

MANITOBA INFRASTRUCTURE - WATER MANAGEMENT AND STRUCTURES

LAKE MANITOBA AND LAKE ST. MARTIN OUTLET CHANNEL PROJECT

PRECONSTRUCTION ENVIRONMENTAL FIELD WORK – VEGETATION (CONS15843)

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EXECUTIVE SUMMARY

WSP Canada Group Limited was retained by Manitoba Infrastructure to complete pre-construction heritage resource investigations and additional terrestrial environmental surveys for plant and wildlife Species of Conservation Concern in support of the Lake Manitoba and Lake St. Martin Outlet Channel Project in the Interlake region of Manitoba (Appendix A, Figure 1). The pre-construction surveys were completed in 2020 to supplement baseline environmental information previously collected and documented in an Environmental Impact Statement (EIS, Manitoba Infrastructure, 2020) developed in support of the Project.

The Project includes the construction of two new water diversion (“outlet”) channels as a permanent flood control management system for the Lake Manitoba and Lake St. Martin region of Manitoba, as well as associated infrastructure in support of channel construction including re-routing of Provincial Road 239 and construction of a Manitoba Hydro power distribution line (Appendix A, Figure 1). The Lake Manitoba Outlet Channel will connect Lake Manitoba with Lake St. Martin, and the Lake St. Martin Outlet Channel will connect Lake St. Martin to Lake Winnipeg; combined, these two channels will convey water from Lake Manitoba through Lake St. Martin to Lake Winnipeg in a manner that alleviates overland flooding in the Lake St. Martin area of Manitoba, such as occurred in the 2011 and 2014 floods.

The current Project Development Area includes the physical space or directly affected area where Project components and activities will occur and the immediately adjacent area, generally corresponding to the designated Right-of-Way for each of the Project components. The Project Development Area for the Lake Manitoba Outlet Channel and Lake St. Martin Outlet Channel is 400 m wide (200 m from centerline), and it is 50 m wide (25 m from centerline) for Provincial Road 239 re-route and Manitoba Hydro’s distribution line. The total area of the current Project Development Area is 2,023 ha, including:

- 1030 ha for the Lake Manitoba Outlet Channel
- 56 ha for the Provincial Road 239 re-reroute
- 891 ha for the Lake St. Martin Outlet Channel
- 46 ha for Manitoba Hydro’s distribution line

The objective of the 2020 vegetation pre-construction survey was to assess occurrences of plant Species of Conservation Concern and Communities of Conservation Concern that have the potential to occur within the Project Development Area. Documenting occurrences of plant Species of Conservation Concern and Communities of Conservation Concern will aid in confirming and supplementing information described in the Environmental Impact Statement, will satisfy Manitoba Infrastructure’s remaining pre-license and pre-monitoring requirements for the Project, will support consultation and engagement commitments, and will assist Manitoba Infrastructure in future planning and developing environmental protection plans.

A detailed review of background information for the Lake Manitoba Outlet Channel and Lake St. Martin Outlet Channel was conducted to synthesize previously documented vegetation conditions and classification, confirmed and potential Species of Conservation Concern and Communities of Conservation Concern weeds, and plant community types in proximity to the Project Development Area.

For the purposes of this report, Species of Conservation Concern were identified as those listed under the Federal *Species at Risk Act*, regulated under the Manitoba Provincial *Endangered Species and Ecosystems Act* (Government of Manitoba, 2016) and those listed by the Manitoba Conservation Data Centre as having an S-rank of S1, S2 or S3 as these species are tracked by the MBCDC as they are considered to be rare and vulnerable to extirpation in Manitoba (Government of Manitoba, n.d.a, Personal Communication, November 19, 2020 MBCDC). In Manitoba, plant Communities of Conservation Concern are defined as “*native upland vegetation communities listed as at risk by the Manitoba Endangered Species and Ecosystems Act including alvars and tall grass prairie. Communities of Conservation Concern also include sensitive sites with unique landform features that can support uncommon vegetation communities defined as shallow (within 1 m) soils, exposed bedrock (i.e., limestone and dolomite), saline soils, and sandy soils*” (Manitoba Infrastructure, 2020).

No single classification system exists in Manitoba to adequately convey detailed ecosystem information for the Project Development Area, which broadly includes forested land, wetlands and water, and anthropogenic affected lands (disturbances). As such, a compilation of several applicable classification systems was used to classify plant communities, and to refine the vegetation and wetland mapping for the Project Development Area (Zoladeski, et al., 1995; National Wetlands Working Group, 1997; Stewart and Kantrud, 1971; Wulder and Nelson, 2003).

Sixty-one rare plant surveys and associated plant community characterization surveys were conducted during two survey periods, early rare (34 surveys) and late rare (27 surveys), to capture variation in the flowering periods of different species. Survey locations were selected for areas where there was low historic sampling density, and areas of native vegetation. These surveys focused on transitional areas, and rare, uncommon or previously underrepresented plant community types.

Six plant Species of Conservation Concern were observed within region during previous baseline studies completed in support of the Environmental Impact Statement including: common sweet grass, current name alpine sweetgrass (*Anthoxanthum monticola* ssp. *alpinum*, S1S2), saline shooting star, current name pretty shooting star (*Dodecatheon pulchellum*, current name *Primula pauciflora*, S3), annual sunflower, current name common sunflower (*Helianthus annuus*, S3), early yellow locoweed (*Oxytropis sericea*, S1), yellow willow (*Salix lutea*, S2S3) (Manitoba Infrastructure, 2020); and dragon’s mouth orchid (*Arethusa bulbosa*, S2) (SG Environmental Services Inc., 2016; MI, 2017). No Communities of Conservation Concern were identified in previous studies (SG Environmental Services Inc, 2016; SG Environmental Services Inc, 2017, MI, 2020). Twelve regulated noxious weeds have been identified in the region during previous baseline studies for the Environmental Impact Statement, including three Tier 2 species and 10 Tier 3 species (Manitoba Infrastructure, 2020; SG Environmental Services Inc., 2016; SG Environmental Services Inc., 2017).

Three hundred twenty-two species were observed during the course of the 2020 plant Species of Conservation Concern surveys. The species observed consisted of six lichens, 23 mosses, 61 graminoids, 162 forbs, 61 shrubs and nine trees. Of these species, three Species of Conservation Concern were observed: narrow-leaved water-plantain (*Alisma gramineum*, S1), ram’s-head lady’s-slipper (*Cypripedium arietinum*, S2S3) and yellow sedge (*Carex flava*, S2). None of the plant Species of Conservation Concern identified in the previous baseline studies completed in support of the Environmental Impact Statement were observed during 2020 surveys.

Thirteen Manitoba regulated weed species were observed during the 2020 surveys including two Tier 2 species and 11 Tier 3 species.

Updated mapping of vegetation cover classes was completed as part of this project that resulted in a Merged Classification System with twenty-six, Merged Classification System types being identified within the Project Development Area during post-field mapping. Six of these Merged Classification System types were not surveyed

during the field program: Shore Fen, Water Bodies, Cultural Features, Forage Crops, Forest Cutovers, and Roads and Trails. Shore Fen was not surveyed due to its small representation within the overall Project Development Area (0.2%), its similarity to Stream Fen, which was more highly represented in the Project Development Area (11.5%) and was also the wetland Merged Classification System type with the highest number of surveys (9 surveys). Bare Rock, Sand and Gravel, the seasonally-flooded zone immediately adjacent to Water Bodies, was surveyed; however, the open water portion of Water Bodies, consisting of open water streams or lakes greater than 2 metres deep, were not surveyed. The remaining Disturbance/Anthropogenic Merged Classification System types were not surveyed due to low potential for plant Species of Conservation Concern to occur within these habitats.

Merged Classification System types were grouped into three broad categories: Forested, Wetlands and Water, and Disturbance/Anthropogenic (including agriculture). Nearly 60 % of the Project Development Area consists of Wetlands and Water (1213.73 ha), approximately 30% is Disturbance/Anthropogenic, and the remainder is Forested. The most abundant Merged Classification System types are Forage Crops (313.71 ha) and Stream Fen (232.78 ha). The least abundant Merged Classification Systems are Jack Pine-Black Spruce/Feather Moss (V28) (0.24 ha), Class V (0.83 ha), and Riverine Swamp (0.89 ha). Plant Species of Conservation Concern surveys and associated plant community characterizations served to provide updated information to the baseline conditions presented in the Environmental Impact Statement for the original Project Development Area adjustments and the addition of Provincial Road 239 re-route and Manitoba Hydro's distribution line. Three additional plant Species of Conservation Concern were identified within the Project Development Area. No Communities of Conservation Concern were identified in the Project Development Area during the previous studies or the 2020 field surveys. The primary recommended mitigation measure for these species is avoidance, due to the limited number of individuals and limited time prior to construction to complete possible seed collection programs Mitigation measures regarding rare plants proposed in this report follow those proposed in the Environmental Impact Statement (MI, 2020), with additional measures recommended as relevant.

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1 INTRODUCTION

WSP Canada Group Limited (WSP) was retained by Manitoba Infrastructure (MI) to complete pre-construction heritage resource investigations and additional terrestrial environmental surveys for plant and wildlife Species of Conservation Concern (SOCC) in support of the Lake Manitoba and Lake St. Martin Outlet Channel Project (the Project) in the Interlake region of Manitoba (Appendix A, Figure 1). The pre-construction surveys were completed in 2020 to supplement baseline environmental information previously collected and documented in an Environmental Impact Statement (EIS, Manitoba Infrastructure, 2020) developed in support of the Project.

This vegetation report provides a summary of the information collected during the pre-construction vegetation surveys completed for the Project in July through August of 2020 and includes a summary of the desktop analysis, survey methods used for field data collection, and results of data collected during field surveys. The report also provides species lists, a summary of SOCC and Communities of Conservation (COCC) identified, figures depicting refined vegetation mapping and photos of representative habitats. In addition, a discussion of the findings of the field surveys and recommended mitigation measures for SOCC, COCC, and other key plant observations has been included.

This document does not include confidential information such as specific locations of Species at Risk, Traditional Knowledge and environmentally sensitive areas/habitat.

1.1 Background

The Project includes the construction of two new water diversion (“outlet”) channels as a permanent flood control management system for the Lake Manitoba and Lake St. Martin region of Manitoba, as well as associated infrastructure in support of channel construction including re-routing of Provincial Road (PR) 239 and construction of a Manitoba Hydro power distribution line (Appendix A, Figure 1). The Lake Manitoba Outlet Channel (LMOC) will connect Lake Manitoba with Lake St. Martin, and the Lake St. Martin Outlet Channel (LSMOC) will connect Lake St. Martin to Lake Winnipeg; combined, these two channels will convey water from Lake Manitoba through Lake St. Martin to Lake Winnipeg in a manner that alleviates overland flooding in the Lake St. Martin area of Manitoba, such as occurred in the 2011 and 2014 floods (Appendix A, Figures 1B and 1C).

In 2019, MI filed an EIS with Federal and Provincial regulators for the construction of the outlet channels. To further support the Project, including confirming information outlined in the EIS, pre-construction heritage resource investigations and terrestrial environmental surveys for plant and wildlife SOCC were undertaken in July through September 2020. The pre-construction surveys were developed as three work packages and involved both a desktop review and supporting field investigations.

- Work Package 1 involved the completion of a pre-construction vegetation field investigation to assess the Project Development Area (PDA) of both the LMOC and the LSMOC, the re-route of PR 239 and Manitoba Hydro’s planned distribution line for the presence of plant SOCC. The focus of the vegetation investigation was to survey for occurrences of plant SOCC in areas of low sampling density identified in the EIS and previously non-surveyed areas of native vegetation that have the ability to support SOCC, including wetland transition zones and areas of shallow bedrock. In addition, wetland mapping was completed as a desktop mapping exercise, with ground truthing of mapping completed during the vegetation surveys to aid in identifying wetland transition zones for the vegetation surveys and to inform habitat mapping for plant and wildlife SOCC.

- Work Package 2 involved completion of a pre-construction wildlife field investigation to assess previously non-surveyed areas with high potential for wildlife within the Local Assessment Area (LAA) of both the LMOC and the LSMOC, the PR 239 re-route right-of-way and Manitoba Hydro's planned distribution line. The focus of the investigation was on species at risk most likely to be impacted by the Project within the LAA, including species such as the red-headed woodpecker and the Eastern whip-poor-will.
- Work Package 3 involved the completion of a pre-construction Heritage Resource Impact Assessment (HRIA) to assess the presence of heritage resources within the PDA of the LMOC, LSMOC, the PR 239 re-route and Manitoba Hydro's planned distribution line as well as development of a Heritage Resource Protection Plan (HRPP). The focus of the investigation was on areas of high potential for heritage and archaeological resources within the PDA.

Note that information collected during the pre-construction wetland, wildlife and heritage resources surveys has been provided as separate summary reports in support of the Project.

1.2 Study Area

The EIS examined three study areas for the Vegetation Valued Component (VC): the Project Development Area (PDA, the right-of-way for the Project component), Local Assessment Area (LAA, 1 km beyond the PDA), and Regional Assessment Area (RAA, 5 km beyond the PDA). The PDA was generally adopted for the 2020 pre-construction surveys, but added areas not previously addressed in the EIS. Alignments have changed slightly on the two outlet channel routes and the PR 239 alignment since the EIS was completed, and Manitoba Hydro's distribution line was not assessed in the EIS or supporting documents, such that gaps existed in the original surveys.

The current Project PDA includes the physical space or directly affected area where Project components and activities will occur and the immediately adjacent area, generally corresponding to the designated ROW for each of the Project components. The PDA for the LMOC and LSMOC is 400 m wide (200 m from centerline), and it is 50 m wide (25 m from centerline) for PR239 re-route and Manitoba Hydro's distribution line. The total area of the current PDA is 2,023 ha, including:

- 1030 ha for the LMOC
- 56 ha for the PR 239 re-reroute
- 891 ha for the LSMOC
- 46 ha for Manitoba Hydro's distribution line

At this time, it is assumed that all access routes, staging areas, and temporary laydown areas will either be contained within the PDA, or will fall within developed areas that already exist or are expected to exist at the time the Project goes to construction.

In the EIS, the LAA was the maximum area within which Project environmental effects might be predicted for most resources, including both direct and indirect effects. The LAA included the PDA and adjacent areas where indirect environmental effects might reasonably be expected to occur. Within the EIS, the LAA varied for specific Valued Components (VCs).

The RAA is the area that provides context to the changes occurring in the LAA for each VC. For example, this could include the area occupied by the VC population, so that effects to the VC can be characterized or quantified. The RAA is also the area within which the Project's environmental effects may interact or accumulate

with the environmental effects of other projects or activities that have been or will be carried out such that cumulative environmental effects may potentially occur. The RAA for each VC depends on physical and biological conditions and the type and location of other past, present, or reasonably foreseeable projects or activities that have been or will be carried out. The RAA selected for the EIS, for most VCs, included all of Lake Manitoba, Lake St. Martin and the North Basin of Lake Winnipeg.

Vegetation field surveys in support of the EIS were conducted in 2016 at 68 sites to identify occurrences of plant SOCC, weed species, and traditional-use plant species (Appendix A, Figures 2 and 3). Historic survey locations assessed for the EIS are depicted on Figures 2 and 3 as white circle symbols and were located in the following areas:

- 22 in association with the LMOC PDA
- 5 in in association with the LSMOC PDA
- 2 in the LAA on the north shore of Lake St. Martin
- 4 in the LAA on the west shore of Lake St. Martin
- 35 in the RAA outside of the LAA

As different options were assessed during the baseline studies completed in support of the EIS, the PDA assessed during the vegetation baseline differs from the PDA assessed in 2020 and data gaps therefore exist in the previous vegetation baseline information and mapping for the Project. Therefore, the 2020 pre-construction vegetation surveys focused on investigation of occurrences of plant SOCC in areas of low sampling density, including areas of native vegetation (i.e. forested, wetland and native grassland) within the south portion of the PDA (LMOC and PR 239 re-route), as well as areas of higher potential for plant SOCC within the northern portion of the PDA (LSMOC and Manitoba Hydro's distribution line). On Figures 2 and 3 (Appendix A) orange circle symbols represent locations that were assessed during the 2020 early season vegetation survey and those depicted as blue circle symbols represent those locations that were assessed during the 2020 late season vegetation assessment.

1.3 Environmental Setting

1.3.1 Climate, Terrain, Soils, and Vegetation Communities

The Project lies within the Boreal Plains Ecozone, an area characterized by short, moderately warm summers and long cold winters, with a subhumid, moderately cold Cyroboreal soil climate (Smith et al., 1998). The Boreal Plains Ecozone is an area formed through glaciation, with relatively less bedrock influence than the more northern boreal parts of Manitoba (Smith et al., 1998). It is covered almost entirely with glacial deposits. Terrain is generally flat, with a distinct north to south trending drumlinoid, or ridged and swale, topography formed from subglacial deposition, with slopes of 1 to 3%. Ridges are generally well drained with upland forest vegetation, while the swales are poorly drained, and support wetland communities. These characteristic physiographic features are evident in aerial imagery of the Project study areas: southeast to northwest trending shallow drumlin ridges are very evident in the area occupied by the south Project components (LMOC and PR 239 re-route), and complex patterns of bog, fens and small streams dominate the northern LSMOC and Manitoba Hydro's distribution line. Luvisolic soil is the predominant soil order present in the Boreal Plains Ecozone, with Dark Gray and Black Chernozems frequently present in the southern portion of the ecozone, while Brunisolic and Organic soils are subdominant to Luvisolic soil in the northern portion (Smith et al., 1998). Jack pine (*Pinus banksiana*),

white spruce (*Picea glauca*), trembling aspen (*Populus tremuloides*), and white birch (*Betula papyrifera*), are the dominant upland trees present in the Boreal Plains Ecozone, with balsam poplar (*Populus balsamifera*) occupying transitional and wetland ecosystems. The occurrence of black spruce (*Picea mariana*) and tamarack (*Larix laricina*) increases moving north, as peatland habitats increase in frequency and scope in the landscape (Smith et al., 1998). The Project components traverse two Ecoregions of the Boreal Plains Ecozone: the Interlake Plain and Mid-Boreal Lowland.

The south Project components (LMOC and PR 239 re-route) lie within the Interlake Plain Ecoregion. Consistent with the overarching Ecozone, climate in this Ecoregion is characterized by short, moderately warm summers and long cold winters, with a subhumid, moderately cold Cryoboreal soil climate (Smith et al., 1998). Mean annual temperatures range from 1 °C to 2.4 °C, and annual precipitation is seasonally variable, ranging from 500 mm to 525 mm, with much of it as rain. The regional landform is underlain by low relief Palaeozoic limestone bedrock, with a general surface form of a level to ridged, lake terrace complex. Surficial deposits range from loamy glacial till, varying from deep (>30 m) to very shallow (<20 m) deposits to water-worked areas with veneers to blankets of glaciolacustrine sand, gravel and boulder deposits (Smith et al., 1998). In some places, limestone bedrock is at or near surface, particularly near erosional remnants, scrapes and drumlinoid ridges. Flooding issues are linked to the low relief: at times of high seasonal precipitation; surface flows in the south will collect in low-lying swales between drumlins and ridges, or in the lowland floodplains adjacent larger lakes. The resulting landscape includes complexes of large graminoid marsh and shrubby swamp wetlands of temporary to seasonal water duration, with smaller to moderately large kettle ponds supporting permanent to semi-permanent marshes and shallow open water. Two of the three major lakes to be connected by the proposed Project outlet channels (Lake St. Martin to Lake Manitoba). Soils in this Ecoregion are mainly Chernozemic, specifically with Black Chernozem associated with very calcareous, clayey glaciolacustrine overlays in the southern and northwest. Brunisols and shallow Luvisols form on till and some glaciolacustrine deposits, while Organic soils are associated with peatlands and Gleysols with mineral wetlands in large portions of the central and northern parts of the Ecoregion. Trembling aspen is the dominant forest cover, with balsam poplar and white spruce mixedwood stands occurring less frequently (Smith et al., 1998). Depressional lowland areas support sedges (*Carex* spp.), meadow grasses (Poaceae) and willows (*Salix* spp.), and reed and cat-tail (*Typha latifolia*) emergent species in deeper marshes.

The north Project components (LSMOC and Manitoba Hydro's distribution line) fall within the southern part of the Mid-Boreal Lowland Ecoregion. Climate conditions in this Ecoregion are similar to the Interlake Plain Ecoregion, with slightly cooler annual temperatures and more precipitation (Smith et al., 1998). This combination of relatively high precipitation inputs and low levels of annual evapotranspiration contributes to wetland and waterbody development. Specifically, climatic factors combined with the smoothing action of clay, silt and sand glacial deposits from Lake Agassiz have supported the developed of complex patterns of bog, fens and small streams (Smith et al., 1998), and large to very large lakes (Smith et al., 1998), such as Lake Winnipeg. Brunisolic and Organic soil orders co-dominate the Mid-Boreal Lowland Ecoregion, with significant inclusions of Gray Luvisols. In the Mid-Boreal Lowland Ecoregion, predominant tree species in upland communities consist of trembling aspen, Jack pine, white spruce, and occasionally balsam fir (*Abies balsamea*), with black spruce and balsam poplar present on transitional sites (Smith et al., 1998). Peatland vegetation consists of black spruce, ericaceous shrubs (Ericaceae), and moss (eg. *Sphagnum*) in bog habitats, with tamarack, swamp birch (*Betula pumila*), sedges and brown moss dominating fens (Smith et al., 1998).

1.3.2 Anthropogenic Influences

The majority of the southern portion of the Project (LMOC and PR 239 re-route) lies within an agriculturally developed landscape, which has been cleared of much of its natural vegetation. Native communities are limited to within poorly drained areas supporting wetland habitat and isolated remnant tree stands. Most of this development occurred prior to 1984, the earliest publicly available imagery reviewed, and does not appear to have substantially changed since that time. From a vegetation and hydrology perspective, roads, pasture and some cropland development have converted the natural landscape to a more anthropogenic one. Small drainage channels have been created to drain agricultural areas, and while wetlands remain within these areas, water permanence appears to have been reduced to temporary or seasonal duration in many instances. Many of these areas still support wetland characteristics (wetland vegetation, seasonal flooding), while some are hayed during drier seasons and years.

The PR 239 re-route follows an existing road for much of its length. Corners at the intersections with other roads will be rounded into curves in two locations, crossing over lands currently used for agriculture. Otherwise the road development will occur in lands already highly modified by existing road construction, cropland or pasture uses.

The majority of the northern portion of the Project (LSMOC and Manitoba Hydro's distribution line) will be constructed in poorly drained peatlands that have experienced far less development. Few roads currently exist in the broader region, and none are in close proximity to LSMOC or Manitoba Hydro's distribution line. The closest road to the northern Project components is PR 513 to Dauphin River, just under two km away from the northwestern end of Manitoba Hydro's distribution line. Short sections of the existing Lake St. Martin Emergency Outlet Channel (different from the LSMOC) falls within the LSMOC PDA, and has separated bog and fen habitat in places. Drying effects are also evident in this area, where surface flows have been intercepted by the emergency outlet channel.

1.4 Study Objectives

The objective of the 2020 vegetation pre-construction survey was to assess occurrences of plant SOCC and COCC that have the potential to occur within the PDA. Documenting occurrences of plant SOCC and COCC will aid in confirming and supplementing information described in the EIS, will satisfy MI's remaining pre-license and pre-monitoring requirements for the Project, will support consultation and engagement commitments, and will assist MI in future planning and developing environmental protection plans.

2 STUDY METHODS

2.1 Desktop Studies

A desktop review of available information pertaining to the PDA was completed in July 2020, prior to the commencement of the early summer field program. The review included information presented in previous reports, public databases, data provided by MI, and publicly available imagery.

2.1.1 Data Sources

A detailed review of background information for the LMOC and LSMOC was conducted to synthesize previously documented vegetation conditions and classification, confirmed and potential SOCC and COCC, PSCS, weeds, and plant community types in proximity to the PDA.

Literature reviewed in the collection of background information included the EIS and baseline vegetation reports:

- Lake Manitoba Outlet Channel Route Options Vegetation Technical Report. Final Report (SG Environmental Services, 2017)
- Lake St. Martin Outlet Channel Proposed All Season Access Road – Vegetation Technical Report (SG Environmental Services Inc, 2016)
- Lake St. Martin Outlet Channels – Vegetation Technical Report. Draft Report (SG Environmental Services Inc, 2017)
- Lake Manitoba And Lake St. Martin Outlet Channels Project - Environmental Impact Statement, Volume 3, Biophysical Effects Assessment (MI, 2020)

Publicly available data sources reviewed included:

- Manitoba Conservation Data Center (MBCDC) - list of SOCC for the Interlake Plain and Mid-Boreal Lowland Ecoregions (Government of Manitoba, n.d.b). Ecoregion-specific SOCC Lists are provided in Appendix B
- Environment and Climate Change Canada. Species at Risk Public Registry (Government of Canada, 2019)
- Early Detection and Distribution Mapping System (EDDMapS, 2020)

The following spatial datasets were provided by MI:

- University of Manitoba Herbarium (WIN) dataset query for the Project
- Orthoimagery (5 cm resolution), extending approximately 1.5 km from the centerlines of LMOC, PR 239 re-route, LSMOC, and Manitoba Hydro's distribution line
- EIS land capability classification for the PDA, LAA, and RAA
- Survey data for locations of some SOCC previously identified and historical survey locations
- PDA, LAA, and RAA shapefiles

2.1.2 Plant Species and Communities of Conservation Concern

The MBCDC maintains information on Manitoba's biodiversity including plant and animal species, and natural plant communities. The MBCDC has developed a list of plant species with confirmed occurrences in Manitoba, also known as elements of diversity. Each of these elements is assigned a conservation status rank, based on how rare the species or plant community is in Manitoba. The MBCDC database contains information on the status, location (by Ecoregion) and ecology of species, with a focus on those deemed to be at risk. Conservation status ranks measure extinction or extirpation risk of species/communities at three geographic scales, including: global (G-rank), national (N-rank) and subnational (S-rank). The MBCDC provides G-ranks, N-ranks and S-ranks for all known species in Manitoba.

For the purposes of this report, SOCC were identified as those listed on the Federal *Species at Risk Act* (SARA), regulated under the Manitoba Provincial *Endangered Species and Ecosystems Act* (MB ESEA) (Government of Manitoba, 2016) and those listed by the MBCDC as having an S-rank of S1, S2 or S3 as these species are tracked by the MBCDC as they are considered to be rare and vulnerable to extirpation in Manitoba (Government of Manitoba, n.d.a, Personal Communication, November 19, 2020 MBCDC).

Definitions of the conservation status ranks utilized by the MBCDC for SOCC is provided below in Table 2-1.

Table 2-1 Subnational Conservation Status Rank for MBCDC Listed Plant SOCC

Rank	Definition
S1	Critically imperiled – At a very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats or other factors.
S2	Imperiled – At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, very steep declines, severe threats or other factors.
S3	Vulnerable - At a moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats or other factors
S4	Apparently Secure - At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats or other factors.
S5	Secure - At a very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.
SU	Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SX	Presumed Extirpated —Species or ecosystem is believed to be extirpated from the jurisdiction (i.e., nation, or state/province). Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. [equivalent to “Regionally Extinct” in IUCN Red List terminology].
SH	Possibly Extirpated – Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.
SNR	Unranked – National or subnational conservation status not yet assessed.

Rank	Definition
SNA	Not Applicable - A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities (e.g., long distance aerial and aquatic migrants, hybrids without conservation value, and non-native species or ecosystems).

In Manitoba, plant COCC are defined as “*native upland vegetation communities listed as at risk by the Manitoba Endangered Species and Ecosystems Act including alvars and tall grass prairie. COCC also include sensitive sites with unique landform features that can support uncommon vegetation communities defined as shallow (within 1 m) soils, exposed bedrock (i.e., limestone and dolomite), saline soils, and sandy soils*” (MI, 2020).

An inventory of listed SOCC and COCC identified as occurring or having the potential to occur in the PDA was compiled, prior to the field survey. The compiled species list was used to create a field booklet with pictures, botanical descriptions, preferred habitats, and key characteristics from floras to enable WSP to easily identify SOCC in the field.

2.1.3 Invasive Species

The EIS and baseline reports were reviewed during the desktop study to synthesize previously identified non-native invasive and regulated noxious weeds in proximity to the PDA. Additionally, Manitoba’s EDDMapS database (2020) was consulted to identify any additional species that might be found in proximity to the PDA.

The Noxious Weeds Act (C.C.S.M.c. N110) of Manitoba outlines control or destruction measures for noxious weeds that are regulated under the Act. Control of noxious weeds is the responsibility to anyone owning or occupying land in Manitoba on which a noxious weed is located. *The Noxious Weeds Regulation* (Man.Reg. 42/17) provides a listing of noxious weeds that are ranked according to their threat level and provides the location within the province for which the threat levels apply. A noxious weed is defined as a plant that is designed as a Tier 1, Tier 2 or Tier 3 weed in the Regulation. Levels of weed management under the Act vary by Tier level and include:

- Tier 1 weeds are considered a significant threat and must be eradicate without conditions.
- Tier 2 weeds must be managed according to the infestation size.
- Tier 3 weeds must be controlled if the weed’s uncontrolled growth or spread can negatively impact the economy, environment or well being of local residents (Manitoba Agriculture, 2016).

2.2 2020 Field Surveys

Plant SOCC surveys and associated plant community characterization surveys were conducted during two survey periods, early summer and late summer, to capture variation in the flowering periods of different species. Survey locations were selected for areas where there was low historic sampling density and areas of native vegetation in anthropogenically disturbed areas, as well as in areas identified as having higher potential for plant SOCC to occur (see Section 1.2). These surveys focused on transitional areas, and rare, uncommon or previously underrepresented plant community types.

2.2.1 Plant Species and Communities of Conservation Concern Surveys

Plant SOCC and COCC surveys followed a similar methodology as was used in the EIS, to allow for comparison with the previous assessments, and to provide a baseline for any future monitoring requirements. At each survey location, 100 m meandering transects were located near or at the Project centre line, and all vascular plants and

bryophytes observed within a 5 metre (m) visual radius of the transect were identified and recorded. Generally, species were recorded at each survey location until no new species were found along the transect. At the starting point of each transect, a waypoint was taken with a GPS-enabled tablet or handheld Garmin GPS unit, representative photos were taken and detailed notes were recorded. Where SOCC or a COCC were identified, the location was recorded with a GPS point, detailed notes were recorded, and photographs of diagnostic features were taken, to facilitate confirmation. In order to classify the plant community, an associated plant community survey, consisting of detailed vegetation information including tree, shrub, and ground cover (forbs, graminoids, and bryophytes) and information on the soil type, was conducted at each survey location.

Thirty-four early summer plant SOCC surveys were conducted from July 6 to 12, 2020; survey locations denoted by blue circles on Figures 2 and 3 (Appendix A). Surveys conducted between July 6 and 7 occurred along the LMOC (10 surveys) and PR 239 re-route (5 surveys), and surveys conducted between July 8 and 12 occurred along the LSMOC (14 surveys) and Manitoba Hydro's distribution line (6 surveys).

Twenty-seven late summer SOCC surveys were conducted from August 6, 7 and 9 to 12, 2020; survey locations denoted by yellow circles on Figures 2 and 3 (Appendix A). Surveys conducted between August 6 and 7 occurred along the LMOC (4 surveys) and PR 239 re-reroute (4 surveys), and surveys conducted between August 9 to 12 occurred along the LSMOC (4 surveys) and Manitoba Hydro's distribution line (15 surveys). The greatest number of survey points were conducted along the proposed Manitoba Hydro's distribution line extending to the LSMOC water control structure, as limited historical data was available for this area, and poorer image quality made mapping of this Project component more challenging.

A summary of plant surveys conducted by season and Project component are provided in Table 2-2 below.

Table 2-2 2020 Plant Surveys Completed by Project Component

Survey Season	LMOC	PR 239	LSMOC	Distribution Line	Total
Early Summer	10	5	14	6	34*
Late Summer	4	4	4	15	27
Grand Total	14	9	18	21	61*

*Totals do not sum as one survey site was completed at the intersection of LMOC and PR 239 re-route and was counted as both part of the LMOC and the PR 239 re-route.

2.2.2 Invasive Species

Non-native, invasive and regulated weed species were documented and are included in the plant species lists compiled for each of the survey locations.

2.3 Mapping Updates

The results of the Desktop Studies (Section 2.1) and 2020 Field Surveys (Section 2.2) were used to complete mapping updates for the PDA. No single classification system exists in Manitoba to adequately convey detailed ecosystem information for the PDA, which broadly includes forested land, wetlands and water, and anthropogenic affected lands (disturbances). As such, a compilation of several applicable classification systems was used to classify plant communities, and to refine the vegetation and wetland mapping for the PDA. The classification systems used include:

- The Forest Ecosystem Classification for Manitoba - used for forested uplands (Zoladeski, et al., 1995)
- The Canadian Wetland Classification System – used for bog, fen, and swamp wetland types (National Wetlands Working Group, 1997)
- The Classification of Natural Ponds and Lakes in the Glaciated Prairie Region - used for marshes (Stewart and Kantrud, 1971)
- The Manitoba version of the Canadian Land Cover Classification (Wulder and Nelson, 2003), for human-influenced uplands and open water

Together, these systems were combined into the Merged Systems Classification (MSC) for the Project. Descriptions of the MSC units are provided in Appendix C.

Detailed mapping methods are provided in the wetland mapping report, prepared under separate cover (WSP, 2020).

3 STUDY RESULTS

3.1 Desktop Studies

The following sections present the results of the desktop review completed for the Project.

3.1.1 Plant Species and Communities of Conservation Concern

Lists of all potentially occurring SOCC within the two Ecoregions traversed by the Project are included in Appendix B. Previous reports also list a number of other SOCC that were identified to occur in the region and that may have the potential to occur within the PDA (MI, 2020; SG Environmental Services Inc., 2016; MI, 2017). Of these species, six have been observed within the PDA, LAA and/or RAA: common sweet grass, current name alpine sweetgrass (*Anthoaxanthum monticola* ssp. *alpinum*, S1S2), saline shooting star, current name pretty shooting star (*Dodecatheon pulchellum*, current name *Primula pauciflora*, S3), annual sunflower, current name common sunflower (*Helianthus annuus*, S3), early yellow locoweed (*Oxytropis sericea*, S1), yellow willow (*Salix lutea*, S2S3) (MI, 2020); and dragon's mouth orchid (*Arethusa bulbosa*, S2) (SG Environmental Services Inc., 2016; MI, 2017). Of these six SOCC, only the locations of previously identified dragon's mouth orchid were available at the time of preparing this report (Appendix A, Figure 4). The University of Manitoba Herbarium dataset had identified one location of river bulrush (*Bolboschoenus fluviatilis*), but this occurrence appears on the northwestern shore of Lake St. Martin, far from the PDA.

No COCC were identified in previous studies (SG Environmental Services Inc, 2016; SG Environmental Services Inc, 2017, MI, 2020). The likelihood of alvars occurring within the EIS LAA is low to none, and there are no known remnants of tall grass prairie within the EIS RAA (MI, 2020).

3.1.2 Invasive Species

Twelve regulated noxious weeds have been identified within the region that have the potential to occur within the PDA, including three Tier 2 species and 10 Tier 3 species (MI, 2020; SG Environmental Services Inc., 2016; SG Environmental Services Inc., 2017):

Tier 2

- nodding thistle (*Carduus nutans*)
- oxeye daisy (*Leucanthemum vulgare*)
- scentless chamomile (*Tripleurospermum inodorum*)

Tier 3

- great burdock (*Arctium lappa*)
- absinthe (*Artemisia absinthium*)
- nodding thistle (*Carduus nutans*)
- water hemlock (*Cicuta maculata*)
- Canada thistle (*Cirsium arvense*)
- hemp nettle (*Galeopsis tetrahit*)

- wild parsnip (*Pastinaca sativa*)
- perennial sow-thistle (*Sonchus arvensis*)
- common dandelion (*Taraxacum officinale*)

Invasive phragmites (*Phragmites australis* sub. *australis*) was identified as an additional invasive species that may occur in the PDA, although it can be challenging to distinguish from the native common reedgrass (*P. australis*), and is not currently regulated by the Declaration of Noxious Weeds in Manitoba (Government of Manitoba, 2016).

3.2 2020 Rare Plant and Community Characterization Surveys

Sixty-one plant SOCC surveys and associated plant community characterization surveys were completed in 2020. Lists of species observed in 2020 by conservation status are provided in Appendix E. Descriptions of the vegetation merged system vegetation classes used to describe the vegetation cover within the PDA, as well as representative photograph examples of these classes can be found in Appendices C and F, respectively. Overall, three hundred twenty-two plant species were observed during the course of the community characterization surveys. The species observed consisted of six lichens, 23 mosses, 61 graminoids, 162 forbs, 61 shrubs and nine trees.

The following sections present the results of the 2020 rare plant field surveys completed for the Project PDA.

3.2.1 Plant Species and Communities of Conservation Concern

During the 2020 plant SOCC survey, three SOCCs were observed: narrow-leaved water-plantain (*Alisma gramineum*, S1), ram's-head lady's-slipper (*Cypripedium arietinum*, S2S3) and yellow sedge (*Carex flava*, S2). Narrow-leaved water-plantain was found on the upstream, flooded southeast side of the existing Lake St. Martin Emergency Outlet Channel (EOC) in the northeastern portion of LSMOC. One occurrence of a small lady's-slipper orchid, with one individual, was observed in a jack pine forest with large amounts of blowdown, that likely resulted from a late fall storm with strong winds in 2019. While the individual's phenology was past flowering stage at the time of the late summer plant SOCC survey, current literature only lists one species of lady's-slipper that occurs in Manitoba with the leaf arrangement observed and a habitat preference for pine woods (Harms and Leighton, 2011). For these reasons, it is assumed that this species is the plant SOCC, ram's-head lady's-slipper.

Yellow sedge was observed in an overgrown cutline in a rich swamp within Manitoba Hydro's distribution line PDA. None of the plant SOCC identified in the previous baseline studies conducted for the Project, SARA listed SOCC or COCC were observed during 2020 surveys.

3.2.2 Invasive Species

Thirteen Manitoba regulated weed species were observed during the surveys conducted by WSP in 2020: two Tier 2 species, and 11 Tier 3 species (Figures 5A, 5B and 5C, Appendix A). The list of regulated weed species observed in 2020 is provided in Table 3-2 below.

Table 3-1 Manitoba Regulated Weeds Observed in the PDA in 2020

Scientific Name	Common Name	MB Weed Tier ¹
Graminoid		
<i>Hordeum jubatum</i>	Foxtail Barley	Tier 3
Forb		
<i>Leucanthemum vulgare</i>	Ox-eye Daisy	Tier 2
<i>Silene vulgaris</i>	Bladder campion	Tier 2
<i>Arctium minus</i>	Common Burdock	Tier 3
<i>Cicuta bulbifera</i>	Bulb-bearing Water-hemlock	Tier 3
<i>Cicuta maculata</i>	Spotted Water-hemlock	Tier 3
<i>Cirsium arvense</i>	Canada Thistle	Tier 3
<i>Cirsium vulgare</i>	Bull Thistle	Tier 3
<i>Crepis tectorum</i>	Narrow-leaved Hawks-beard	Tier 3
<i>Sonchus arvensis</i>	Field Sow-thistle	Tier 3
<i>Sonchus asper</i>	Spiny-leaved Sow-thistle	Tier 3
<i>Taraxacum officinale</i>	Common Dandelion	Tier 3
<i>Thlaspi arvense</i>	Field Pennycress	Tier 3

Notes:

¹ Government of Manitoba, 2016

3.3 Mapping Updates

Sixty-one plant SOCC surveys and associated plant community characterization surveys were completed during the 2020 plant SOCC surveys. The most frequently surveyed merged system class (MCS) during the 2020 plant SOCC surveys were Aspen Hardwood (V5) and Stream Fen, with six surveys and characterization surveys completed for each. The least frequently surveyed MSCs were White Birch Hardwood and Mixedwood (V4), Jack Pine-Black Spruce/Feather Moss (V28), Basin Fen, Class IV wetland, Class V wetland, Lacustrine Swamp, Riverine Swamp, and Agricultural Cropland, with one survey and characterization survey completed for each. Table 3-3 below summarizes the 2020 plant SOCC surveys completed by season and MSC.

Twenty-six MSCs were identified within the PDA during post-field mapping. Six of these MSC were not surveyed during the field program: Shore Fen, Water Bodies, Cultural Features, Forage Crops, Forest Cutovers, and Roads and Trails. Shore Fen was not surveyed due to its small representation within the overall PDA (0.2%), its similarity to Stream Fen, which was more highly represented in the PDA (11.5%) and was also the wetland MSC with the highest number of surveys (9 surveys). Bare Rock, Sand and Gravel, the seasonally-flooded zone immediately adjacent to Water Bodies, was surveyed; however, the open water portion of Water Bodies, consisting of open water streams or lakes greater than 2 m deep, were not surveyed. The remaining Disturbance/Anthropogenic MSCs were not surveyed due to low potential for plant SOCC to occur within these habitats.

MSCs were grouped into three broad categories: Forested, Wetlands and Water, and Disturbance/Anthropogenic. Nearly 60% of the PDA consists of Wetlands and Water (1213.73 ha), approximately 30% is

Disturbance/Anthropogenic, and the remainder is Forested. The most abundant MSCs are Forage Crops (313.71 ha) and Stream Fen (232.78 ha). The least abundant MSCs are Jack Pine-Black Spruce/Feather Moss (V28) (0.24 ha), Class V (0.83 ha), and Riverine Swamp (0.89 ha). Mapped MSCs are provided in Figure 4, Mapsheets 1 through 53, Appendix A).

A breakdown of all MSCs in the PDA is provided in Table 3-3 below. Descriptions of MSCs used to describe the Project can be found in Appendix C.

Table 3-2 2020 Merged System Class Areas (ha) within the PDA

Merged System Class	Total (ha)	2020 Surveys
Forested¹		
Balsam Poplar Hardwood (V1)	60.98	8
White Birch Hardwood and Mixedwood (V4)	4.22	1
Aspen Hardwood (V5)	126.54	9
Jack Pine Conifer (V24)	4.29	2
Jack Pine-Black Spruce/Feather Moss (V28)	0.24	1
Forested Total	196.27	21
Wetlands and Water		
<i>Bog²</i>		
Basin Bog	114.33	2
<i>Bog Total</i>	<i>114.33</i>	<i>2</i>
<i>Fen²</i>		
Basin Fen	43.10	1
Horizontal Fen	335.10	3
Shore Fen	4.84	-
Stream Fen	232.78	9
<i>Fen Total</i>	<i>615.82</i>	<i>13</i>
<i>Marsh³</i>		
Class II	72.13	4
Class III	199.08	3
Class IV	39.09	1
Class V	0.83	1
<i>Marsh Total</i>	<i>311.13</i>	<i>10</i>
<i>Swamp²</i>		
Basin Swamp	54.76	4
Lacustrine Swamp	11.50	1
Lagg Swamp	15.58	4
Riverine Swamp	0.89	1
Unconfined Flat Swamp	22.71	3
<i>Swamp Total</i>	<i>105.44</i>	<i>13</i>
<i>Water Bodies⁴</i>		

Merged System Class	Total (ha)	2020 Surveys
Water Bodies	65.58	-
<i>Water Bodies Total</i>	<i>65.58</i>	<i>-</i>
Wetlands and Water Total	1213.73	38
Disturbance/Anthropogenic⁴		
Agricultural Cropland	173.39	1
Bare Rock, Gravel and Sand	49.00	2
Cultural Features	2.33	-
Forage Crops	313.71	-
Forest Cutovers	30.97	-
Roads and Trails	45.05	-
Disturbance/Anthropogenic Total	614.45	3
Grand Total	<u>2023.02</u>	<u>61</u>

Notes:

- ¹ Zoladeski *et. al.*, 1995
- ² National Wetlands Working Group, 1998
- ³ Stewart and Kantrud, 1971
- ⁴ Wolfer and Nelson, 2003

3.4 Lake Manitoba Outlet Channel

Fourteen plant SOCC surveys and associated plant community characterization surveys were completed in the LMOC PDA in 2020. A list of species observed in this Project component is provided in Appendix E. Descriptions of MSCs used to describe the vegetation cover within the PDA as well as representative photograph examples of these classes can be found in Appendices C and F, respectively. Overall, one hundred twenty-seven species were observed during the course of the 2020 plant SOCC surveys in the LMOC PDA. The species observed consisted of one lichen, 24 graminoids, 73 forbs, 25 shrubs and four trees.

The following sections present the results of the 2020 rare plant field surveys completed for the Project PDA.

None of the plant SOCC identified in the previous studies conducted for the Project were identified in 2020; SARA listed SOCC or COCC were observed during 2020 surveys.

Eight Manitoba regulated weed species were observed during the LMOC surveys: one Tier 2 species, and seven Tier 3 species.

Fourteen plant SOCC surveys and associated plant community characterization surveys were completed in the LMOC PDA. The most frequently surveyed MSCs were Aspen Hardwood (V5), Class II, and Class III, with one survey and characterization survey completed in each MSC type. The rest of the MSCs observed in the LMOC PDA were also surveyed with only one survey and characterization survey completed for each vegetation cover type.

Approximately 46 % of the LMOC PDA consists of Disturbance/Anthropogenic MSCs (474.5 ha), approximately 41% is Wetlands and Water, and the remainder is Forested. The most abundant MSCs are Forage Crops (303.88 ha) and Class II (197.91 ha). The least abundant MSCs are Bare Rock, Gravel and Sand (0.35 ha), Lacustrine Swamp (0.74 ha), and Class V (0.83 ha). Mapped MSCs are provided in Figure 4.

