

6.0 IDENTIFICATION AND EVALUATION OF ALTERNATIVE ROUTES

6.1 BACKGROUND

The Pine Falls-Manigotagan 115 kV Transmission Line (Line PQ95) Final Preferred Route was selected by a multi-step process within the overall context of the SSEA approach developed by Manitoba Hydro. The route selection process used regional and site-specific biophysical and socio-economic information as well as cost and technical factors to identify the alternative routes. A variety of sources were used, including literature reviews, field studies, interviews with local community members and stakeholders, and the Public Engagement Program (PEP), to obtain this information. Proxies for cost were used to aid in route selection. The Final Preferred Route selected is technically feasible, environmentally favourable and socially acceptable.

The Manigotagan Corner Station Site was determined primarily by engineering and environmental criteria. The preferred site was assessed from specific environmental discipline perspectives as well. Details on the Preferred Station Site location were integrated into the PEP process.

Chapter 3.0 describes the SSEA process for identifying the best balanced transmission line route and station site for the project. The SSEA process strives to identify a transmission route and station site that is cost effective, technically viable and will have the greatest positive and least negative effect on people and the environment.

This chapter outlines the approach used to identify and compare the alternative routes and station sites, and identifies a Final Preferred Route and station site. This chapter also provides background information for understanding the environmental effects for which mitigation might be applied to the project.

6.2 PUBLIC ENGAGEMENT PROGRAM AND THE ROUTE SELECTION PROCESS

An important element of the transmission route and station site selection process was integration of feedback from the public. This included sharing project information with local and regional community representatives, various stakeholders including resource users and managers, non-government organizations, potentially affected landowners and the public in general. To guide this process, Manitoba Hydro developed a two-round PEP for the Project. Each round of public engagement included:

- open houses;
- meetings with elected officials, municipalities;
- workshops with holders of ATK;

- key person interviews with individuals having knowledge of specific resource issues;
- one-on-one meetings and other communications with individual landowners.

During each round of PEP, interested parties were invited to share knowledge and offer their opinions about the project. This included the selection of routes as well as the station site. Feedback from the PEP was integrated into each stage of the route selection process for the transmission line. The preferred site for the Manigotagan Corner Station was presented as part of the PEP for the project.

A detailed description of the PEP is provided in Chapter 5.0.

6.3 ROUTING CONSTRAINTS AND OPPORTUNITIES

The transmission route selection process used several standard criteria and mapping tools to aid in comparing the alternative routes. In particular, a list of routing constraints and opportunities was developed for routing the transmission line. These included biophysical and socio-economic constraints; engineering and cost constraints and routing opportunities.

Each of these is further described below.

6.3.1 Biophysical and Socio-economic Constraints

The routing constraints and opportunities were developed based on Manitoba Hydro's previous experience with similar transmission line projects, input from technical environmental specialists, and any features known within the Project Study Area.

The list of biophysical and socio-economic constraints that were applied to this project is as follows:

Biophysical Constraints:

- known rare and endangered species and habitats;
- habitat of wildlife species important to the region;
- major wetlands;
- watercourse crossings;
- shelterbelts, and private woodlots; and
- special protected and conservation areas such as Wildlife Management Areas and provincial parks.

Socio-economic Constraints:

- communities and areas of residential development;
- rural dwellings and farmyards;

- trappers cabins;
- areas designated for known future development;
- interference with airstrips and communication towers;
- designated recreation areas;
- areas of known heritage and archaeological significance; and
- areas of cultural and traditional significance to local communities.

The socio-economic and biophysical constraints were also refined into a priority list, referred to as Valued Environmental Components. The purpose of the VECs was to assess the project alternatives based on those elements that were most important to the area. VECs were used as a guide to identify sensitivities particularly at route comparison stage. The list of VECs, along with the rationale for their selection, is provided in Table 3-1 and Table 3-2 in Chapter 3.0.

6.3.2 Engineering and Economic Constraints

Capital costs for materials and construction were considerations in the alternative route identification and selection process. In general, capital costs increase with line length, number of heavy angle structures and routing complexities.

Capital costs are proportional to line length. Heavy angle structures, special structures used to redirect the transmission line, are a substantial cost premium over suspension structures on straight line segments. A consideration in identifying alternative routes was therefore to limit transmission line length and minimize route complexities. Line length and the number of heavy angle structures were used as a relative proxy for variation in cost.

6.3.3 Routing Opportunities

6.3.3.1 Linear Features

A limited number of features in the Project Study Area offered potential routing opportunities for the transmission line. With the exception of those man-made features in the Powerview-Pine Falls area, routing opportunities traversing the length of the Project Study Area were limited to the PR #304 and the 66 kV sub-transmission line which follows that road. Technical and safety issues limit the physical use of the PR road allowance; however, following adjacent to this road was considered an opportunity.

Following adjacent to the 66 kV sub-transmission line was considered a routing opportunity in areas where the sub-transmission line was straight over longer distances.

Following municipal road allowances was also considered to be a routing opportunity.

6.3.3.2 Provincial Crown Land

With the exception of lands immediately within Powerview-Pine Falls, the Project Study Area was identified essentially as provincial Crown Land. Provincial Crown Lands do have resource related activity associated with it, including Aboriginal traditional and cultural areas of local significance. Map 6-1 illustrates the extent of provincial Crown Land as well as lands under private ownership. Unencumbered Crown Lands were considered to be a routing opportunity.

6.3.3.3 Manitoba Hydro Owned Land

Manitoba Hydro-owned lands are generally recognized as routing opportunities for transmission lines. Routing opportunities however had to be considered within the context of other routing considerations as well as the potential environmental sensitivities within each land parcel.

Lands in the Project Study Area which are under Manitoba Hydro entitlement are generally located adjacent to the Winnipeg River and associated tributaries. These lands have been acquired as part of water reserve rights associated with the Pine Falls Generating Station. They are located upstream from the Pine Falls Generating Station in the Powerview-Pine Falls area.

There are no existing transmission lines that provide opportunities for routing this new line. However, Manitoba Hydro owns a 66 kV sub-transmission line (referenced above) that is located immediately adjacent to the PR #304 from Powerview-Pine Falls to Manigotagan and beyond. It crosses the provincial road several times and is adjacent to both sides of the PR #304 for varying distances.

Map 6-2 above identifies those lands under Manitoba Hydro entitlement on the north side of the Winnipeg River and Pine Creek in the Powerview-Pine Falls area. This map also identifies the location of the 66 kV sub-transmission line relative to PR #304 in this area.

6.3.3.4 Private Property

In general, private property is avoided where possible when routing transmission lines. Where it is not practical to do so, developed private properties such as those with residences, commercial or light industrial assets, are avoided to the extent possible. Less developed private property such as forage crop, grasslands, pasturelands, unattended woodlots or marginal annual crop production tend to be more desirable for routing than developed private properties. Effects on private property can be minimized by following municipal road allowances, half mile lines or property boundaries where practical.

