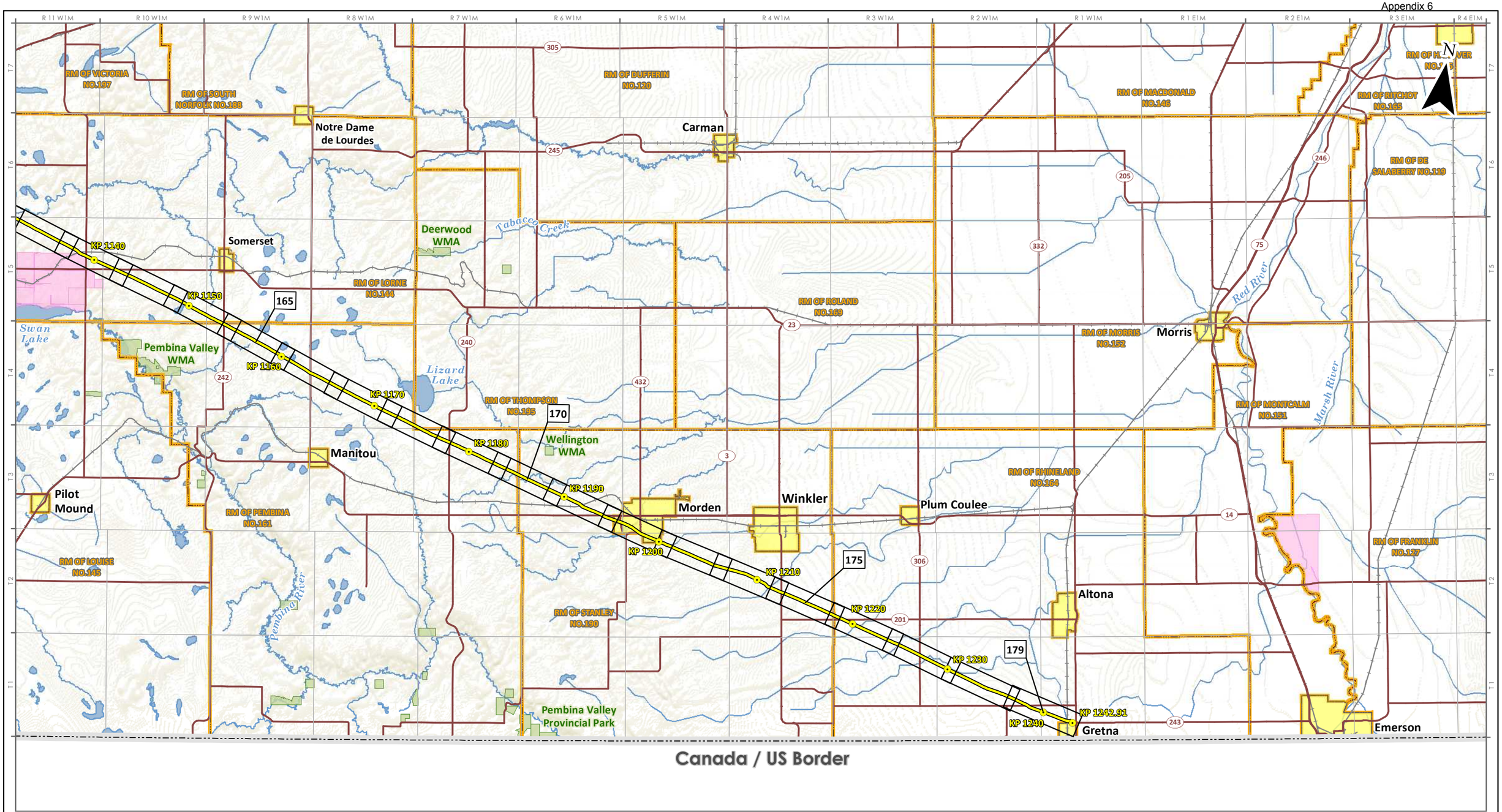

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