3.5 Provincial Road 239 Re-route

Nine plant SOCC surveys and associated plant community characterization surveys were completed in the PR 239 re-route PDA in 2020. A list of species observed in this Project component is provided in Appendix E. Descriptions of MSCs used to describe the vegetation cover within the PDA as well as representative photograph examples of these classes can be found in Appendices C and F, respectively. Overall, one hundred thirty-two species were observed during the course of the 2020 plant SOCC surveys in the PR 239 re-route PDA. The species observed consisted of two mosses, 21 graminoids, 71 forbs, 34 shrubs and four trees. None of the plant SOCC identified in the previous studies conducted for the Project; SARA listed SOCC or COCC were observed during 2020 surveys. Five Manitoba regulated weed species were observed during the PR 239 re-route surveys, one Tier 2 species, and four Tier 3 species.

Nine plant SOCC surveys and associated plant community characterization surveys were completed in the PR 239 re-route PDA. The most frequently surveyed MSCs were Aspen Hardwood (V5) and Basin Swamp, with three surveys and characterization surveys completed in each MSC type. The rest of the MSCs observed in the PR 239 re-route PDA were also surveyed with only one survey and characterization survey completed for each.

Approximately 69 % of the PR 239 re-route PDA consists of Disturbance/Anthropogenic MSCs (38.75 ha), approximately 17% is Wetlands and Water, and the remaining 14 % is Forested. The most abundant MSCs are Forage Crops (303.88 ha) and Class II (197.91 ha). The least abundant MSCs are Bare Rock, Gravel and Sand (0.35 ha), Lacustrine Swamp (0.74 ha), and Class V (0.83 ha). Mapped MSCs are provided in Figure 4.

3.6 Lake St. Martin Outlet Channel

Eighteen plant SOCC surveys and associated plant community characterization surveys were completed in the LSMOC PDA in 2020. A list of species observed in this Project component is provided in Appendix E. Descriptions of MSCs used to describe the vegetation cover within the PDA as well as representative photograph examples of these classes can be found in Appendices C and F, respectively. Overall, one hundred ninety-one species were observed during the course of the 2020 plant SOCC surveys in the LSMOC PDA. The species observed consisted of four lichens, 16 mosses, 37 graminoids, 83 forbs, 44 shrubs and seven trees.

Within the LSMOC PDA, one SOCC was observed: narrow-leaved water-plantain. None of the plant SOCC identified in the previous studies conducted for the Project; SARA listed SOCC or COCC were observed during 2020 surveys. Four Manitoba regulated weed species were observed during the LSMOC surveys: all Tier 3 species.

Eighteen plant SOCC surveys and associated plant community characterization surveys were completed in the LSMOC PDA. The most frequently surveyed MSCs were Stream Fen, with eight surveys and characterization survey completed, and Horizontal Fen, with three surveys and characterization survey completed. The least frequently surveyed MSCs were Lacustrine Swamp, Lagg Swamp, and Bare Rock, Gravel and Sand, with only one survey and characterization survey completed in each MSC type.

Approximately 86 % of the LSMOC PDA consists of Wetlands and Water MSCs (771.42 ha), approximately 10% is Disturbance/Anthropogenic, and the remaining portion is Forested. The most abundant MSCs are Horizontal Fen (333.26 ha) and Stream Fen (232.53 ha). The least abundant MSCs are Class III (0.11 ha), and Water Bodies (1.39 ha). Mapped MSCs are provided in Figure 4.

3.7 Manitoba Hydro Distribution Line

Twenty-one plant SOCC surveys and associated plant community characterizations were completed in Manitoba Hydro's Distribution Line PDA in 2020. A list of species observed in this Project component is provided in Appendix E. Descriptions of MSCs used to describe the vegetation cover within the PDA as well as representative photograph examples of these classes can be found in Appendices C and F, respectively. Overall one hundred ninety-nine species were observed during the course of the 2020 plant surveys in Manitoba Hydro's Distribution Line PDA. The species observed consisted of four lichens, 18 mosses, 30 graminoids, 94 forbs, 45 shrubs and eight trees.

Of the one hundred ninety-nine species observed, two SOCC were observed: ram's-head lady's-slipper and yellow sedge. One occurrence of a small lady's-slipper orchid, with one individual, was observed in a jack pine forest with large amounts of blowdown, that likely resulted from a late fall storm with strong winds in 2019. While the individual's phenology was past flowering stage at the time of the late summer plant SOCC survey, current literature only lists one species of lady's-slipper that occurs in Manitoba with the leaf arrangement observed and a habitat preference for pine woods (Harms and Leighton, 2011). For these reasons, it is assumed that this species is the plant SOCC, ram's-head lady's-slipper.

None of the plant SOCC identified in the previous studies conducted for the Project; SARA listed SOCC or COCC were observed during 2020 surveys.

Three Manitoba regulated weed species were observed during the Manitoba Hydro's Distribution Line surveys: all Tier 3 species.

Twenty-one plant SOCC surveys and associated plant community characterization surveys were completed in Manitoba Hydro's Distribution Line PDA. The most frequently surveyed MSCs were Balsam Poplar Hardwood (V1), with five surveys, and Aspen Hardwood (V5), Lagg Swamp, and Unconfined Flat Swamp, with three surveys and characterization surveys completed in each MSC type. The least frequently surveyed MSCs were White Birch Hardwood and Mixedwood (V4), Jack Pine-Black Spruce/Feather Moss (V28), Basin Fen, Stream Fen, and Riverine Swamp, with only one survey and characterization survey completed for each.

Approximately 50 % of Manitoba Hydro's Distribution Line PDA consists of Forested MSCs (23.00 ha), approximately 31% is Wetlands and Water, and the remaining portion is Disturbance/Anthropogenic. The most abundant MSCs are Balsam Poplar Hardwood (V1) (7.68 ha) and Roads and Trails (7.27 ha). The least abundant MSCs are Lacustrine Swamp (0.10 ha), and Basin Bog (0.23 ha). Mapped MSCs are provided in Figure 4.

4 DISCUSSION

The following sections provide a review of the 2020 desktop, field studies, and mapping updates undertaken for the purpose of updating information presented in the EIS. This discussion also includes recommended mitigation measures for SOCC, invasive species, and plant communities identified within the PDA. All mitigation measures presented in the EIS are to be followed, and where additional mitigation measures are recommended, these are included in the discussion. Site-specific information on plants that are SOCC and COCC will, where pertinent, along with proposed mitigation measures be included in the Environmental Protection Plan for construction of the Project.

4.1 Plant Species and Communities of Conservation Concern

Six plant SOCC were identified in the region during the 2016 baseline surveys (Section 3.1.1), and three additional plant SOCC were observed in the PDA during the 2020 field surveys (Section 3.2.1). No COCC were identified in the PDA. Four other plant SOCC were reported in previous studies as having been observed in the region during the previous vegetation baseline studies (Section 3.1.1). Alpine sweetgrass is reported to prefer dry, acidic peat and rocky tundra and outcrops (Kershaw et. al., 2001). Pretty shooting star prefers wet meadows (Jepson Herbarium, 2020). Common sunflower can be found in moist to dry waste places and disturbed areas (E-Flora of BC, 2020a) Early yellow locoweed can be found in dry, sandy, gravelly or rocky, grassy slopes, bluffs, river terraces, meadows and roadsides (E-Flora of BC, 2020b). Despite having surveying habitats that could potentially support these species, they were not observed during 2020 plant SOCC surveys. Although these species were not observed in 2020, there is potential for these and other plant SOCC to occur within the PDA.

Previous baseline vegetation surveys completed in support of the EIS, reported plant SOCC observations of yellow willow in the region (Section 3.1.1); however, the MBCDC does not currently include this species in its list of species known to be present in the province. While habitats that could support this species (Johnson et. al., 2017) were surveyed in 2020, plant specialists identified willows where observed, and its presence in the PDA could not be confirmed.

Dragon's-mouth orchid was observed in the Project area during the previous 2016 baseline surveys at several locations (Section 3.1.1), with two individuals occurring in the PDA. This species was reportedly observed in an open bog with scattered immature tamarack and some willow and bog birch shrubs (SG Environmental Services Inc, 2017), now mapped as horizontal fen. It was not observed during the 2020 field surveys, despite surveying comparable habitat types. The population size of this SOCC is documented as being variable from year to year, depending on a number of factors, such as timing of late spring frosts (Johnson et. al., 2017). While no occurrences of this species were observed in 2020, conditions may have been poor for germination in spring 2020 and additional individuals, or small populations, may be present at other locations within the PDA.

Three additional plant SOCC were found during 2020 surveys (Section 3.2.1 and Table 4-2). Narrow-leaved water-plantain was found on the upstream, flooded, southeast side of the existing LSMOC in the northeastern portion of the PDA.

One occurrence of a small lady's-slipper orchid, with one individual, was observed in a jack pine forest with large amounts of blowdown, that likely resulted from a late fall storm with strong winds in 2019. While the individual's phenology was past flowering stage at the time of the late summer plant SOCC survey, current literature only lists one species of lady's-slipper that occurs in Manitoba with the leaf arrangement observed and a habitat preference

for pine woods (Harms and Leighton, 2011). For these reasons, it is assumed that this species is the plant SOCC, ram's-head lady's-slipper.

Yellow sedge was observed along an overgrown cutline in a rich swamp. The local population was observed to be of a moderate size (10 m by 10 m patch; Table 4-2); however, it was not observed at any of the other survey locations in 2020.

Table 4-1 Summary of Plant Species of Conservation Concern

Common Name	Scientific Name	Subnational Rank	Population Size (# of Individuals)
Dragon's mouth orchid ¹	<i>Arethusa bulbosa</i>	S2	2
Narrow-leaved water-plantain	<i>Alisma gramineum</i>	S1	2
Ram's-head Lady's-slipper	<i>Cypripedium arietinum</i>	S2S3	1
Yellow sedge	<i>Carex flava</i>	S2	~50

Notes:

¹ Species information from previous studies (2016)

4.1.1 Mitigation Recommendations

Mitigation measures for all potential and confirmed plant SOCC should follow those proposed in the EIS (MI, 2020).

The two occurrences of dragon's-mouth orchid are very near the current centerline of the LSMOC PDA; as such, avoidance of these individuals is not possible. As only two individuals were observed, an insufficient number of individuals are present to undertake a seed collection program.

The portion of the PDA where narrow-leaved water-plantain was observed parallels the existing Lake St. Martin Emergency Outlet Channel (different from LSMOC). Additional disturbance to this plant SOCC's habitat is anticipated to be of limited extent, if the existing footprint of the channel will not be expanded. Due to the very limited number of observations of narrow-leaved water-plantain in the province of Manitoba (S1 – critically imperilled) and the limited number of individuals observed in the PDA (less than 10 individuals), seed collection and/or physical transplants are not considered a viable mitigation measure for this plant SOCC.

The ram's-head lady's-slipper orchid was observed in a pine forest with large amounts of blowdown. A single individual was observed at this location, so seed collection is also not advisable for this species.

While a sufficient number of individuals of yellow sedge were present to allow for seed collection of this plant SOCC, seed collection will require a minimum of one full growing season to attempt.

The following recommendations will be considered for the populations of plant SOCC confirmed to be within the PDA:

- Avoidance
- If disturbance in the vicinity of confirmed populations of plant SOCC is required for construction, appropriate mitigation measures as outlined in the Project Environmental Protection Plan and / or Revegetation Plan should be followed. Mitigation measures may include:
 - Marking the nearby population with signage and high-visibility fencing (e.g. snow fence) prior to construction
 - Establishing equipment access routes to avoid the population
 - Conducting pre-construction meetings to inform contractor personnel of the population's presence and the importance of avoiding it
 - Routine monitoring through construction to verify populations have not been disturbed, and to repair signage and/or exclusion fencing, as necessary
- If avoidance is not possible (e.g., dragon's mouth orchid), populations should be transplanted to a safe location in the vicinity of the original population, within the same plant community type and in comparable microhabitats

4.2 Invasive Species

Baseline surveys conducted in support of the EIS had identified 12 regulated noxious weeds within previous PDA alignments for the Project, including three Tier 2 species and ten Tier 3 species (Section 3.1.3). Surveys conducted in 2020 identified an additional Tier 2 species (bladder campion), and six additional Tier 3 species (Section 3.2.3). A cumulative list of Regulated noxious weed species observed to date in the vicinity of the PDA is provided below. Table 4-2 provides a summary of locations and number of noxious weed species observed in the Project PDAs.

Tier 2 Noxious Weeds Observed

- nodding thistle (*Carduus nutans*),
- oxeye daisy (*Leucanthemum vulgare*),
- bladder campion (*Silene vulgaris*), and
- scentless chamomile (*Tripleurospermum inodorum*)

Tier 3 Noxious Weed Species Observed

- great burdock (*Arctium lappa*),
- common burdock (*Arctium minus*),
- absinthe (*Artemisia absinthium*),
- nodding thistle (*Carduus nutans*),
- bulb-bearing water-hemlock (*Cicuta bulbifera*),
- water hemlock (*Cicuta maculata*),
- Canada thistle (*Cirsium arvense*),
- bull thistle (*Cirsium vulgare*),
- narrow-leaved hawks-beard (*Crepis tectorum*)
- hemp nettle (*Galeopsis tetrahit*),
- foxtail barley (*Hordeum jubatum*),
- wild parsnip (*Pastinaca sativa*),
- perennial sow-thistle (*Sonchus arvensis*),
- spiny-leaved sow-thistle (*Sonchus asper*),
- common dandelion (*Taraxacum officinale*), and
- field pennycress (*Thlaspi arvense*).

Table 4-2 Number and General Location of Noxious Weeds Observed in 2020

Location	No. Tier 1 Species Observed	No. of Tier 2 Species Observed	No. of Tier 3 Species Observed
LSMOC PDA	0	1	3
PR 239 Re-route	0	1	4
LSMOC PDA	0	0	3
MB Hydro Distribution Line	0	0	3

4.2.1 Mitigation Recommendations

Invasive species observations made in 2020 are associated with known locations (UTM coordinates), which can be incorporated into a construction Environmental Protection Plan (EPP) to mitigate the establishment and spread of regulated noxious weeds within and outside the PDA. Potential mitigation measures could include mechanical or chemical cleaning stations for construction equipment to prevent importing or transporting weed seeds. Other potential mitigation measures could include mechanical, biological and/or chemical treatment of windrowed topsoil, subsoil or spoil piles to manage a developing infestation.

Manitoba Tier 2 species must be managed according to the size of infestation (Government of Manitoba, 2016), and locations noted in 2020 surveys will be important for Project compliance during construction. Tier 3 weeds require control only if the uncontrolled growth or spread would have negative impacts on the localized economy,

environment or residents (Government of Manitoba, 2016). Mitigation measures for these species will likely be field-fit, based on observations immediately prior to and during construction.

4.3 Plant Community Types

The Project EIS identified 35 broad land cover classes within six broad level land cover categories (MI, 2020). The results of desktop studies and 2020 field surveys were used along with remote sensing methods to complete mapping updates for the PDA (see Section 3.3. and the wetland mapping report provided under separate cover; WSP, 2020). Twenty-six MSCs were identified within three broad land cover classes in the PDA (Table 3-3). Nearly 60 % of the PDA consists of Wetlands and Water (1213.73 ha), approximately 30% is Disturbance/Anthropogenic, and the remainder (10%) is Forested. The most abundant MSCs are Forage Crops (313.71 ha) and Stream Fen (232.78 ha). The least abundant MSCs are Jack Pine-Black Spruce/Feather Moss (V28) (0.24 ha), Class V (0.83 ha), and Riverine Swamp (0.89 ha).

The assessment of effects presented in the EIS found the following Project residual effects:

- Change in landscape diversity
- Change in community diversity
- Change in species diversity
- Change in wetland functions

The 2020 assessment of vegetation as described in Work Package 1 (Section 1.1) did not result in changes to the anticipated residual effects to vegetation as presented in the EIS (MI, 2020). The wetland mapping report provides an updated discussion of anticipated residual effects specific to wetlands (WSP, 2020).

4.3.1 Mitigation Recommendations

Mitigation measures for plant communities should follow those proposed in the EIS (MI, 2020).

5 CLOSURE

Plant SOCC surveys and associated plant community characterizations served to provide updated information to the baseline conditions presented in the EIS for the PDA that includes the LMOC, LSMOC, PR 239 re-route and Manitoba Hydro's distribution line. Three additional plant SOCC were identified within the PDA. No COCC were identified in the PDA during the previous studies or the 2020 field surveys. Mitigation measures outlined in the Project EIS, Environmental Protection Plan and / or Revegetation Plan should be followed for these species to minimize adverse affects to SOCC within the Project PDAs.

Regulated noxious weeds have been documented in the PDA, and observed locations can be used to make informed decisions about potential environmental protection measures that could be incorporated into an Environmental Protection Plan and / or Revegetation Plan prior to construction of the Project.

Ground truthing of MSC and associated polygon refinement has provided additional data required to update the vegetation mapping within the PDA, combining four classification systems into one set of merged classes for application in the PDA.

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APPENDIX

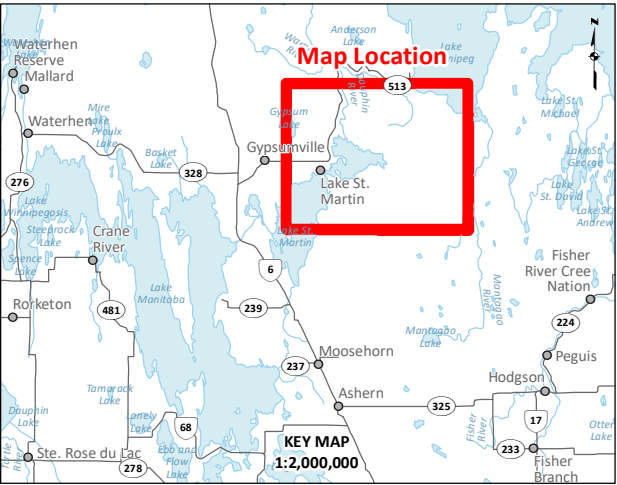
A FIGURES



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- Legend**
- Project Development Area (PDA)
 - Manitoba Hydro's Distribution Line
 - Roads
 - Watercourse

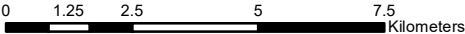


**Figure 1B: Project Location - Lake St. Martin
Outlet Channel and Manitoba Hydro's**

Lake Manitoba & Lake St.Martin

Manitoba, Canada

Scale: 1:150,000



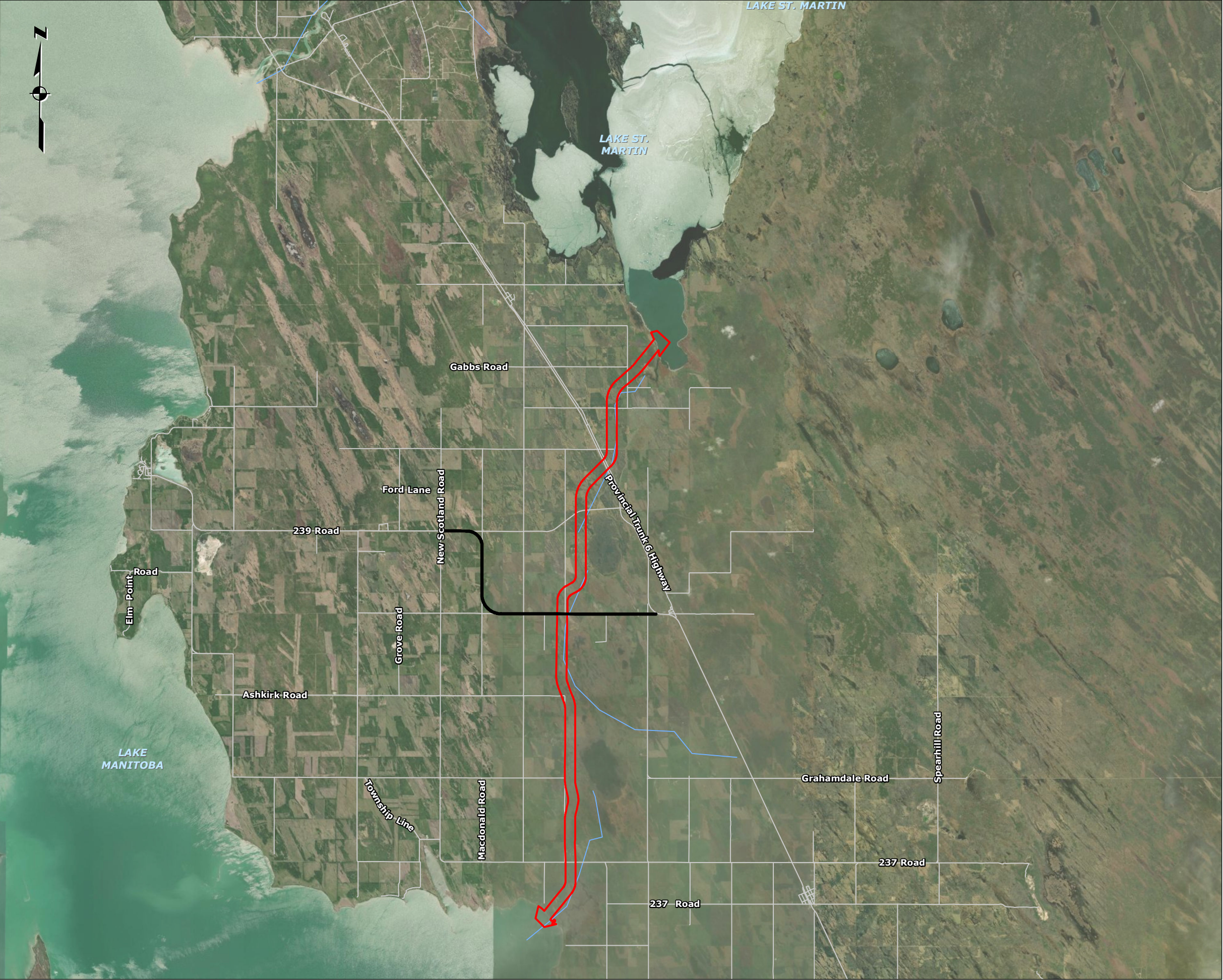
Universal Transverse Mercator (Zone 14)
North American Datum (1983)



Report By: DW
Drawn by: JH
Reviewed By: KT

WSP Job #: 20M-00910-00
Date: September 10, 2020
Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



- Legend**
- Project Development Area (PDA)
 - PR 239 Re-Route
 - Roads
 - Watercourse

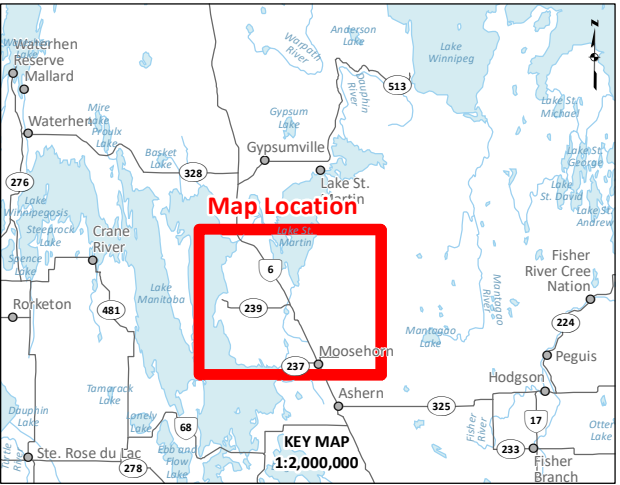
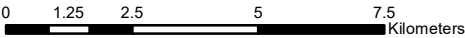


Figure 1C: Project Location - Lake Manitoba Outlet Channel and PR 239 Road Re-route

Lake Manitoba & Lake St.Martin

Manitoba, Canada

Scale: 1:150,000



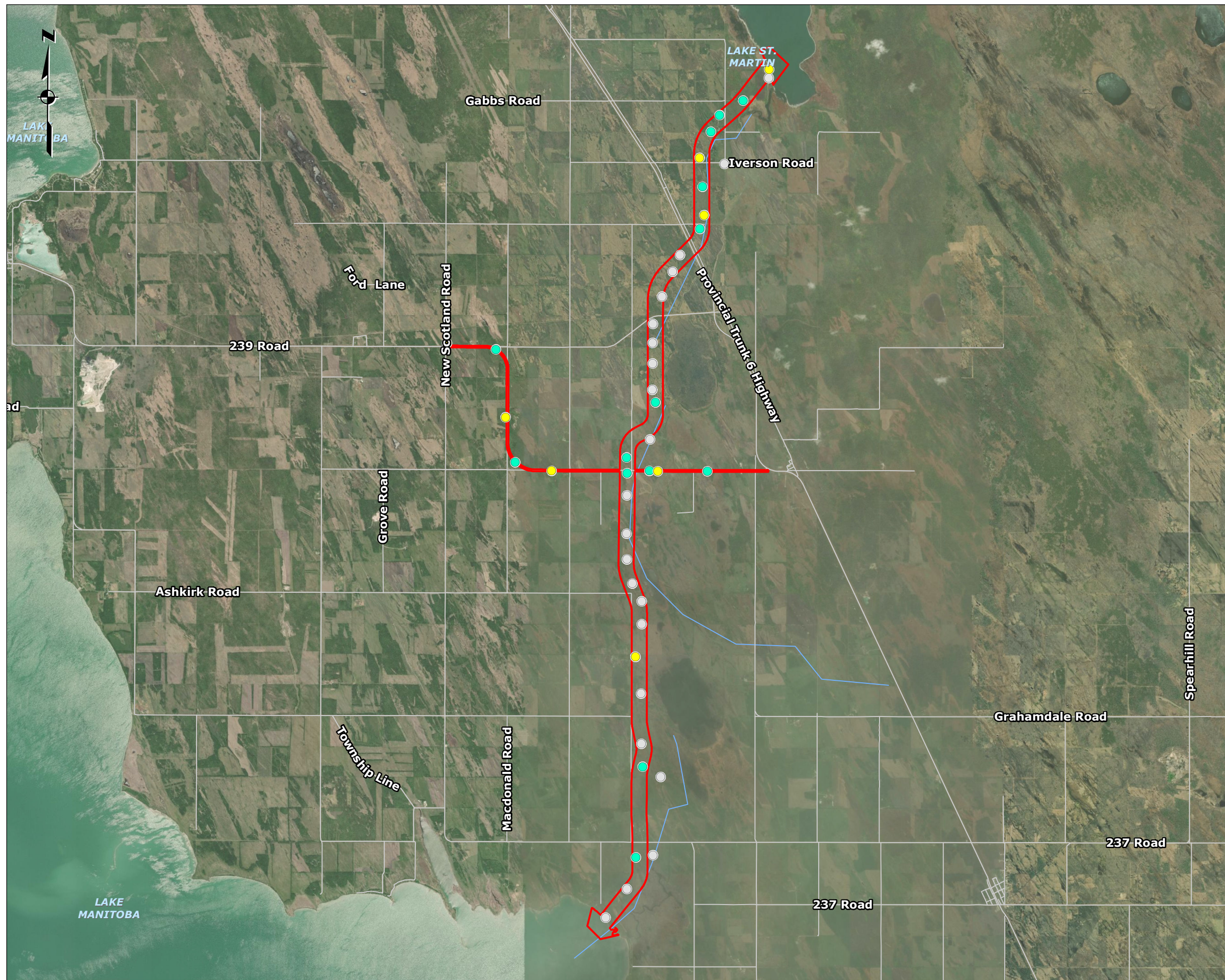
Universal Transverse Mercator (Zone 14)
North American Datum (1983)



Report By: DW
Drawn by: JH
Reviewed By: KT

WSP Job #: 20M-00910-00
Date: September 10, 2020
Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

Project Development Area (PDA)

— Roads

— Watercourse

Vegetation Survey Data

○ Historic Survey Location

● 2020 Early Summer SOCC Survey Location

● 2020 Late Summer SOCC Survey Location

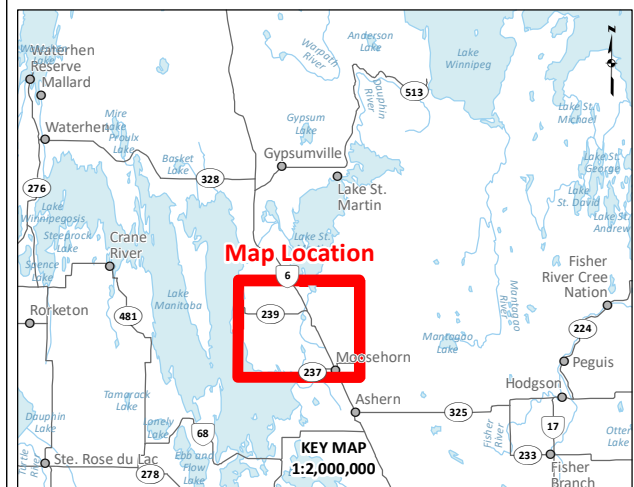
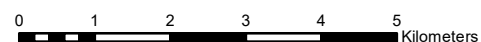


Figure 2: Vegetation Survey Locations - South Area

Lake Manitoba & Lake St.Martin

Manitoba, Canada

Scale: 1:100,000



Universal Transverse Mercator (Zone 14)

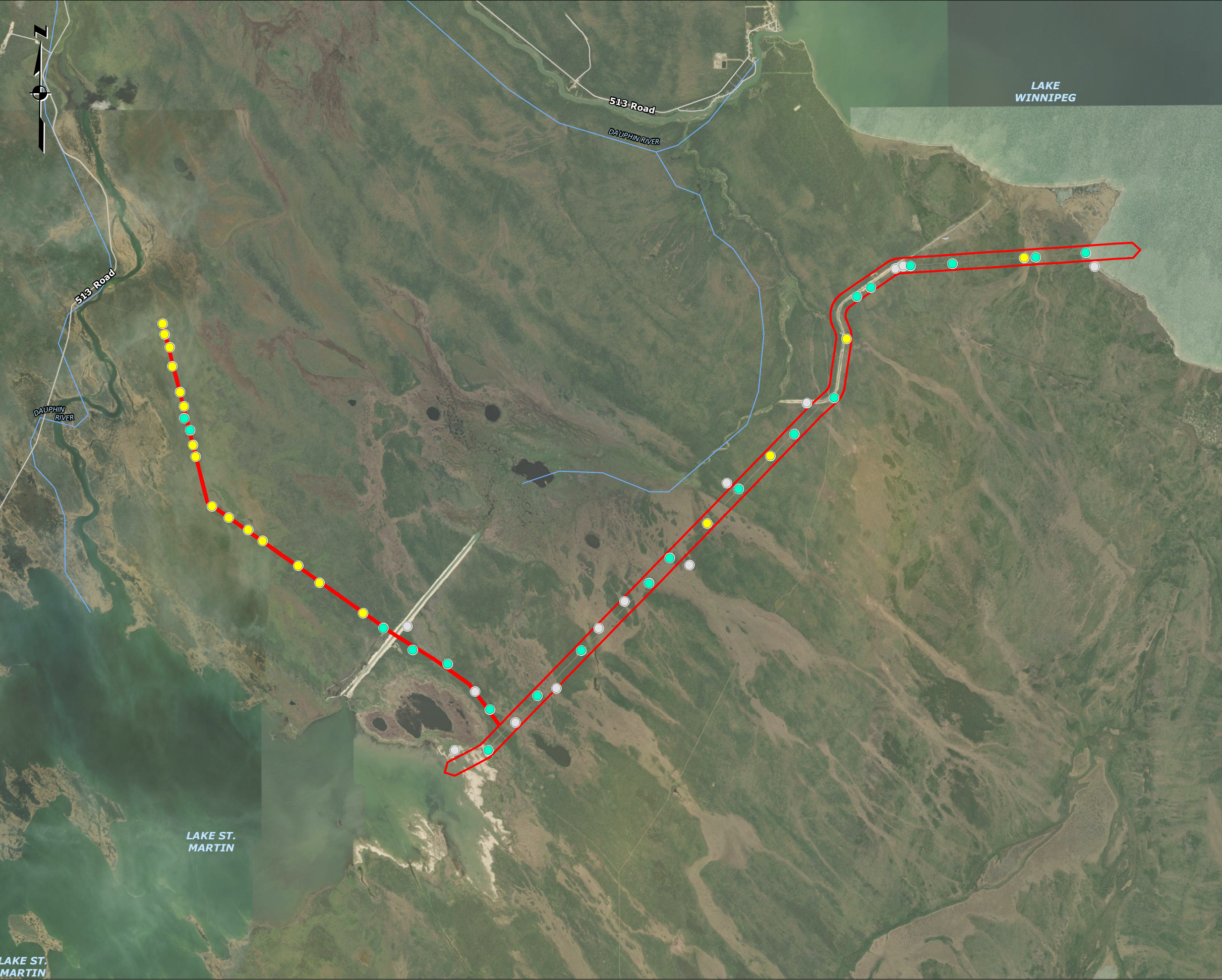
North American Datum (1983)



Report By: LM
Drawn by: JH
Reviewed By: DK

WSP Job #: 20M-00910-00
Date: September 10, 2020
Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

Project Development Area (PDA)

Roads

Watercourse

Vegetation Survey Data

● 2020 Early Summer SOCC Survey Location

● 2020 Late Summer SOCC Survey Location

○ Historic Survey Location

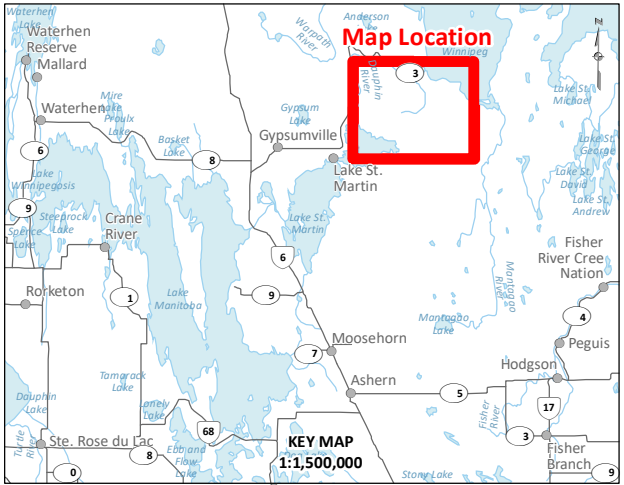
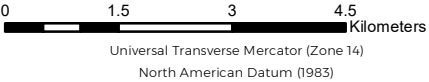


Figure 3: Vegetation Survey Locations - North Area

Lake Manitoba & Lake St.Martin

Manitoba, Canada

Scale: 1:100,000



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



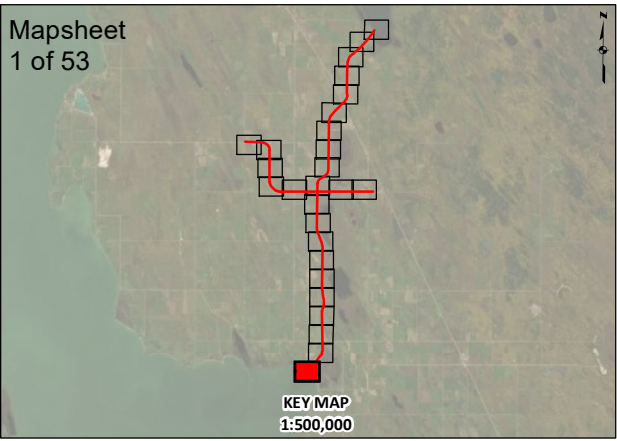
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Project Development Area (PDA)

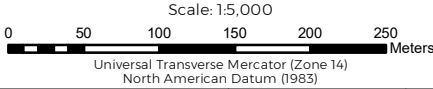
Quarter Section

Classification

- Bare Rock, Gravel and Sand
- Class II Wetland
- Class III Wetland
- Class IV Wetland
- Cultural Features
- Forage Crops
- Lacustrine Swamp
- Roads and Trails
- VI = Balsam Poplar Hardwood and Mixedwood
- Water Bodies

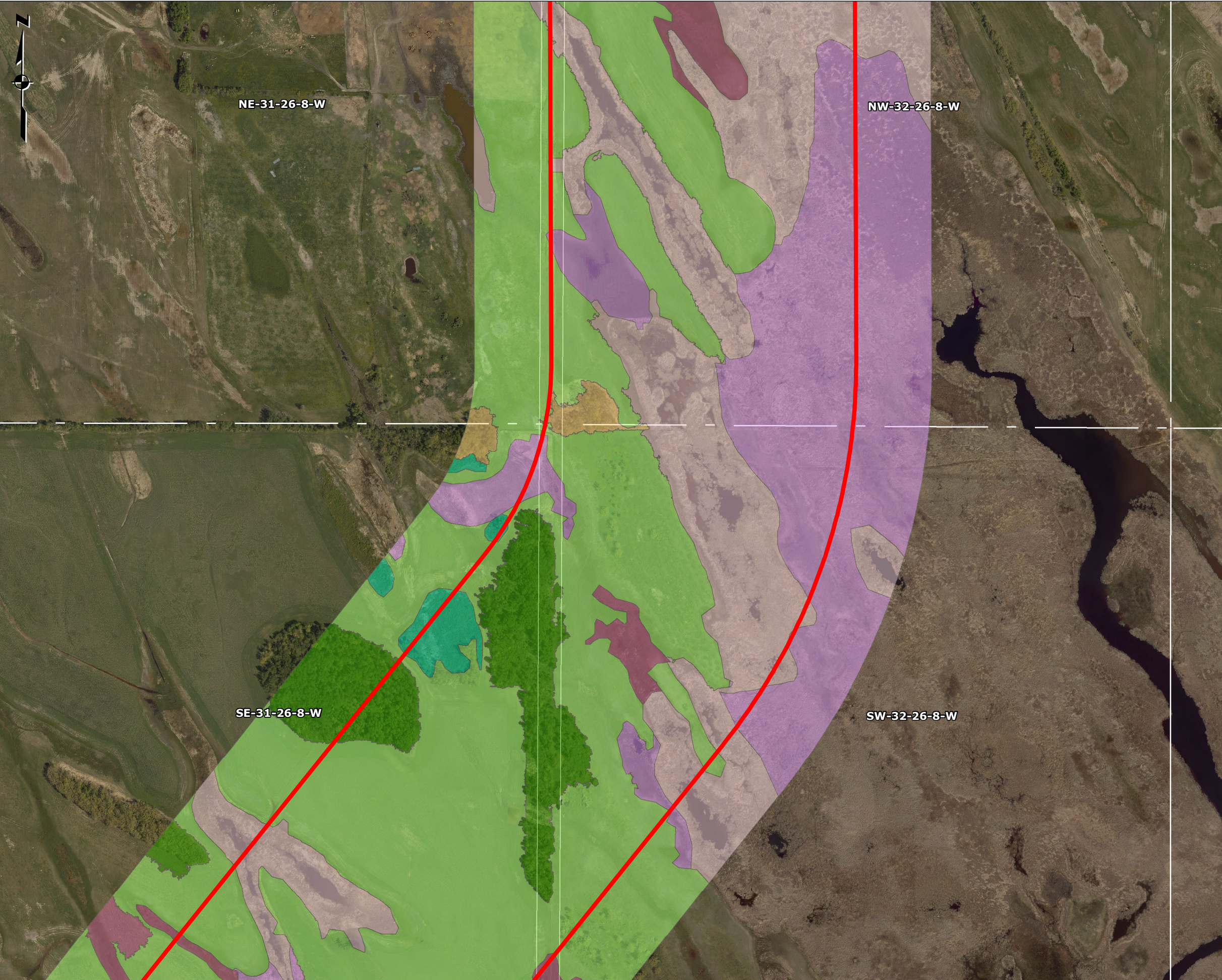


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

Project Development Area (PDA)

Quarter Section

Classification

Basin Swamp

Class II Wetland

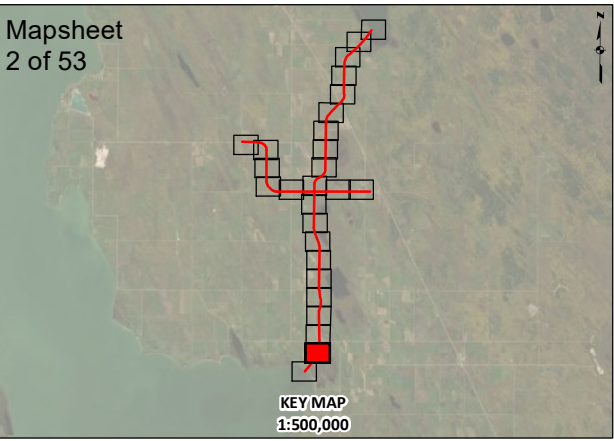
Class III Wetland

Class IV Wetland

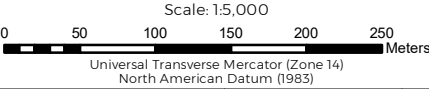
Forage Crops

V1 = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood



**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



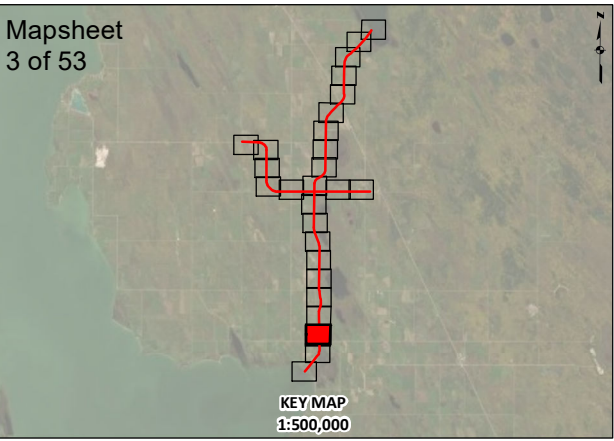
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Project Development Area (PDA)

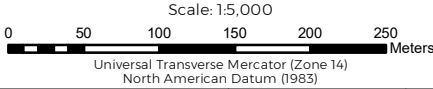
Quarter Section

Classification

- Agricultural Cropland
- Basin Swamp
- Class II Wetland
- Class III Wetland
- Class IV Wetland
- Cultural Features
- Forage Crops
- Roads and Trails
- V1 = Balsam Poplar Hardwood and Mixedwood
- V5 = Aspen Hardwood



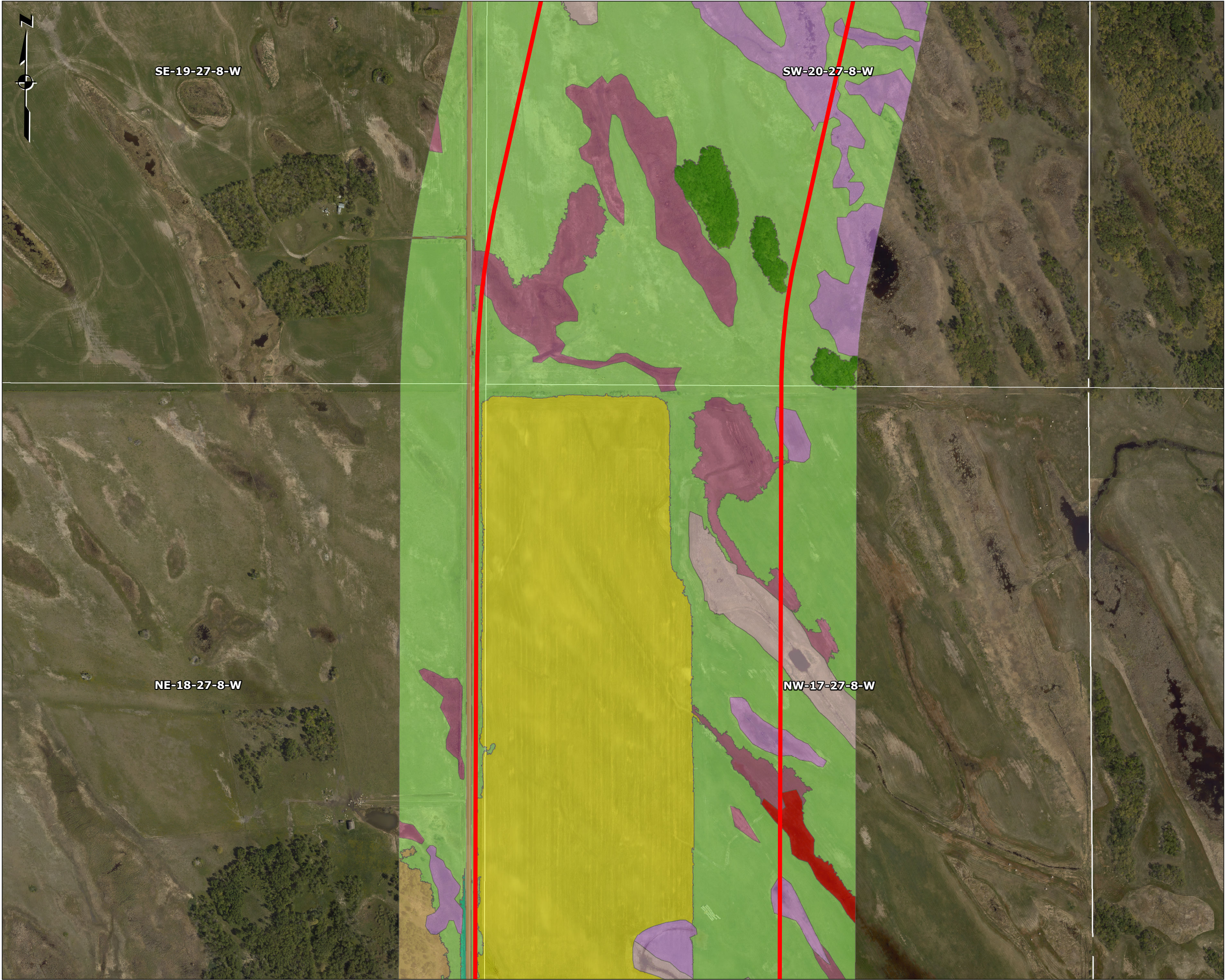
**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM
Drawn by: JH
Reviewed By: DK

WSP Job #: 20M-00910-00
Date: September 10, 2020
Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

 Project Development Area (PDA)