6.4 ROUTE SELECTION PROCESS

A three phased approach was applied to identify, evaluate and compare alternative routes. The approach assessed alternative routes in a systematic manner which resulted in a final route preference. Phase I began in mid-2011 with the identification of a Project Study Area and preliminary alternative routes. The PEP was initiated during this phase as well. Phase II began with the refinement of the preliminary alternative routes and implementation of an enhanced PEP. This phase, which spanned throughout 2012, compared and evaluated viable alternative

routes and identified a Preferred Route. Phase III focused on optimizing the Preferred Route in late 2012 to identify the Final Preferred Route.

During each phase, updated and more detailed biophysical, socio-economic, and stakeholder information was incorporated into the route selection process.

The approach to the public engagement process, the review of publically available information and results recorded from fieldwork activities are detailed in Chapter 5.0, and accompanying technical reports.

The following is a more detailed description of each phase:

Phase I:

Phase I of the routing process began in early 2011. It identified a reasonably wide Project Study Area based on high-level biophysical, socio-economic, engineering and economic constraints as described in Chapter 3.0. Preliminary Alternative Routes were identified in order to receive feedback from local level provincial and federal government agencies, stakeholders and from community representatives and resource users (Map 6-3).

The alternative routes identified in early 2011 were site investigated to confirm route viability. Initial feedback was received from various local community representatives, regional government agencies which supported a preference to locate the Alternative Routes closer to PR #304, if possible.

The Phase I Study Area and Preliminary Alternative Routes are illustrated in Map 6-1. Feedback for the initial 2011 PEP is available in the Public Engagement Program Technical Report (Maskwa et al. 2012).

Phase II:

Phase II began in mid-2012 with refining the alternative routes to accommodate initial feedback from the 2011 PEP. These refined alternative routes were then compared and evaluated based on biophysical, socio-economic, additional community and stakeholder information from the ongoing PEP as well as technical and cost considerations.

The following Phase II steps were followed:

1. Refinement of alternative routes to be located closer to PR #304;
2. Field investigations of the alternative routes;
3. Ongoing collection of ATK and continuation of the PEP;
4. Qualitative and quantitative comparison of alternative routes;
5. Identification of the Preferred Route.

A detailed description of the ATK is available in the Cultural Resources Technical Report (NLHS 2012a). Details of Rounds 1 and 2 PEP are provided in Chapter 5.0 and the Public Engagement Program Technical Report (Maskwa et al. 2012).

Phase III:

Phase III was designed to complete a more detailed level of investigation of the Preferred Route. This phase focused on integrating feedback from the PEP, particularly at the local level. Field investigations and the ATK process provided site specific environmental information and community related knowledge to be considered for the final route refinements and the initial identification of possible mitigation measures. Local level and community input, including individual landowners and stakeholders was used to make final routing adjustments, where practical.

The following steps were completed as part of the Phase III process:

1. Identification of possible route refinements based on input from directly affected landowners, community representatives, regional agencies and resource stakeholders;
2. Communication with landowners regarding route re-alignments or refinements;
3. Finalizing a preferred route. On-going communication and discussions with private landowners whose land were affected, or felt that the transmission line's proximity to their land when on adjacent properties, affected them in some way was important in this process.

6.5 ALTERNATIVE ROUTE IDENTIFICATION

As part of Phase II, the three original Alternative Routes (A, B and C) were modified and transferred onto available orthophoto imagery and topographic base maps. Routing constraints and opportunities were applied for refining the alternative routes. Alternative Route A was designed to follow PR #304 as much as possible. Alternative Route C provided a least cost and least environmental distance disruption option. Alternative Route B was a blend of both A and C. The Alternative Routes were identified based on the routing constraints and opportunities identified in Section 6.6.1.

All Alternative Routes were in close proximity to each other, with the greatest separation among them being approximately 3.5 km. These routes were also in close proximity to PR #304. Because of their proximity to one another, the routes were designed to be independent, however, practical crossovers onto other route segments were considered at the final route selection stage to address specific issues.

The Alternative Routes A, B, and C were reviewed by technical specialists with expertise in aquatics, forestry, wildlife, land use, socio- economic, vegetation, heritage and ATK disciplines. Specialists obtained publically available information pertaining to their discipline, (including the review of Manitoba Hydro's existing data bases). As the three alternative routes were located in

close proximity to PR #304 as well as each other, variances in environmental effects were anticipated to be modest. This was confirmed in the results of these technical field studies.

Map 6-3 provides the location of the Phase II Alternative Routes. Each Alternative Route is described below in further detail.

6.6 ALTERNATIVE ROUTE COMPARISON AND EVALUATION

6.6.1 Preliminary Alternative Route Description

Phase II identified three Alternative Routes; A, B and C. Each Alternative Route is described below as well as being spatially illustrated in Maps 6-4, 6-5 and 6-6.

All Alternative Routes originate at the Pine Falls Generating Station Switchyard, located south of the Pine Falls Generating Station. They proceed north as an underground cable from the switchyard to the Pine Falls Generating Station. They then cross the Winnipeg River using existing conductor cable trays located on the underside of PR #304. This portion of road uses the spillway side of the Pine Falls Generating Station to cross the Winnipeg River. On the north shore of the Winnipeg River, the suspended cables will connect to conductors located on the transmission towers.

Alternative Route A

From this point, Alternative Route A proceeds north, in the Rural Municipality of Alexander, along the west side of PR #304 for 0.9 km. Along this section, Alternative Route A encroaches on seven residential properties. Alternative Route A turns east and crosses PR #304 and the western end of Dufort Road and proceeds east for 1.0 km, while encroaching on two residential properties and two business properties (one commercial and one agricultural) before entering Manitoba Hydro property. Alternative Route A turns northeast and proceeds through a combination of Manitoba Hydro and private agricultural property, then crosses Broadlands Road. It proceeds north-northeast for 0.5 km and crosses PR #304 onto provincial Crown Land.

From this point north to the Manigotagan Corner Station Site, Alternative Route A is located on provincial Crown Land currently designated as Forest Management Licence 01. Alternative Route A follows on the west side of PR #304, for approximately 20 km before crossing PR #304 to follow along the east side of PR #304 for 22 km. Along this line segment the O'Hanly and Black Rivers are crossed. Alternative Route A then crosses PR #304 and follows along and relatively adjacent to the west side for 17 km, crossing Sandy River in this line length. Along this line length, Duncan Creek meanders are crossed several times. The route then crosses PR #304 to the east side following relatively adjacent to PR #304. The Manigotagan River is crossed in the line length and then the route follows PR #304 for 6 km to reach the Manigotagan Corner Station Site.