 Quarter Section

Classification

 Agricultural Cropland

 Basin Swamp

 Class II Wetland

 Class III Wetland

 Class IV Wetland

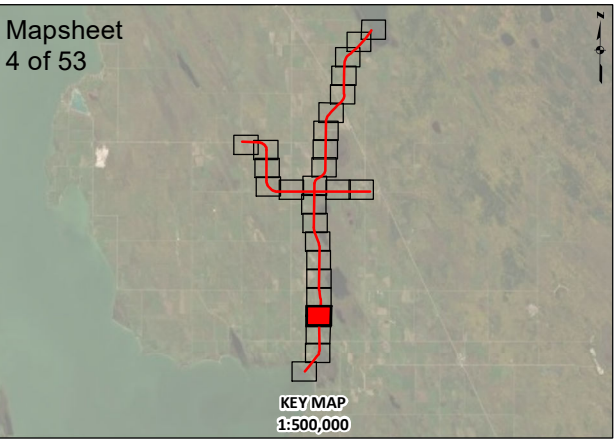
 Class V Wetland

 Forage Crops

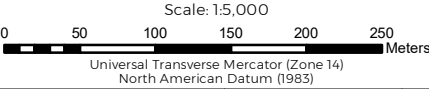
 Roads and Trails

 V1 = Balsam Poplar Hardwood and Mixedwood

 V5 = Aspen Hardwood

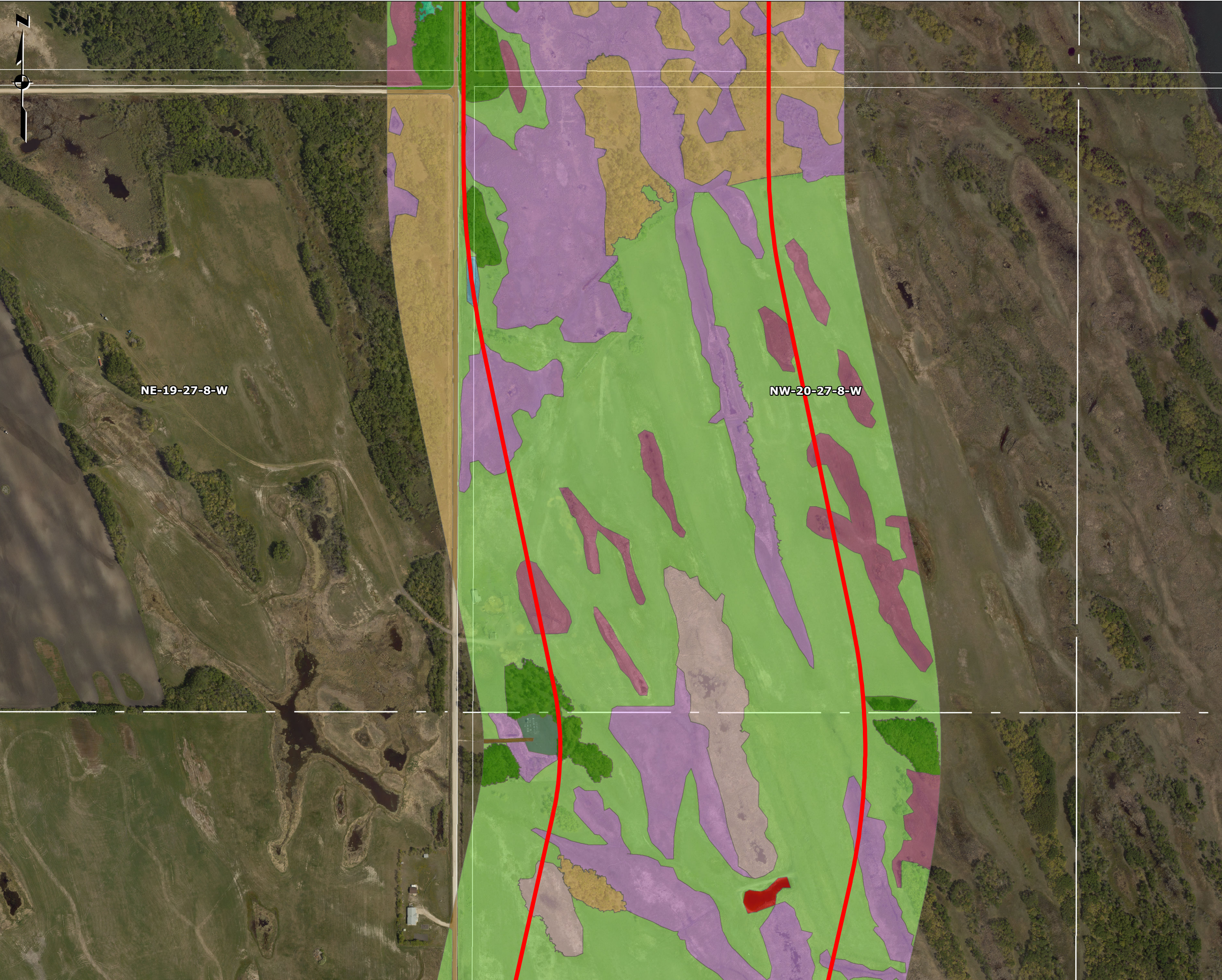


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

Project Development Area (PDA)

Quarter Section

Classification

Basin Swamp

Class II Wetland

Class III Wetland

Class IV Wetland

Class V Wetland

Cultural Features

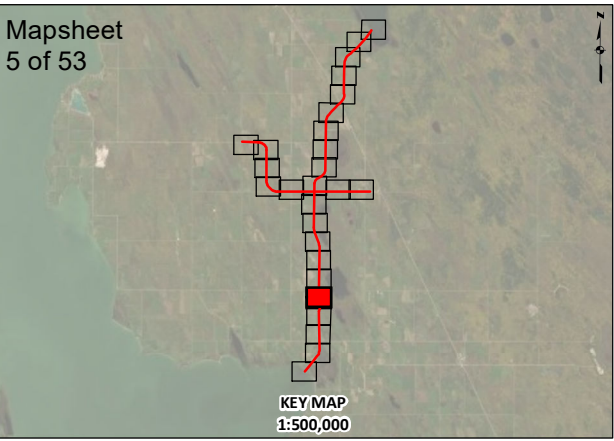
Forage Crops

Roads and Trails

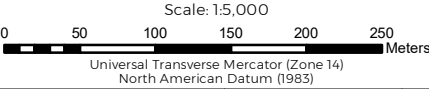
V1 = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood

Water Bodies

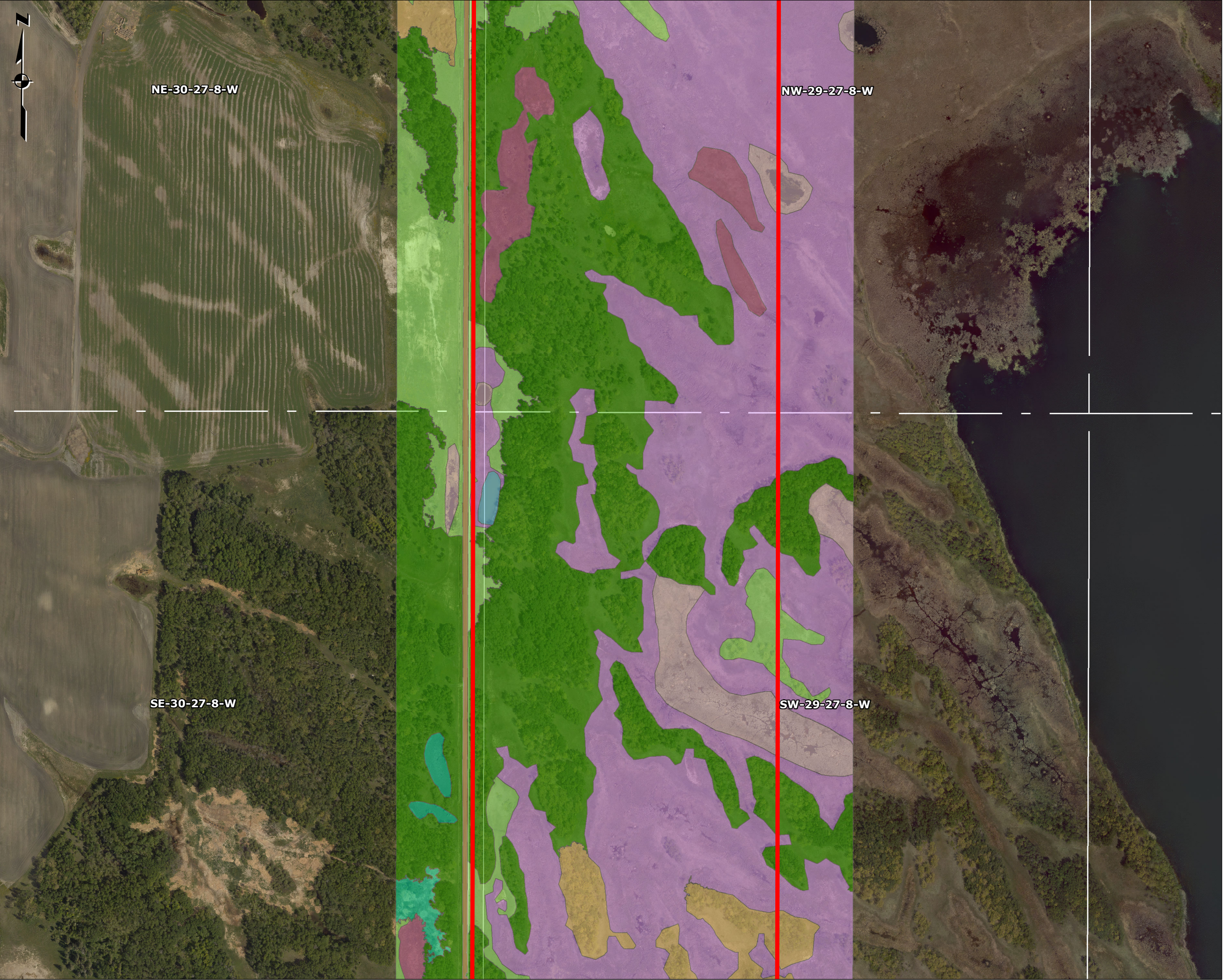


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas
Lake Manitoba & Lake St. Martin
Manitoba, Canada**



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

Project Development Area (PDA)

Quarter Section

Classification

Basin Swamp

Class II Wetland

Class III Wetland

Class IV Wetland

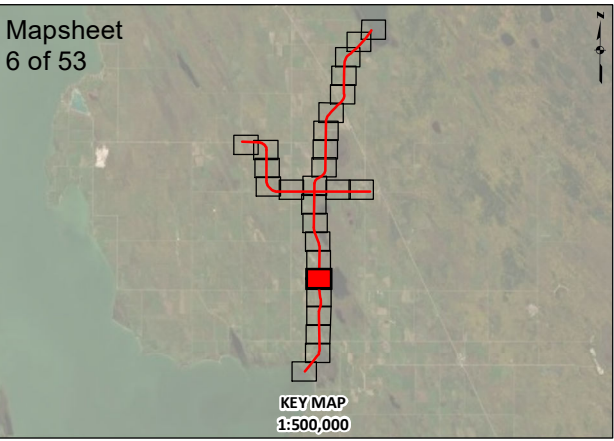
Forage Crops

Roads and Trails

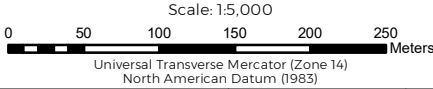
V1 = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood

Water Bodies

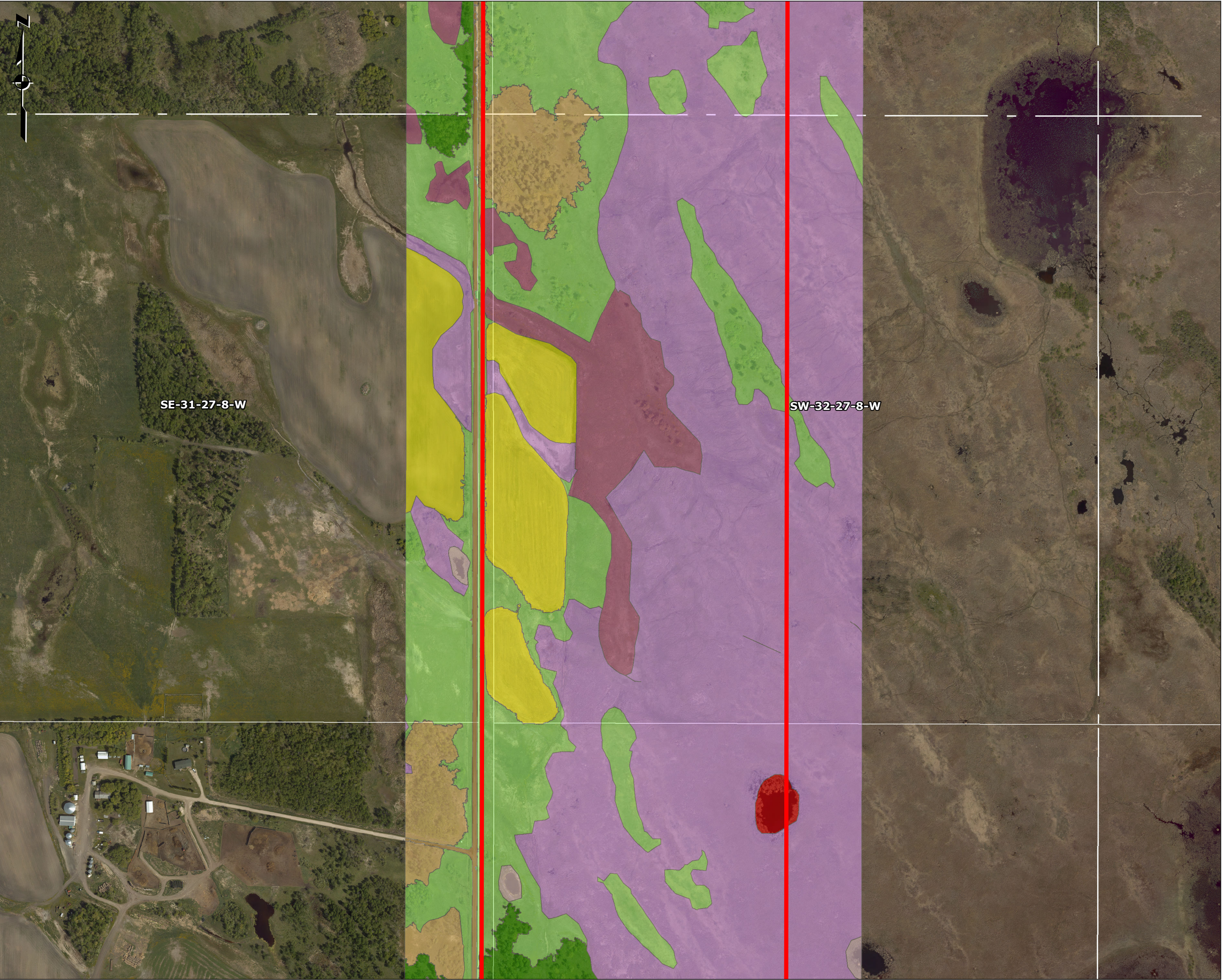


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

 Project Development Area (PDA)

 Quarter Section

Classification

 Agricultural Cropland

 Class II Wetland

 Class III Wetland

 Class IV Wetland

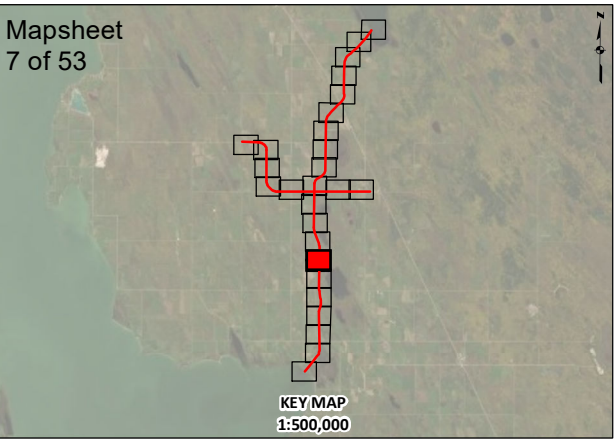
 Class V Wetland

 Forage Crops

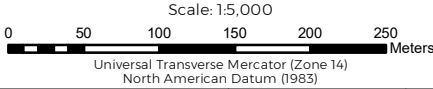
 Roads and Trails

 V1 = Balsam Poplar Hardwood and Mixedwood

 V5 = Aspen Hardwood

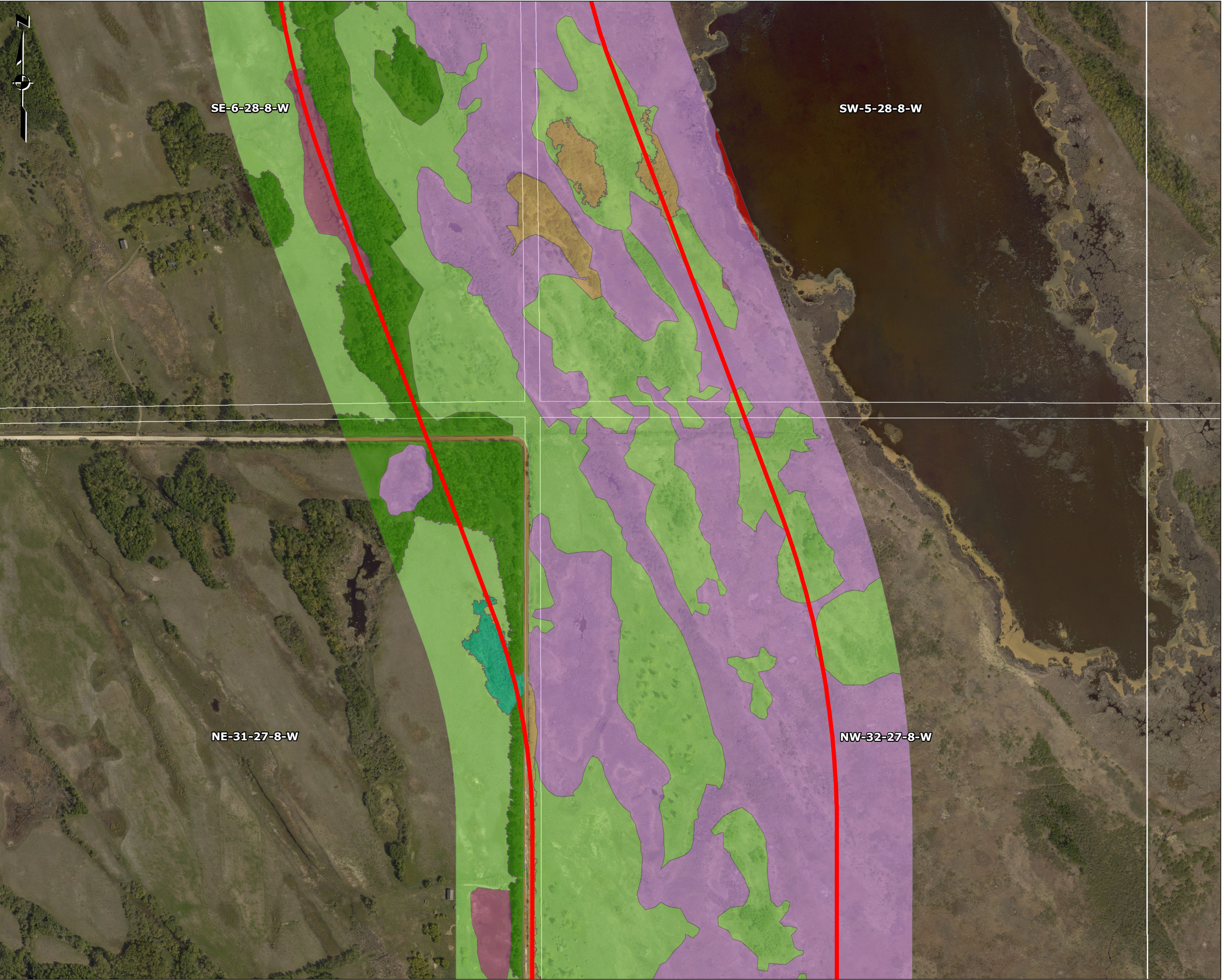


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

Project Development Area (PDA)

Quarter Section

Classification

Basin Swamp

Class II Wetland

Class III Wetland

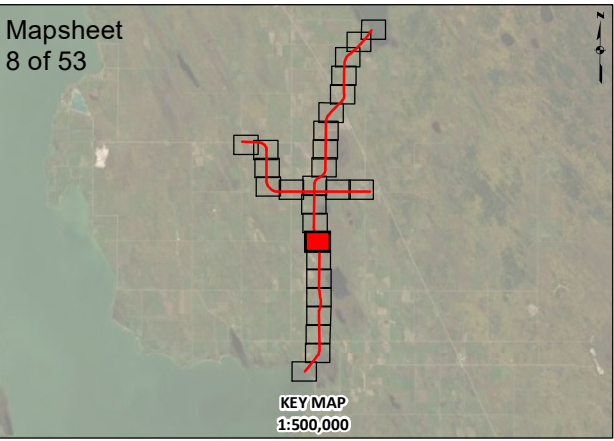
Class V Wetland

Forage Crops

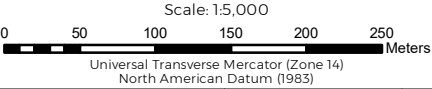
Roads and Trails

V1 = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood



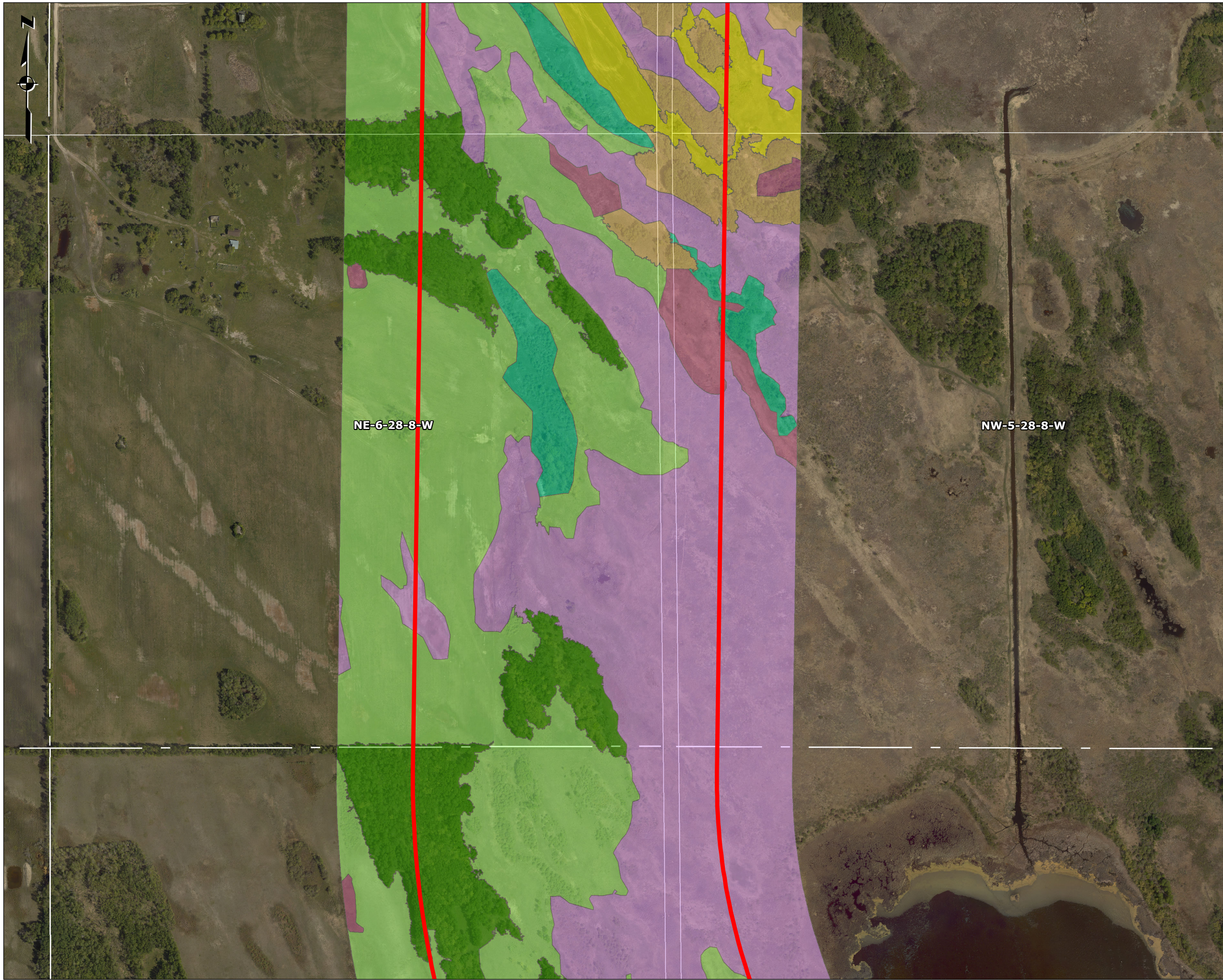
**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM
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Legend

 Project Development Area (PDA)

 Quarter Section

Classification

 Agricultural Cropland

 Basin Swamp

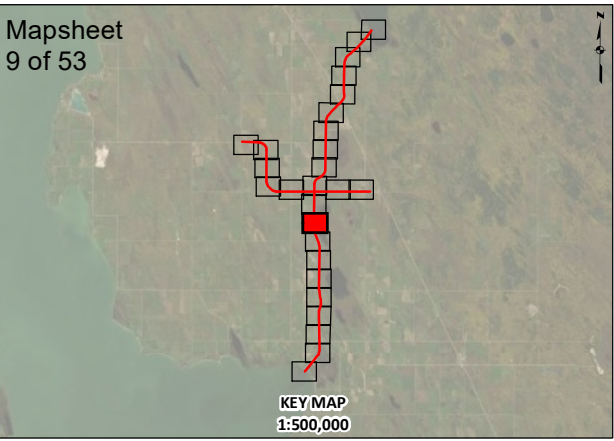
 Class II Wetland

 Class III Wetland

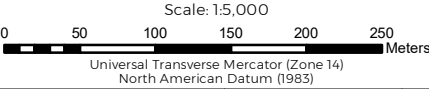
 Forage Crops

 V1 = Balsam Poplar Hardwood and Mixedwood

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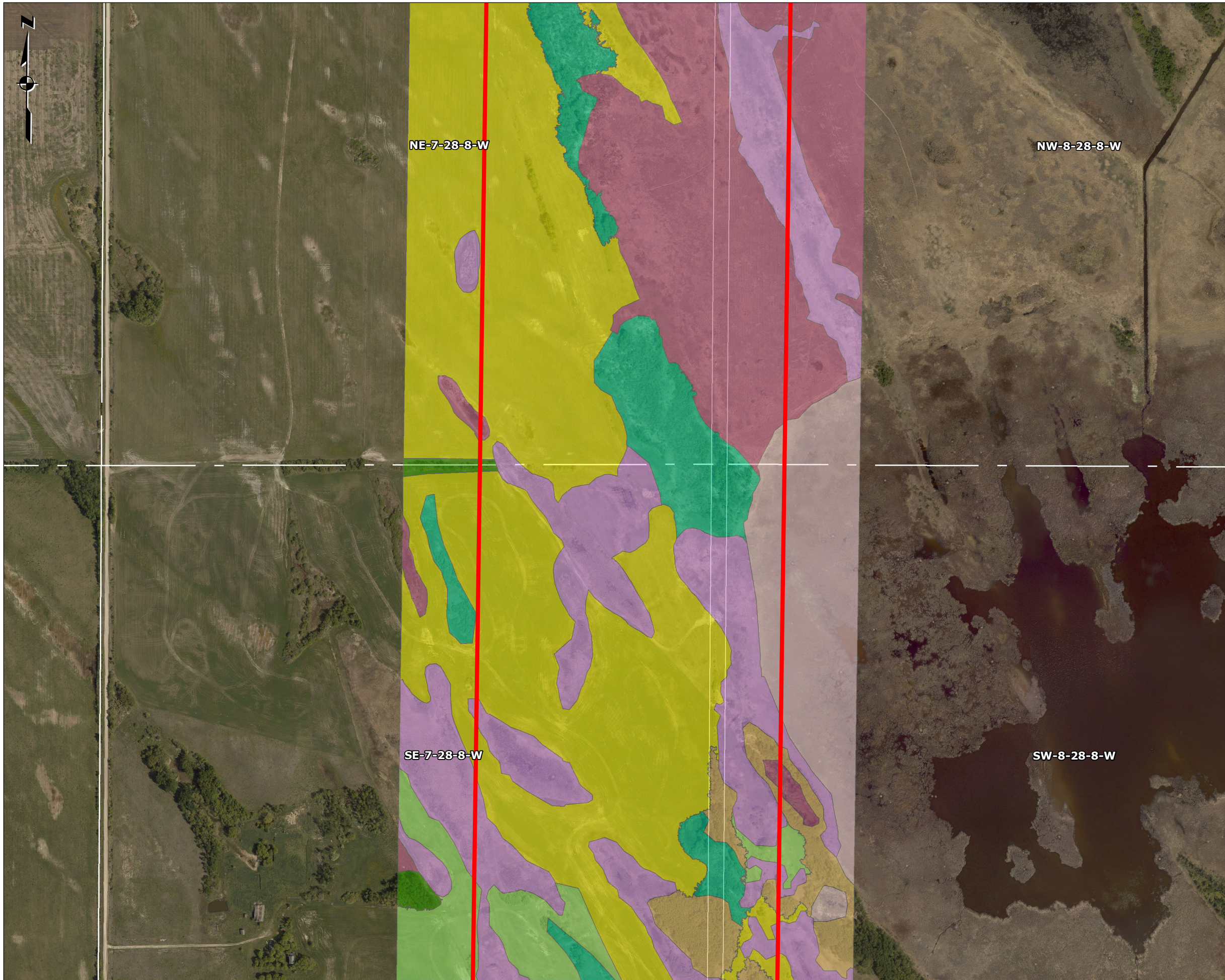


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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Legend

 Project Development Area (PDA)

 Quarter Section

Classification

 Agricultural Cropland

 Basin Swamp

 Class II Wetland

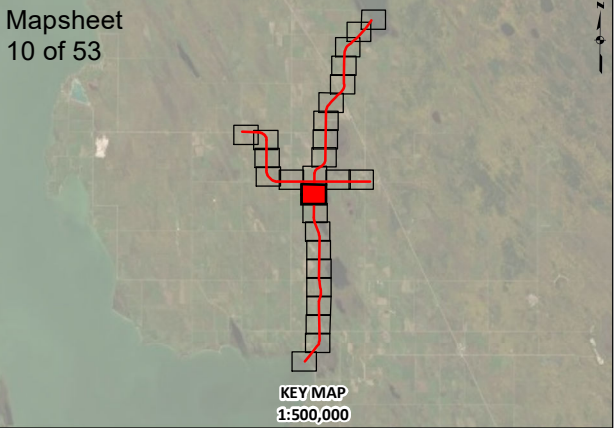
 Class III Wetland

 Class IV Wetland

 Forage Crops

 VI = Balsam Poplar Hardwood and Mixedwood

 V5 = Aspen Hardwood



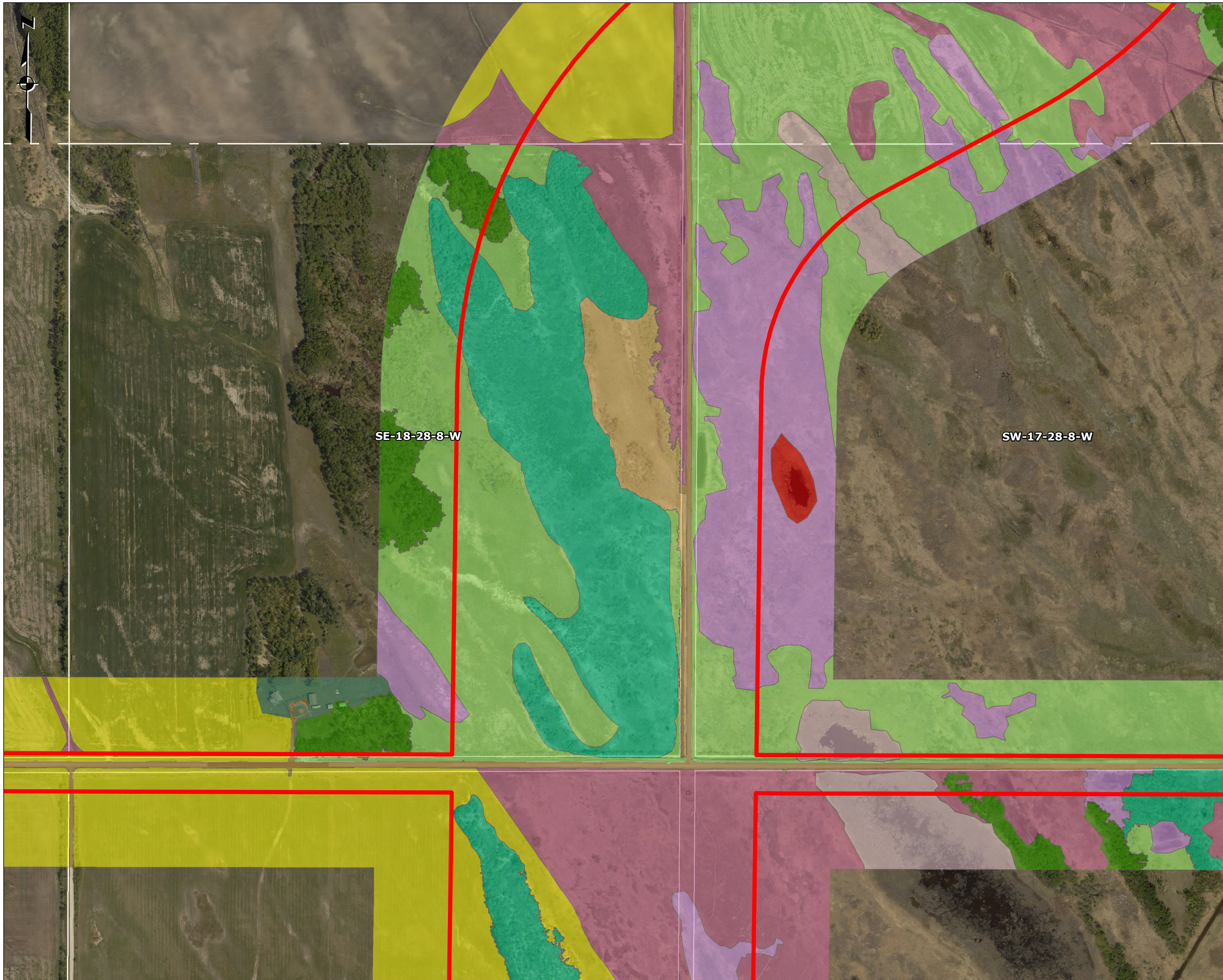
**Figure 4: Pre-construction Survey
Vegetation Assessment Areas
Lake Manitoba & Lake St.Martin
Manitoba, Canada**

Scale: 1:5,000
0 50 100 150 200 250 Meters
Universal Transverse Mercator (Zone 14)
North American Datum (1983)



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Legend

Project Development Area (PDA)

Quarter Section

Classification

Agricultural Cropland

Basin Swamp

Class II Wetland

Class III Wetland

Class IV Wetland

Class V Wetland

Cultural Features

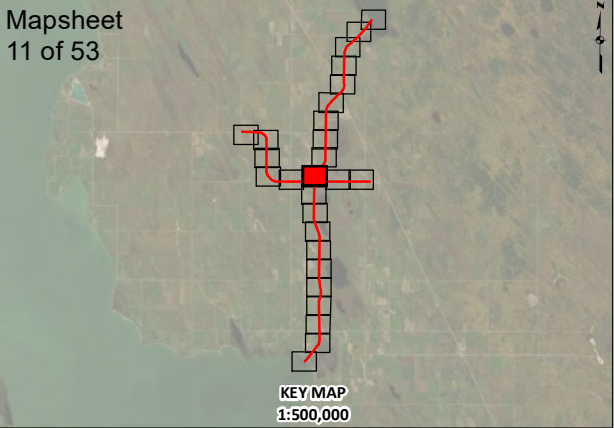
Forage Crops

Roads and Trails

V1 = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood

Mapsheet
11 of 53



Manitoba
Infrastructure

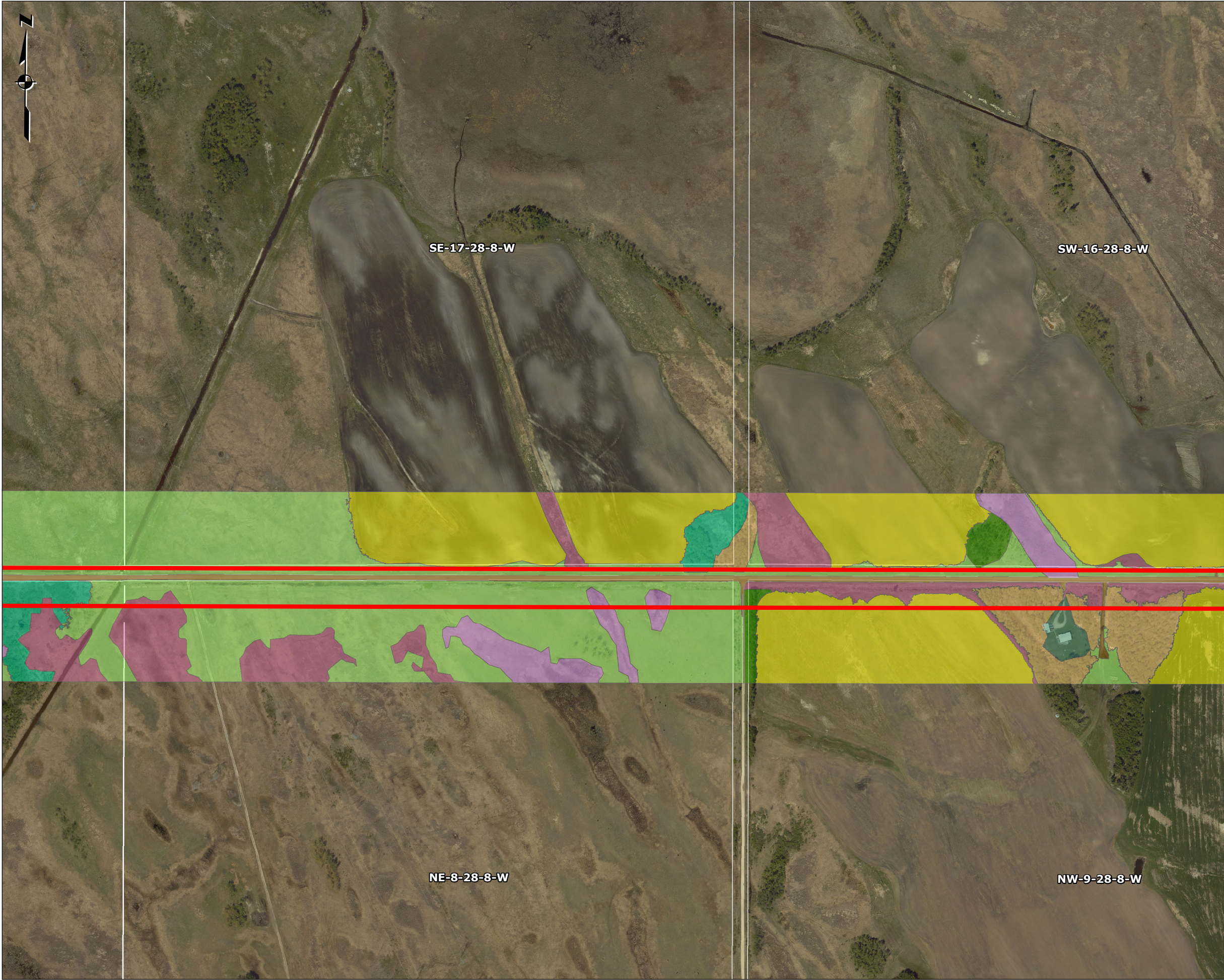
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Lake Manitoba & Lake St. Martin
Manitoba, Canada**

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Legend

 Project Development Area (PDA)

 Quarter Section

Classification

 Agricultural Cropland

 Basin Swamp

 Class II Wetland

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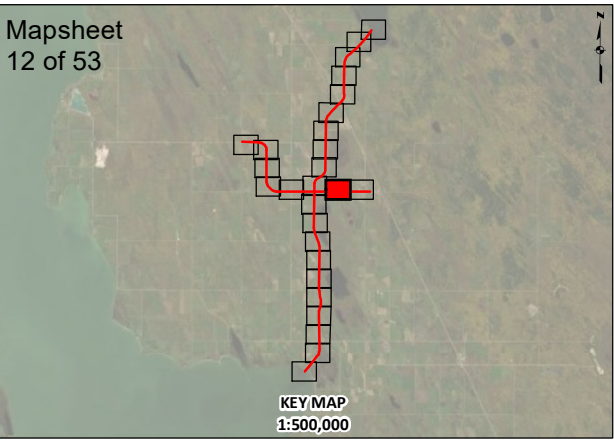
 Cultural Features

 Forage Crops

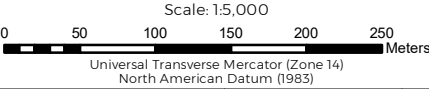
 Roads and Trails

 V1 = Balsam Poplar Hardwood and Mixedwood

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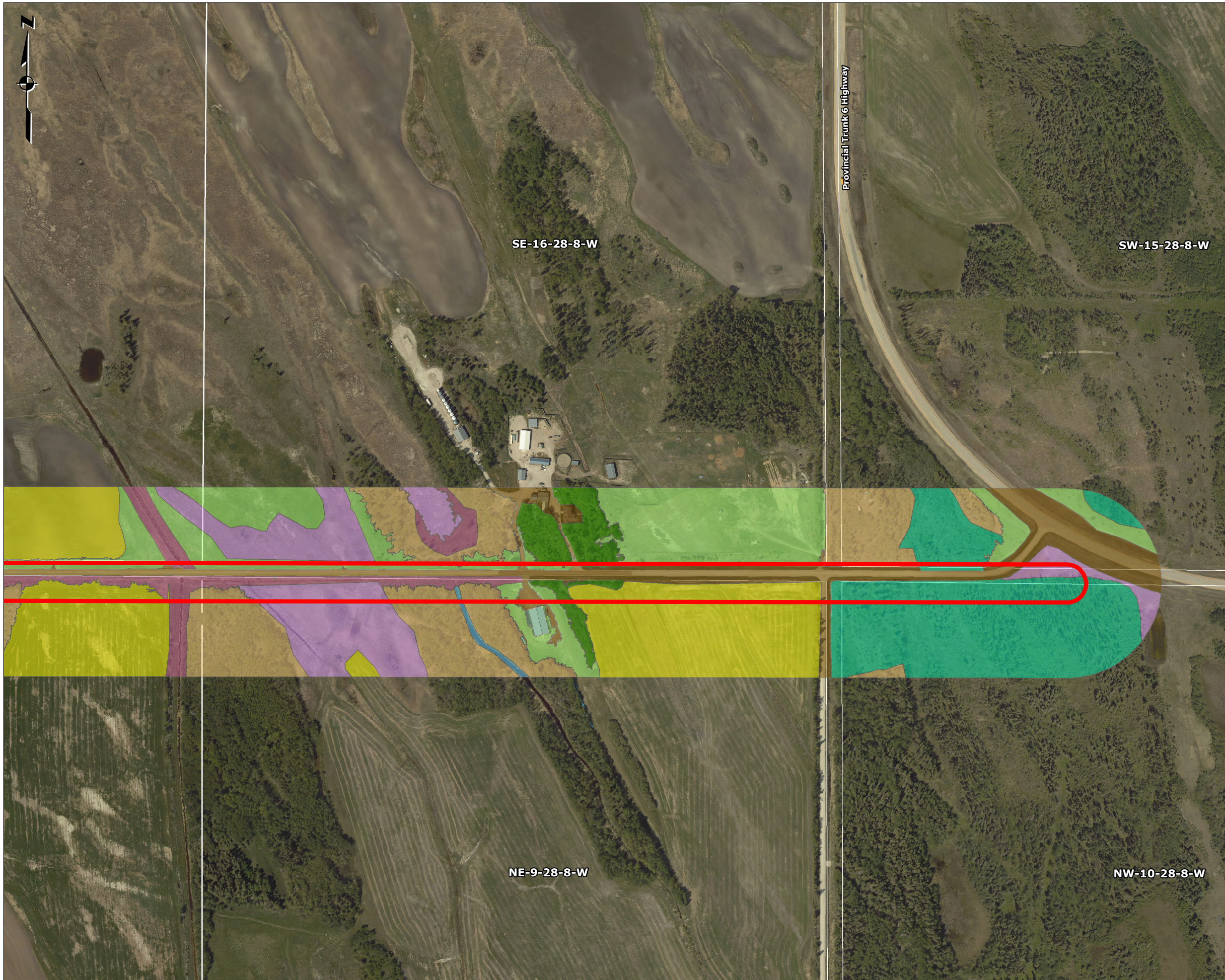
**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



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Legend

 Project Development Area (PDA)