Alternative Route A follows adjacent to the PR #304 for the majority of the line length. Separation from PR #304 varies from several hundred metres to less than two kilometers.

Map 6-4 identifies the location of Alternative Route A.

Alternative Route B

From this point, Alternative Route B proceeds north, in the Rural Municipality of Alexander, along the west side of PR #304 for 0.9 km, where it crosses the North Shore Road. Along this distance, Alternative Route B encroaches on seven residential and one commercial property. Alternative Route B crosses PR #304 and proceeds east for 1.1 km, while encroaching on one residential property and two business properties (one commercial and one agricultural) before entering Manitoba Hydro property. Alternative Route B turns northeast for 0.4 km, where it is located on a combination of Manitoba Hydro and private agricultural property and crosses Broadlands Road. It proceeds north-northeast for 0.5 km and crosses PR #304 onto Provincial Crown Land.

From this point north to the Manigotagan Corner Station Site, Alternative Route B is located on provincial Crown Land currently designated as Forest Management Licence 01. Alternative Route B follows on the west side of PR #304, for approximately 28 km before crossing the O'Hanly River then to the east side of PR #304. It follows a northerly direction for 8 km to cross the Black River in this line length. This line length is separated from PR #304 by a maximum distance of about 3.5 km.

There is a trapper cabin located along the Black River to the west of Alternative Route B. Alternative Route B then proceeds northward for 13 km and crosses PR #304. It follows along and relatively adjacent to the west side for 10 km, crossing Sandy River at the southern extent and several meanders of Duncan Creek at the northern extent of this line length. The route then crosses PR #304 to the east side following at a maximum separation of 2 km from PR #304 to reach the Manigotagan Corner Station Site. The Manigotagan River is crossed in this line length.

Alternative Route B follows adjacent to, as well as maintains some separation from PR #304. Separation from PR #304 varies from several hundred metres to less than 3.5 kilometers, however the majority of line length is within one kilometer of the road.

Map 6-5 spatially identifies the location of Alternative Route B.

Alternative Route C

From this point, Alternative Route C proceeds north, in the Rural Municipality of Alexander, along the west side of PR #304 for 130 metres (m) while located on property owned by Manitoba Hydro. Alternate Route C turns east-northeast and crosses to the east side of PR #304 and proceeds for 0.7 km to the west side of Pine Creek. This segment is located primarily on provincial Crown Land and Manitoba Hydro property. It does however encroach on approximately 75 m of private business forestland and runs along the south side of a private business access road for 220 m. This access road is located on private and Manitoba Hydro

property. This segment also runs parallel to the Winnipeg River with a separation that ranges from 25 to 150 m. A private business boat launch, constructed on Manitoba Hydro property, is located on Pine Creek approximately 60 m east of the end of this segment. Alternative Route C turns north-northeast, crosses the private business access road, and proceeds for 0.4 km on Manitoba Hydro property. There is a separation of less than 0.1 km from Pine Creek on portions of this segment. This route turns northeast and proceeds for 0.8 km to the north side of Broadlands Road. This segment parallels Pine Creek, with separation in some locations of less than 0.1 km. Alternative Route C proceeds north-northeast for 0.5 km, then crosses PR #304 and onto provincial Crown Land.

From this point north to the Manigotagan Corner Station, Alternative Route C is located on provincial Crown Land currently designated as Forest Management Licence 01. Alternative Route C follows adjacent to the west side of PR #304, for approximately 4 km before redirecting in a northerly direction for 13 km, and separating from PR #304 for a maximum of 3.5 km. The route then crosses to the east side of PR #304 and travels adjacent to the east side for a distance of 20 km. In this line length, the O'Hanly and Black Rivers are crossed. After crossing PR #304 to the west side again, Alternative Route C travels north for 17 km, deviating from the PR #304 to a maximum distance of 3.5 km during this line length. Sandy River and Duncan Creek are also crossed in the line length. Alternative Route C crosses the PR #304 and proceeds for another 13 km to the Manigotagan Corner Station Site. The Manigotagan River is crossed in this line length.

Alternative Route C follows adjacent to, as well as maintains some separation from PR #304. Separation from PR #304 varies from several hundred metres to less than 3.5 km, however the majority of line length is within one kilometer of PR #304.

Map 6-6 spatially identifies the location of Alternative Route C.

6.7 ALTERNATIVE ROUTE COMPARISON AND EVALUATION

6.7.1 Alternative Routes Environmental Comparison

The VECs were used to aid in comparing the Alternative Routes. Evaluation criteria to reflect technical and cost considerations and other biophysical and socio-economic components were also used to assist in the route comparisons. These are identified in Section 6.8 in Table 6-3 Route Comparison Matrix for Assessment of Alternative Routes A, B and C. A detailed qualitative assessment of the alternative routes was also completed to provide further description of the evaluation criteria and context for their effects from each alternative route.. The following is a summary by discipline, of that qualitative assessment for Alternative Routes A, B and C.

The aquatic evaluation of the Alternative Routes included VECs (important fish habitat; marginal fish habitat) as well as a number of criteria including the number of watercourses crossed,

whether watercourses were natural (e.g., creeks, rivers, lakes) or anthropogenic (man-made, such as highway drainage channels, borrow pits and quarries), the angle at which the proposed route would cross the watercourse and the potential type of fish habitat present at the crossing site. With respect to crossing angle, transmission line crossings that are perpendicular (or as close to perpendicular as possible) to watercourses are preferred. Perpendicular crossings tend to minimize the extent of effects on riparian vegetation whereas transmission line crossings not at a perpendicular angle could potentially result in more riparian vegetation being cleared. A qualitative assessment of potential fish habitat was based largely on analysis of orthophoto images, as well as knowledge of the watercourses. Fish habitat was categorized as Important, Marginal or None. Important fish habitat focussed on perennial watercourses that contain water and flow year-round, and likely to have sufficient depth for overwintering of fish. All major rivers (O'Hanly, Black, Sandy, and Manigotagan) were classified as Important Fish Habitat. Marginal fish habitat was represented by intermittent water courses, where water or water flow may not be present year-round, and where water depth is likely shallow enough to enable freezing to the bottom in winter. Intermittent watercourses were those waterbodies that provided fish habitat for a portion of the year. Watercourses containing no fish habitat lacked water for most of the year. For the assessment of the three Alternative Routes, only the highway drainage channels that appeared to lack water on the orthophotos were classified as having no fish habitat.

Alternative Route A

Alternative Route A has a total of 20 watercourse crossings. This includes crossings on 15 natural water features (creeks, rivers) and five man-made water features (highway drainage channels). Of the 15 water crossings on natural watercourses, five were on Duncan Creek. This low gradient creek meanders through a low-lying area, which is flooded year-round. Alternative Route A crosses Duncan Creek five times on these meanders. While there is generally no riparian forest vegetation at these locations (the crossing sites are mainly aquatic plant species including cattails and rushes), the wet area surrounding Duncan Creek is considered a sensitive site. Of the watercourse crossing locations assessed for Alternative Route A, four were identified as containing important fish habitat. These were the O'Hanly, Black, Sandy and Manigotagan Rivers. Fourteen crossing locations have marginal fish habitat, and two locations have no fish habitat. Alternative Route A crosses the watercourse at a perpendicular angle (or nearly so) at 13 crossing locations, and at an oblique (more of a tangent angle) at seven locations. The majority of the angled crossings are due to the multiple crossings of Duncan Creek. Field assessments were carried out at some of the crossing locations of Alternative Route A. The crossing location of Alternative Route A on the Black River (both banks) and the Sandy River (north bank) is rated as having low bank stability due to clay-based soils and beaver activity. There is evidence of erosion at the site. There are no known fish spawning areas at any of the crossing sites for Alternative Route A.

Alternative Route B

Alternative Route B has a total of 23 watercourse crossings. This includes crossings on 14 natural water features (creeks, rivers) and nine man-made water features (highway drainage

channels). Of the 14 water crossings on natural watercourses, five were on Duncan Creek. This low gradient creek meanders through a low-lying area which is flooded year-round. Alternative Route B crosses Duncan Creek five times on these meanders. While there is generally no riparian forest vegetation at these locations (the crossing sites are mainly aquatic plant species including cattails and rushes), the wet area surrounding Duncan Creek is considered a sensitive site. Of the watercourse crossing locations assessed for Alternative Route B, only four were identified as containing important fish habitat. These were the O'Hanly, Black, Sandy and Manigotagan Rivers. Fifteen crossing locations have marginal fish habitat, and four locations have no fish habitat. Alternative Route B crosses the watercourse at a perpendicular angle at 13 crossing locations, and at an oblique at 10 locations. There are no known fish spawning areas at any of the crossing sites for Alternative Route B.

Alternative Route C

Alternative Route C has a total of 11 watercourse crossings. This includes crossings on 9 natural water features (creeks, rivers) and two man-made water features (2 water-filled borrow pits along PR #304). In contrast to Alternative Routes A and B, Alternative Route C only crosses Duncan Creek at one site. Of the watercourse crossing locations assessed for Alternative Route C, four were identified as containing important fish habitat. These were the O'Hanly, Black, Sandy and Manigotagan Rivers. Seven crossing locations have marginal fish habitat, and there are no locations that have no fish habitat. Alternative Route C crosses the watercourse at a perpendicular angle at eight crossing locations, and at an oblique angle at three locations. Field assessments were carried out at some of the crossing locations of Alternative Route C. The crossing location of Alternative Route C on the Black River (both banks) is rated as having low bank stability due to clay-based soils and beaver activity. There is evidence of erosion at the site. There are no known fish spawning areas at any of the crossing sites for Alternative Route C.

The detailed aquatics assessment is available in the Aquatic Environment Technical Report (Miette 2012).

6.7.1.1 Forestry

The Powerview-Pine Falls community area, located north of the Pine Falls Generating Station, is privately owned land, a portion of which is owned by Manitoba Hydro. The remainder of the Project Study Area lies on provincial Crown Land. As the forestry effect on Crown Land is very similar for all three alternative routes, this component did not influence the route selection process.

The forestry assessment for each of the alternative routes was based on the following two VECs:

- productive forestlands; and
- high value forest sites.

Alternative Route A

The forestry effect on private land forest values is similar for Alternative Routes A and B. Alternative Route A affects 427 m of shelterbelts, 90 aesthetic trees and 3.1 hectares (ha) of natural forest area.

Alternative Route A, although marginally, has the highest effect on productive forestland (354.8 ha), the second highest effect on high value reforestation sites (17.3 ha) but does not affect any research and monitoring sites on provincial Crown Land.

The ATK identified forest values include firewood collection areas within all three alternative routes. Alternative Route A may result in a positive effect through the generation of firewood during construction. There were no negative effects to ATK forest value identified.

Alternative Route B

The forestry effect on private land forest values is similar for Alternative Routes A and B. Alternative Route B affects 352 m of shelterbelts, 94 aesthetic trees and 3.0 ha of natural forest area.

Alternative Route B has the second highest effect on productive forestland (353.2 ha), the highest effect on high value reforestation sites (23.5 ha) but does not affect any research and monitoring sites on provincial Crown Land.

ATK identified forest values include firewood collection areas within all three alternative routes. The Alternative Route B may result in a positive effect through the generation of firewood during project construction. There were no negative effects to ATK forest value identified.

Alternative Route C

In the Powerview-Pine Falls area, Alternative Route C avoids all residential properties and does not affect any private land shelterbelts or aesthetic trees. Alternative Route C affects 1.7 ha of natural forest area thereby having the least effect on private land forest values.

The remainder of Alternative Route C is located on provincial Crown Land. The VECs related forestry effect on crown is very similar for all three alternative routes and should not influence the route selection process. Alternative Route C marginally has the least effect on productive forestland (342.3 ha) and high value reforestation sites (16.3 ha) but does not affect any research and monitoring sites.

ATK identified forest values include firewood collection areas within all three alternative routes. Alternative Route C may result in a positive effect through the generation of firewood during project construction. There were no negative effects to ATK forest value identified.

Based solely on the private land forest values effect, Alternative Route C or the southern private land segment of Route C would be the preferred route option from a forestry perspective.

The detailed forestry assessment is provided in the Forestry Technical Report (Maskwa 2012a).

6.7.1.2 Cultural Resources

Each of the Alternative Routes begins at the Pine Falls Generating Station switchyard and terminates at the Manigotagan Corner Station near the community of Manigotagan. The location of alternative routes became the basis of discussion with the communities during the ATK workshops. Once the workshops were completed, the gathered information was analyzed along with the map data provided by each of the participating communities. The data of the ATK was then identified as Cultural Resources. Further ATK shared through the key person interviews to identify Cultural Resources was also included. This information, in the form of ATK overview summaries, was used to evaluate each of the Alternative Routes. Where Cultural Resources interacted with the Final Preferred Route, the resource became identified as a Culturally Sensitive Site (CSS).

Cultural Resources represent areas that participating communities discussed and identified on 1:50,000 scale National Topographic Survey sheets. These sites were represented on map sheets as points, lines or polygons to highlight where potential interaction with cultural resources may occur. The following is a summary of ATK identified Cultural Resources along each of the Alternative Routes.

Alternative Route A

A total of 27 Cultural Resources were determined to intersect Alternative Route A from the Pine Falls Generating Station switchyard to the proposed Manigotagan Corner Station Site.