 Quarter Section

Classification

 Agricultural Cropland

 Basin Swamp

 Class II Wetland

 Class III Wetland

 Cultural Features

 Forage Crops

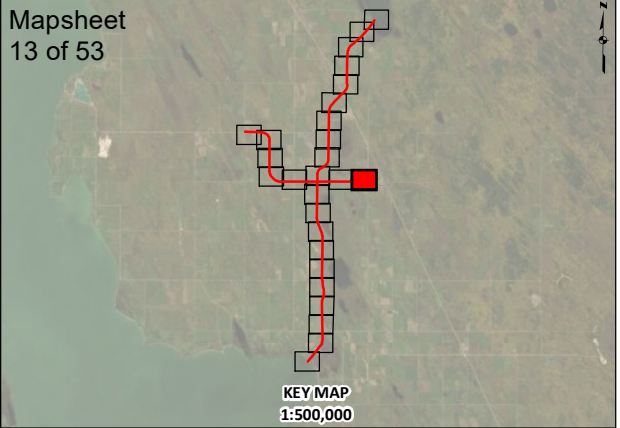
 Roads and Trails

 V1 = Balsam Poplar Hardwood and Mixedwood

 V5 = Aspen Hardwood

 Water Bodies

Mapsheet
13 of 53



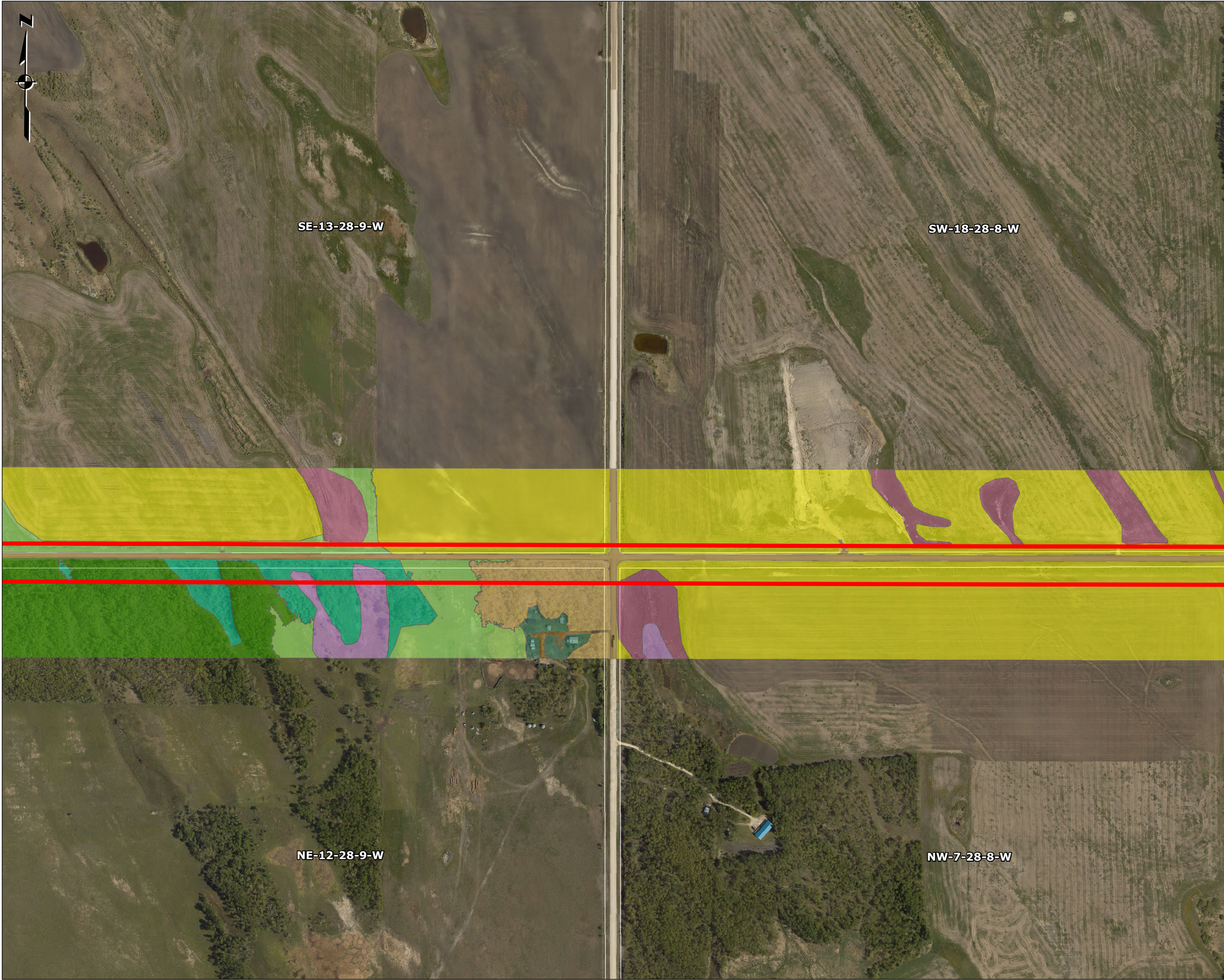
**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada

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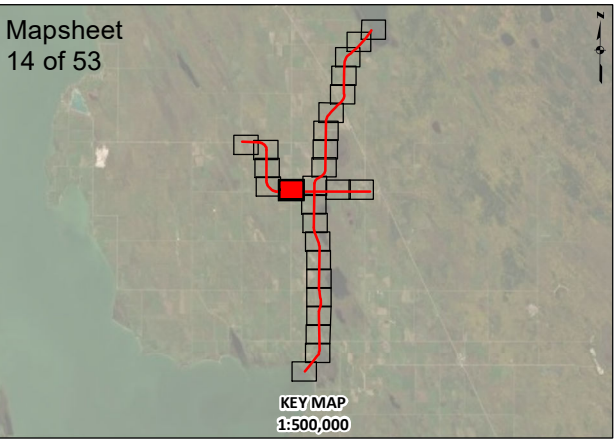


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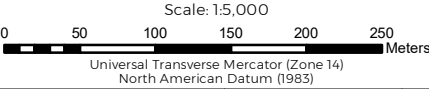
 Project Development Area (PDA)

Classification

-  Agricultural Cropland
-  Basin Swamp
-  Class II Wetland
-  Class III Wetland
-  Cultural Features
-  Forage Crops
-  Roads and Trails
-  VI = Balsam Poplar Hardwood and Mixedwood
-  V5 = Aspen Hardwood

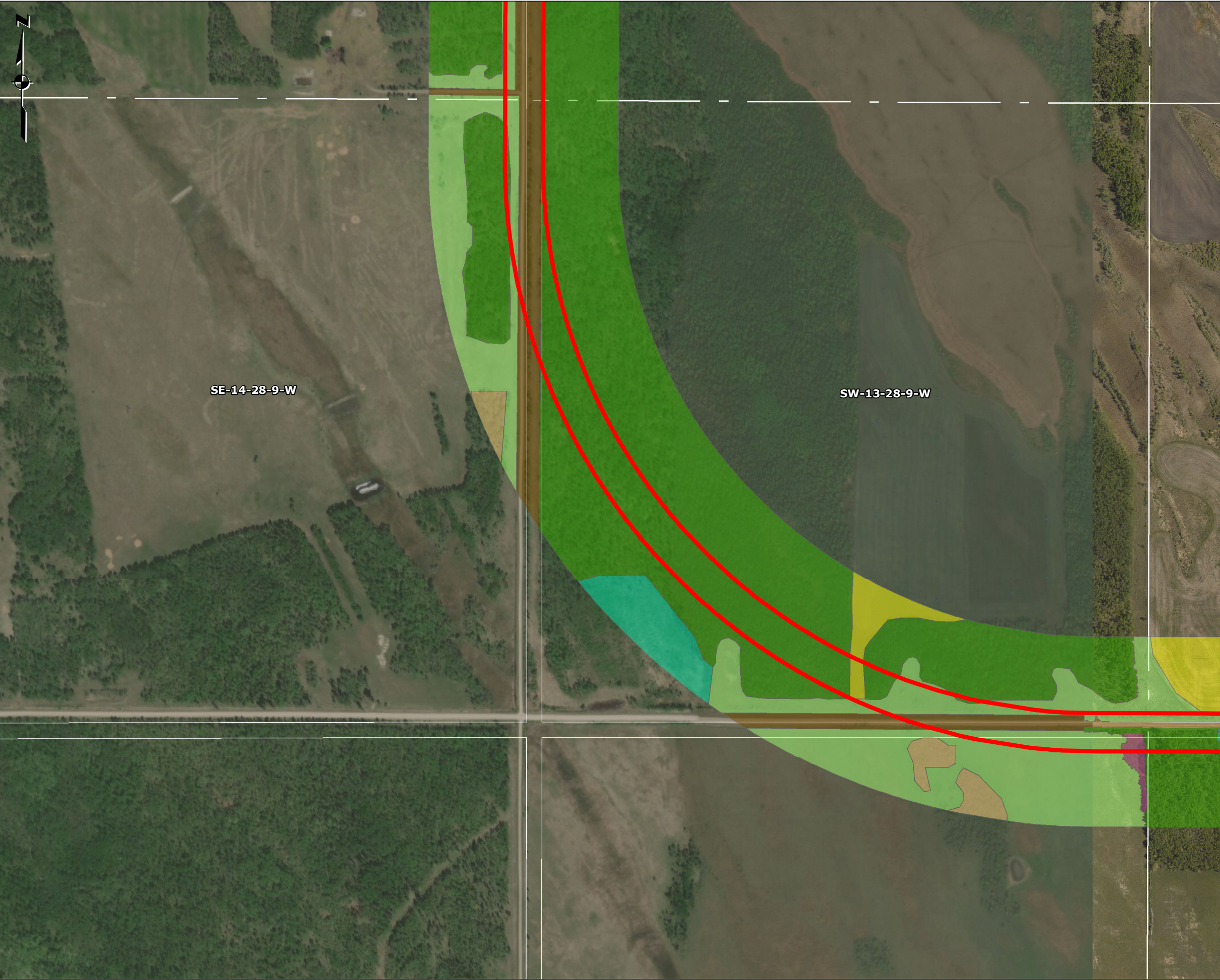


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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Legend

Project Development Area (PDA)

Quarter Section

Classification

Agricultural Cropland

Basin Swamp

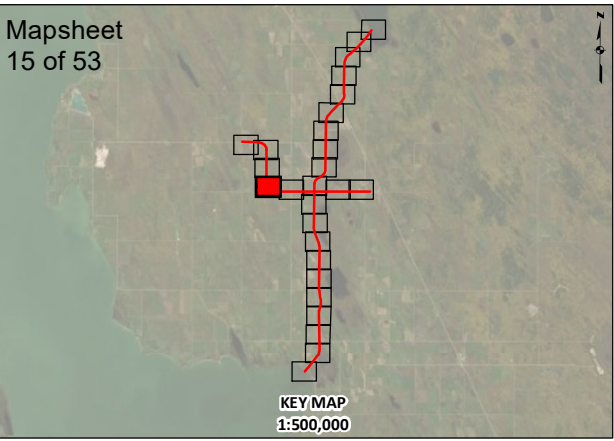
Class II Wetland

Forage Crops

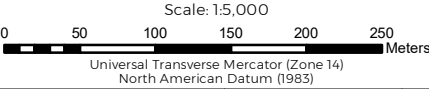
Roads and Trails

V1 = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood

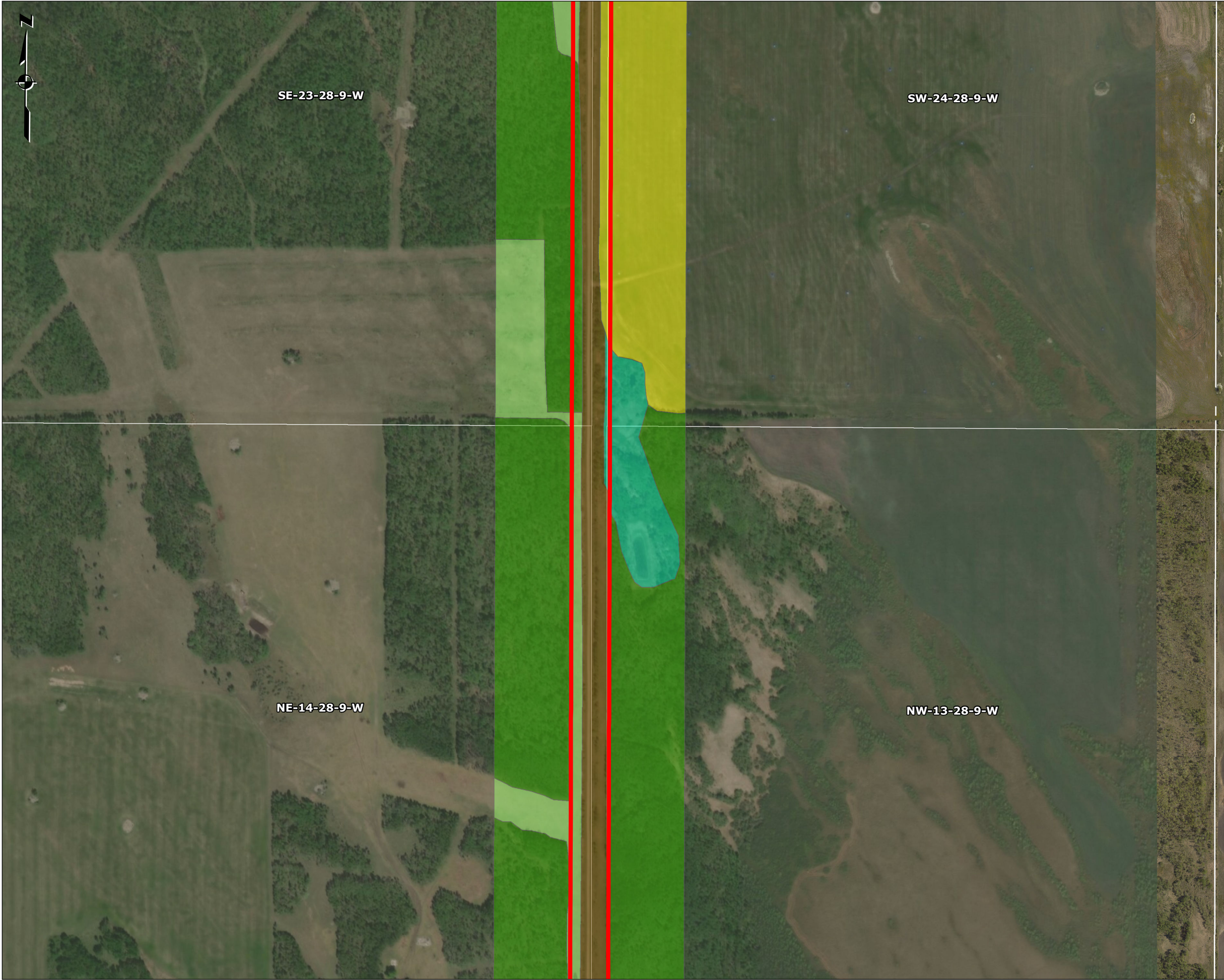


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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Legend

Project Development Area (PDA)

Quarter Section

Classification

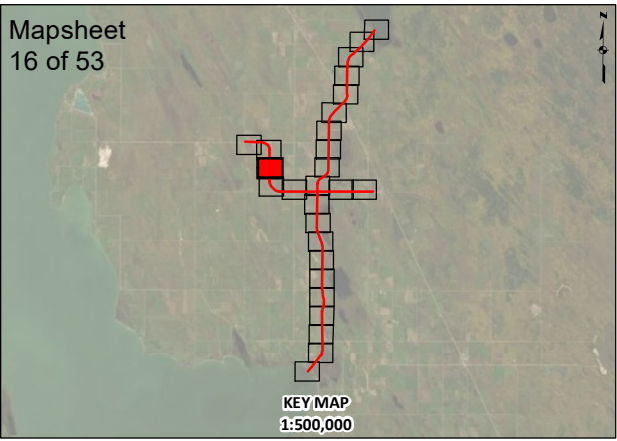
Agricultural Cropland

Basin Swamp

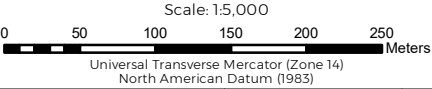
Forage Crops

Roads and Trails

V5 = Aspen Hardwood



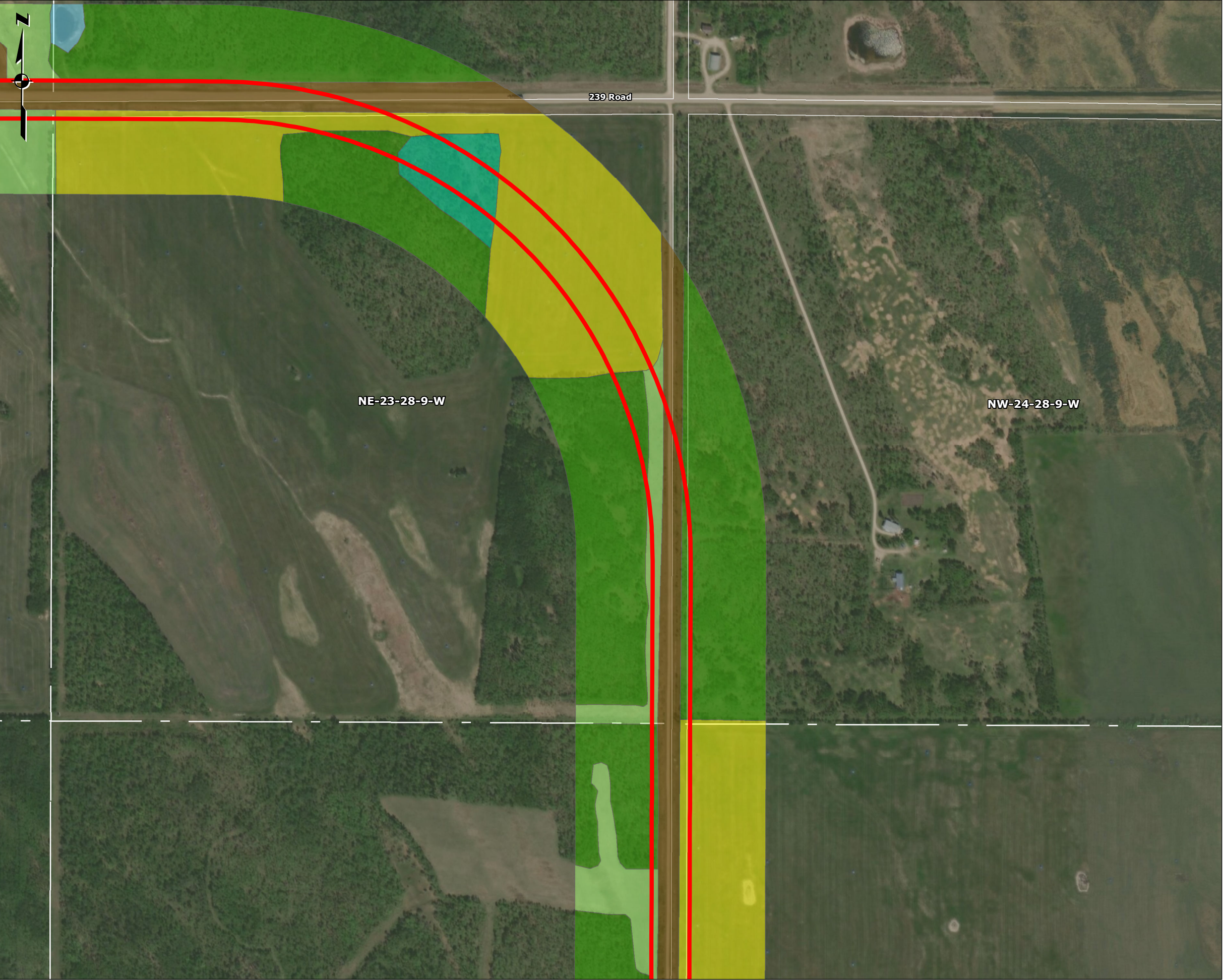
**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada



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Legend

Project Development Area (PDA)

Quarter Section

Classification

Agricultural Cropland

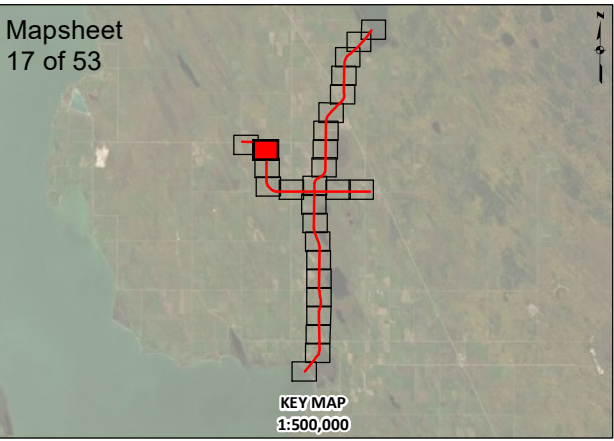
Basin Swamp

Forage Crops

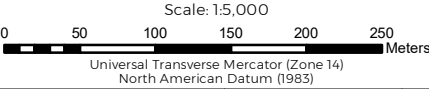
Roads and Trails

V5 = Aspen Hardwood

Water Bodies



**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada

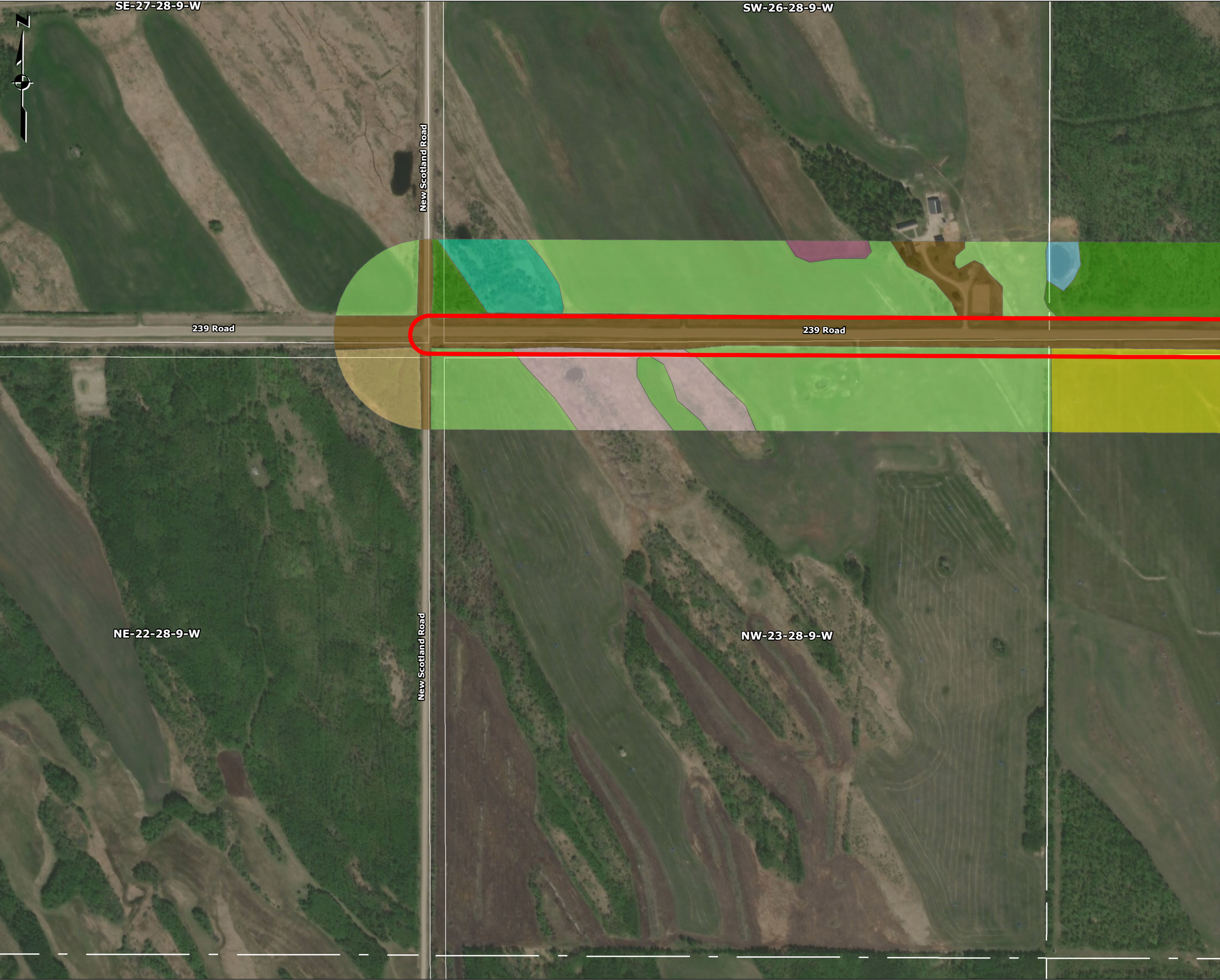


wsp

Report By: LM
Drawn by: JH
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WSP Job #: 20M-00910-00
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Legend

Project Development Area (PDA)

Quarter Section

Classification

Agricultural Cropland

Basin Swamp

Class II Wetland

Class IV Wetland

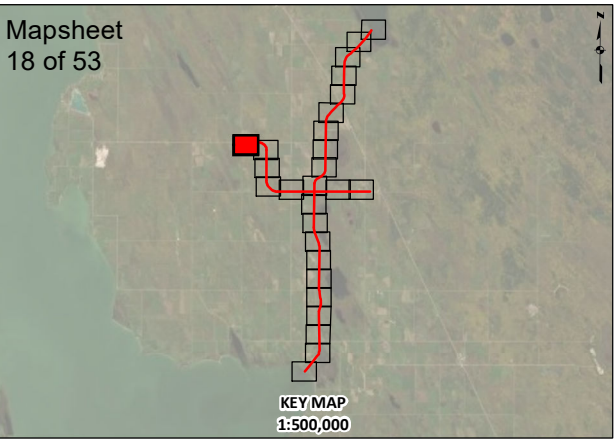
Forage Crops

Roads and Trails

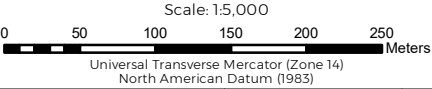
V1 = Balsam Poplar Hardwood and Mixedwood

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Water Bodies

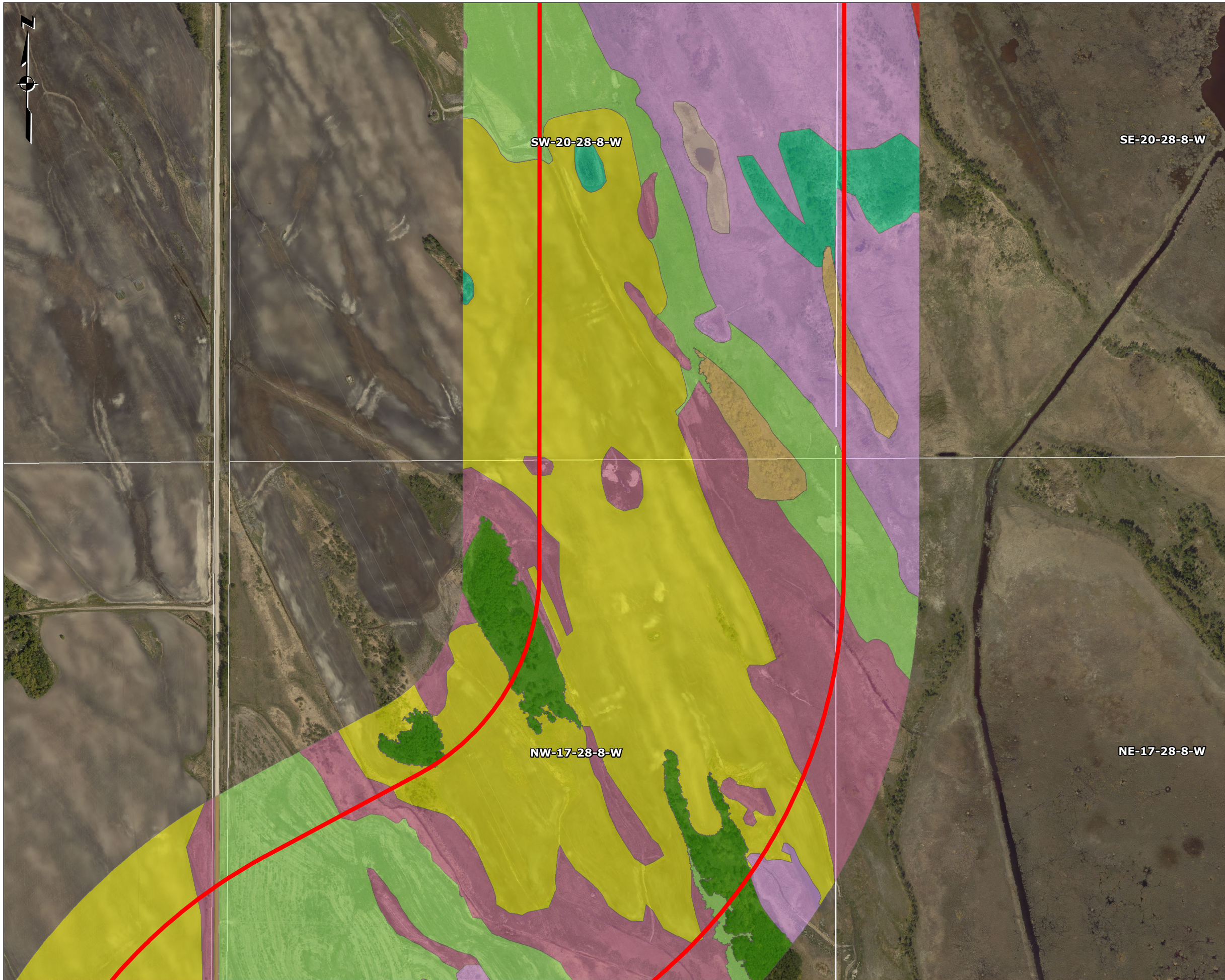


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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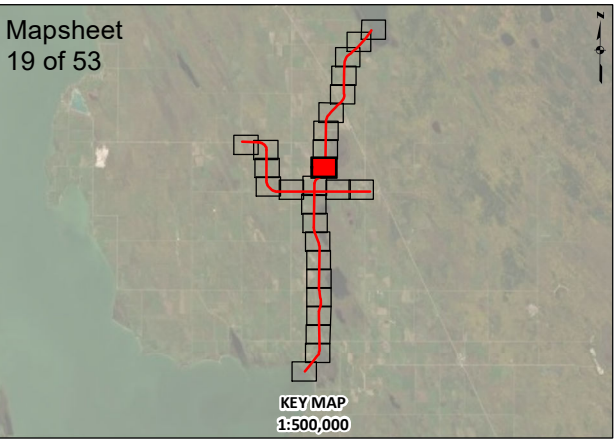
Legend

Project Development Area (PDA)

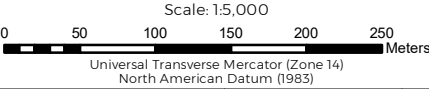
Quarter Section

Classification

- Agricultural Cropland
- Basin Swamp
- Class II Wetland
- Class III Wetland
- Class IV Wetland
- Class V Wetland
- Forage Crops
- Roads and Trails
- VI = Balsam Poplar Hardwood and Mixedwood
- V5 = Aspen Hardwood

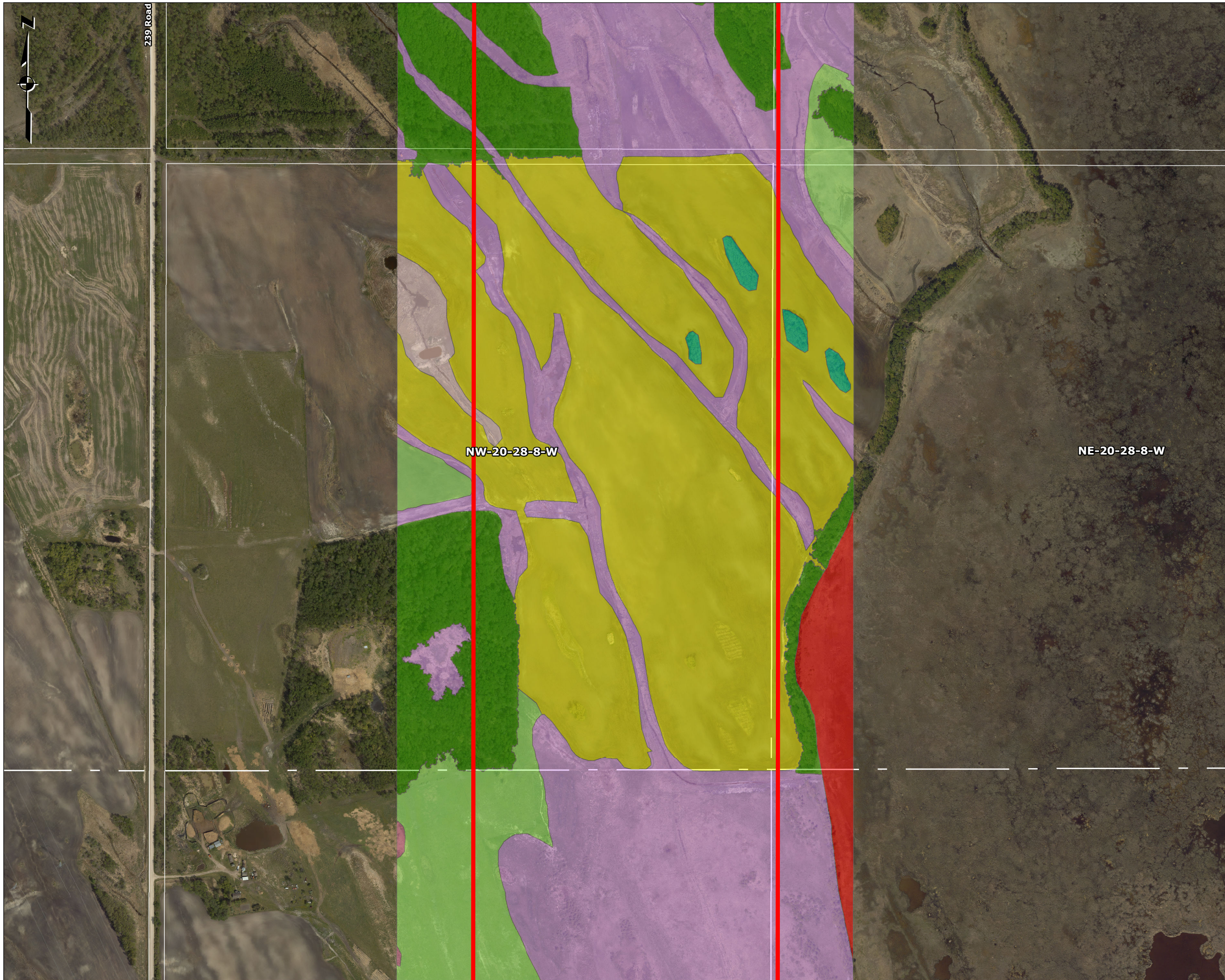


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada

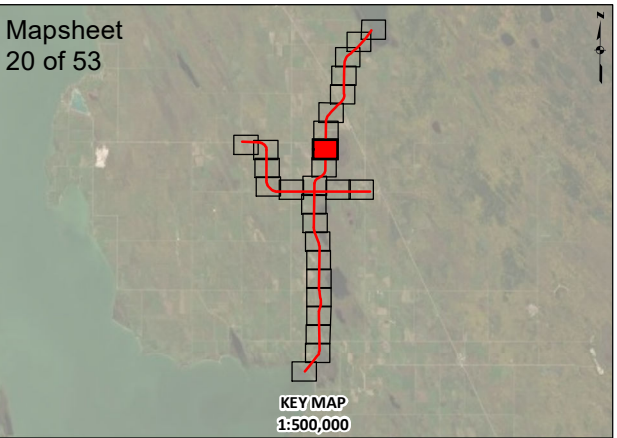


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- Legend**
- Project Development Area (PDA)
 - Quarter Section
- Classification**
- Agricultural Cropland
 - Basin Swamp
 - Class II Wetland
 - Class III Wetland
 - Class IV Wetland
 - Class V Wetland
 - Forage Crops
 - V5 = Aspen Hardwood



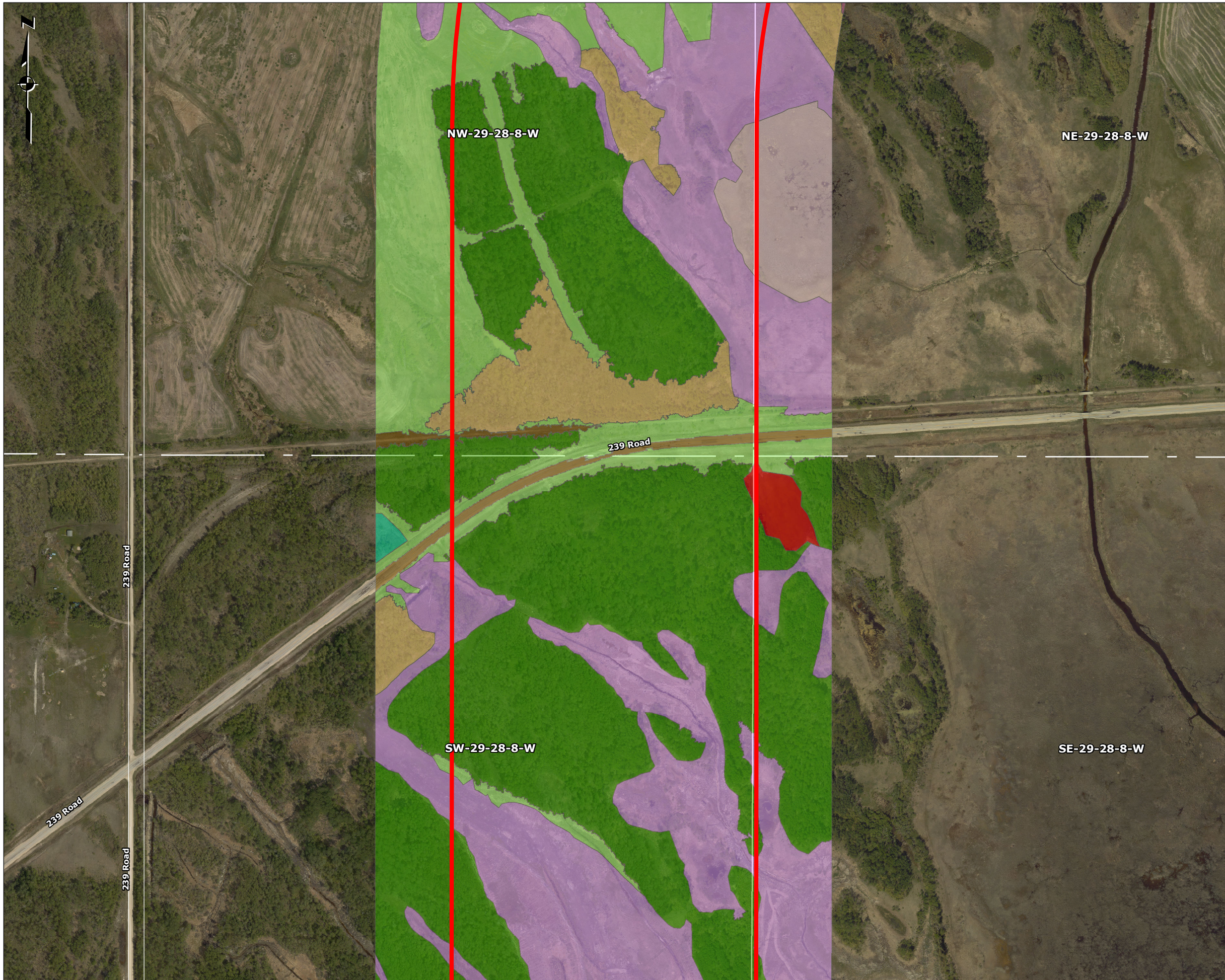
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Lake Manitoba & Lake St.Martin
Manitoba, Canada

Scale: 1:5,000
0 50 100 150 200 250 Meters
Universal Transverse Mercator (Zone 14)
North American Datum (1983)



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Legend

Project Development Area (PDA)

Quarter Section

Classification

Basin Swamp

Class II Wetland

Class III Wetland

Class IV Wetland

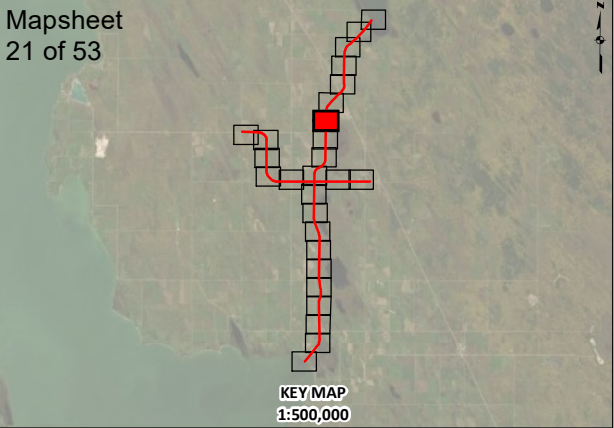
Class V Wetland

Forage Crops

Roads and Trails

VI = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood



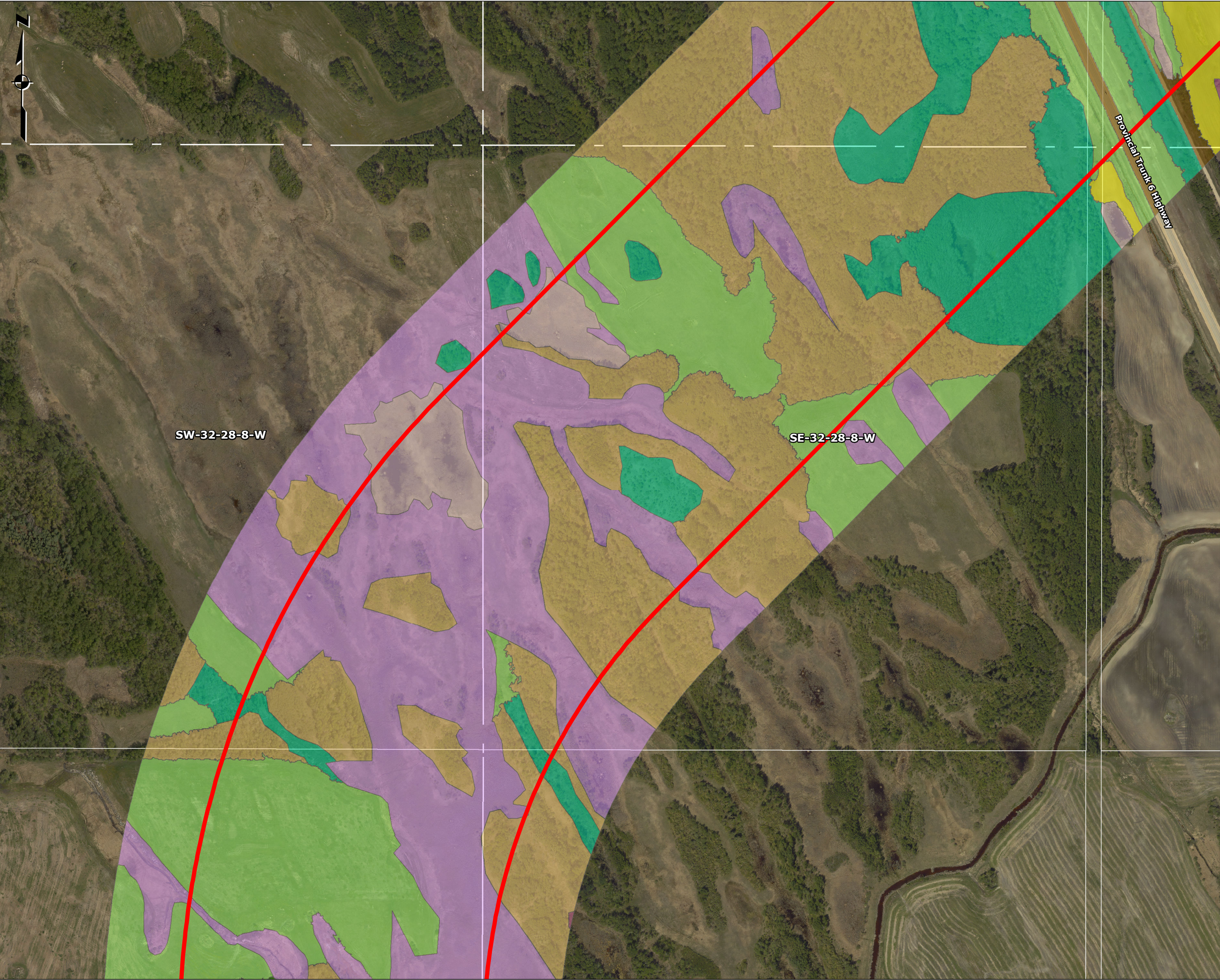
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Project Development Area (PDA)

Quarter Section

Classification

Agricultural Cropland

Basin Swamp

Class II Wetland

Class III Wetland

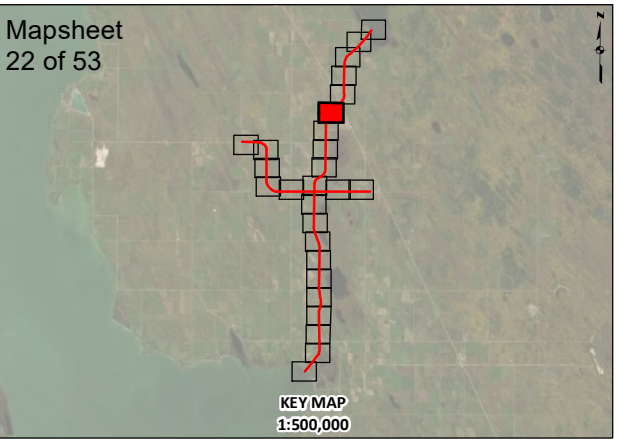
Class IV Wetland

Forage Crops

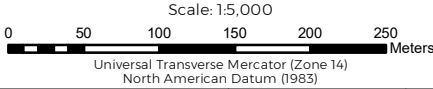
Roads and Trails

V1 = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood



**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



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Project Development Area (PDA)