The nature of these Cultural Resource sites include:

- berry picking areas;
- wood collection for personal use;
- trapping regions;
- heritage areas of concern;
- moose crossing and calving regions at the Wanipigow, Manigotagan and Sandy Rivers;
- medicinal plant harvesting;
- duck and eagle habitat; and
- fish spawning areas.

Alternative Route B

A total of 29 Cultural Resources were determined to intersect Alternative Route B from the Pine Falls Generating Station switchyard to the proposed Manigotagan Corner Station Site.

The nature of these Cultural Resources include:

- berry picking areas,
- wood collection for personal use as fuel,

- trapping regions,
- heritage areas of concern,
- moose crossing and calving regions at the Manigotagan, Sandy and Black Rivers,
- medicinal plant harvesting,
- an eagle nesting region along the O'Hanly River up to the bridge crossing at PR #304, and
- fish spawning areas.

Alternative Route C

A total of 26 Cultural Resources were determined to intersect Alternative Route C from the Pine Falls Generating Station switchyard to the proposed Manigotagan Corner Station Site.

The nature of these Cultural Resource sites include:

- berry picking areas;
- wood collection for personal use such as fuel;
- trapping regions;
- heritage areas of concern;
- moose crossing and calving regions at the Manigotagan, Sandy and Black Rivers;
- medicinal plant harvesting;
- duck and eagle habitat; and
- fish spawning areas.

A more detailed description of the Cultural Resources assessment is available in the Cultural Resources Technical Report (NLHS 2012a).

6.7.1.3 Heritage Resources

A heritage resources assessment of Alternative Routes A, B and C began with a desktop study to identify areas of high heritage potential occurring within a 100 m buffer of each routing option. This was followed by a review of existing heritage site inventories, background research, a literature review, collection of ATK, and favourable environmental attributes selected based on professional judgment. Field investigations were conducted where access permitted, to determine the presence of heritage resources.

ATK concerning heritage resources was derived from knowledge shared by Elders and resource users during several workshops and was applied to the Alternative Routes. Existing studies were reviewed to identify areas of overlap in the knowledge base. Available studies indicated ATK east of the study area. Traditional knowledge regarding land use was used to determine if any heritage sites were located within the alternative route ROWs.

The Alternative Routes are situated close together and in some instances overlap one another; accordingly all three routes were examined using the same criteria for the desktop study. The field investigation was also conducted on the Final Preferred Route to assess the effects on heritage resources.

No known heritage sites were registered within the alternative route ROWs based on information gathered from the Historic Resource Branch of Manitoba Culture, Heritage, and Tourism. However, in gathering information for the Alternative Routes, a few issues related to heritage were identified.

Alternative Route A

Heritage resources information derived from ATK for Alternative Route A had identified potential for heritage resources that have not yet been verified and are not part of the provincial archaeological inventory. Three sites were identified through ATK and included unmarked burials, and areas related to a 1950s plane crash; 17 water crossings were also recorded. Waterbodies are environmental attributes that are considered to have high potential for heritage resources. Although 17 river crossings were identified, only four were deemed large enough for human transportation and thus were considered for potential heritage concern. The Manigotagan River, Sandy River, Black River and O'Hanly River are sizable enough to allow for transportation and might have unknown heritage resources.

Alternative Route B

Alternative Route B is located very close to Alternative Route A. As a result the considerations for heritage were similar. Route B intersects 18 water crossings however heritage concerns focused on the larger river systems; the Manigotagan River, Sandy River, Black River and O'Hanly River. Alternative Route B contained three areas identified through ATK including a trapper's cabin, unmarked burials and a 1950s plane crash site.

Alternative Route C

Heritage assessment along Alternative Route C was similar to Alternative Routes A and B. The ATK information included two areas; an unmarked burial, and a 1950s plane crash site. Of the 14 water crossings that Alternative Route C intersects, the Manigotagan River, Sandy River, Black River and O'Hanly River were a heritage concern. However based on this assessment, Alternative Route C was the preferred option due to the one less ATK area and fewer water crossings.

A detailed Heritage Resources assessment is provided in the Heritage Resources Technical Report (NLHS 2012b).

6.7.1.4 Wildlife

The wildlife assessment of Alternative Routes A, B and C used a desktop study to identify measureable differences among the routes. The evaluation of alternative routes for wildlife considered VECs (moose, American marten, bald eagle, spruce grouse, olive-sided flycatcher,

and Canada warbler) and their habitat. Habitat was modeled for the six VECs and the amount of habitat altered on each route was estimated. Additional criteria were used to describe differences among the Alternative Routes. The length of the routes was used as an estimate of the amount of habitat each would alter, where a longer route would alter more habitat than a shorter one. Riparian areas typically support a greater diversity of wildlife species than upland areas, and the number of natural and man-made watercourses crossed by each route was considered, where the fewest crossings would have the smallest effect on most wildlife species. The average distance of each route to PR #304 was measured as an indicator of habitat fragmentation. The more closely a route follows the existing ROW, the smaller the expected effect of habitat fragmentation on wildlife.

A detailed wildlife assessment is provided in the Wildlife Technical Report (WRCS 2012).

Alternative Route A

Alternative Route A is 72.7 km in length; the longest of the three routes. This route would cross the greatest amount of wildlife habitat. As indicated in the aquatics assessment, Alternative Route A crosses 20 watercourses, 15 natural and five man-made. Five of the natural watercourse crossings are at Duncan Creek, where there is generally no riparian forest habitat, only aquatic vegetation. This route would intersect marginally more riparian wildlife habitat than Alternative Route C, but less than Alternative Route B. The average distance of this route to PR #304 is 0.6 km and it would fragment marginally less habitat than Alternative Routes B and C.

Alternative Route B

At 72.0 km in length, Alternative Route B is marginally shorter than Alternative Route A, but the amount of habitat alteration would be similar on both routes. As indicated in the aquatics assessment, Alternative Route B crosses the most watercourses of the three routes (23 crossings). Five of the watercourse crossings are at Duncan Creek, where there is generally no riparian forest habitat, only aquatic vegetation. This route would intersect the most riparian wildlife habitat. The average distance of the route to PR #304 is 0.9 km; which would result in slightly more habitat fragmentation than Alternative Route B and slightly less fragmentation than Alternative Route C.

Alternative Route C

Alternative Route C is 69.9 km in length, the shortest of the three routes. Although it is expected to alter the smallest amount of wildlife habitat, Alternative Route C is only marginally shorter than Alternative Routes A and B. It crosses 11 watercourses, 9 natural and 2 man-made, the fewest of the three routes, and therefore, this route would intersect with the least amount of riparian wildlife habitat. The average distance of the route to PR #304 is 1.1 km and it would fragment marginally more habitat than Alternative Routes A and B.

Valued Environmental Components

Moose

Alternative Route A crosses the least amount (33%) of primary moose habitat. However, the amount altered by Alternative Routes B and C would be only marginally greater (38% and 34%, respectively). Alternative Routes A, B, and C cross similar amounts of secondary moose habitat (29%, 29%, and 32%, respectively).

As Alternative Route A follows PR #304 for the majority of its length, browse on the ROW could attract moose to the road on this route, increasing the risk of wildlife-vehicle collisions, and the harvest of moose near the road. Alternative Routes B and C are slightly more likely to enhance hunting effects further from the road, but would reduce the risk of wildlife-vehicle collisions.

American Marten

Alternative Route A crosses the least amount (45%) of American marten habitat. However, Alternative Routes B and C cross a marginally greater amount (49% and 47%, respectively). American martens prefer mature forest to younger forest and openings, thus the effects of habitat fragmentation would be smallest on Alternative Route A. As Alternative Route A follows PR #304 for the majority of its length, it would provide less access for trapping. Alternative Routes B and C are slightly more likely to enhance trapping effects on marten further from the road.

Bald Eagle

Alternative Route C crosses the least amount of bald eagle habitat (11%). However, Alternative Routes A and B cross only a marginally greater amount (14%). Bald eagles tend to fly along waterways, and Alternative Routes A and B, which cross more streams, would increase the risk of bird-wire collisions. ATK indicated bald eagle habitat on Alternative Routes A and C, and an eagle nesting region was identified on Alternative Route B.

Spruce Grouse

Alternative Route A crosses the least amount (42%) of spruce grouse habitat. However, Alternative Routes B and C cross only a marginally greater amount (46%). As Alternative Route A follows PR #304 for the majority of its length, it would limit the amount of new access for hunting. Alternative Routes B and C are slightly more likely to enhance hunting effects further from the road.

Olive-sided Flycatcher

Each alternative route crosses a relatively large amount of olive-sided flycatcher habitat. There is virtually no difference between the habitat intersected by Alternative Routes A, B and C (83%, 83% and 84% respectively).

Canada Warbler

Each alternative route crosses a relatively large amount of Canada warbler habitat. There is virtually no difference between the habitat intersected by Alternative Routes A, B and C (12%, 11% and 11% respectively).

6.7.2 Land Use

Alternative Routes A, B and C all originate just outside of the Town of Powerview-Pine Falls and proceed north, generally following PR #304, to the proposed Manigotagan Corner Station Site, located east of Manigotagan, Manitoba. All three alternative routes avoid the Observation Point Wildlife Management Area, Manigotagan River Provincial Park, and the First Nations and Metis communities located in the Project Study Area (Map 6-7).

Alternative Route A

Alternative Route A begins by following PR #304 and the existing 66 kV sub-transmission line as it travels north from the Pine Falls Generating Station Switchyard, across to the north side of the Winnipeg River and travelling within 100 m of seven residences. Alternative Route A then heads east along a government road allowance and then heading north across agricultural land to cross Broadlands Road and then PR #304. Two additional residences and one commercial operation are also in proximity. Alternative Route A then continues north through provincial Crown Land, travelling within several kilometres of PR #304, crossing it again between the Black River and Powerview-Pine Falls. It crosses PR #304 again a few kilometres north of the Black River, and a few kilometres south of Manigotagan. Alternative Route A passes west of Manigotagan River Provincial Park and within approximately 500 m of Manigotagan community before turning east to connect to the Manigotagan Corner Station.

Alternative Route B

Alternative Route B also begins by following PR #304 north from the Pine Falls Generating Station switchyard, across to the north side of the Winnipeg River. On the north side of the Winnipeg River, this route travels within 100 m of seven residences, before turning east along a government road allowance and then heading north across agricultural land to cross Broadlands Road and PR #304. Two commercial operations are in close proximity. Alternative Route B crosses provincial Crown Land, and follows Alternative Route A until Alternative Route A crosses PR #304 for the second time. At this location, between Black River and Powerview-Pine Falls, Alternative Route B continues to go northwest before turning north and crossing PR #304 at O'Hanly River. Alternative Route B passes approximately 150 m west of a trapper's cabin on the north side of Black River. It then continues straight north through provincial Crown Land, including two more crossings of PR #304 near Sandy River and Duncan Creek. Alternative Route B passes west of Manigotagan River Provincial Park and approximately 1 km east of Manigotagan before turning east to reach the Manigotagan Corner Station Site.

Alternative Route C

Alternative Route C, following the same route as Alternative Routes A and B to the north side of the Winnipeg River then travels east along the Winnipeg River on provincial Crown Land, avoiding residences, before diverting northeast across commercial, agricultural, and Manitoba Hydro land. After crossing Broadlands Road and PR #304, Alternative Route C continues north on provincial Crown Land, crossing PR #304 a few kilometres north of Black River, and again near Duncan Creek. Alternative Route C passes closer to the Observation Point Wildlife Management Area than Alternative Routes A or B. Alternative Route C travels west of Manigotagan River Provincial Park and approximately 1 km east of Manigotagan before turning east to reach the Manigotagan Corner Station Site.

The three alternative routes were assessed based on the following factors:

- proximity to residences;
- proximity to other incompatible human development or infrastructure; and
- use of Crown Land or Manitoba Hydro land entitlement;

Proximity to residences

The alternative routes all travel through isolated woodland and wetlands with few or no nearby residences. On the south end, near the Town of Powerview-Pine Falls, Alternative Routes A and B travel along the existing highway ROW passing near seven residences then west where Alternative Route A passes close to one residence and a commercial operation and Route B passes close to two commercial operations. In contrast, Alternative Route C travels east of Powerview-Pine Falls and avoids residences. On the north end, Alternative Route A travels within approximately 500 m of residences in Manigotagan, while Alternative Routes B and C are located approximately 1 km east of Manigotagan.

Proximity to other incompatible Human Development or Infrastructure

All three alternative routes cross a small portion of agricultural land located immediately north of the Winnipeg River and they also cross PR #304 four times. All three alternative routes avoid Observation Point Wildlife Management Area, Manigotagan River Provincial Park, and the three First Nations in the study area.

Use of Crown Land or Manitoba Hydro Land Entitlement

All three alternative routes travel primarily across provincial Crown Land, except on the south end of the study area. In Powerview-Pine Falls, Alternative Routes A and B each use approximately three provincial Crown Land or Manitoba Hydro land entitlements, while Alternative Route C would cross approximately six such areas.

6.7.2.1 Vegetation and Rare Plants

For the comparison of Alternative Routes, several plants and one forest type were selected as VECs and are discussed below.

Bog Club Moss

Bog club moss, selected because MBCDC has ranked it as S1 (very rare). It has been found in Manitoba's Model Forest, which overlaps the study area. Little is known about its habitat requirements.