Quarter Section

Classification

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Basin Swamp

Class II Wetland

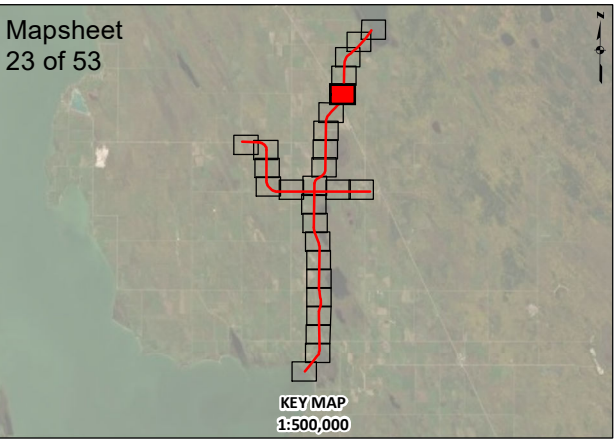
Class III Wetland

Class IV Wetland

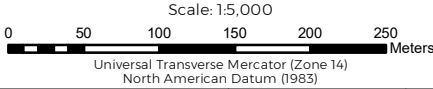
Forage Crops

Roads and Trails

VI = Balsam Poplar Hardwood and Mixedwood



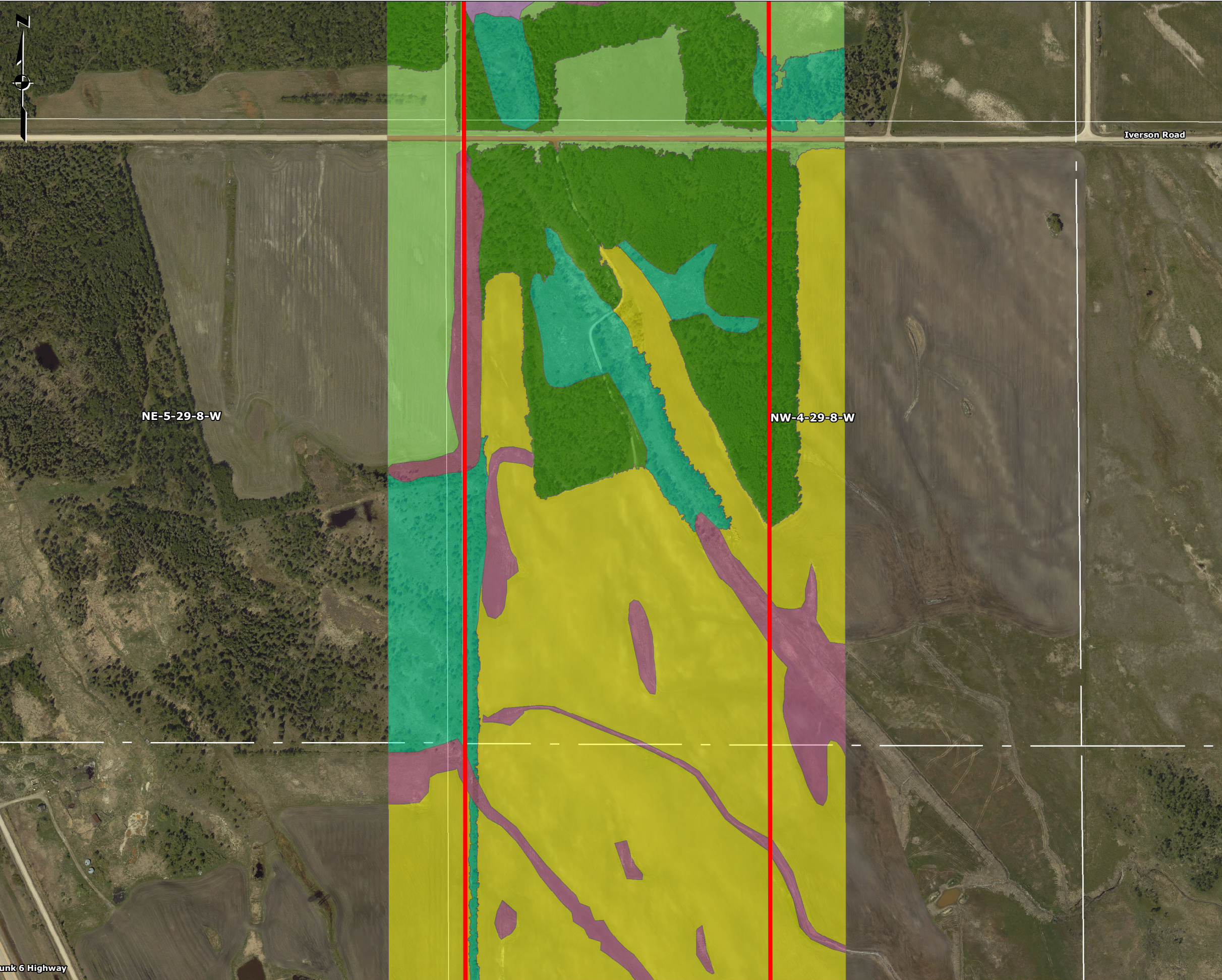
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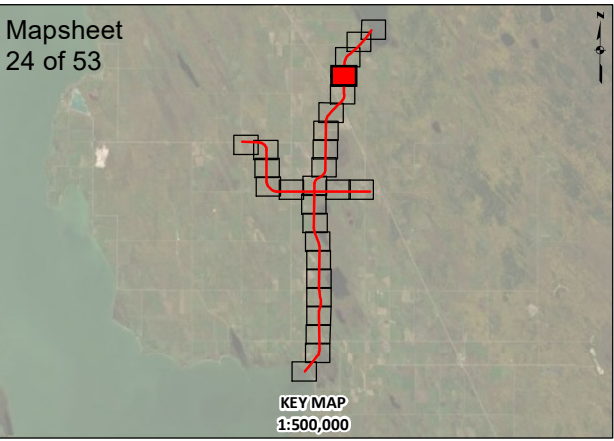
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Class III Wetland

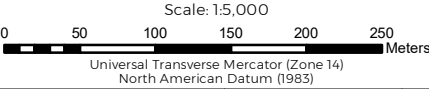
Forage Crops

Roads and Trails

V5 = Aspen Hardwood



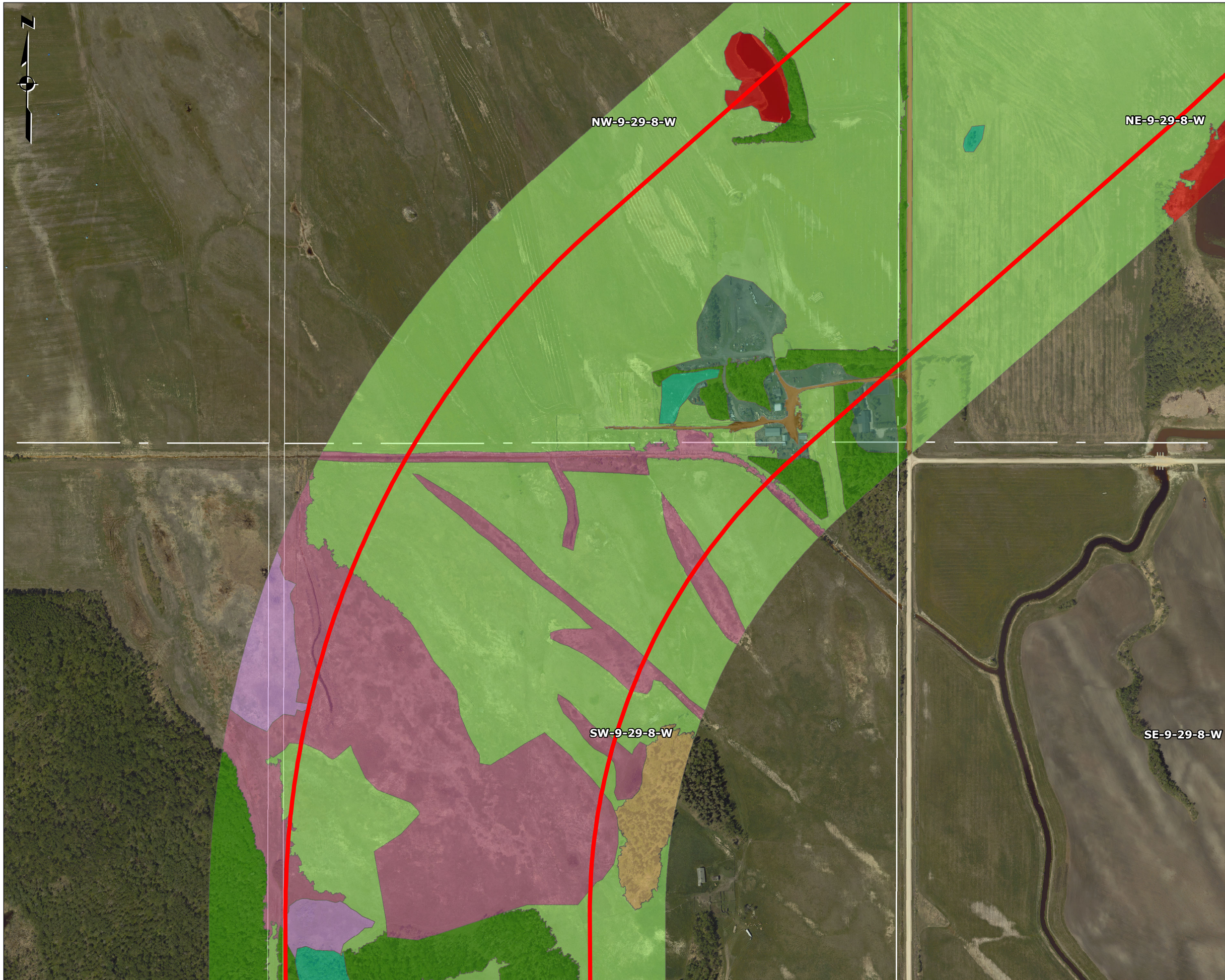
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Project Development Area (PDA)

Quarter Section

Classification

Basin Swamp

Class II Wetland

Class III Wetland

Class V Wetland

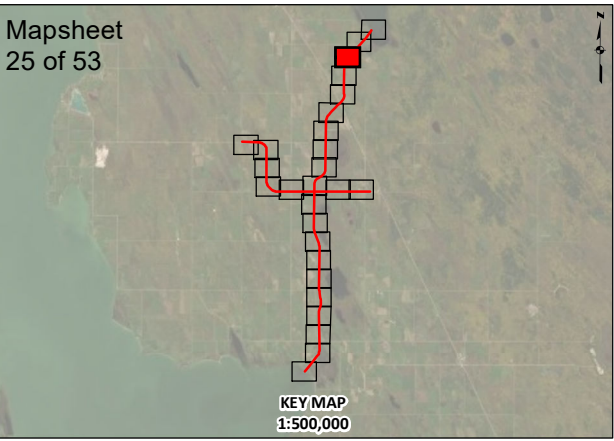
Cultural Features

Forage Crops

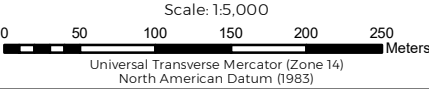
Roads and Trails

V1 = Balsam Poplar Hardwood and Mixedwood

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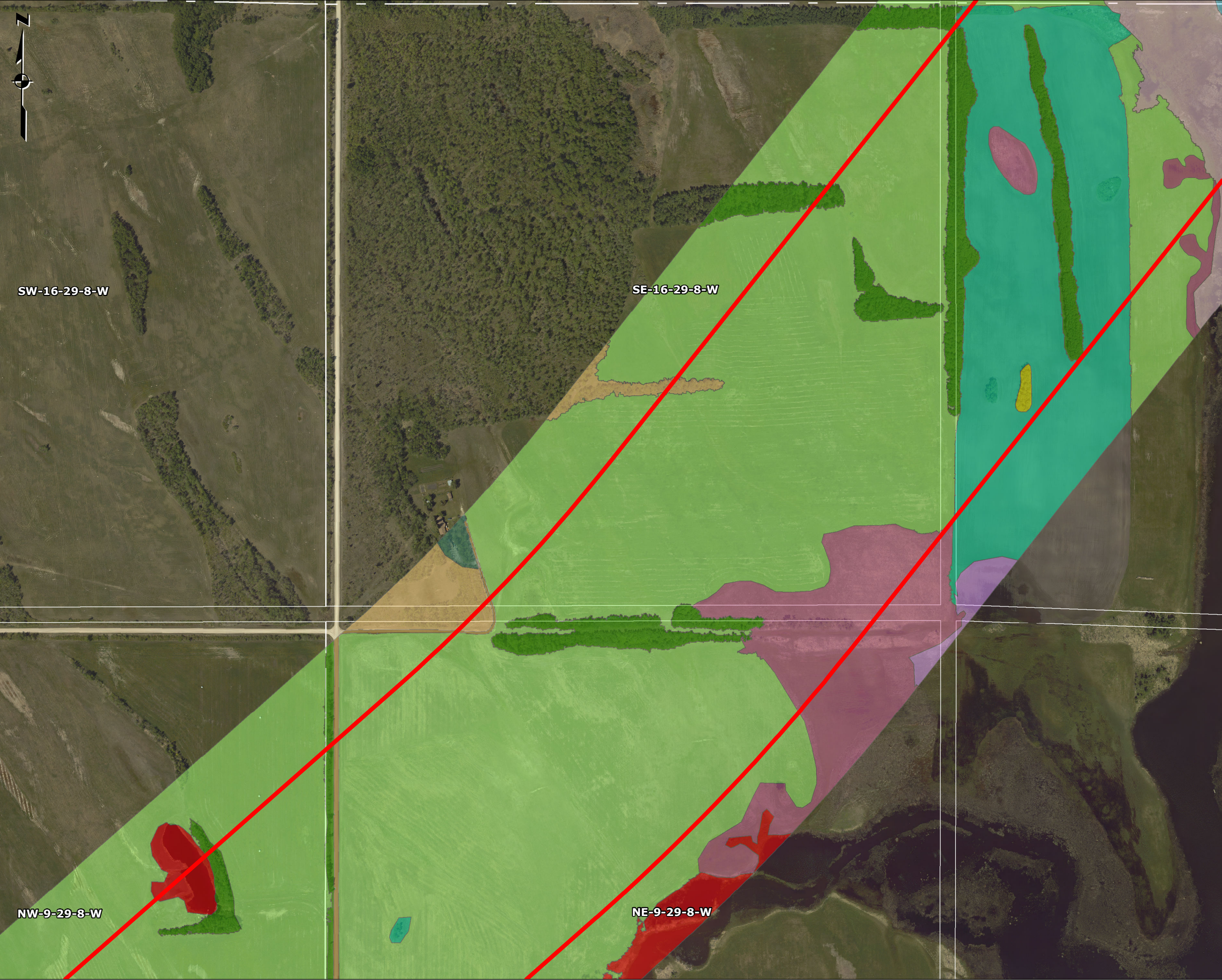
**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
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Project Development Area (PDA)

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Basin Swamp

Class II Wetland

Class III Wetland

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Class V Wetland

Cultural Features

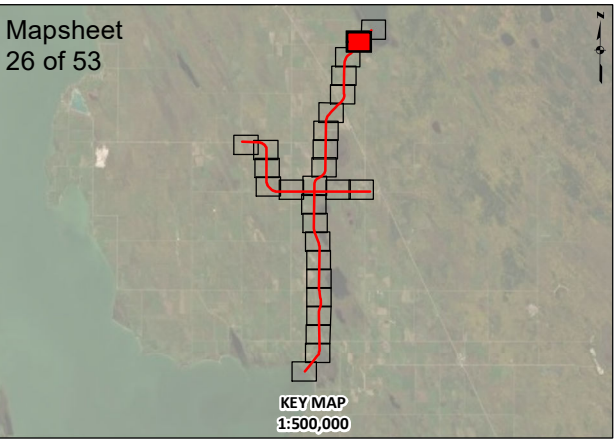
Forage Crops

Roads and Trails

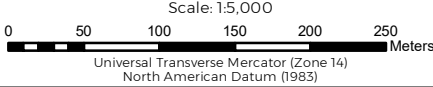
V1 = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood

Water Bodies



**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



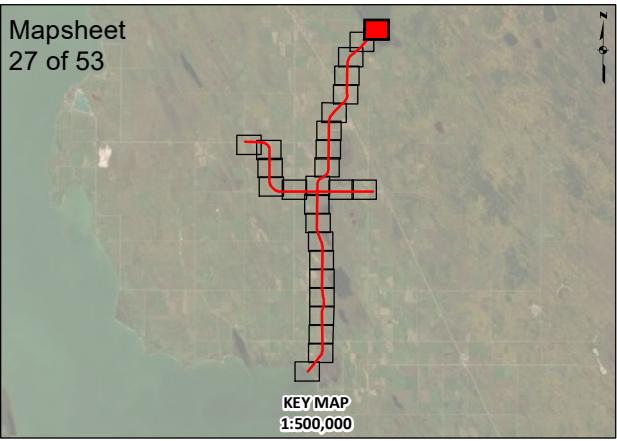
Legend

Project Development Area (PDA)

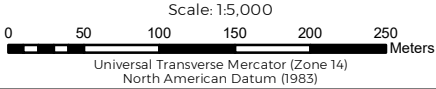
Quarter Section

Classification

- Agricultural Cropland
- Basin Swamp
- Class II Wetland
- Class IV Wetland
- Forage Crops
- V5 = Aspen Hardwood
- Water Bodies

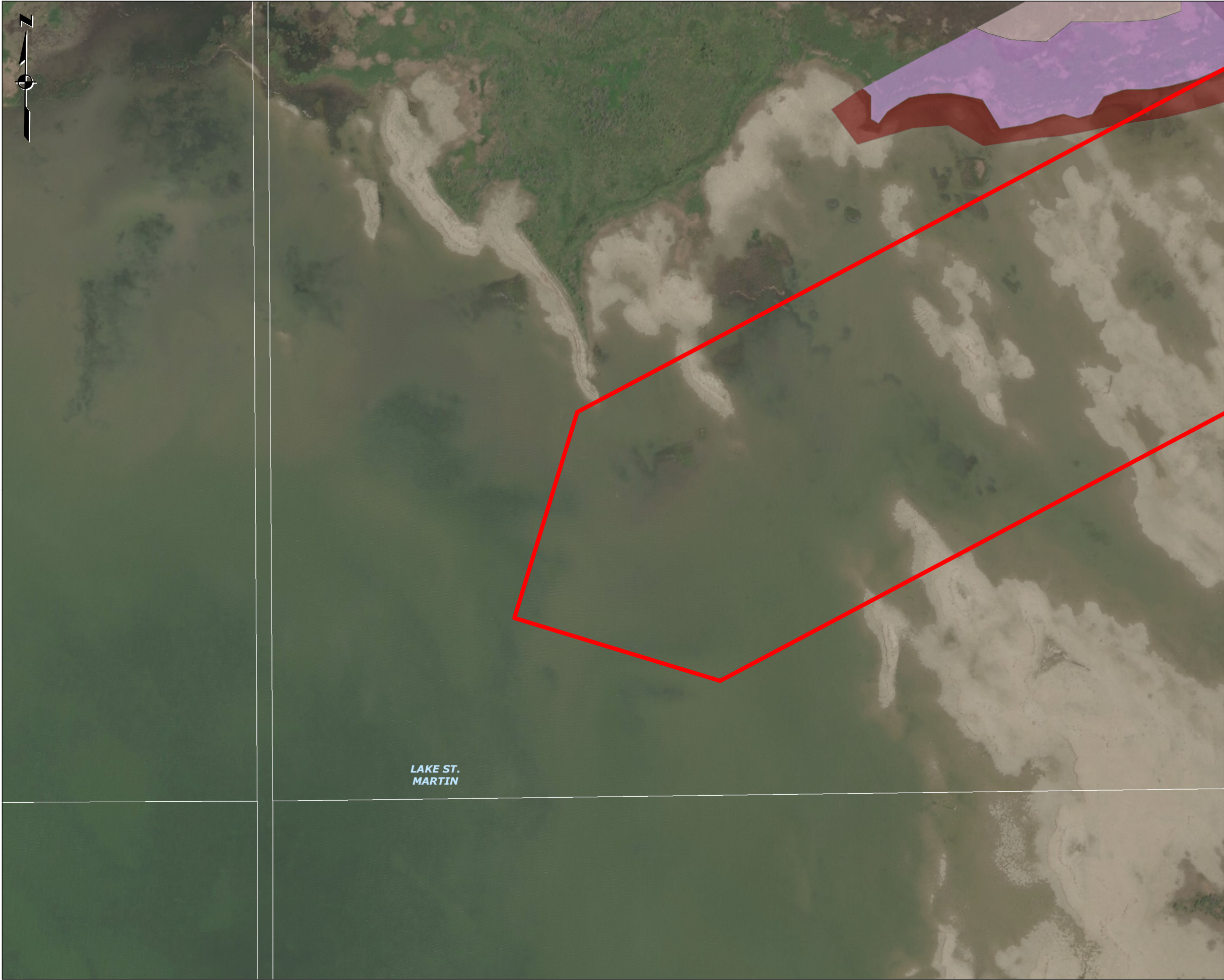


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
**Lake Manitoba & Lake St.Martin
Manitoba, Canada**



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
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Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

 Project Development Area (PDA)

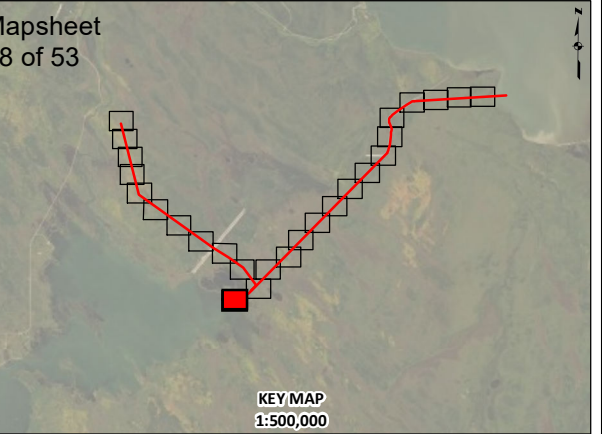
Classification

 Bare Rock, Gravel and Sand

 Class III_Wetland

 Class IV Wetland

Mapsheet
28 of 53



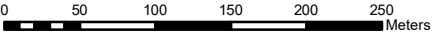
KEY MAP
1:500,000



**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**

Lake Manitoba & Lake St.Martin
Manitoba, Canada

Scale: 1:5,000



Universal Transverse Mercator (Zone 14)
North American Datum (1983)



Report By: LM
Drawn by: JH
Reviewed By: DK

WSP Job #: 20M-00910-00
Date: September 10, 2020
Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitiba Infrastructure

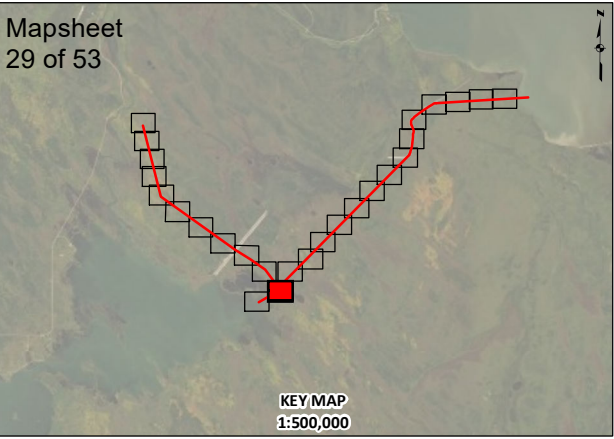


Legend

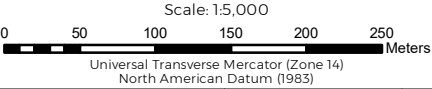
Project Development Area (PDA)

Classification

- Bare Rock, Gravel and Sand
- Class III_Wetland
- Horizontal Fen
- Lacustrine Swamp
- Riverine Swamp
- Roads and Trails
- Stream Fen
- Unconfined Flat Swamp
- V5 = Aspen Hardwood

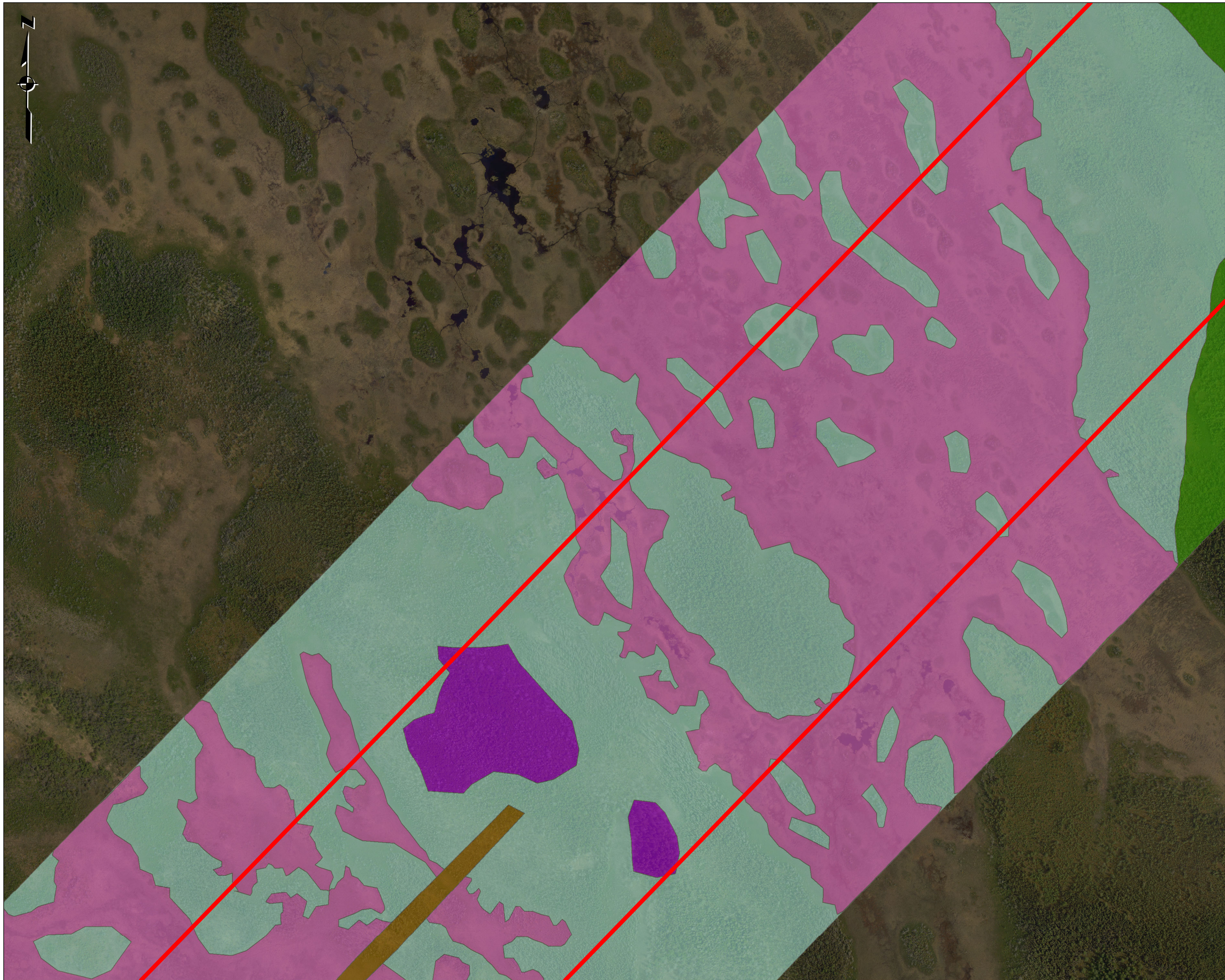


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada

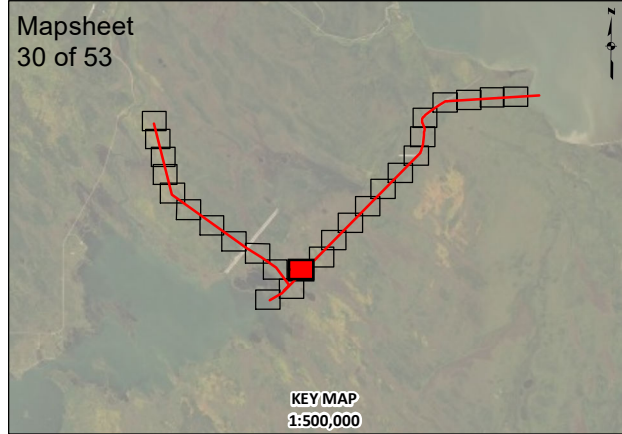


Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

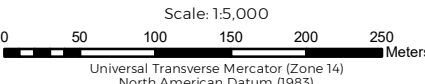
Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure

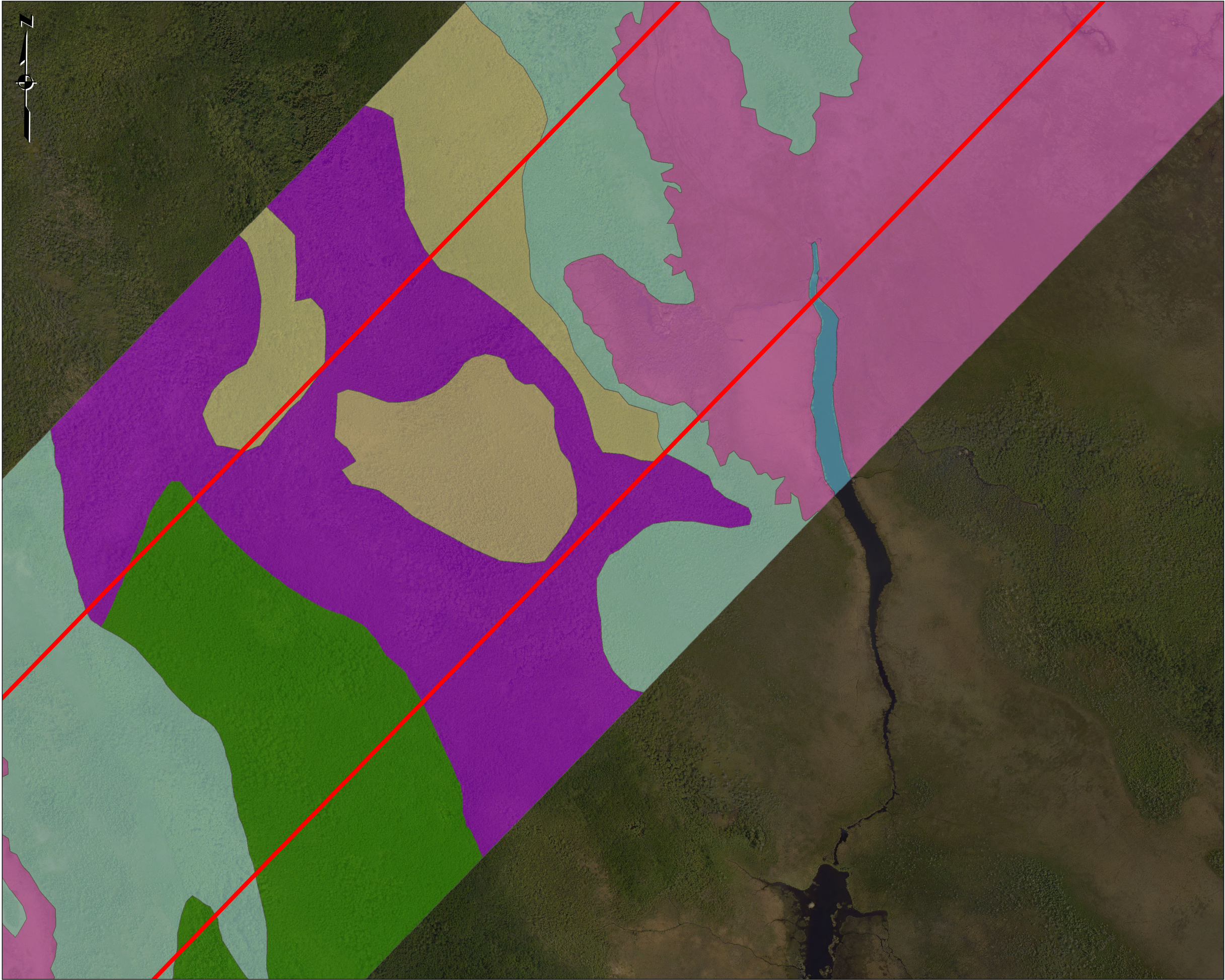


- Legend**
- Project Development Area (PDA)
- Classification**
- Horizontal Fen
 - Roads and Trails
 - Stream Fen
 - Unconfined Flat Swamp
 - V5 = Aspen Hardwood



**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



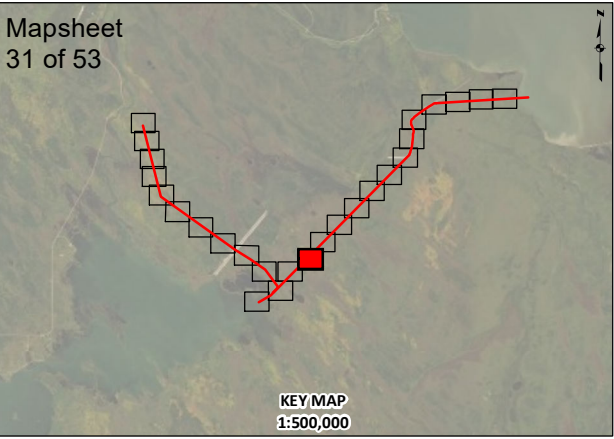


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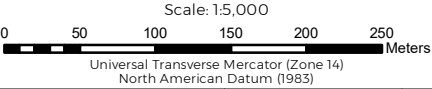
Project Development Area (PDA)

Classification

- Basin Bog
- Horizontal Fen
- Stream Fen
- Unconfined Flat Swamp
- V1 = Balsam Poplar Hardwood and Mixedwood
- V5 = Aspen Hardwood
- Water Bodies

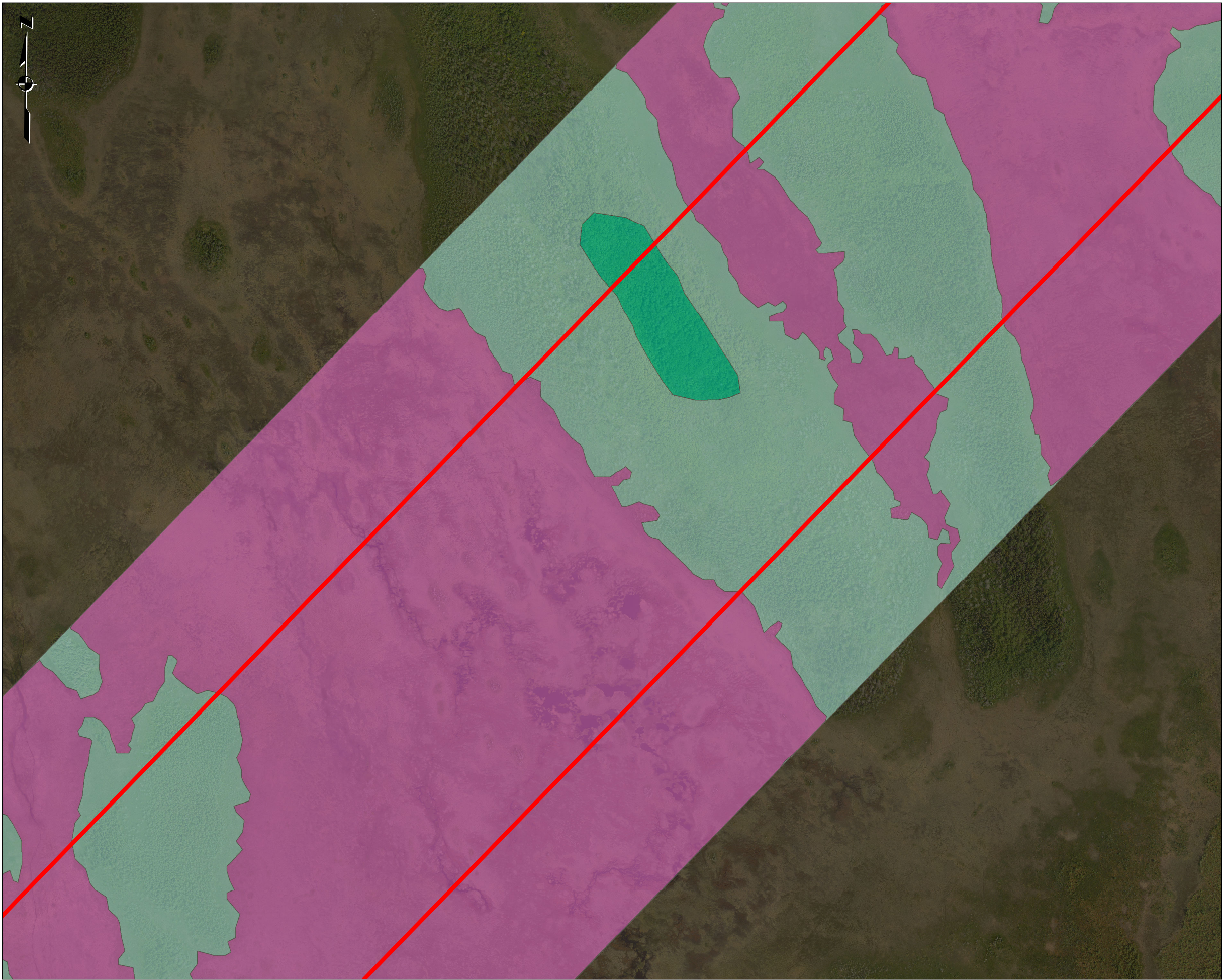


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
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Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

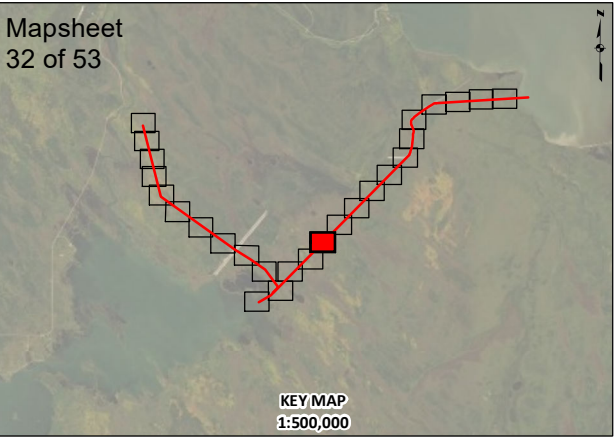
 Project Development Area (PDA)

Classification

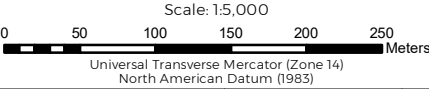
 Horizontal Fen

 Lagg Swamp

 Stream Fen

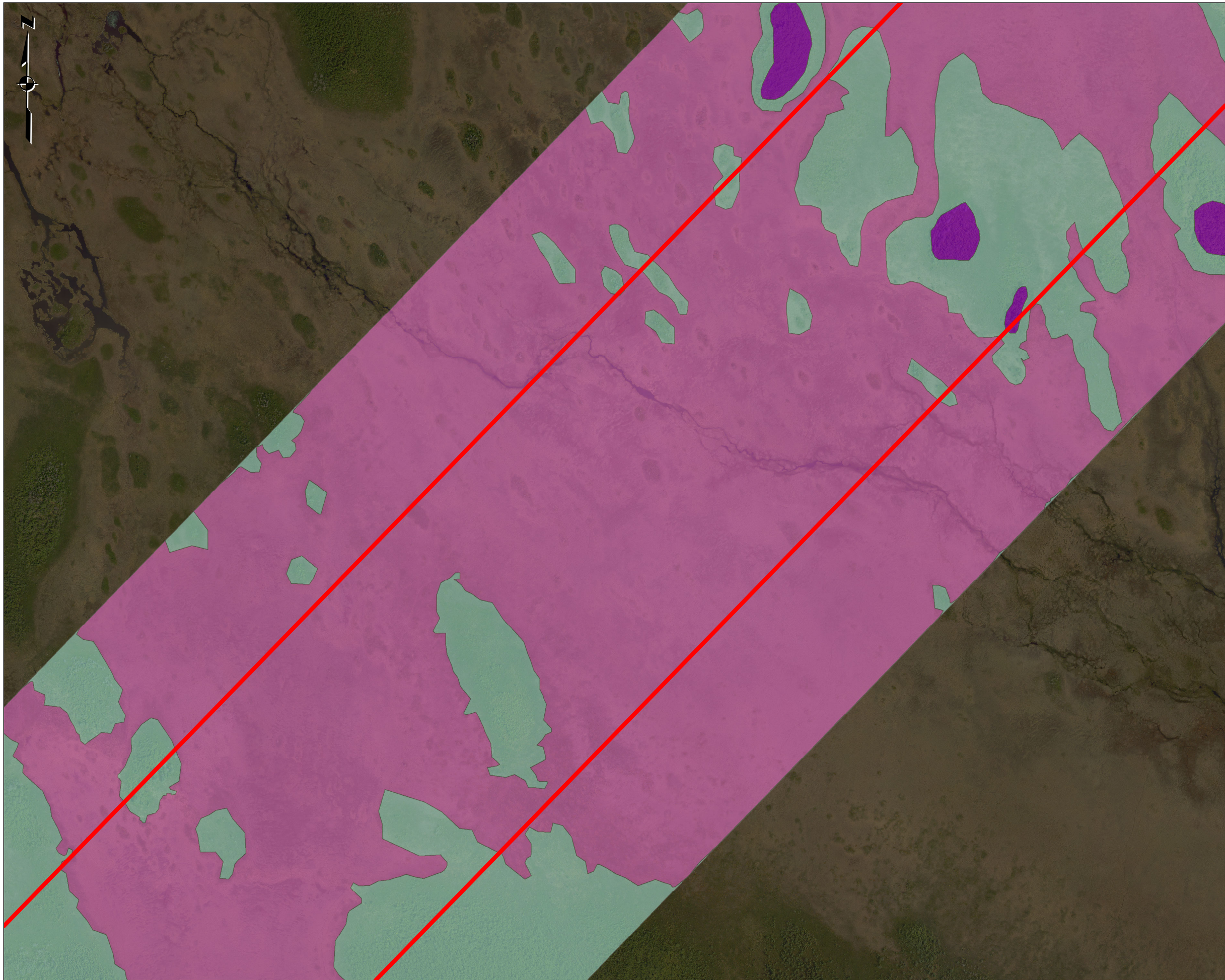


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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Legend

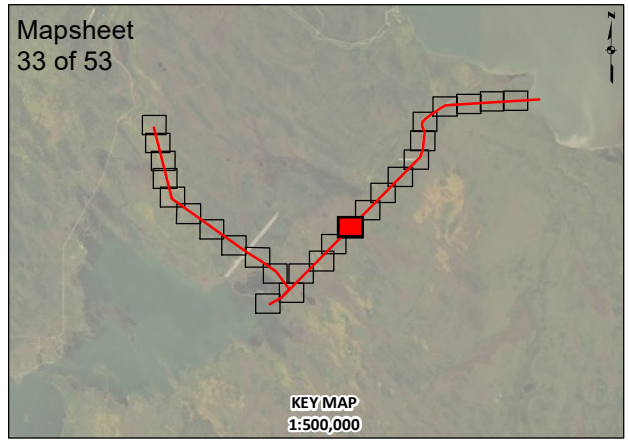
Project Development Area (PDA)

Classification

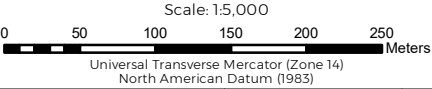
Horizontal Fen

Stream Fen

Unconfined Flat Swamp

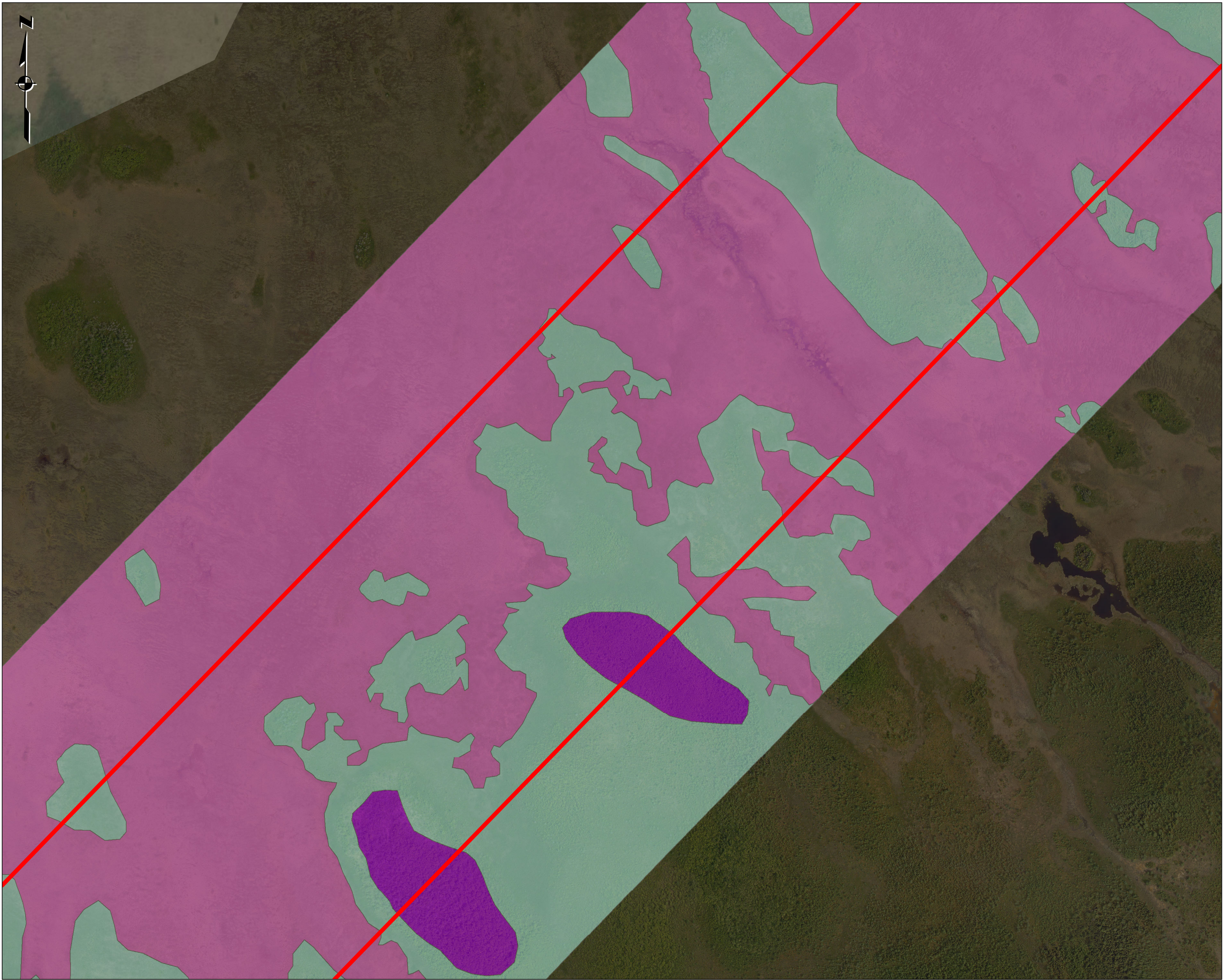


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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Legend

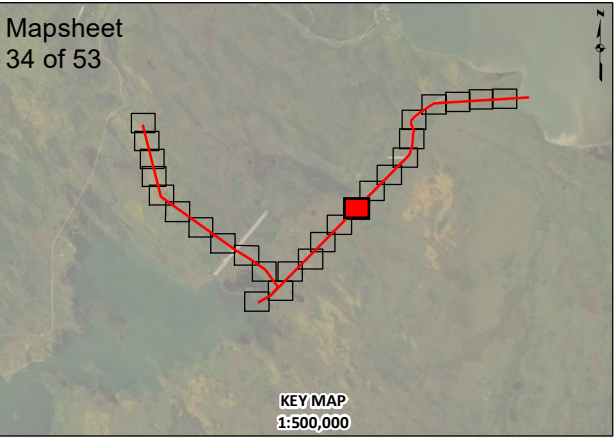
 Project Development Area (PDA)

Classification

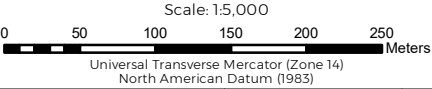
 Horizontal Fen

 Stream Fen

 Unconfined Flat Swamp

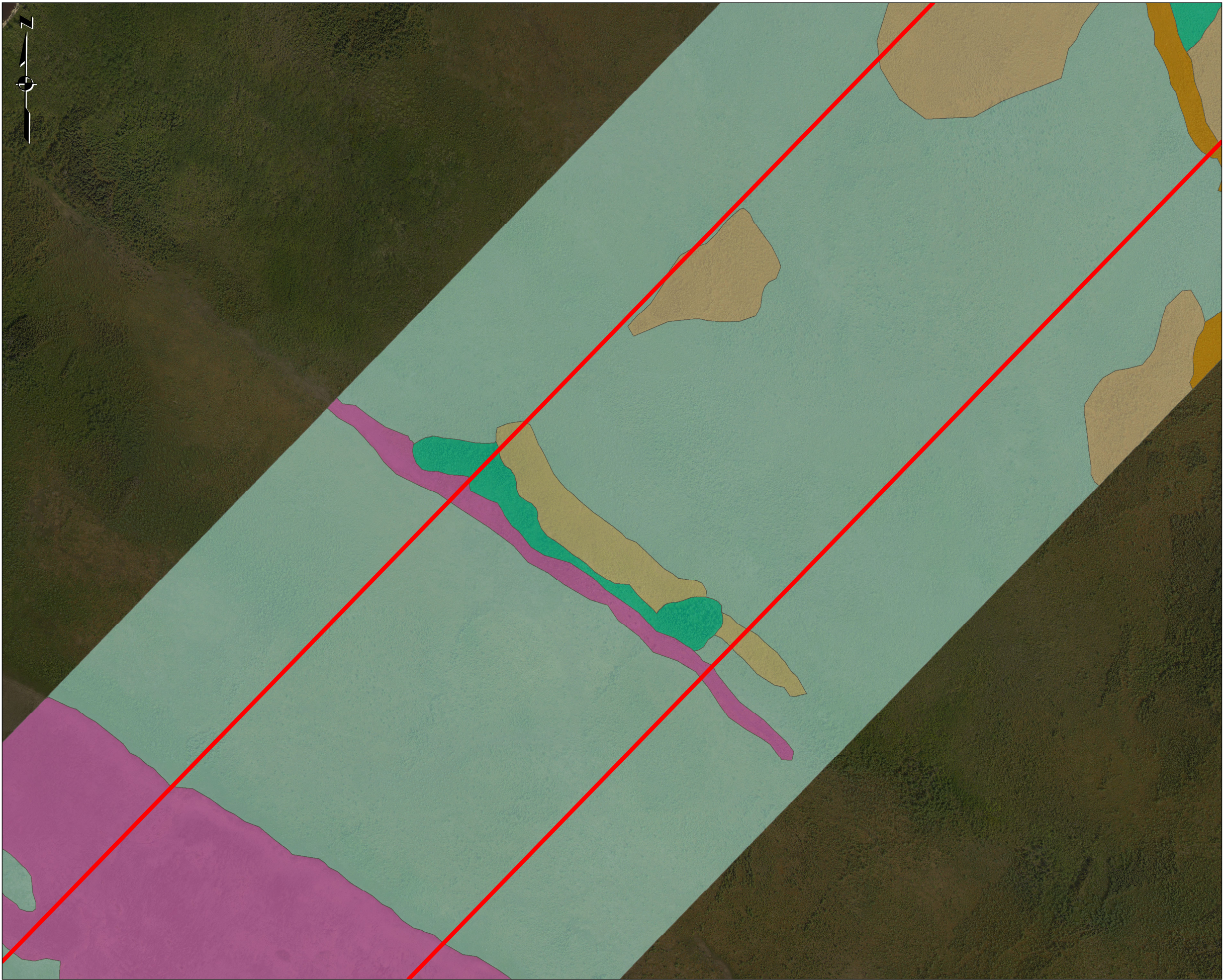


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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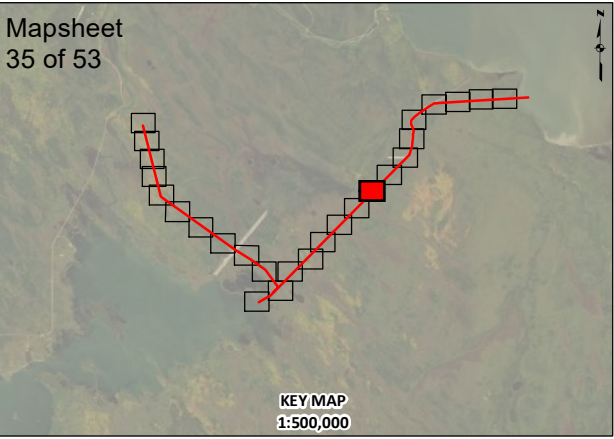


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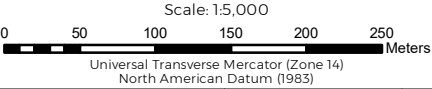
Project Development Area (PDA)

Classification

- Basin Bog
- Basin Fen
- Horizontal Fen
- Lagg Swamp
- Stream Fen
- VI = Balsam Poplar Hardwood and Mixedwood



**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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Legend

Project Development Area (PDA)

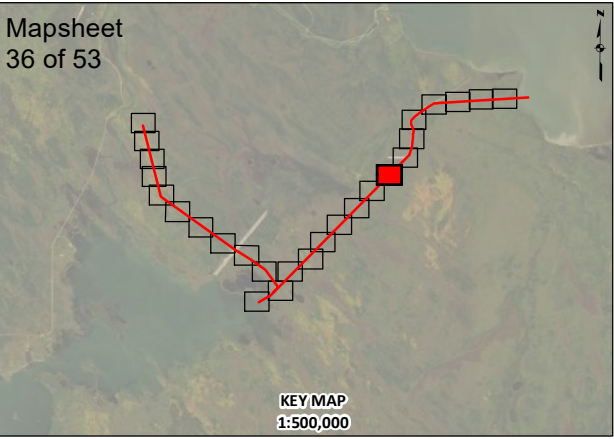
Classification

Basin Bog

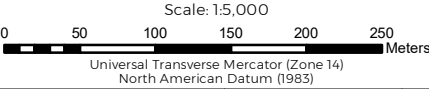
Basin Fen

Horizontal Fen

Lagg Swamp

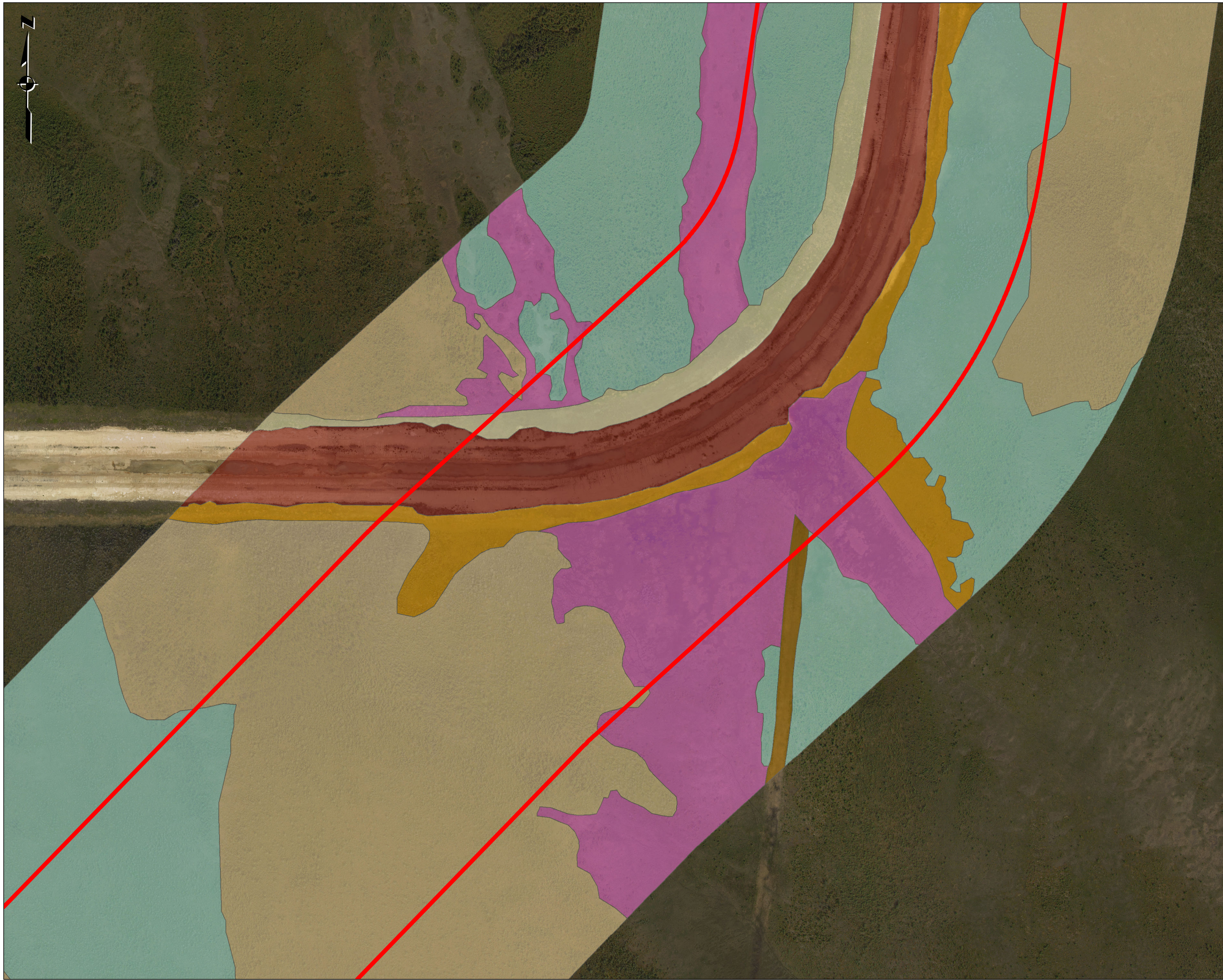


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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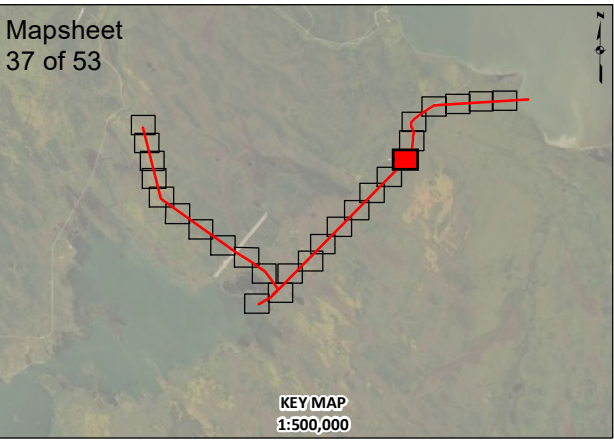


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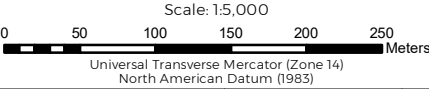
Project Development Area (PDA)

Classification

- Bare Rock, Gravel and Sand
- Basin Bog
- Basin Fen
- Forest Cutovers
- Horizontal Fen
- Roads and Trails
- Stream Fen

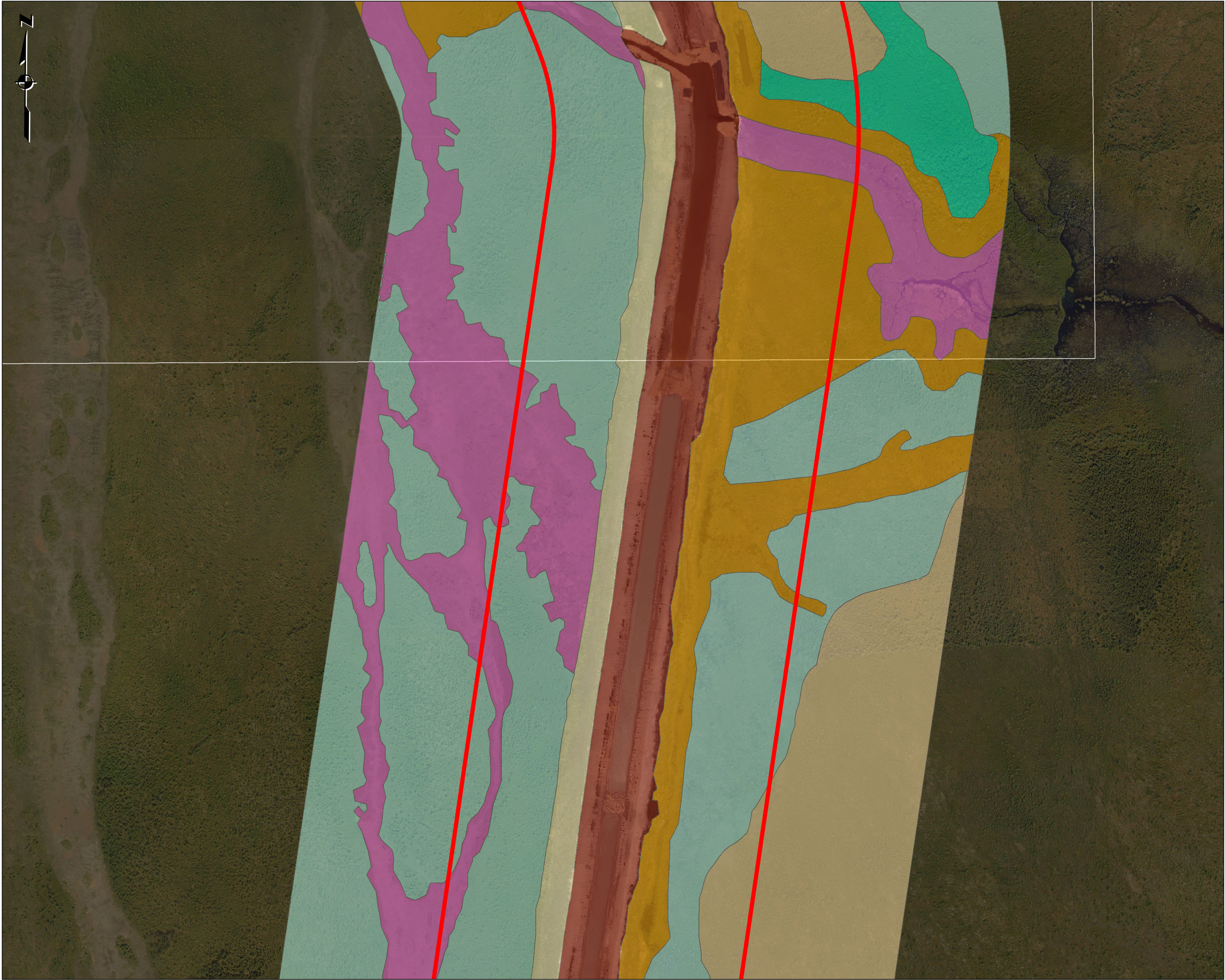


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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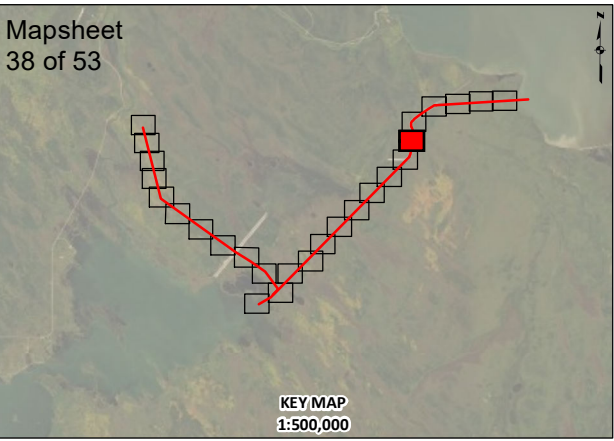


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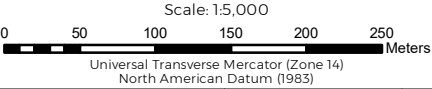
Project Development Area (PDA)

Classification

- Bare Rock, Gravel and Sand
- Basin Bog
- Basin Fen
- Forest Cutovers
- Horizontal Fen
- Lagg Swamp
- Stream Fen

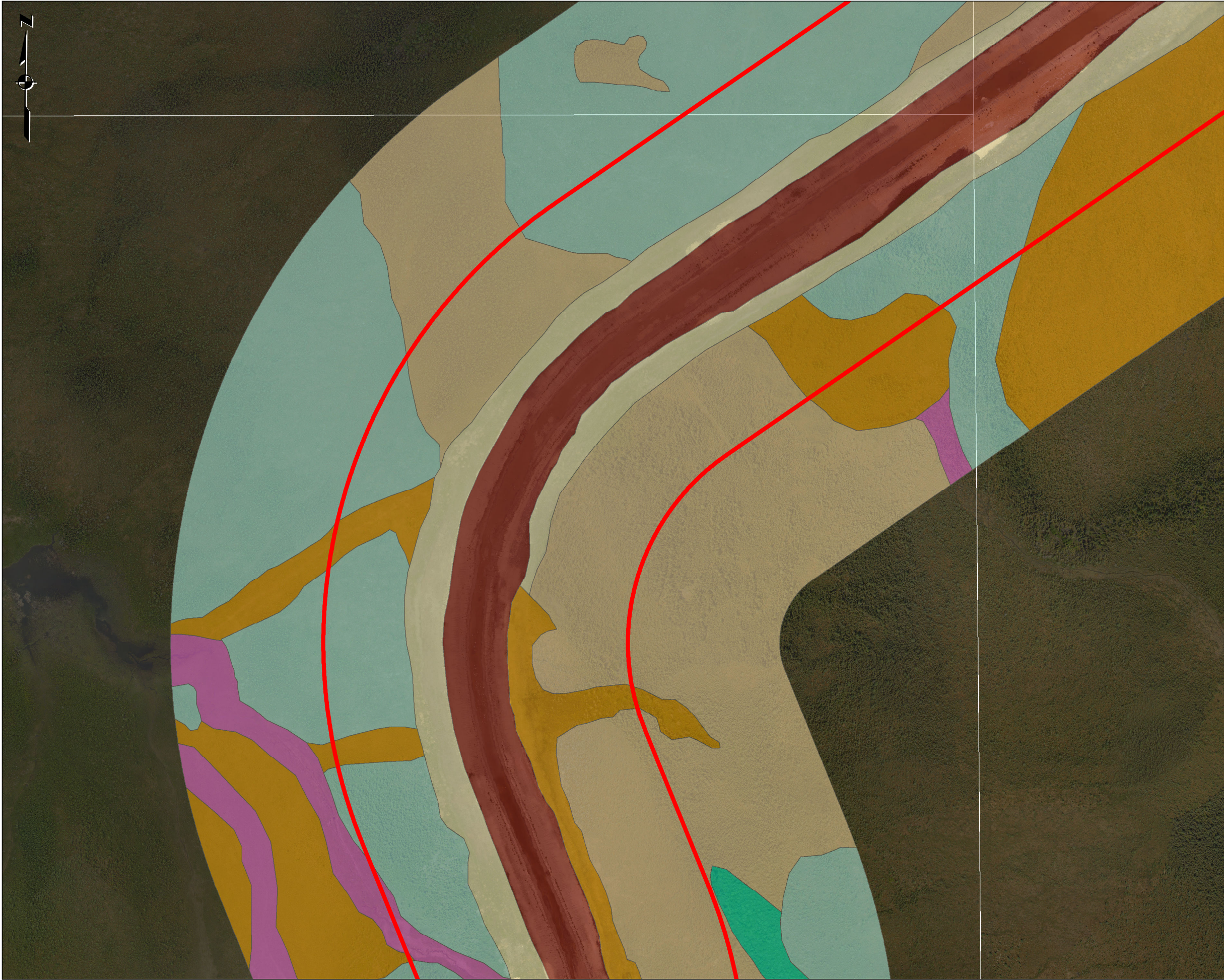


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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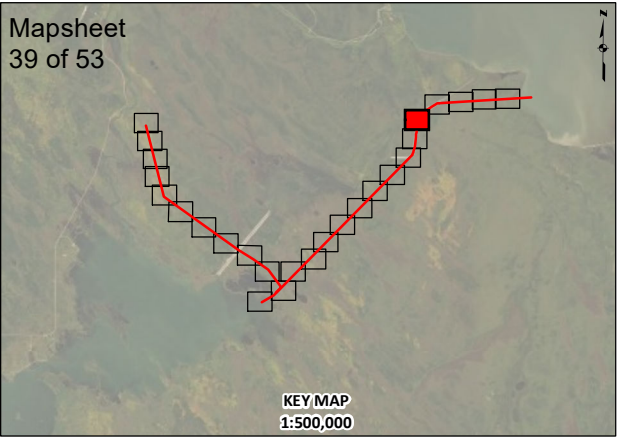


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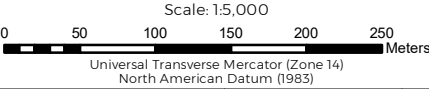
Project Development Area (PDA)

Classification

- Bare Rock, Gravel and Sand
- Basin Bog
- Basin Fen
- Forest Cutovers
- Horizontal Fen
- Lagg Swamp
- Stream Fen

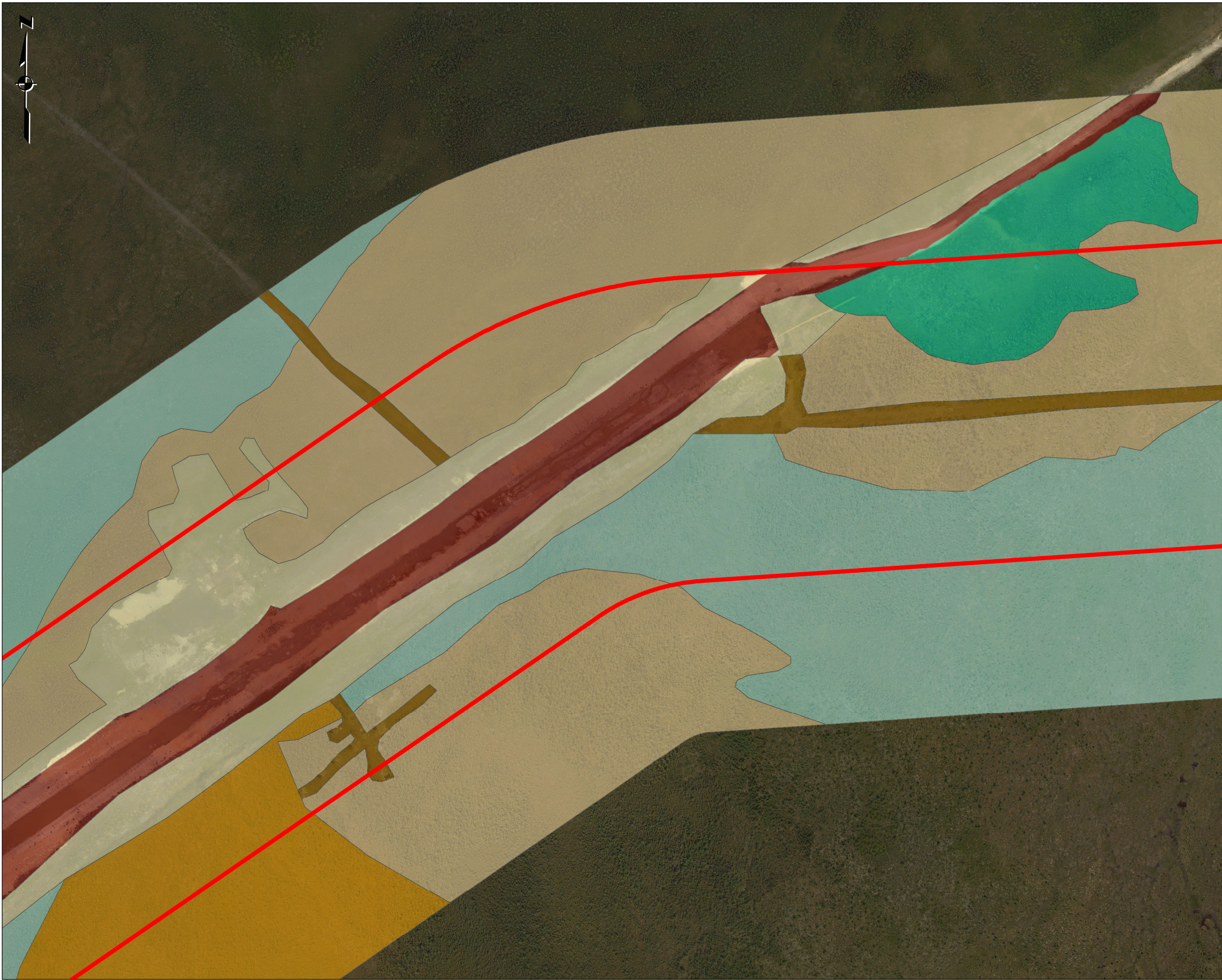


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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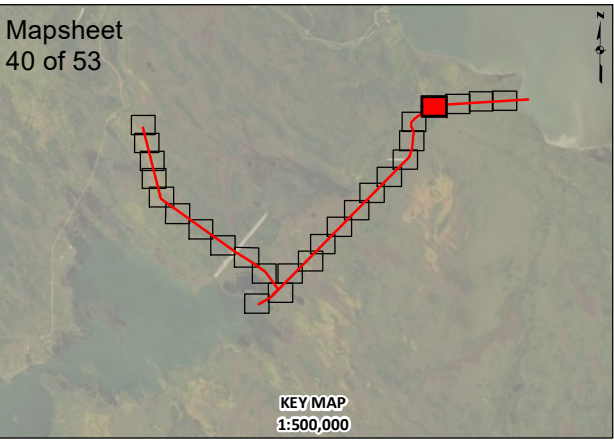


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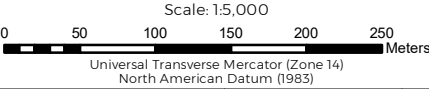
 Project Development Area (PDA)

Classification

-  Bare Rock, Gravel and Sand
-  Basin Bog
-  Basin Fen
-  Basin Swamp
-  Forest Cutovers
-  Horizontal Fen
-  Roads and Trails

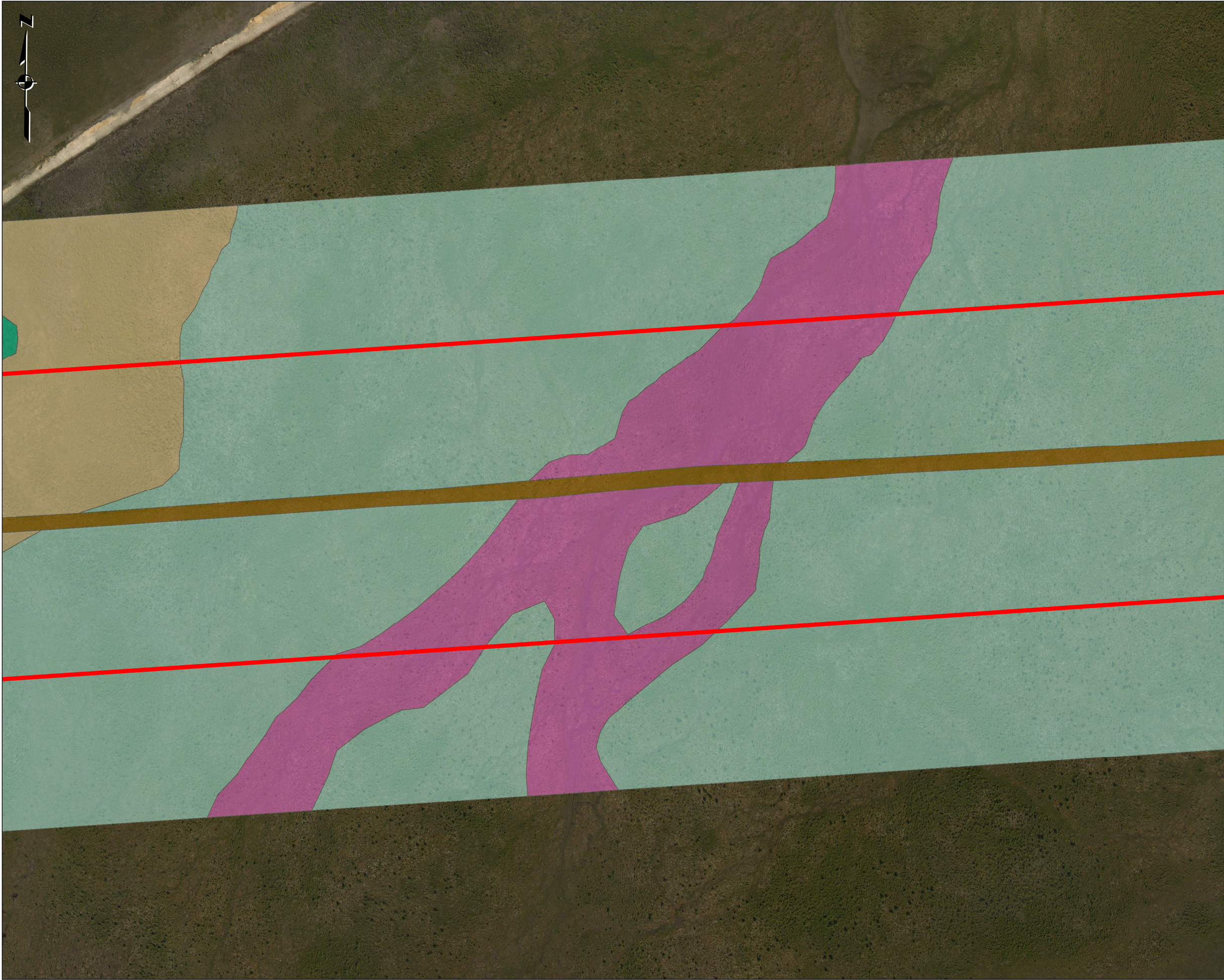


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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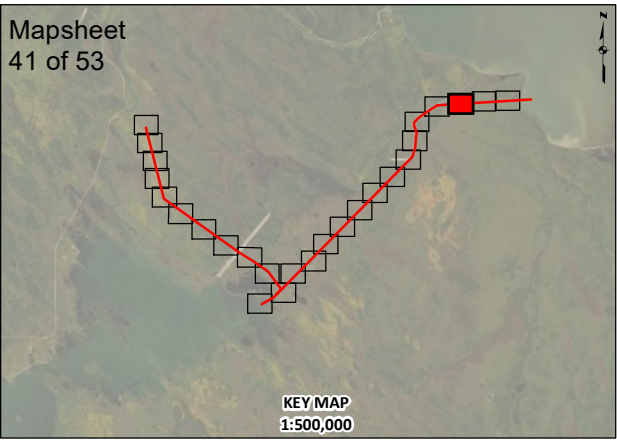


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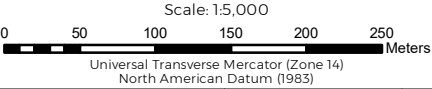
Project Development Area (PDA)

Classification

- Basin Bog
- Basin Swamp
- Horizontal Fen
- Roads and Trails
- Stream Fen



**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
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Legend

 Project Development Area (PDA)

Classification

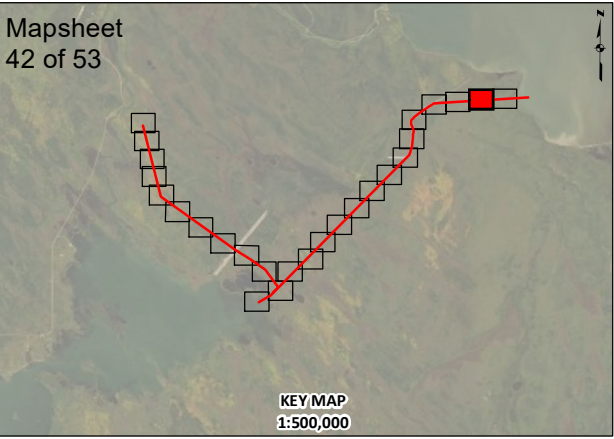
 Basin Fen

 Horizontal Fen

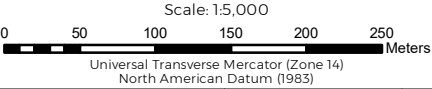
 Lagg Swamp

 Roads and Trails

 Stream Fen

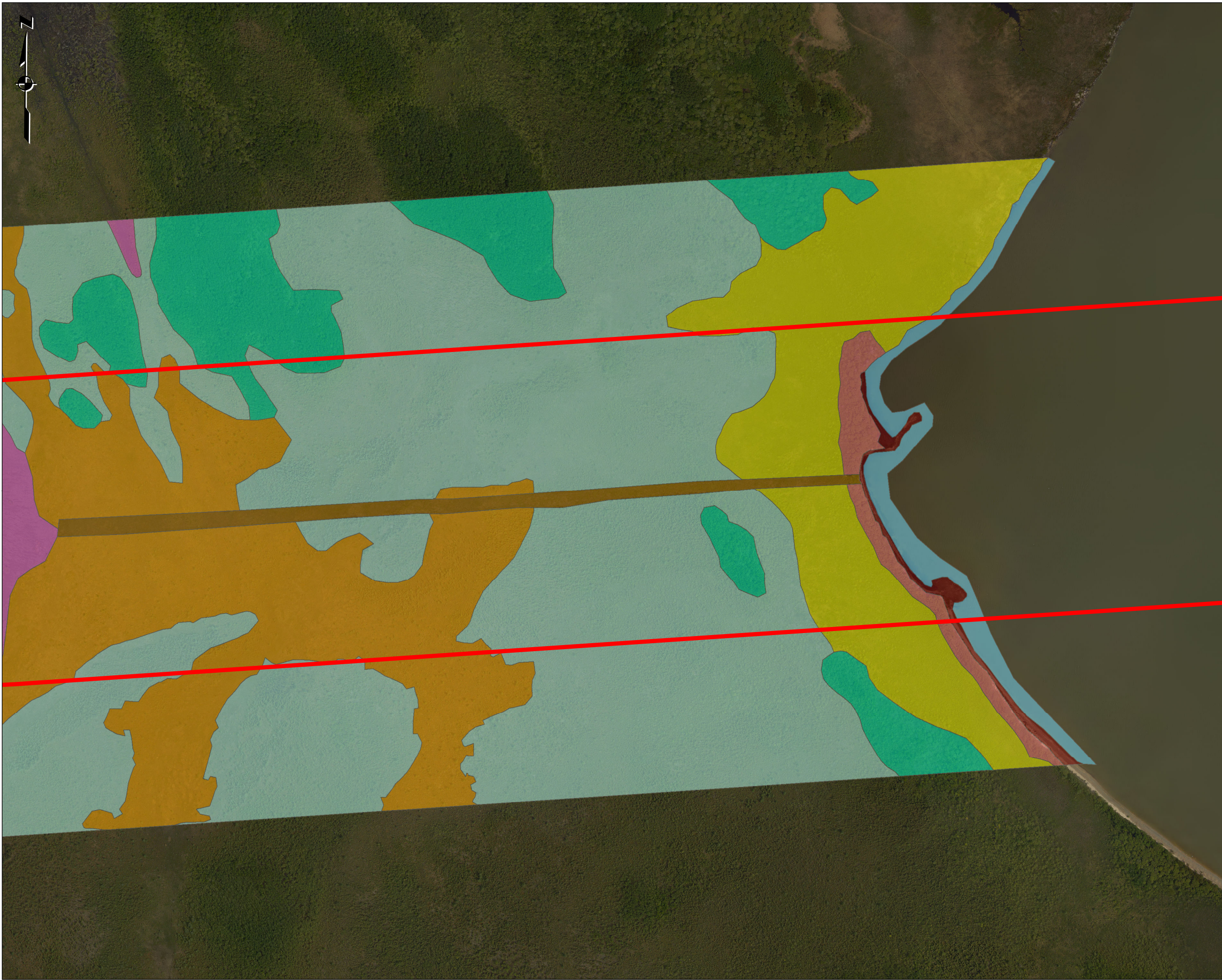


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
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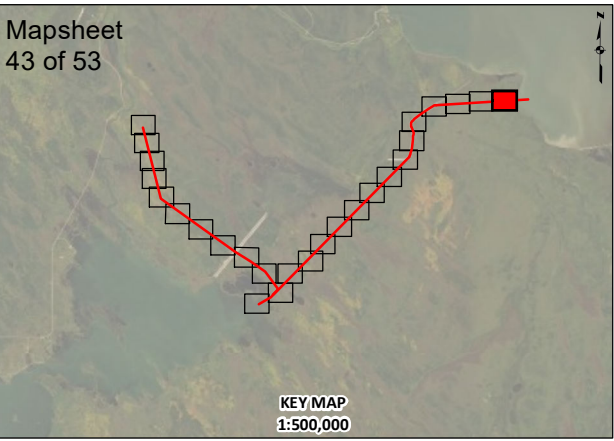


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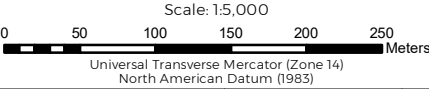
Project Development Area (PDA)

Classification

- Bare Rock, Gravel and Sand
- Basin Fen
- Horizontal Fen
- Lacustrine Swamp
- Lagg Swamp
- Roads and Trails
- Shore Fen
- Stream Fen
- Water Bodies

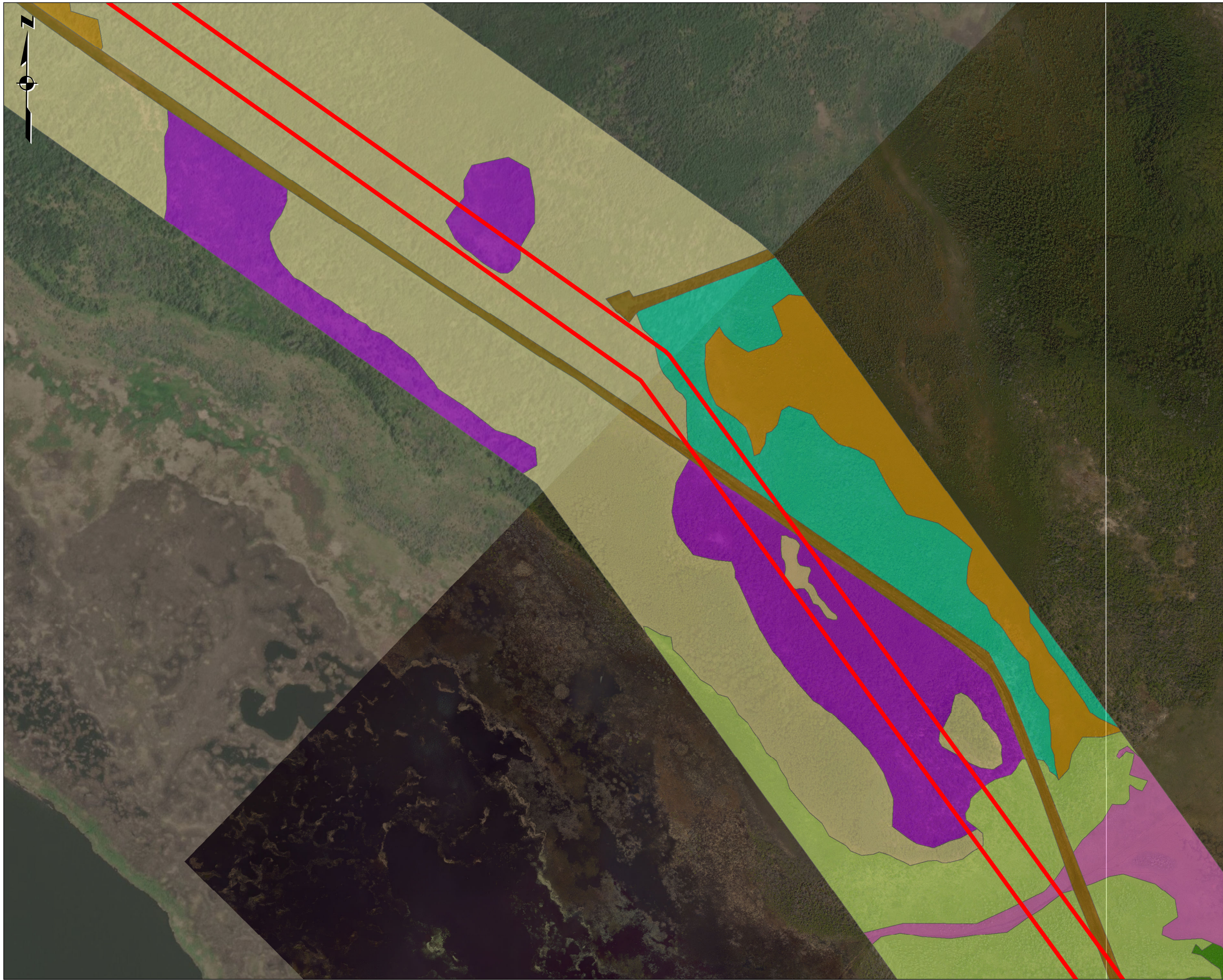


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas
Lake Manitoba & Lake St.Martin
Manitoba, Canada**



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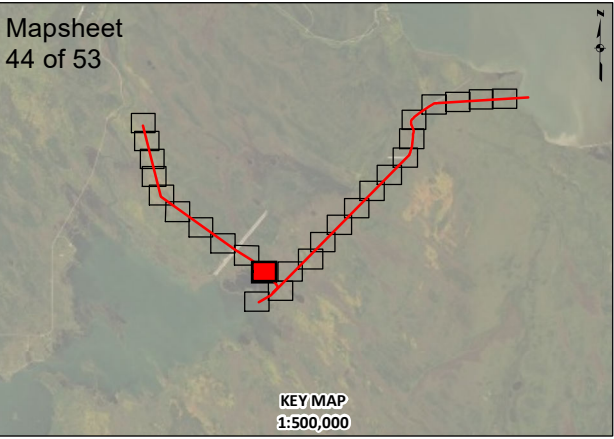


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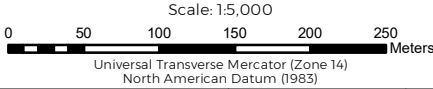
Project Development Area (PDA)

Classification

- Basin Bog
- Basin Fen
- Lagg Swamp
- Riverine Swamp
- Roads and Trails
- Stream Fen
- Unconfined Flat Swamp
- VI = Balsam Poplar Hardwood and Mixedwood
- V5 = Aspen Hardwood