Checkered Rattlesnake Plantain Orchid

Checkered rattlesnake plantain orchid, selected because MBCDC has ranked it as S2 (rare). It has been found in Manitoba's Model Forest, which overlaps the study area. It is usually found in the deep shade of mature coniferous forests. Logging and forest fires in the study area have probably reduced the habitats where this plant is found.

Hooker's orchid

Hooker's orchid was selected because the MBCDC has ranked it as S2 (rare). It has been found in Manitoba's Model Forest, which overlaps the study area. It is usually found in dry mature coniferous and mixed forests. Logging and forest fires in the study area have probably reduced the habitats for this plant.

Ash forest

Ash forest was selected because the MBCDC has ranked black ash as S3 (uncommon). It is often a component of the canopy cover (confirmed through field work and literature review) where many other S3 plant species are found.

Vegetation Assessment of Alternative Routes

Although there are other rare and uncommon plants (MBCDC ranks S2 – S3) that have been found in the study area, the above VECs were selected because of the effects that clearing, construction and maintenance activities could have on their population numbers.

To identify potential areas where these plants might be found:

- actual occurrences of VEC species were compiled (MBCDC records);
- suitable habitats for VECs were recorded using Forest Resource Inventory (FRI) data; and
- field sites were selected for investigation.

No plant species listed by the *Species at Risk Act*, COSEWIC or under the *Manitoba Endangered Species Act* were identified in the literature or found during field studies in the study area.

Alternative Route A

Alternative Route A is favored as it avoids the greatest area of ash/elm forests. Alternative Route A is the second choice to avoid potential habitat for bog club moss.

Alternative Route B

Alternative Route B is favored to minimize effects on potential habitat for bog club moss. It is also the close second choice to avoid habitat for checkered rattlesnake plantain.

Alternative Route C

Alternative Route C is favored to minimize effects on checkered rattlesnake plantain and Hooker's orchid habitats.

A detailed vegetation assessment of the alternative routes is provided in the Vegetation Technical Report (Calyx Consulting 2012)

6.8 ALTERNATIVE ROUTES COMPARISON MATRIX AND SUMMARY

A quantitative route comparison matrix was developed to support the qualitative environmental comparison of the alternative routes. The alternative route comparison matrix included a combination of VECs as well as other important environmental and technical factors that could affect routing decisions. A qualitative summary is also appended to the comparison matrix. This matrix is provided in Table 6-1.

Table 6-1: Route Comparison Matrix for Assessment of Alternate Routes A, B and C

Alternative Route Options	A	B	C
Basic Technical			
Line Length	72.65	72.02	69.96
Number of heavy angle structures	14	12	12
Number of major road crossings	5	5	5
Areas of significant soils instability greater than 420 m	0	0	0
Aquatics			
Number of crossings of natural watercourses	15	14	9
Number of crossings of man-made watercourses	5	9	2
Aquatic VEC: Identified Important Fish Habitat	4	4	4
Aquatic VEC: Identified Marginal Fish Habitat	14	15	7
Number of crossings at perpendicular angle	13	13	8
Terrestrial Environment			
Species at Risk: Wolverine	low	low	low
Species at Risk: Other if applicable	low	low	low
Other Wildlife Habitat (hectares crossed)	low	low	low
Productive Forest Effects (hectares)	354.8	353.2	342.3
Hectares of Plantation	17.3	23.5	16.3
Research and Monitoring Sites (number intersected)	0	0	0

Table 6-1: Route Comparison Matrix for Assessment of Alternate Routes A, B and C

Alternative Route Options	A	B	C
Private Land Shelterbelts (m)	427	352	0
Private Land Aesthetic Trees (number)	90	94	0
Private Land Natural Forest (hectares)	3.1	3.0	1.7
Vegetation VEC: Bog Club Moss (hectares)	22.4	20.4	26.5
Vegetation VEC: Hooker's Orchid (hectares)	9.5	10.6	0.2
Vegetation VEC: Rattlesnake Checkered Plantain (hectares)	18.3	12.4	10.2
Vegetation VEC: Green Ash/American Elm Forest (hectares)	22.9	25.5	25.9
Mammal VEC: American Martin	low	medium	medium
Mammal VEC: Moose	low	medium	medium
Avian VEC: Canada Warbler	low	low	low
Avian VEC: Olive-sided flycatcher	low	low	low
Avian VEC: Bald Eagle	low	low	low
Avian VEC: Spruce Grouse	low	low	low
Socio-Economic Environment			
Effects on residential properties (number of properties)	5 to 10`	5 to 10	0
Effects on incompatible Human Development or infrastructure	0	0	0
Long Term Economic Development Opportunities	modest	modest	modest
Identified Sensitive Heritage Resources	3	3	2
Heritage Resources			
Heritage VEC: Identified Sensitive Heritage Resources	3	3	2
Cultural Resources			
Cultural VEC Identified ATK Areas of Cultural Concern	27	29	26
Alternative A			
Forestry: Alternative Routes A and B effects are similar; however Route A has a greater effect on private land and Alternative Route B has a greater effect on plantations.			
Vegetation: Alternative Route A is the favoured route to avoid the forests containing Elm/Ash. Alternative Route A is marginally second to avoid potential habitat for Boss Moss Club.			
Aquatics: Routes A and B crossed several meanders of Duncan Creek in addition to several stream and river crossings.			
Socio-economics: No specific route is favoured			
Land Use: Between 5 and 10 private residential properties in the Powerview-Pine Falls area will be affected. Also some agricultural lands will be affected. No existing Manitoba Hydro lands are available to be used however some Crown Lands can be used for routing.			
Culture and Heritage Resources: Routes A and B effects are similar with 27 and 29 respectively, ATK Areas of Cultural Concern Value within 100 m of the ROW edge. Routes A and B also have three identified Sensitive Heritage Resources Sites each.			
Wildlife: Slightly lower potential fragmentation effects than Routes B and C due to some segment lengths being closer to existing human features; Marginally reduces access to new areas for trapping; Negligible difference in potential habitat alteration.			
Alternative B			
Forestry: Route A and B effects are similar; however Route A has a greater effect on private land.			
Vegetation: Route B is favoured to minimize effects on Bog Club Moss. Route B is marginally second to avoid potential habitat of Checkered Rattlesnake Plantain.			
Aquatics: Routes A and B crossed several meanders of Duncan Creek as well as several stream and river crossings.			
Socio-economics: No specific route favoured			
Land Use: Between 5 and 10 private residential properties in the Powerview-Pine Falls area will be affected by Route B. Some agricultural lands will also be effected. Also a trapper's cabin is located on the north side of the Black River about 150 m west of Route B.			
Culture and Heritage Resources: Routes A and B effects are similar with 27 and 29 respectively; ATK Areas of Cultural Concern Value within 100 m of the ROW edge. Routes A and B also have three identified Sensitive Heritage Resources Sites each.			