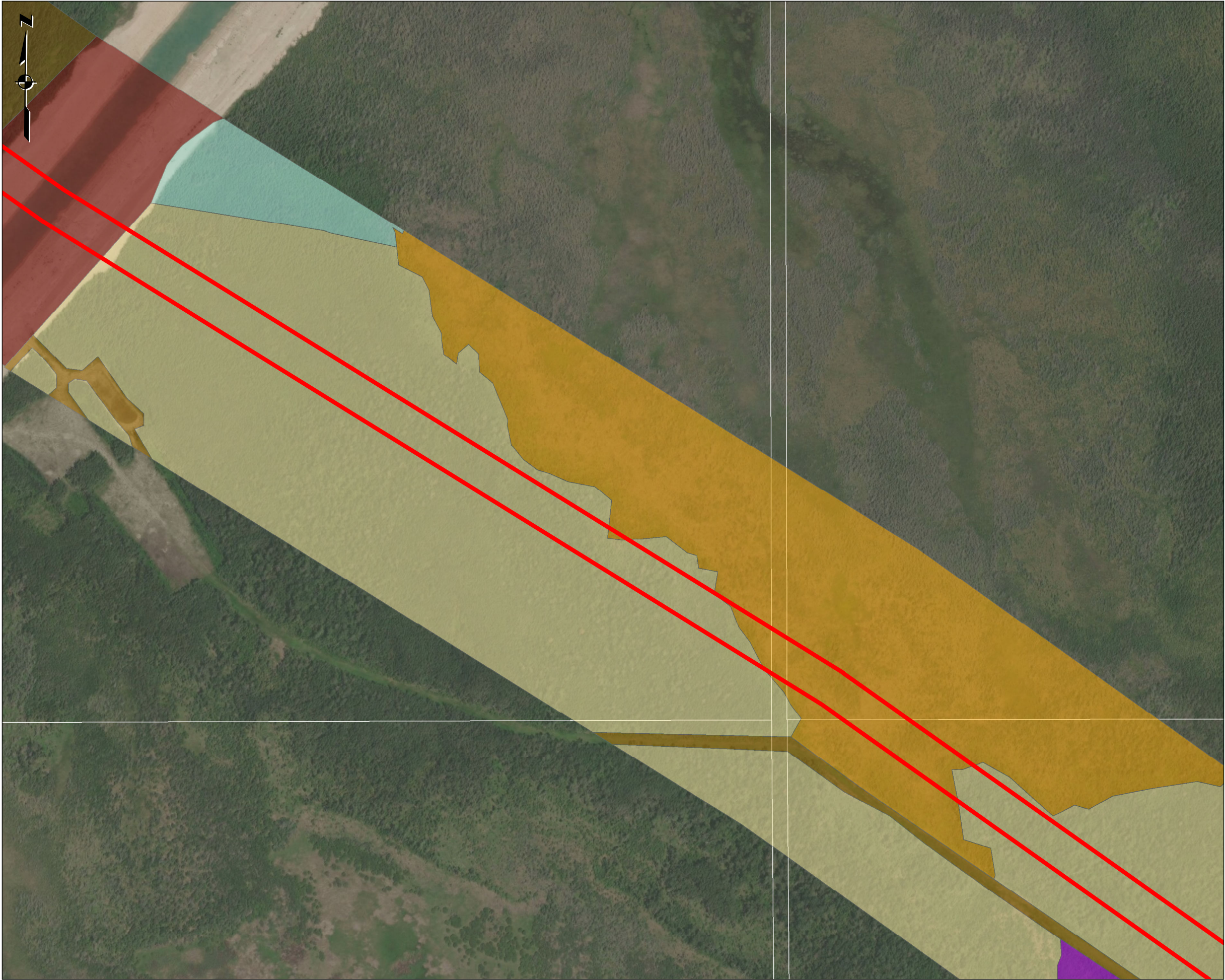


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



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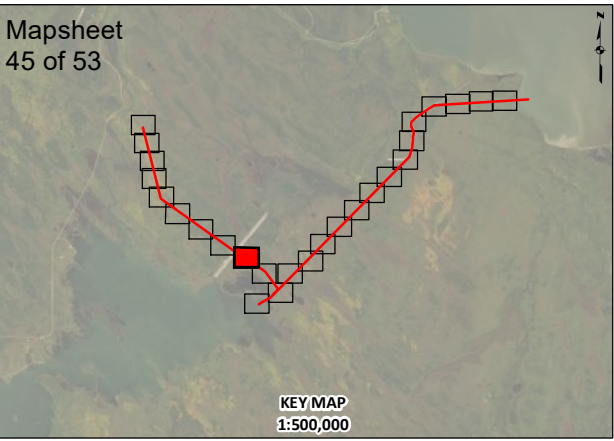


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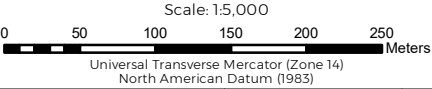
Project Development Area (PDA)

Classification

- Bare Rock, Gravel and Sand
- Basin Fen
- Horizontal Fen
- Roads and Trails
- Unconfined Flat Swamp
- VI = Balsam Poplar Hardwood and Mixedwood
- V28 = Jack Pine-Black Spruce/Feather Moss

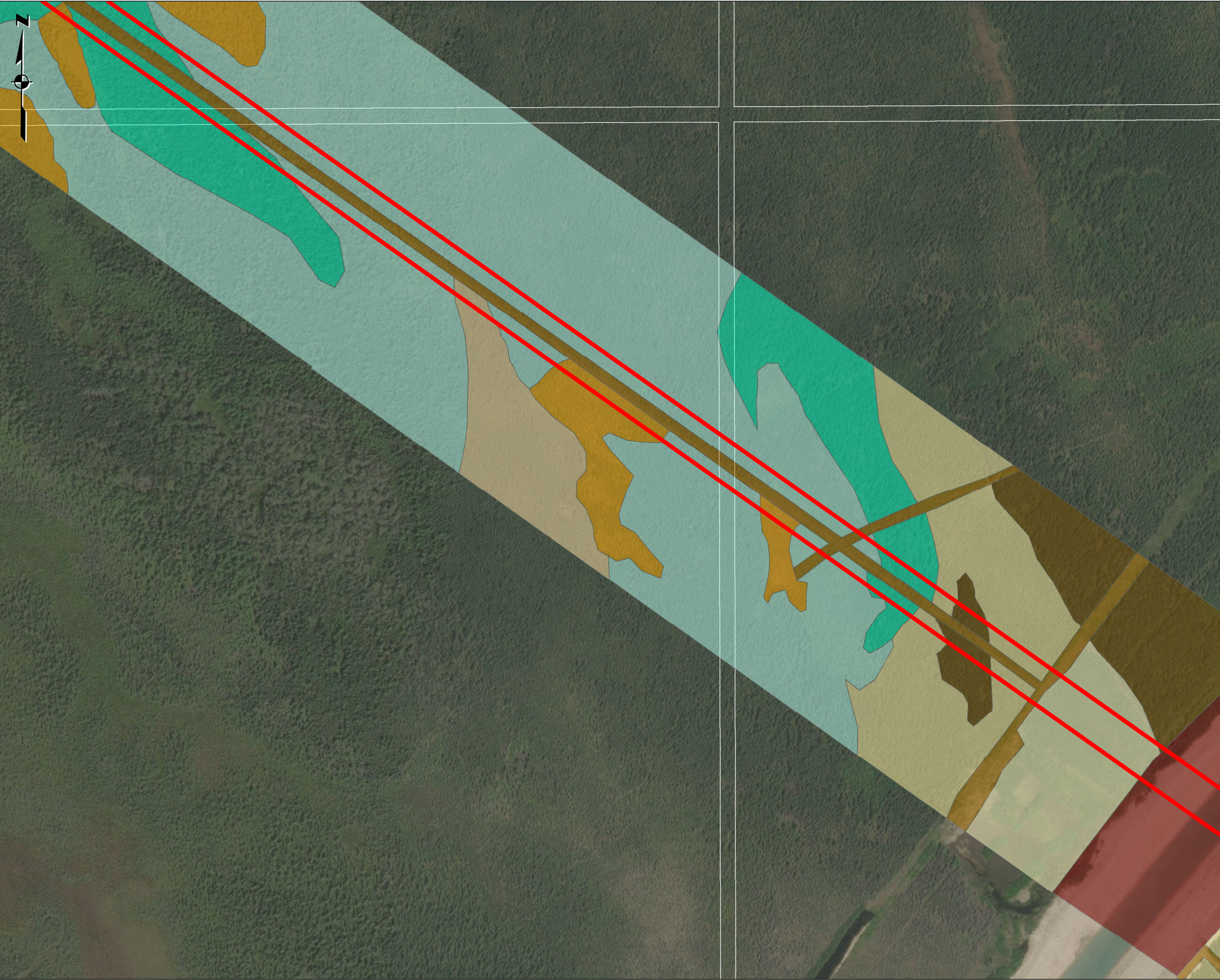


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



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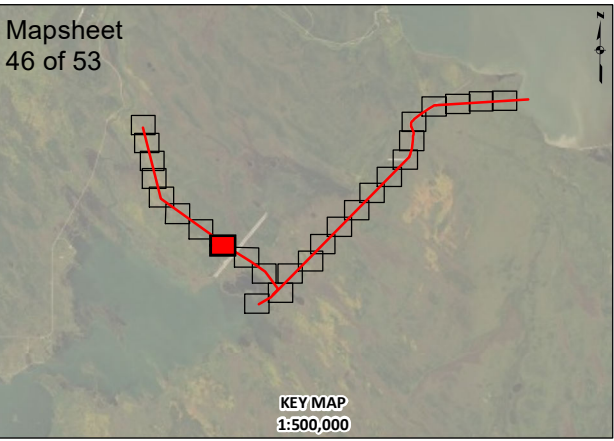


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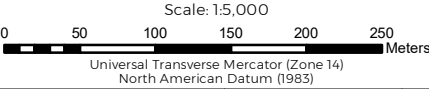
 Project Development Area (PDA)

Classification

-  Bare Rock, Gravel and Sand
-  Basin Bog
-  Basin Fen
-  Forest Cutovers
-  Horizontal Fen
-  Lagg Swamp
-  Roads and Trails
-  V1 = Balsam Poplar Hardwood and Mixedwood
-  V28 = Jack Pine-Black Spruce/Feather Moss

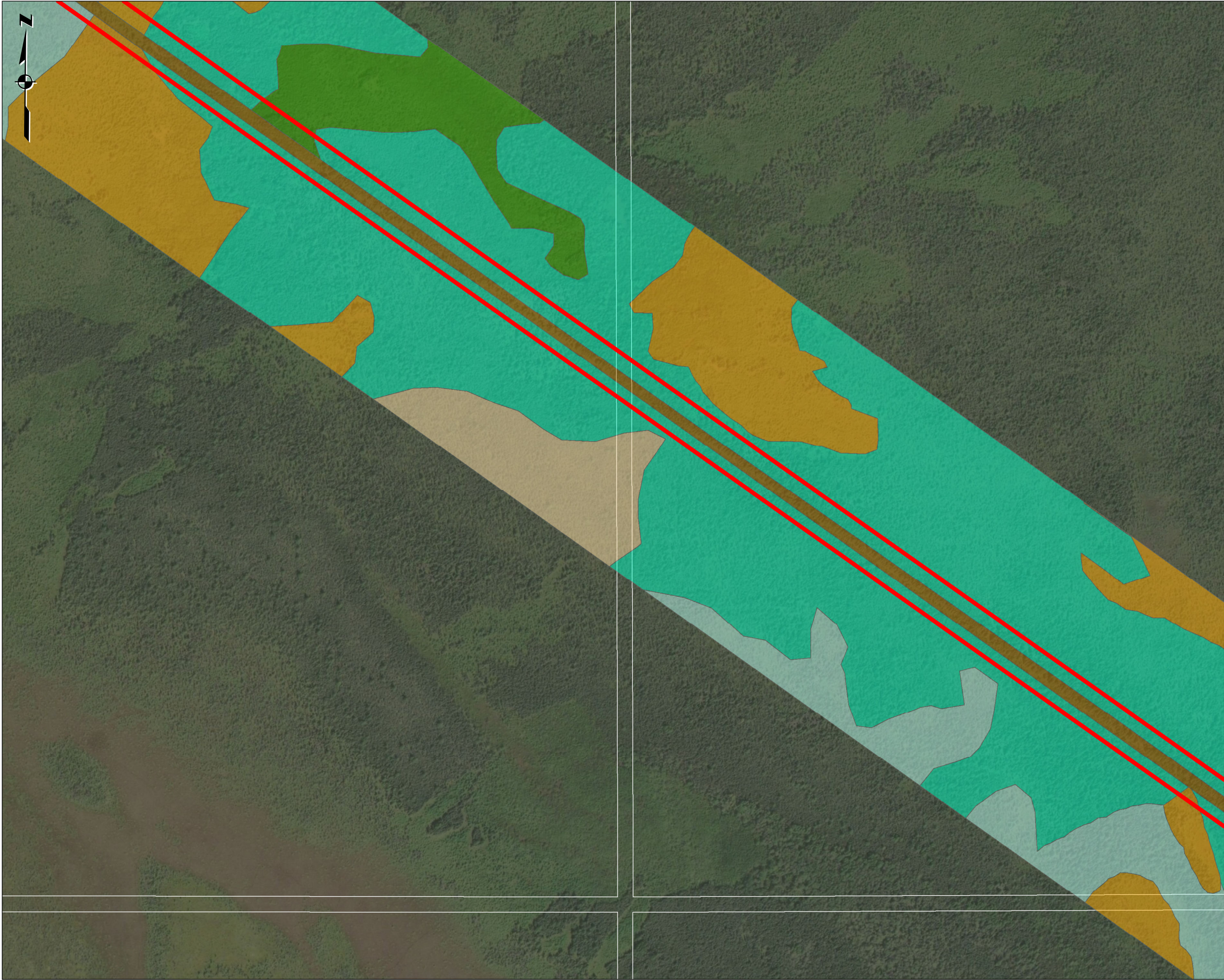


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



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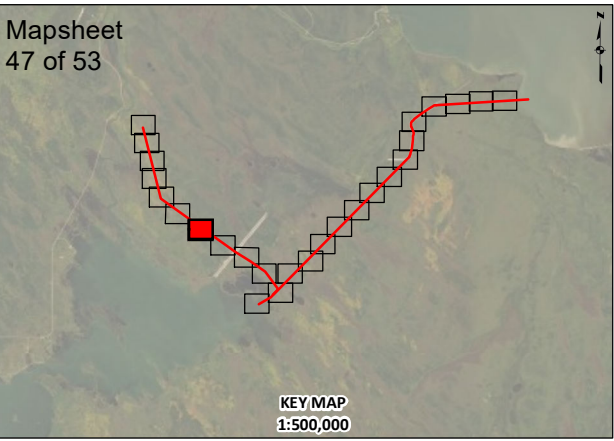


Legend

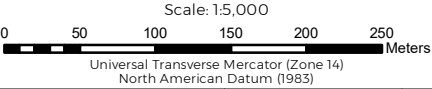
Project Development Area (PDA)

Classification

- Basin Bog
- Basin Fen
- Horizontal Fen
- Lagg Swamp
- Roads and Trails
- V5 = Aspen Hardwood

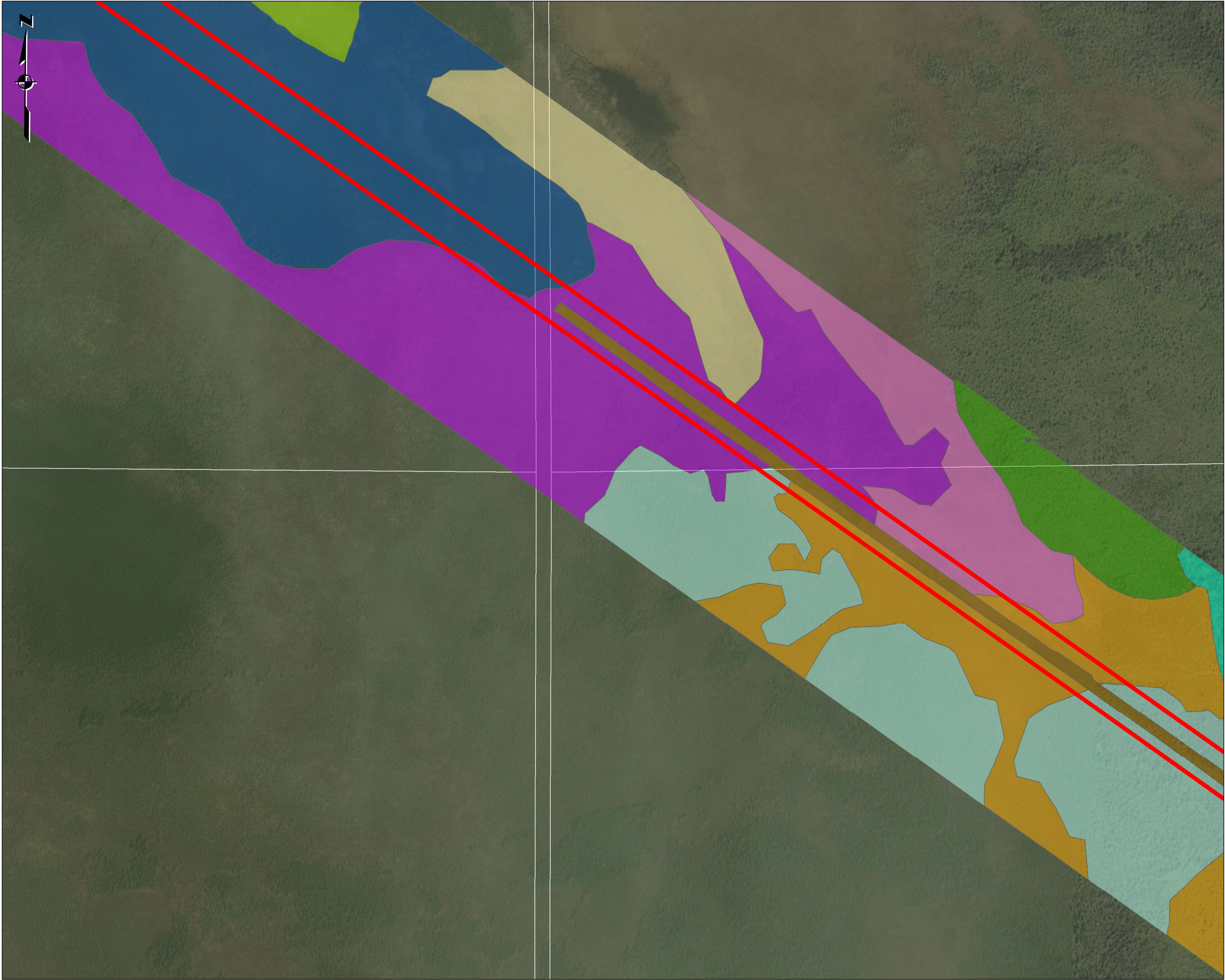


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure

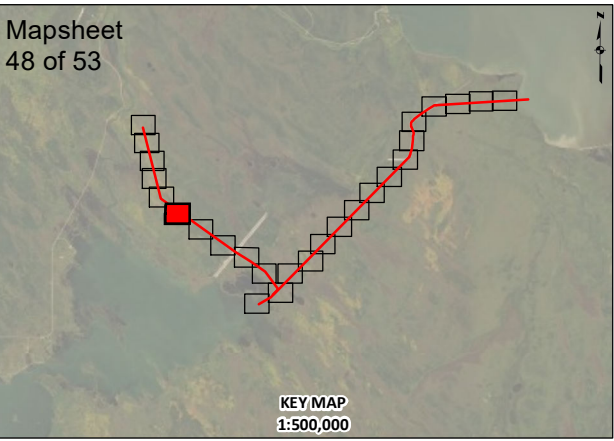


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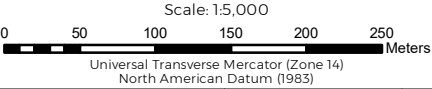
Project Development Area (PDA)

Classification

- Basin Fen
- Horizontal Fen
- Lagg Swamp
- Roads and Trails
- Stream Fen
- Unconfined Flat Swamp
- V1 = Balsam Poplar Hardwood and Mixedwood
- V4 = White Birch Hardwood and Mixedwood
- V5 = Aspen Hardwood
- V24 = Jack Pine Conifer

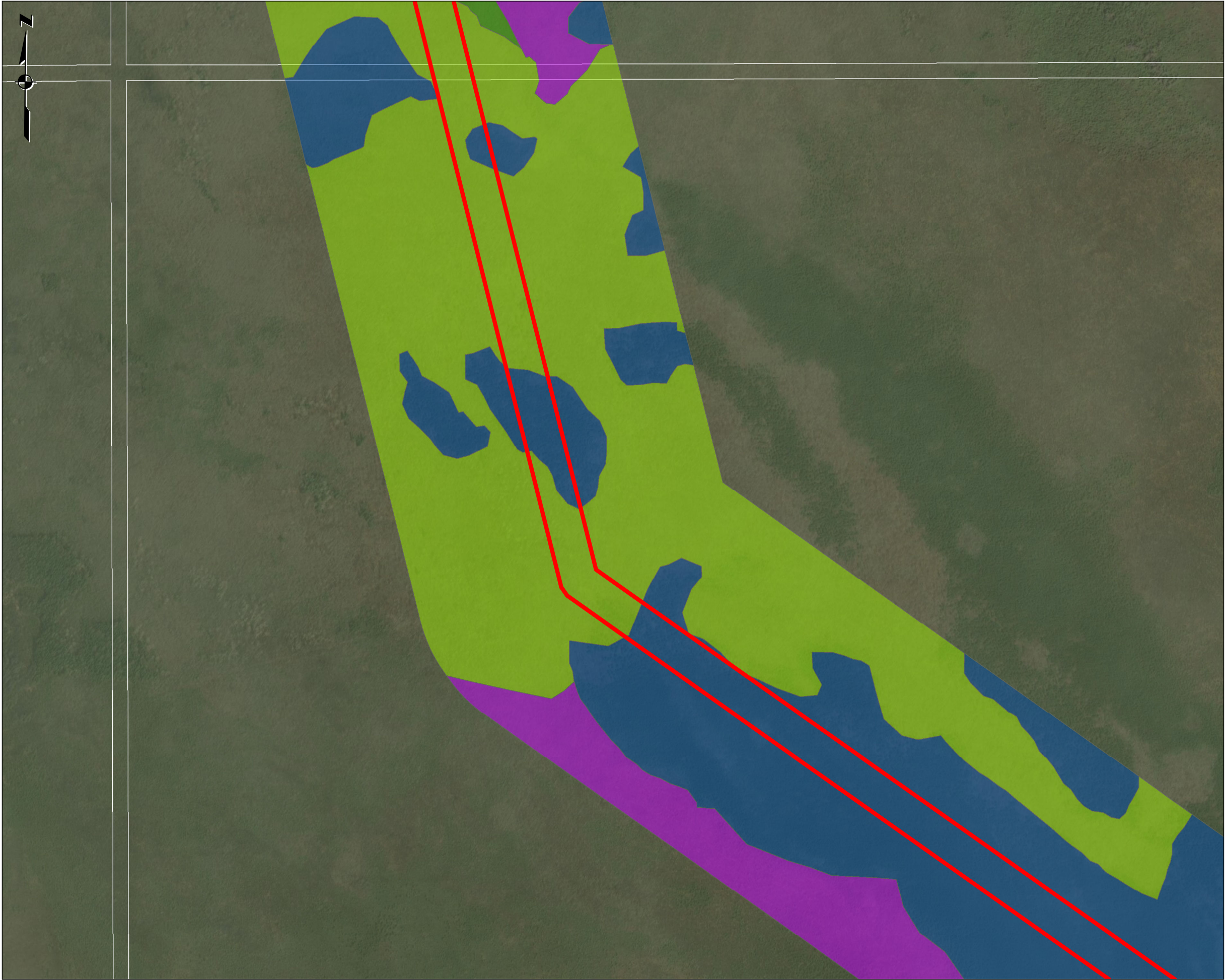


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

 Project Development Area (PDA)

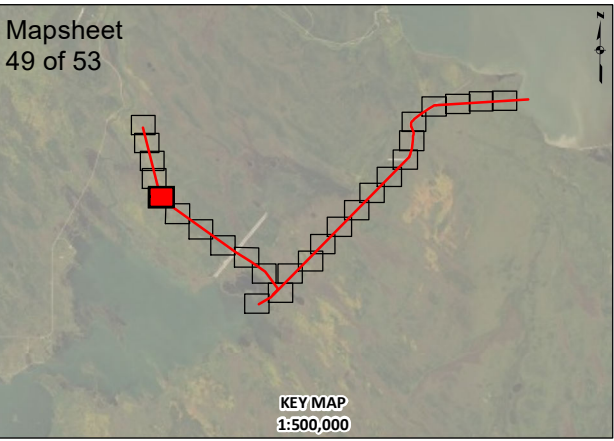
Classification

 Unconfined Flat Swamp

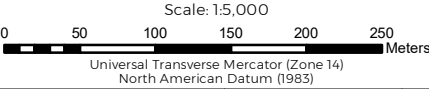
 V4 = White Birch Hardwood and Mixedwood

 V5 = Aspen Hardwood

 V24 = Jack Pine Conifer

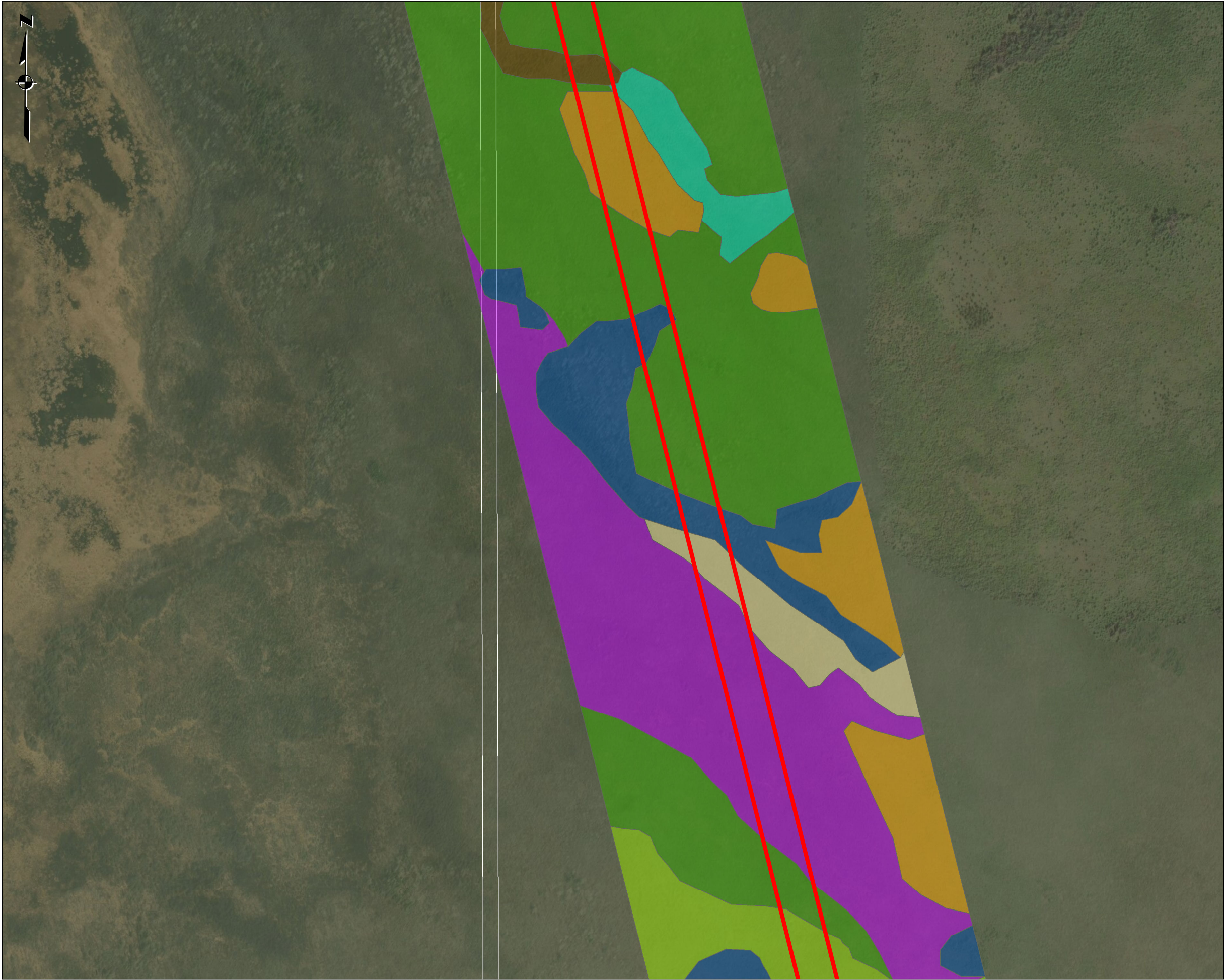


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure

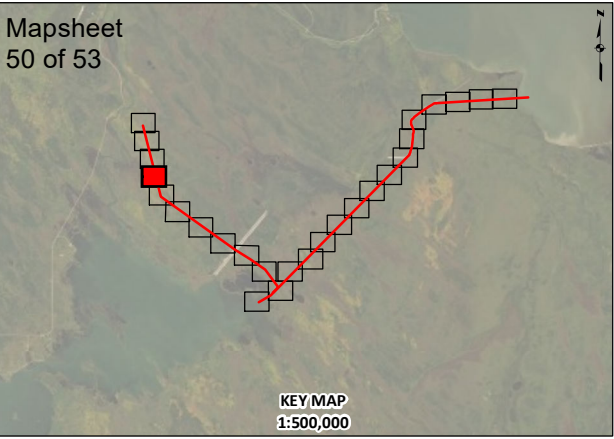


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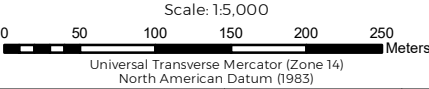
Project Development Area (PDA)

Classification

- Basin Fen
- Lagg Swamp
- Unconfined Flat Swamp
- V1 = Balsam Poplar Hardwood and Mixedwood
- V4 = White Birch Hardwood and Mixedwood
- V5 = Aspen Hardwood
- V24 = Jack Pine Conifer
- V28 = Jack Pine-Black Spruce/Feather Moss

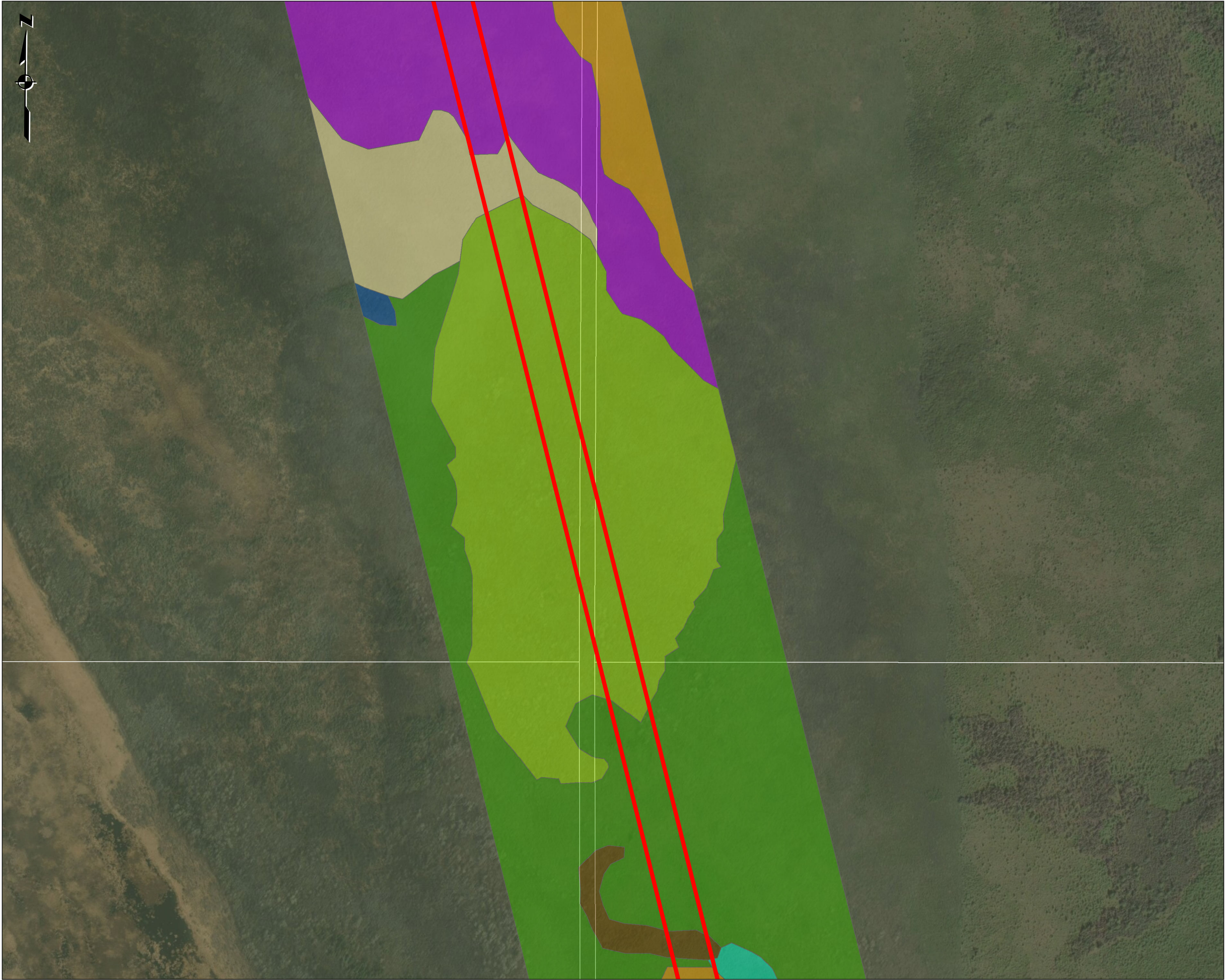


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
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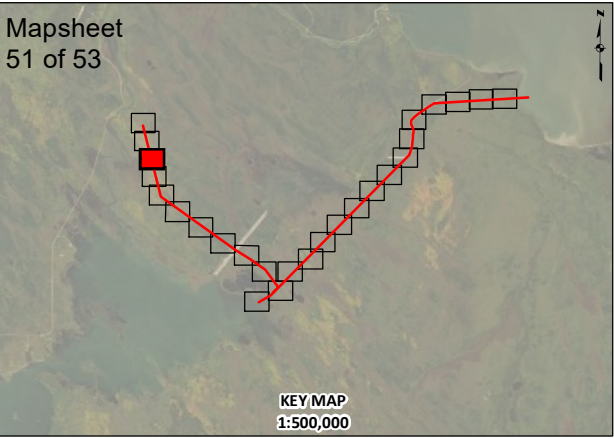


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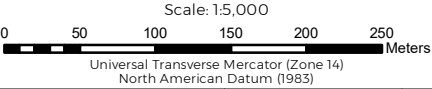
Project Development Area (PDA)

Classification

- Basin Fen
- Lagg Swamp
- Unconfined Flat Swamp
- V1 = Balsam Poplar Hardwood and Mixedwood
- V4 = White Birch Hardwood and Mixedwood
- V5 = Aspen Hardwood
- V24 = Jack Pine Conifer
- V28 = Jack Pine-Black Spruce/Feather Moss

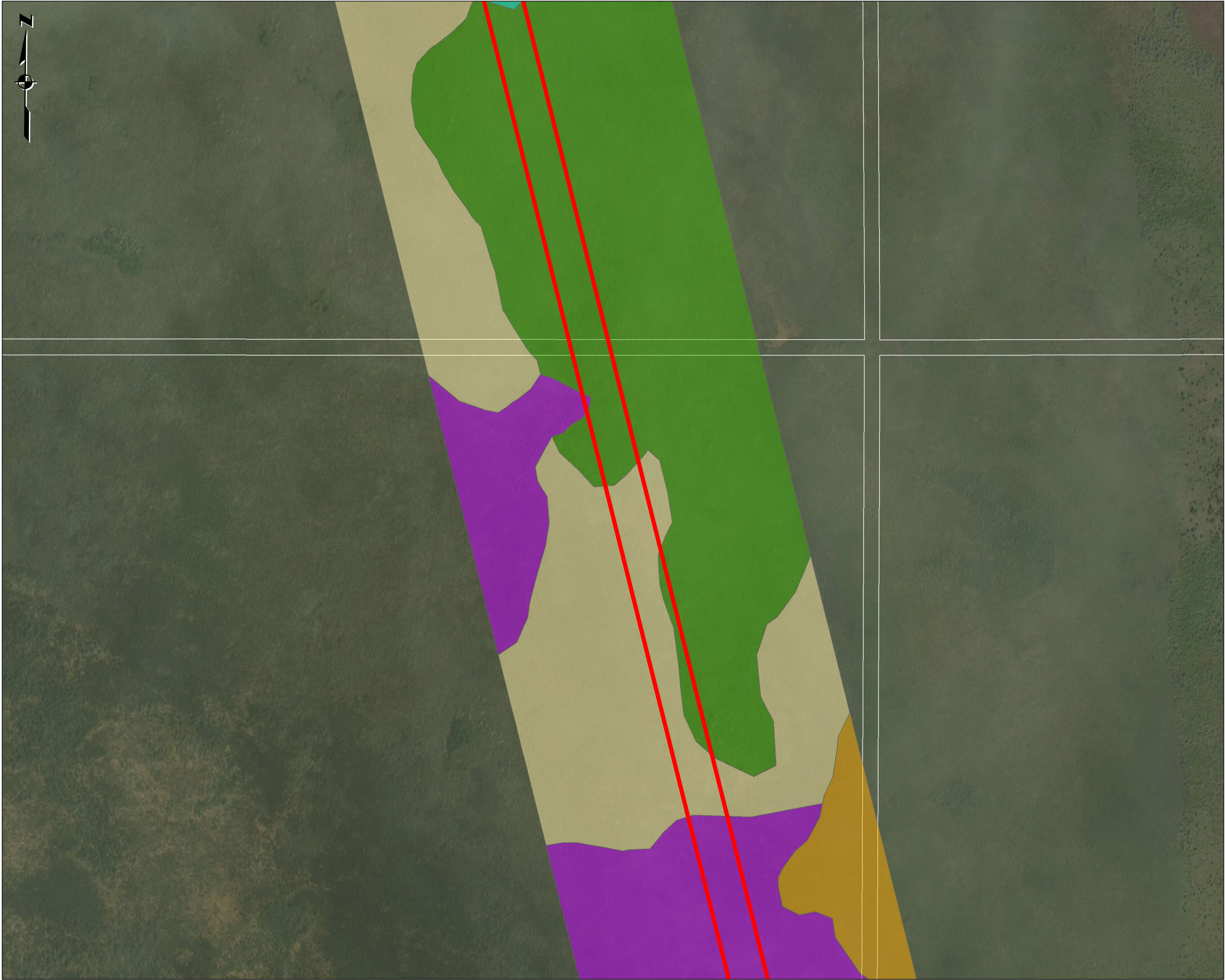


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

Project Development Area (PDA)

Classification

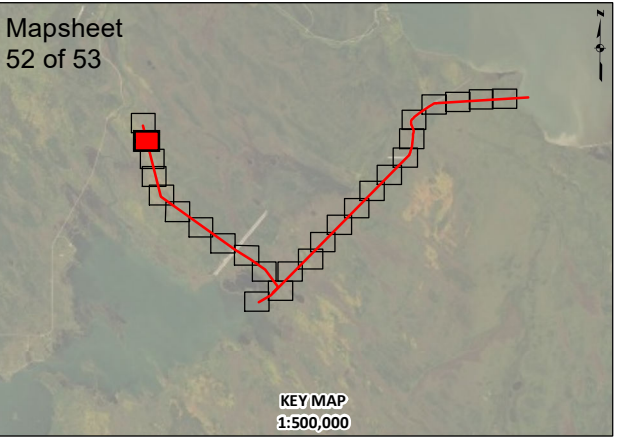
Basin Fen

Lagg Swamp

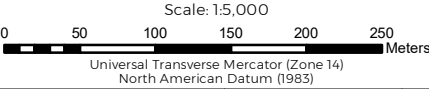
Unconfined Flat Swamp

VI = Balsam Poplar Hardwood and Mixedwood

V5 = Aspen Hardwood



**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St.Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

 Project Development Area (PDA)

Classification

 Forest Cutovers

 Horizontal Fen

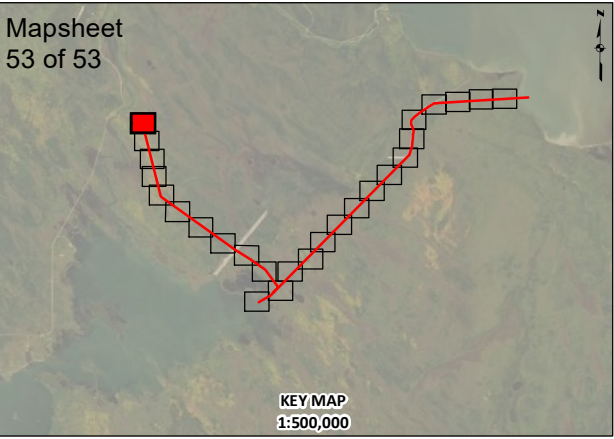
 Lagg Swamp

 Roads and Trails

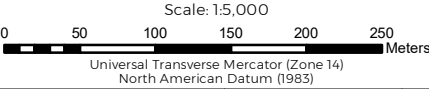
 Stream Fen

 VI = Balsam Poplar Hardwood and Mixedwood

 V5 = Aspen Hardwood

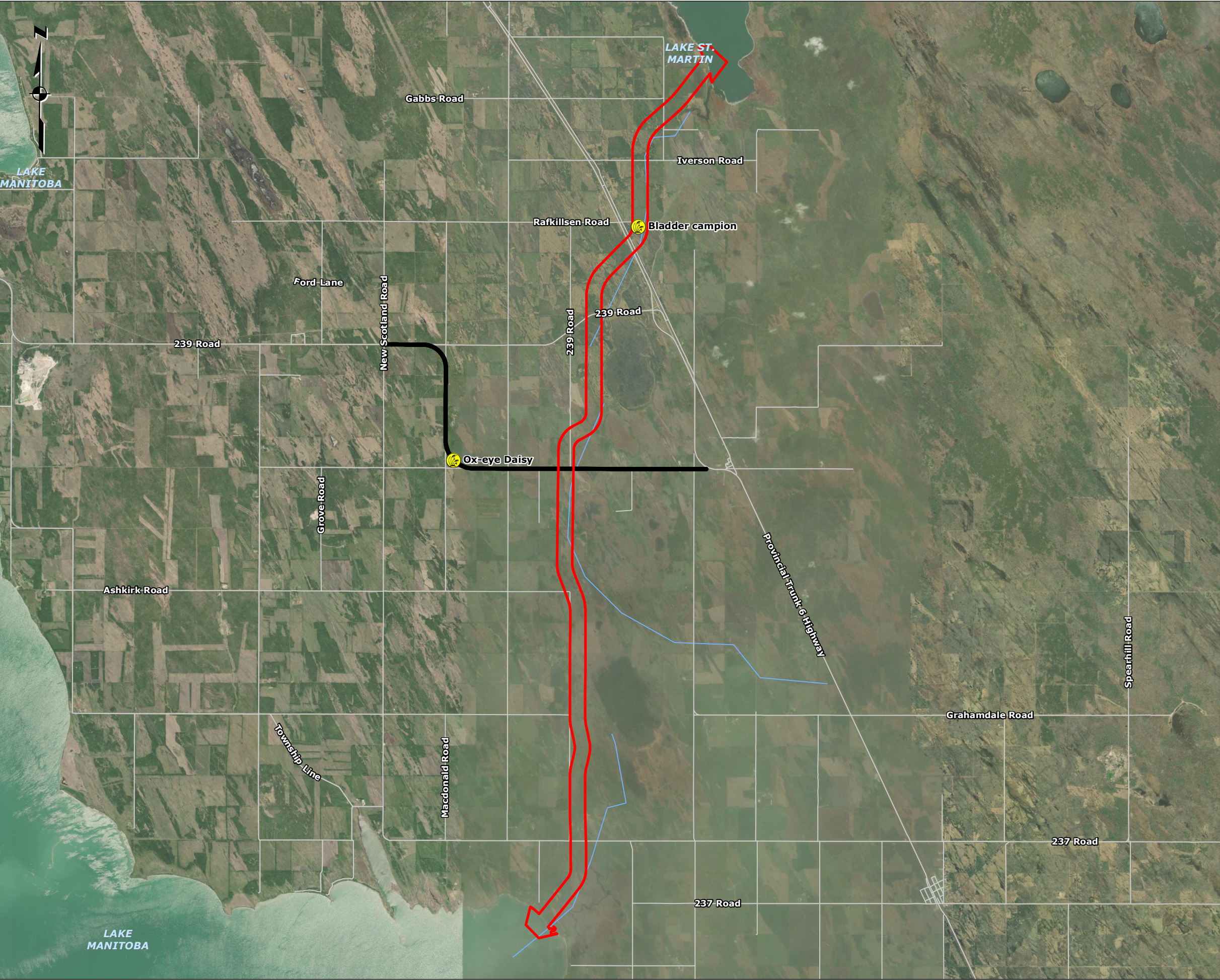


**Figure 4: Pre-construction Survey
Vegetation Assessment Areas**
Lake Manitoba & Lake St. Martin
Manitoba, Canada



Report By: LM WSP Job #: 20M-00910-00
Drawn by: JH Date: September 10, 2020
Reviewed By: DK Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

- Project Development Area (PDA)
- PR 239 Road Re-Alignment
- Roads
- Watercourse

Invasive Weeds

- Tier 2

KEY MAP
1:1,500,000

Manitoba
Infrastructure

Figure 5A: Invasive Weeds

Lake Manitoba & Lake St.Martin
Manitoba, Canada

Scale: 1:100,000

0 1 2 3 4 5 Kilometers

Universal Transverse Mercator (Zone 14)
North American Datum (1983)

Report By: DS
Drawn by: JH
Reviewed By: KT

WSP Job #: 20M-00910-00
Date: November 18, 2020
Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

- Project Development Area (PDA)
- Manitoba Hydro's Distribution Line
- Roads
- Watercourse

Invasive Weeds

- Tier 3

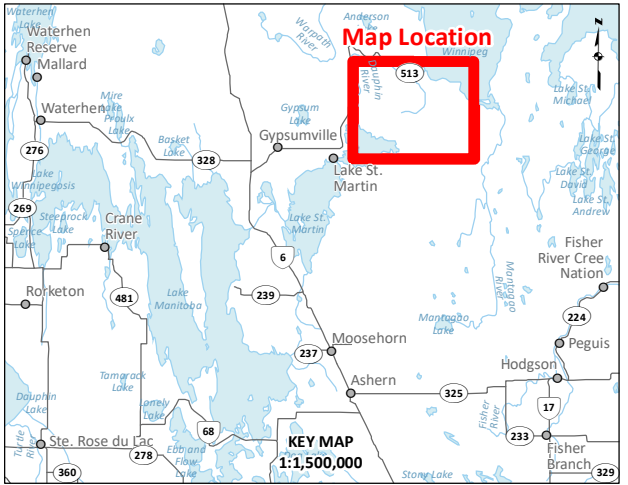
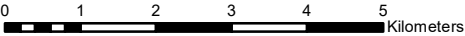


Figure 5B: Invasive Weeds

Lake Manitoba & Lake St.Martin

Manitoba, Canada

Scale: 1:100,000



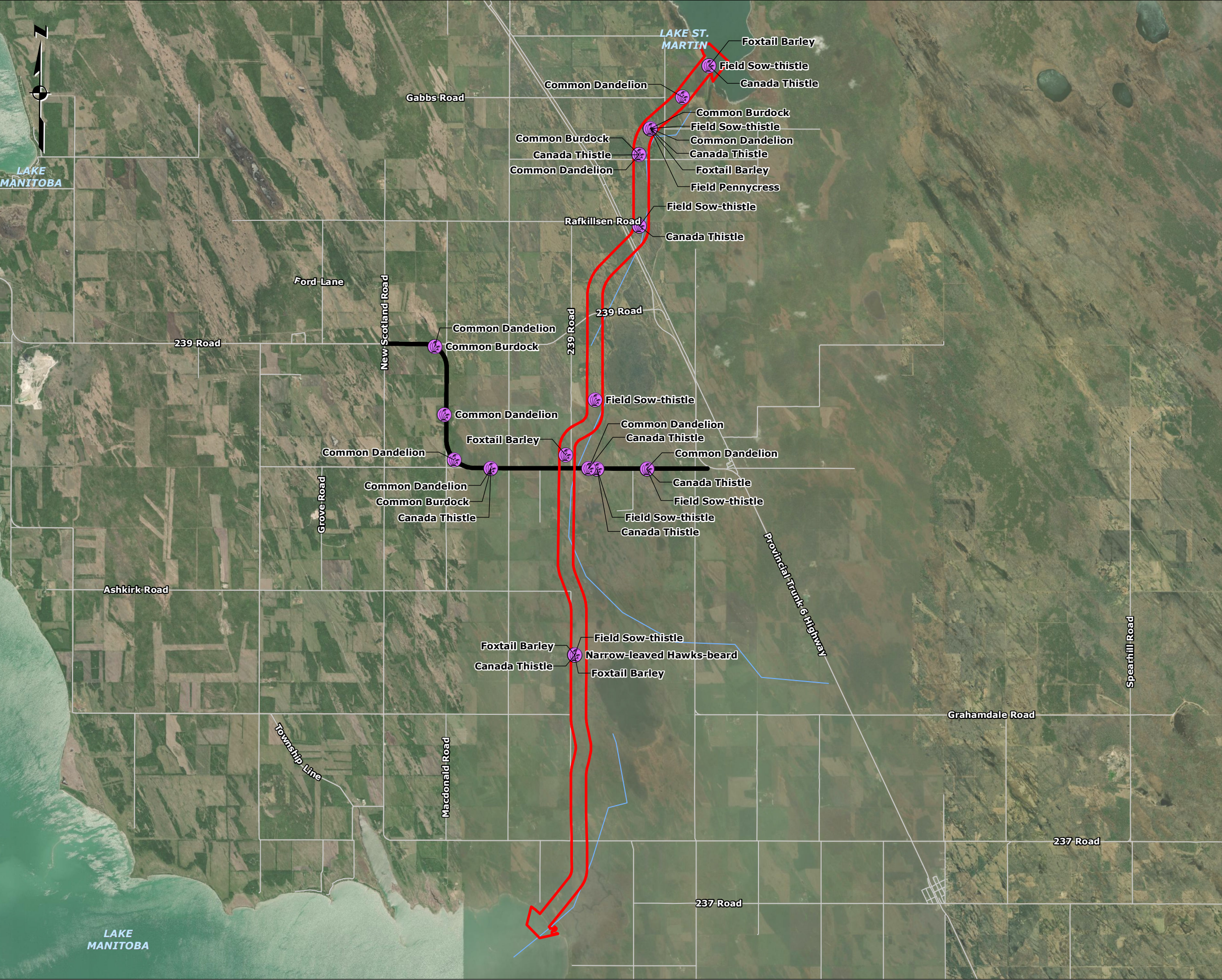
Universal Transverse Mercator (Zone 14)
North American Datum (1983)



Report By: DS
Drawn by: JH
Reviewed By: KT

WSP Job #: 20M-00910-00
Date: November 18, 2020
Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure



Legend

- Project Development Area (PDA)
- PR 239 Road Re-Alignment
- Roads
- Watercourse

Invasive Weeds

- Tier 3

KEY MAP
1:1,500,000

Manitoba
Infrastructure

Figure 5C: Invasive Weeds

Lake Manitoba & Lake St.Martin
Manitoba, Canada

Scale: 1:100,000

012345

Kilometers

Universal Transverse Mercator (Zone 14)
North American Datum (1983)

Report By: DS
Drawn by: JH
Reviewed By: KT

WSP Job #: 20M-00910-00
Date: November 18, 2020
Office: Winnipeg

Notes: Data Source: Imagery ESRI, Base Data: Manitoba Infrastructure

APPENDIX

B POTENTIAL PLANT SPECIES OF CONSERVATION CONCERN

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Table B-1 Plant Species of Conservation Concern that have the Potential to Occur in the Interlake Plain Ecoregion

Scientific Name	Common Name	S Rank*
Achnatherum richardsonii	Richardson Needle Grass	S1S2
Agalinis aspera	Rough Agalinis	S2
Agalinis tenuifolia	Narrow-leaved Agalinis	S2S3
Agrimonia gryposepala	Common Agrimony	S1S2
Alisma gramineum	Narrow-leaved Water-plantain	S1
Amorpha fruticosa	False Indigo	S1S2
Arabidopsis lyrata	Lyre-leaved Rock Cress	S1S2
Aralia racemosa	Spikenard	S2
Arethusa bulbosa	Dragon's-mouth	S2
Asclepias verticillata	Whorled Milkweed	S3
Astragalus australis	Indian milkvetch	S1S2
Astragalus neglectus	Neglected Milkvetch	S1
Astragalus pectinatus	Narrow-leaved Milkvetch	S2
Boltonia asteroides var. recognita	White Boltonia	S2S3
Botrychium campestre	Prairie Moonwort	S1
Botrychium matricariifolium	Daisy-leaf Moonwort	S1
Bouteloua curtipendula	Side-oats Grama	S2
Bromus kalmii	Wild Chess	S2S3
Bromus porteri	Porter's Chess	S2S3
Calamagrostis montanensis	Plains Reed Grass	S3
Calopogon tuberosus	Swamp-pink	S2
Canadanthus modestus	Large Northern Aster	S2
Cardamine bulbosa	Spring Cress	SH
Carex conoidea	Field Sedge	S1
Carex cryptolepis	Northeastern Sedge	S1
Carex douglasii	Douglas Sedge	S2
Carex flava	Yellow Sedge	S2
Carex hystericina	Porcupine Sedge	S3
Carex livida	Livid Sedge	S3
Carex parryana	Parry's Sedge	S3
Carex pedunculata	Stalked Sedge	S3
Carex sterilis	Dioecious Sedge	S2
Carex stricta	Tussock Sedge	S1
Carex supina ssp. spaniocarpa	Weak Sedge	S2S3
Carex tetanica	Rigid Sedge	S3
Carex vulpinoidea	Fox Sedge	S3
Caulophyllum thalictroides	Papoose-root	S2
Ceanothus herbaceus	New Jersey Tea	S2S3
Chrysosplenium iowense	Iowa Golden-saxifrage	S1
Cladium mariscoides	Twig Rush	S2S3
Clematis ligusticifolia	Western Virgin's-bower	S1
Clematis virginiana	Virgin's-bower	S2?
Corispermum villosum	Hairy Bugseed	S1S2
Cyperus erythrorhizos	Red-root Flatsedge	S1
Cyperus houghtonii	Houghton's Umbrella-sedge	S2S3
Cypripedium arietinum	Ram's Head Lady's-slipper	S2S3
Cypripedium candidum	Small White Lady's-slipper	S1
Desmodium canadense	Beggar's-lice	S2
Elymus lanceolatus	Northern Wheat Grass	S3
Elymus lanceolatus ssp. lanceolatus	Thickspike Wheatgrass	S3
Festuca hallii	Plains Rough Fescue	S3
Fraxinus nigra	Black Ash	S2S3
Gentiana rubricaulis	Closed Gentian	S3
Geranium maculatum	Wild Crane's-bill	S1
Goodyera tessellata	Tesselated Rattlesnake Plantain	S2
Hesperostipa curtiseta	Western Porcupine Grass	S3
Hudsonia tomentosa	False Heather	S3
Krigia biflora	Two-flowered Dwarf-dandelion	S2S3
Lactuca canadensis	Tall Yellow Lettuce	S3
Lactuca floridana	Woodland Lettuce	SH
Lechea intermedia	Pinweed	S1?
Linum sulcatum	Grooved Yellow Flax	S3
Lomatium foeniculaceum	Hairy-fruited Parsley	S3
Lomatium macrocarpum	Long-fruited Parsley	S2S3
Lysimachia quadriflora	Whorled Loosestrife	S2
Maianthemum racemosum	False Spikenard	S1
Malaxis monophyllos	White Adder's-mouth	S2?
Malaxis paludosa	Bog Adder's-mouth	S1?
Malaxis unifolia	Green Adder's-mouth	S2?
Muhlenbergia andina	Foxtail Muhly	S1



Table B-1 Plant Species of Conservation Concern that have the Potential to Occur in the Interlake Plain Ecoregion

Scientific Name	Common Name	S Rank*
Oenothera perennis	Sundrops	S1
Onoclea sensibilis	Sensitive Fern	S3?
Ophioglossum pusillum	Northern Adder's-tongue	S1
Orobanche fasciculata	Clustered Broom-rape	S3
Orobanche ludoviciana	Louisiana Broom-rape	S2
Osmunda claytoniana	Interrupted Fern	S2S3
Oxytropis lambertii	Purple Locoweed	S3
Parnassia parviflora	Small Grass-of-parnassus	S1
Pellaea gastonyi	Gastony's Cliffbrake	S1
Pellaea glabella	Smooth Cliffbrake	S2
Pellaea glabella ssp. occidentalis	Western Dwarf Cliffbrake	S2
Penthorum sedoides	Ditch-stonecrop	S1S2
Phryma leptostachya	Lopseed	S3
Platanthera praeclara	Western Prairie Fringed Orchid	S1
Polygala verticillata	Whorled Milkwort	S2
Pyrola americana	Round-leaved Pyrola	S2?
Ranunculus hispidus var. caricetorum	Bristly Buttercup	S2
Rhynchospora alba	White Beakrush	S3
Rhynchospora capillacea	Horned Beakrush	S2S3
Sceptridium multifidum	Leathery Grape-fern	S3
Selaginella densa	Prairie Spike-moss	S3
Sisyrinchium campestre	White-eyed Grass	S3
Solidago mollis	Velvety Goldenrod	S3
Solidago riddellii	Riddell's Goldenrod	S2S3
Spiranthes magnicamporum	Great Plains Ladies'-tresses	S1S2
Symphyotrichum sericeum	Western Silvery Aster	S2S3
Teucrium canadense	American Germander	S3
Thalictrum revolutum	Waxleaf Meadow-rue	S1
Utricularia minor	Lesser Bladderwort	S3
Vaccinium caespitosum	Dwarf Bilberry	S3
Veronicastrum virginicum	Culver's-root	S1S2
Viola labradorica	Early Blue Violet	S3

Source: Government of Manitoba (n.d.) Species of conservation concern by Ecoregion. Accessed September 14, 2020. Retrieved from Retrieved from Manitoba Conservation and Climate, Environment and Biodiversity, Conservation Data Centre, Ecoregions: https://www.gov.mb.ca/sd/environment_and_biodiversity/cdc/ecoregions/index.html.

Notes: *Species with an "S" rank of S1, S2 or S3 are considered to be rare and are vulnerable to extirpation in Manitoba.



Table B-2 Plant Species of Conservation Concern that have the Potential to Occur in the Mid-Boreal Lowland Ecoregion

Scientific Name	Common Name	S Rank*
<i>Aralia racemosa</i>	Spikenard	S2
<i>Arethusa bulbosa</i>	Dragon's-mouth	S2
<i>Calopogon tuberosus</i>	Swamp-pink	S2
<i>Carex flava</i>	Yellow Sedge	S2
<i>Carex garberi</i>	Elk Sedge	S1?
<i>Carex hystericina</i>	Porcupine Sedge	S3
<i>Carex pedunculata</i>	Stalked Sedge	S3
<i>Carex projecta</i>	Necklace Sedge	S3?
<i>Carex vulpinoidea</i>	Fox Sedge	S3
<i>Cyperus houghtonii</i>	Houghton's Umbrella-sedge	S2S3
<i>Cypripedium arietinum</i>	Ram's Head Lady's-slipper	S2S3
<i>Drosera linearis</i>	Slender-leaved Sundew	S2?
<i>Dulichium arundinaceum</i>	Three-way Sedge	S2
<i>Eleocharis engelmannii</i>	Engelmann's Spike-rush	S1S2
<i>Eriophorum callitrix</i>	Beautiful Cotton-grass	S2
<i>Galium aparine</i>	Cleavers	S3
<i>Goodyera tessellata</i>	Tesselated Rattlesnake Plantain	S2
<i>Gymnocarpium robertianum</i>	Limestone Oak Fern	S1
<i>Heteranthera dubia</i>	Water Star-grass	S2S3
<i>Listera auriculata</i>	Auricled Twayblade	S1
<i>Malaxis monophyllos</i>	White Adder's-mouth	S2?
<i>Malaxis unifolia</i>	Green Adder's-mouth	S2?
<i>Nymphaea odorata</i>	Fragrant Water-lily	S2?
<i>Onoclea sensibilis</i>	Sensitive Fern	S3?
<i>Osmunda claytoniana</i>	Interrupted Fern	S2S3
<i>Pellaea gastonyi</i>	Gastony's Cliffbrake	S1
<i>Pellaea glabella</i>	Smooth Cliffbrake	S2
<i>Pellaea glabella</i> ssp. <i>occidentalis</i>	Western Dwarf Cliffbrake	S2
<i>Pinus resinosa</i>	Red Pine	S2S3
<i>Plantago maritima</i>	Seaside Plantain	S2
<i>Platanthera lacera</i>	Fringed Orchid	S1S2
<i>Pogonia ophioglossoides</i>	Rose Pogonia	S1
<i>Polypodium sibiricum</i>	Siberian Polypody	S3
<i>Potamogeton strictifolius</i>	Straightleaf Pondweed	S2S3
<i>Pyrola americana</i>	Round-leaved Pyrola	S2?
<i>Rhynchospora alba</i>	White Beakrush	S3
<i>Rhynchospora capillacea</i>	Horned Beakrush	S2S3
<i>Sceptridium multifidum</i>	Leathery Grape-fern	S3
<i>Taxus canadensis</i>	Canada Yew	S3
<i>Thalictrum sparsiflorum</i>	Few-flowered Meadow-rue	S1S3
<i>Vaccinium caespitosum</i>	Dwarf Bilberry	S3
<i>Viola labradorica</i>	Early Blue Violet	S3
<i>Viola selkirkii</i>	Long-spurred Violet	S2
<i>Woodsia glabella</i>	Smooth Woodsia	S2

Source: Government of Manitoba (n.d.) Species of conservation concern by Ecoregion. Accessed September 14, 2020. Retrieved from Retrieved from Manitoba Conservation and Climate, Environment and Biodiversity, Conservation Data Centre, Ecoregions: https://www.gov.mb.ca/sd/environment_and_biodiversity/cdc/ecoregions/index.html.

Notes: *Species with an "S" rank of S1, S2 or S3 are considered to be rare and are vulnerable to extirpation in Manitoba.

APPENDIX

C MERGED SYSTEM CLASS DESCRIPTIONS

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**Table C-1 Merged System Classification Descriptions Developed for the 2020
Species of Conservation Concern Surveys**

Merged System Class	Description
Forested¹	
V1	Balsam Poplar Hardwood and Mixedwood ; mixed stands dominated by balsam poplar and trembling aspen in the overstory. The understory is herb and shrub rich, but ground moss cover is sparse. Occurring on deep, moist mineral soils of morainal, lacustrine, glaciofluvial, or fluvial origin.
V4	White Birch Hardwood and Mixedwood ; usually mixedwood stands dominated by white birch in the overstory, often with and admixture of jack pine. Stands are usually herb and shrub rich. Occurring generally on fresh to moist, well to rapidly drained, fine to coarse-textured mineral soils.
V5	Aspen Hardwood ; hardwood stands of trembling aspen, sometimes with a small admixture of other species. The understory is relatively herb and shrub rich. Occurring on a deep, moist, upland mineral soils, mostly on flat to slightly undulating terrain.
V24	Jack Pine Conifer ; jack pine-dominated, even-aged stands. The understory is variable, usually with <i>Arctostaphylos uva-ursi</i> in the dwarf shrub layer. The herb layer is typically sparse. Feather moss is discontinuous and occurs in scattered patches. Found on rapidly drained, fresh, coarse-textured soils.
V28	Jack Pine-Black Spruce/Feather Moss ; jack pine-black spruce stands with an open understory. The dwarf shrub and herb layers are poorly developed, with scattered occurrences of <i>Alnus crispa</i> , <i>Linnaea borealis</i> , <i>Aralia nudicaulis</i> and <i>Cornus canadensis</i> . The forest floor is covered by a continuous carpet of feather moss. Occurring on fresh to moist, fine-textured soils.
Wetlands and Water	
Bog²	
Basin Bog	Topographically confined peatland with poor nutrients and level surface; water input limited to snowmelt, rain and local surface run-off.
Fen²	
Basin Fen	Topographically confined peatland; water inputs consisting of snowmelt, rain, surface runoff, and groundwater.
Horizontal Fen	Uniformly vegetated peatland on broad depressions or plains; water inputs consisting of snowmelt, rain, surface runoff, and groundwater.
Shore Fen	Peatland situated adjacent to lakes or ponds with firmly anchored surface peat; water inputs consisting of snowmelt, rain, surface runoff, groundwater and surface flow.
Stream Fen	Peatland located in main channel or along banks of permanent or semi-permanent streams; water inputs consisting of snowmelt, rain, surface runoff, groundwater and surface flow.
Marsh³	
Class II	Temporary graminoid/forb mineral wetland with wet meadow plant community; surface water is present for a short period of time after snowmelt or a heavy rainfall.
Class III	Seasonal graminoid/forb mineral wetland with shallow wetland plant community; surface water is present throughout the majority of the growing season, but is typically dry by the end of summer.
Class IV	Semi-permanent graminoid/forb mineral wetland with deep wetland community; surface water is present for most or all of the year, except in periods of drought.
Class V	Permanent graminoid/forb mineral wetland with open water community; surface water is present throughout the year.
Swamp²	
Basin Swamp	Topographically confined shrubby or treed wetland with less than 40 cm of organic soil.
Lacustrine Swamp	Shrubby or treed wetland with less than 40 cm of organic soil occurring along the shores of permanent ponds or lakes; water level affected by lake during high water periods.
Lagg Swamp	Sloping shrubby or treed wetland with less than 40 cm of organic soil occurring between upland mineral terrain and peatlands.
Riverine Swamp	Shrubby or treed wetland with less than 40 cm of organic soil occurring along banks of rivers and permanent and intermittent streams; subject to flooding when stream or river waters are high.
Unconfined Flat Swamp	Broad shrubby or treed wetland with less than 40 cm of organic soil among other kinds of wetlands with poorly defined edges.
Water Bodies⁴	
Water Bodies	Consists of all open water including lakes, rivers, streams, ponds and lagoons.

**Table C-1 Merged System Classification Descriptions Developed for the 2020
Species of Conservation Concern Surveys**

Merged System Class	Description
Disturbance/Anthropogenic⁴	
Agricultural Cropland	Consists of all lands dedicated to the production of annual cereal, oil seed, and other specialty crops
Bare Rock, Gravel and Sand	Exposed areas of bedrock with little or no vegetation, or exposed areas such as sand dunes and beaches. Also included are all gravel quarry/pit operations, mine tailings, burrow pits, and rock quarries.
Cultural Features	Built-up areas such as cities and towns, peat farms, golf courses, cemeteries, shopping centers, large recreation sites, auto wreckyards, airports, cottage areas, and race tracks.
Forage Crops	Consists of perennial forage such as alfalfa and clover or blends of these with tame species of grass.
Forest Cutovers	Areas where commercial timber has been completely or partially removed by logging operations.
Roads and Trails	All highways, secondary roads, trails, cut survey lines or right-of-way such as railway lines, and transmission lines.

Notes:

1 Zoladeski et. al., 1995

2 National Wetlands Working Group, 1997

3 Stewart and Kantrud, 1971

4 Wulder and Nelson, 2003

APPENDIX

D 2020 PLOT SUMMARY

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APPENDIX

E 2020 SPECIES LISTS

Table E-1 List of Species Observed During the 2020 Species of Conservation Concern Surveys

Notes:

- 1. Orange and bold highlighted rows indicate species listed as S1, S2 or S3 rank
- 2. Blue highlighted rows indicated Tier 2 weed species as per *The Noxious Weed Regulation* (Man.Reg.42/17) of Manitoba
- 3. Green highlighted rows indicated Tier 3 weed species as per *The Noxious Weed Regulation* (Man.Reg.42/17) of Manitoba

Scientific Name	Common Name	Provincial Conservation Status ¹	SARA ²	COSEWIC ³	Manitoba Endangered Species and Ecosystems Act ⁴	Manitoba Weed Regulation Tier ⁵
Lichen						
<i>Cladonia arbuscula</i> ssp. <i>mitis</i>	Green Reindeer Lichen	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Cladonia rangiferina</i>	Gray Reindeer Lichen	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Cladonia stellaris</i>	Star-tipped Reindeer Lichen	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Cladonia stygia</i>	Black-footed Reindeer Lichen	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Pylaisia polyantha</i>	Many-flowered Pylaisia Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Vulpicida pinastr</i>	Powdered Sunshine Lichen	S5	Not Listed	Not Listed	Not Listed	N/A
Moss						
<i>Aulacomnium palustre</i>	Ribbed Bog Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Brachythecium salebrosum</i>	Golden Ragged Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Calliergon richardsonii</i>	Richardson's Water Moss	SU	Not Listed	Not Listed	Not Listed	N/A
<i>Climacium dendroides</i>	Northern Tree Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Dicranum polysetum</i>	Wavy-leaved Broom Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Dicranum undulatum</i>	Bog Broom Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Elodium blandowii</i>	Blandow's Bog Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Hylocomium splendens</i>	Stairstep Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Moss</i> sp.	Moss Species	SNR	Not Listed	Not Listed	Not Listed	N/A
<i>Plagiomnium ellipticum</i>	Marsh Leafy Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Pleurozium schreberi</i>	Red-stemmed Feather Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Polytrichum commune</i>	Common Haircap Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Polytrichum juniperinum</i>	Juniper Haircap Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Polytrichum strictum</i>	Bog Haircap Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Ptilium crista-castrensis</i>	Knight's Plume Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sphagnum angustifolium</i>	Narrowleaf Peatmoss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sphagnum capillifolium</i>	Northern Peatmoss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sphagnum fuscum</i>	Brown Peatmoss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sphagnum magellanicum</i>	Magellan's Peatmoss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sphagnum squarrosum</i>	Shaggy Peatmoss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sphagnum warnstorffii</i>	Warnstorf's Peatmoss	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Thuidium recognitum</i>	Hook-leaved Fern Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Tomentypnum nitens</i>	Golden Fuzzy Fen Moss	S4S5	Not Listed	Not Listed	Not Listed	N/A
Graminoid						
<i>Agropyron cristatum</i>	Crested Wheat-grass	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Agrostis scabra</i>	Rough Bentgrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Beckmannia syzigachne</i>	American Sloughgrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Bromus ciliatus</i>	Fringed Brome	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Bromus inermis</i>	Smooth Brome	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Calamagrostis canadensis</i>	Bluejoint Reedgrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Calamagrostis stricta</i>	Northern Reedgrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex aquatilis</i>	Water Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex atherodes</i>	Awned Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex aurea</i>	Golden Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex brunnescens</i>	Brownish Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex canescens</i>	Hoary Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex capillaris</i>	Hair-like Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex deweyana</i>	Dewey's Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex diandra</i>	Two-stamened Sedge	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex disperma</i>	Two-seeded Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex flava</i>	Yellow Sedge	S2	Not Listed	Not Listed	Not Listed	N/A
<i>Carex interior</i>	Inland Sedge	S4?	Not Listed	Not Listed	Not Listed	N/A
<i>Carex leptalea</i>	Bristle-stalked Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex limosa</i>	Mud Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex magellanica</i>	Bog Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex media</i>	Intermediate Sedge	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex prairea</i>	Prairie Sedge	S3S4	Not Listed	Not Listed	Not Listed	N/A
<i>Carex rostrata</i>	Beaked Sedge	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Carex</i> sp.	Sedge Species	SNR	Not Listed	Not Listed	Not Listed	N/A
<i>Carex trisperma</i>	Three-sided Sedge	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex utriculata</i>	Beaked Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex vaginata</i>	Sheathed Sedge	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Carex viridula</i>	Green Sedge	S4?	Not Listed	Not Listed	Not Listed	N/A
<i>Danthonia spicata</i>	Poverty Oatgrass	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Deschampsia cespitosa</i>	Tufted Hairgrass	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Eleocharis acicularis</i>	Needle Spike-rush	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Eleocharis palustris</i>	Creeping Spike-rush	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Eleocharis quinqueflora</i>	Few-flowered Spikerush	S3S4	Not Listed	Not Listed	Not Listed	N/A
<i>Elymus trachycaulus</i>	Slender Wildrye	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Eriophorum angustifolium</i>	Tall Cotton-grass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Eriophorum vaginatum</i>	Tussock Cotton-grass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Eriophorum viridicarinated</i>	Thin-leaved Cotton-grass	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Glyceria grandis</i>	Tall Mannagrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Hordeum jubatum</i>	Foxtail Barley	S5	Not Listed	Not Listed	Not Listed	Tier 3
<i>Juncus alpinoarticulatus</i>	Alpine rush	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Juncus arcticus</i> var. <i>balticus</i>	Baltic Rush	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Juncus filiformis</i>	Thread Rush	S4S5	Not Listed	Not Listed	Not Listed	N/A



Table E-1 List of Species Observed During the 2020 Species of Conservation Concern Surveys

Notes:

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- 2. Blue highlighted rows indicated Tier 2 weed species as per *The Noxious Weed Regulation* (Man.Reg.42/17) of Manitoba
- 3. Green highlighted rows indicated Tier 3 weed species as per *The Noxious Weed Regulation* (Man.Reg.42/17) of Manitoba

Scientific Name	Common Name	Provincial Conservation Status ¹	SARA ²	COSEWIC ³	Manitoba Endangered Species and Ecosystems Act ⁴	Manitoba Weed Regulation Tier ⁵
<i>Juncus nodosus</i>	Knotted Rush	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Juncus torreyi</i>	Torrey's Rush	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Juncus vaseyi</i>	Big-head Rush	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Leymus innovatus</i>	Downy Lymegrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Muhlenbergia glomerata</i>	Bog Muhly	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Oryzopsis asperifolia</i>	ricegrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Phalaris arundinacea</i>	Reed Canarygrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Phleum pratense</i>	Meadow Timothy	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Phragmites australis</i>	Common Reedgrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Poa palustris</i>	Fowl Bluegrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Poa pratensis</i>	Kentucky Bluegrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Schizachne purpurascens</i>	Purple Oatgrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Schoenoplectus acutus</i>	Hard-stemmed Bulrush	S4	Not Listed	Not Listed	Not Listed	N/A
<i>tabernaemontani</i>	Soft-stem Bulrush	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sparganium angustifolium</i>	Narrow-leaved Bur-reed	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sparganium eurycarpum</i>	Broad-fruited Bur-reed	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Trichophorum alpinum</i>	Alpine Cotton-grass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Trichophorum cespitosum</i>	Tufted Clubrush	S4	Not Listed	Not Listed	Not Listed	N/A
Forb						
<i>Achillea alpina</i>	Many-flowered Yarrow	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Achillea millefolium</i>	Common Yarrow	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Actaea rubra</i>	Red Baneberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Alisma gramineum</i>	Narrow-leaved Water-plantain	S1	Not Listed	Not Listed	Not Listed	N/A
<i>Alisma triviale</i>	Common Water-plantain	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Anemone canadensis</i>	Canada Anemone	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Anemone virginiana</i>	Virginia Anemone	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Antennaria neglecta</i>	Field Cat's-foot	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Antennaria pulcherrima</i>	Showy Pussytoes	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Apocynum androsaemifolium</i>	Spreading Dogbane	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Arctium minus</i>	Common Burdock	SNA	Not Listed	Not Listed	Not Listed	Tier 3
<i>Artemisia biennis</i>	Biennial Wormwood	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Astragalus agrestis</i>	Field Milkvetch	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Astragalus canadensis</i>	Canadian Milkvetch	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Athyrium filix-femina</i>	Lady Fern	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Botrypus virginianus</i>	Rattlesnake Fern	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Calla palustris</i>	Water-arum	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Caltha palustris</i>	Marsh Marigold	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Campanula aparinoides</i>	Marsh Bellflower	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Campanula rotundifolia</i>	Harebell	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Castilleja miniata</i>	Red Painted-cup	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Chamerion angustifolium</i>	Fireweed	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Cicuta bulbifera</i>	Bulb-bearing Water-hemlock	S5	Not Listed	Not Listed	Not Listed	Tier 3
<i>Cicuta maculata</i>	Spotted Water-hemlock	S4S5	Not Listed	Not Listed	Not Listed	Tier 3
<i>Cirsium arvense</i>	Canada Thistle	SNA	Not Listed	Not Listed	Not Listed	Tier 3
<i>Cirsium flodmanii</i>	Flodman's Thistle	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Cirsium</i> sp.	Thistle Species	SNR	Not Listed	Not Listed	Not Listed	N/A
<i>Cirsium vulgare</i>	Bull Thistle	SNA	Not Listed	Not Listed	Not Listed	Tier 3
<i>pallida</i>	Bastard Toadflax	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Comarum palustre</i>	Marsh Cinquefoil	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Convolvulus arvensis</i>	Field Bindweed	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Coptidium lapponicum</i>	Lapland Buttercup	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Corallorhiza maculata</i>	Spotted Coralroot	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Corallorhiza trifida</i>	Early Coralroot	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Cornus canadensis</i>	Bunchberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Crepis tectorum</i>	Narrow-leaved Hawks-beard	SNA	Not Listed	Not Listed	Not Listed	Tier 3
<i>Cypripedium arietinum</i>	Ram's-head Lady's-slipper	S2S3	Not Listed	Not Listed	Not Listed	N/A
<i>Cypripedium species</i>	Lady's-slipper species	SNR	Not Listed	Not Listed	Not Listed	N/A
<i>Dactylorhiza viridis</i>	Long-bracted Green Orchid	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Drosera rotundifolia</i>	Round-leaved Sundew	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Dryopteris carthusiana</i>	Spinulose Wood Fern	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Epilobium ciliatum</i>	Hairy Willow-herb	S5	Not Listed	Not Listed	Not Listed	N/A
<i>glandulosum</i>	Willow-herb	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Epilobium leptophyllum</i>	Linear-leaf Willowherb	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Epilobium palustre</i>	Marsh Willowherb	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Equisetum arvense</i>	Field Horsetail	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Equisetum fluviatile</i>	Swamp Horsetail	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Equisetum palustre</i>	Marsh Horsetail	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Equisetum pratense</i>	Meadow Horsetail	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Equisetum variegatum</i>	Variegated Horsetail	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Erigeron lonchophyllus</i>	Hirsute Fleabane	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Euthamia graminifolia</i>	Flat-topped Goldenrod	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed	S5	Not Listed	Not Listed	Not Listed	N/A



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Scientific Name	Common Name	Provincial Conservation Status ¹	SARA ²	COSEWIC ³	Manitoba Endangered Species and Ecosystems Act ⁴	Manitoba Weed Regulation Tier ⁵
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Galium boreale</i>	Northern Bedstraw	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Galium trifidum</i>	Small Bedstraw	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Galium triflorum</i>	Sweet-scented Bedstraw	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Gentianella amarella</i>	Northern Gentian	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Geocaulon lividum</i>	Northern Comandra	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Geum aleppicum</i>	Yellow Avens	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Geum macrophyllum</i>	Large-leaved Avens	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Halenia deflexa</i>	Spurred Gentian	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Helianthus maximiliani</i>	Narrow-leaved Sunflower	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Heracleum maximum</i>	Cow-parsnip	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Heuchera richardsonii</i>	Alumroot	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Impatiens capensis</i>	Spotted Touch-me-not	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Iris versicolor</i>	Blue Flag	S3S4	Not Listed	Not Listed	Not Listed	N/A
<i>Lathyrus ochroleucus</i>	Pale Vetchling	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lathyrus palustris</i>	Marsh Vetchling	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lathyrus venosus</i>	Wild Peavine	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lemna trisulca</i>	Star Duckweed	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Leucanthemum vulgare</i>	Ox-eye Daisy	SNA	Not Listed	Not Listed	Not Listed	Tier 2
<i>Lilium philadelphicum</i>	Wood Lily	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Lobelia kalmii</i>	Kalm's Lobelia	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Lycopus uniflorus</i>	Northern Bugleweed	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lysimachia borealis</i>	Northern Starflower	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lysimachia ciliata</i>	Fringed Loosestrife	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lysimachia thyrsoiflora</i>	Tufted Loosestrife	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Maianthemum canadense</i>	Two-leaved Solomon's-seal	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Maianthemum stellatum</i>	Star-flowered Solomon's-seal	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Maianthemum trifolium</i>	Three-leaved Solomon's-seal	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Medicago lupulina</i>	Black Medick	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Medicago sativa</i>	Alfalfa	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Melampyrum lineare</i>	Cow-wheat	S3S5	Not Listed	Not Listed	Not Listed	N/A
<i>Melilotus albus</i>	White Sweet Clover	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Melilotus officinalis</i>	Yellow Sweet Clover	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Mentha canadensis</i>	Canada Mint	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Menyanthes trifoliata</i>	Bogbean	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Mertensia paniculata</i>	Tall Lungwort	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Mitella nuda</i>	Mitrewort	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Orthilia secunda</i>	One-sided Wintergreen	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Parnassia palustris</i>	Marsh Grass of Parnassus	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Persicaria amphibia</i>	Water Smartweed	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Persicaria lapathifolia</i>	Pale Smartweed	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Persicaria</i> sp.	Smartweed Species	SNR	Not Listed	Not Listed	Not Listed	N/A
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Colt's-foot	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Petasites frigidus</i> var. <i>sagittatus</i>	Arrow-leaved Colt's-foot	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Petasites frigidus</i> var. <i>x vitifolius</i>	Vine-leaved Colt's-foot	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Plantago major</i>	Common Plantain	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Platanthera aquilonis</i>	Tall Northern Green Orchid	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Platanthera dilatata</i>	Tall White Bog Orchid	S3S4	Not Listed	Not Listed	Not Listed	N/A
<i>Platanthera huronensis</i>	Huron Fringed Orchid	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Platanthera obtusata</i>	Blunt-leaved Bog Orchid	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Potentilla anserina</i>	Silverweed	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Potentilla norvegica</i>	Rough Cinquefoil	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Prosartes trachycarpa</i>	Fairybells	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Pyrola asarifolia</i>	Pink Pyrola	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Pyrola chlorantha</i>	Green-flowered Wintergreen	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Pyrola grandiflora</i>	Arctic Pyrola	S3S4	Not Listed	Not Listed	Not Listed	N/A
<i>Ranunculus sceleratus</i>	Cursed Crowfoot	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rubus arcticus</i> ssp. <i>acaulis</i>	Stemless Raspberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rubus chamaemorus</i>	Cloudberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rubus pubescens</i>	Dewberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rudbeckia hirta</i>	Black-eyed Susan	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rumex crispus</i>	Curly Dock	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Rumex occidentalis</i>	Western Dock	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rumex triangulivalvis</i>	Narrow-leaved Dock	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sanicula marilandica</i>	Snakeroot	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sarracenia purpurea</i>	Pitcher Plant	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Scutellaria galericulata</i>	Hooded Skullcap	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Silene vulgaris</i>	Bladder campion	SNA	Not Listed	Not Listed	Not Listed	Tier 2
<i>Sium suave</i>	Water-parsnip	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Solidago canadensis</i>	Canada Goldenrod	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Solidago hispida</i>	Hairy Goldenrod	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Solidago nemoralis</i>	Field Goldenrod	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Solidago</i> sp.	Goldenrod species	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Sonchus arvensis</i>	Field Sow-thistle	SNA	Not Listed	Not Listed	Not Listed	Tier 3



Table E-1 List of Species Observed During the 2020 Species of Conservation Concern Surveys

Notes:

- 1. Orange and bold highlighted rows indicate species listed as S1, S2 or S3 rank
- 2. Blue highlighted rows indicated Tier 2 weed species as per *The Noxious Weed Regulation* (Man.Reg.42/17) of Manitoba
- 3. Green highlighted rows indicated Tier 3 weed species as per *The Noxious Weed Regulation* (Man.Reg.42/17) of Manitoba

Scientific Name	Common Name	Provincial Conservation Status ¹	SARA ²	COSEWIC ³	Manitoba Endangered Species and Ecosystems Act ⁴	Manitoba Weed Regulation Tier ⁵
<i>Sonchus asper</i>	Spiny-leaved Sow-thistle	SNA	Not Listed	Not Listed	Not Listed	Tier 3
<i>Spiranthes lacera</i>	Northern Slender Ladies'-tresses	S3S4	Not Listed	Not Listed	Not Listed	N/A
<i>Spiranthes romanzoffiana</i>	Hooded Ladies'-tresses	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Spirodela polyrrhiza</i>	Water-flaxseed	S3S4	Not Listed	Not Listed	Not Listed	N/A
<i>Stachys pilosa</i>	Woundwort	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Stellaria longifolia</i>	Long-leaved Stitchwort	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Stellaria media</i>	Common Chickweed	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Symphyotrichum boreale</i>	Boreal Aster	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Symphyotrichum ciliatum</i>	Alkali American-aster	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Symphyotrichum laeve</i>	Smooth Aster	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Symphyotrichum lanceolatum</i>	Panicled Aster	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Taraxacum officinale</i>	Common Dandelion	SNA	Not Listed	Not Listed	Not Listed	Tier 3
<i>Thalictrum dasycarpum</i>	Tall or Purple Meadow-rue	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Thalictrum venulosum</i>	Veiny Meadow-rue	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Thlaspi arvense</i>	Field Pennycress	SNA	Not Listed	Not Listed	Not Listed	Tier 3
<i>Toxicodendron rydbergii</i>	Poison-ivy	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Trifolium hybridum</i>	Alsike Clover	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Trifolium pratense</i>	Red Clover	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Trifolium repens</i>	White Clover	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Triglochin maritima</i>	Seaside Arrowgrass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Triglochin palustris</i>	Marsh Arrow-grass	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Triticum aestivum</i>	Cultivated Wheat	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Typha angustifolia</i>	Narrow-leaved Cat-tail	S3S4	Not Listed	Not Listed	Not Listed	N/A
<i>Typha latifolia</i>	Common Cat-tail	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Urtica dioica</i>	Stinging Nettle	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Utricularia intermedia</i>	Flat-leaved Bladderwort	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Vicia americana</i>	American Purple Vetch	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Viola renifolia</i>	Kidney-shaped Violet	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Viola species</i>	Violet species	SNA	Not Listed	Not Listed	Not Listed	N/A
<i>Zizia aptera</i>	Heart-leaved Alexanders	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Zizia aurea</i>	Golden Alexanders	S4S5	Not Listed	Not Listed	Not Listed	N/A
Shrub						
<i>Alnus incana</i>	Speckled Alder	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Alnus viridis</i>	Green Alder	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Amelanchier alnifolia</i>	Saskatoon	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Andromeda polifolia</i>	Bog rosemary	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Arctostaphylos uva-ursi</i>	Common Bearberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Betula glandulosa</i>	Dwarf Birch	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Betula occidentalis</i>	River Birch	S3S5	Not Listed	Not Listed	Not Listed	N/A
<i>Betula pumila</i>	Dwarf Birch	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Cornus sericea</i>	Red-osier Dogwood	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Corylus americana</i>	American Hazelnut	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Corylus cornuta</i>	Beaked Hazel	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Crataegus chrysocarpa</i>	Round-leaved Hawthorn	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Dasiphora fruticosa</i>	Shrubby Cinquefoil	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Elaeagnus commutata</i>	Silverberry	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Empetrum nigrum</i>	Black Crowberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Gaultheria hispida</i>	Creeping Snowberry	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Juniperus communis</i>	Common Juniper	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Juniperus horizontalis</i>	Creeping Juniper	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Kalmia polifolia</i>	Bog-laurel	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Linnaea borealis</i>	Twinflower	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lonicera dioica</i>	Limber or Twining Honeysuckle	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lonicera oblongifolia</i>	Swamp-fly-honeysuckle	S3S5	Not Listed	Not Listed	Not Listed	N/A
<i>Lonicera villosa</i>	Mountain-fly-honeysuckle	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Myrica gale</i>	Sweet Gale	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Prunus pensylvanica</i>	Pin Cherry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Prunus virginiana</i>	Chokecherry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rhododendron groenlandicum</i>	Labrador-tea	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Ribes glandulosum</i>	Skunk Currant	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Ribes hudsonianum</i>	Northern Wild Black Currant	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Ribes lacustre</i>	Bristly Black Currant	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Ribes oxycanthoides</i>	Canada Wild Gooseberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Ribes</i> sp.	Currant Species	SNR	Not Listed	Not Listed	Not Listed	N/A
<i>Ribes triste</i>	Wild Red Currant	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rosa acicularis</i>	Prickly Rose	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Rubus idaeus</i>	Red Raspberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix bebbiana</i>	Bebb's or Beaked Willow	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix candida</i>	Hoary Willow	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix discolor</i>	Pussy Willow	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix interior</i>	Sandbar Willow	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix lucida</i>	Shining Willow	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix maccalliana</i>	Velvet-fruited Willow	S4	Not Listed	Not Listed	Not Listed	N/A
<i>Salix myrtilifolia</i>	Myrtle-leaved Willow	S5	Not Listed	Not Listed	Not Listed	N/A



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- 3. Green highlighted rows indicated Tier 3 weed species as per *The Noxious Weed Regulation* (Man.Reg.42/17) of Manitoba

Scientific Name	Common Name	Provincial Conservation Status ¹	SARA ²	COSEWIC ³	Manitoba Endangered Species and Ecosystems Act ⁴	Manitoba Weed Regulation Tier ⁵
<i>Salix pedicellaris</i>	Bog Willow	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix petiolaris</i>	Basket Willow	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix planifolia</i>	Plane-leaved Willow	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix pseudomonticola</i>	False Mountain Willow	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix pyrifolia</i>	Balsam Willow	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix serissima</i>	Autumn Willow	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Salix</i> sp.	Willow Species	SNR	Not Listed	Not Listed	Not Listed	N/A
<i>Shepherdia canadensis</i>	Soapberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Sisyrinchium montanum</i>	Common Blue-eyed Grass	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Spiraea alba</i>	White Meadowsweet	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Symphoricarpos albus</i>	Snowberry	S4S5	Not Listed	Not Listed	Not Listed	N/A
<i>Symphoricarpos occidentalis</i>	Western Snowberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Vaccinium myrtilloides</i>	Velvet-leaf Blueberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Vaccinium oxycoccos</i>	Small Cranberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Vaccinium vitis-idaea</i>	Bog Cranberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Viburnum edule</i>	Mooseberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Viburnum opulus</i>	Highbush-cranberry	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S4S5	Not Listed	Not Listed	Not Listed	N/A
Tree						
<i>Abies balsamea</i>	Balsam Fir	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Betula papyrifera</i>	White Birch	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Larix laricina</i>	Tamarack	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Picea glauca</i>	White Spruce	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Picea mariana</i>	Black Spruce	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Pinus banksiana</i>	Jack Pine	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Populus balsamifera</i>	Balsam Poplar	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Populus tremuloides</i>	Trembling Aspen	S5	Not Listed	Not Listed	Not Listed	N/A
<i>Quercus macrocarpa</i>	Bur Oak	S5	Not Listed	Not Listed	Not Listed	N/A

Data Sources:

- 1 Manitoba Conservation Data Centre, n.d.a
- 2 Government of Canada, 2019
- 3 Government of Canada, 2014
- 4 Government of Manitoba, 2015
- 5 Government of Manitoba, 2005



APPENDIX

F PHOTO PLATES



August 9, 2020



Photograph 1 – Distribution Line

Balsam Poplar Hardwood and Mixedwood (V1)

August 12, 2020



Photograph 2 – Distribution Line

White Birch Hardwood and Mixedwood (V4)

July 11, 2020



Photograph 3 – Distribution Line
Aspen Hardwood (V5)

August 11, 2020



Photograph 4 – Distribution Line
Jack Pine Conifer (V24)

July 11, 2020



Photograph 5 – Distribution Line
Jack Pine-Black Spruce/Feather Moss (V28)

July 8, 2020



Photograph 6 – Lake St. Martin Outlet Channel
Basin Bog

August 12, 2020



Photograph 7 – Distribution Line
Basin Fen

July 9, 2020



Photograph 8 – Lake St. Martin Outlet Channel
Horizontal Fen

July 10, 2020



Photograph 9 – Lake St. Martin Outlet Channel
Stream Fen

July 7, 2020



Photograph 10 – Lake Manitoba Outlet Channel
Class II

August 6, 2020



Photograph 11 – Lake Manitoba Outlet Channel
Class III

July 6, 2020



Photograph 12 – Lake Manitoba Outlet Channel
Class IV

July 7, 2020



Photograph 13 – Lake Manitoba Outlet Channel
Class V

July 6, 2020



Photograph 14 – Lake Manitoba Outlet Channel
Basin Swamp

July 8, 2020



Photograph 15 – Lake St. Martin Outlet Channel
Lacustrine Swamp

August 10, 2020



Photograph 16 – Distribution Line
Lagg swamp

July 10, 2020



Photograph 17 – Distribution Line
Riverine Swamp

August 11, 2020



Photograph 18 – Distribution Line
Unconfined Flat Swamp

August 8, 2020



Photograph 19 – Lake Manitoba Outlet Channel
Agricultural Cropland

August 8, 2020



Photograph 20 – Lake Manitoba Outlet Channel
Bare Rock, Gravel and Sand

APPENDIX

G 2020 PROJECT COMPONENT RESULTS

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