Table 6-1: Route Comparison Matrix for Assessment of Alternate Routes A, B and C

Alternative Route Options	A	B	C
Wildlife: Slightly higher potential fragmentation effects than Route A due to some segment lengths being closer to existing human features; Marginally increases access to new areas for trapping; Negligible difference in potential habitat alteration.			
Alternative C			
Forestry: Route C has the least effect on all forestry values. Route C is marginally preferred option from a forestry aspect.			
Vegetation: Route C is the favoured route to minimize effects on potential habitat for Hooker's Orchid and Checkered Rattlesnake Plantain.			
Aquatics : Route C is marginally favoured as it avoids the Duncan Creek area.			
Socio-economics: No specific route favoured			
Land Use: In the Powerview-Pine Falls area, Route C will have greatest use of Crown Lands as well as Manitoba Hydro property. In this area, likely no residences will be directly affected by Route C, however agricultural land will be affected to a minor extent. Route C is preferred from a Land Use perspective.			
Culture and Heritage Resources: Route C is similar to Routes A and B effects however has fewer (26) ATK Areas of Cultural Concern Value within 100 m of the ROW edge. Route C also has one less (2) identified Sensitive Heritage Resources sites. Route C is favoured over Routes A and B.			
Wildlife: Slightly higher potential fragmentation effects than Route A due to some segment lengths being further from existing human features; Marginally increases access to new areas for trapping; Negligible difference in potential habitat alteration.			

The summary of results of the route comparison matrix is as follows:

Aquatics

Route C has a minor advantage over Routes A and B, from an aquatics perspective because of fewer watercourse crossings and fewer areas of marginal fish habitat.

Vegetation

Route A was slightly preferred, although Alternative Route C is favoured to minimize three effects on two VEC habitats (checkered rattlesnake plantain and Hooker's orchid).

Wildlife

Alternative Routes A and B are preferred, depending on the wildlife species being considered. Differences in habitat and fragmentation effects among the alternative routes however are marginal. Within that context however, there is a slightly greater preference for Alternative Route A, as it most closely follows PR #304 and would create marginally less access to the area, which is a concern for the declining regional moose population.

Forestry

No definite preference except on private lands where route C is preferred.

Heritage Resources

There are no existing archaeological sites within the planned development areas of the project study area; therefore there are no measurable concerns to the VEC heritage resources. However, there is the potential for unknown heritage resources to be unearthed during

construction activities. If heritage concerns arise during construction; the project archaeologist will be able to implement mitigation measures accordingly.

Cultural Resources

For the Cultural Resource VEC, Alternative Route C was chosen as the preferred option due to fewer occurrences of Cultural Resources in the form of ATK. Regarding the Cultural Resources VEC it should be noted that Route A, B and C are very similar due to the fact that all three alternative routes are within close proximity to one another and cultural resource use areas can cover large area of the landscape. All three routes contain ATK identified areas within a 50 m buffer on either side of the centreline of each alternative route.

Despite the ATK similarities that exist between the alternative routes, Route C contains fewer Cultural Resources in the form of ATK identified areas within a 100 m buffer of the route in addition to fewer water crossings (14 as opposed to 17 water crossings for Alternative Route A and 18 water crossings for Alternative Route B).

Land Use

From a Land Use perspective, Alternative Route C avoids proximity to residences and makes most use of provincial Crown and Manitoba Hydro–owned property.

Line Length

Alternative Route C has marginally the shortest line length. Using line length as a relative proxy for cost, Route C is preferred. It should also be noted however that the differences in line length among all alternative routes is modest.

Number of Heavy Angle Structures

Number of heavy angle structures is an additional proxy for project cost, as well as additional cost associated with soil stability. Alternative Route C is favoured over Alternative Routes A and B.

6.8.1 PREFERRED ROUTE

The results of the route comparison indicate that Alternative Route C is slightly favoured as the Preferred Route. However, the route comparison also indicates that several environmental criteria have only very subtle differences among the alternative routes.

During Round 2 of the PEP, this preference was presented to the MCWS regional Integrated Resource Management Team (IRMT). The IRMT identified a recent concern about declining moose populations in the area. Through those discussions the IRMT requested that portions of the Alternative Route C to be adjusted slightly to align more closely with PR #304. This would more effectively support their efforts for the moose population recovery strategy in the area. More detail is provided in Section 6.8.3.

This request was accommodated through two modest adjustments to align the route preference more closely to PR #304.

This Preferred Route is identified and illustrated in Map 6-8.

6.8.1.1 Refinements to Preferred Route

Potential issues related to Preferred Route are considered to be manageable. General route selection and design practices for the final preferred route are as follows:

- attain or exceed all CSA Standards for overhead systems (CAN/CSA-C22.3 NO. 1-10);
- obtain all permits and authorizations prior to construction, including culverts and access roads off PR #304; and
- employ use of guyed lattice steel structures for overhead lines and insulated cables for placement underground and in cable trays.

6.8.2 Route Adjustments leading to a Final Preferred Route

Potential route adjustments were identified throughout the route selection process to further offset specific localized effects of Line PQ95. The route adjustment, as previously noted in Section 6.8.1, was influenced with respect to declining moose populations in the area. This adjustment was accommodated in final stage of Phase II of the routing process. In Phase III of the route selection process, two additional minor modifications were finalized in response to landowner requests to further minimize effects on individual private properties.

Each issue was assessed on a case by case basis. During this process, some of the re-alignments which were reviewed, were considered to achieve a slightly better balance in minimizing potential effects of the transmission line, particularly from a local perspective. Other issues identified for further investigation, were either a transfer of effects onto nearby properties, or the overall effects were greater than for the preferred route being proposed. Ultimately practical route adjustments were made to best accommodate these issues.

The following issues were addressed and contributed to the best balanced Final Preferred Route:

- minor route realignments to further assist in reducing declines and enhancing the recovery of local moose populations in GHA 26 (referenced in Section 6.8.1 above);
- possible re-alignment or mitigation to address existing and future development of a campground area and associated boat launch near Powerview-Pine Falls, immediately north of the Winnipeg River; and
- possible route modifications along an agricultural private property to accommodate future development potential.

6.8.3 Transmission Line Effect on Moose Populations

Over the past few years, the moose population has declined in GHA 26. Manitoba Conservation and Water Stewardship has enacted a moose hunting closure for licensed hunters in that GHA and also designated no moose hunting areas for rights based hunters through Section 35 consultation with the affected First Nations (Map 6-9).

Discussions were held with MCWS, Eastern Region IRMT and the Manitoba Model Forest Committee for Cooperative Moose Management, which includes representatives from the Manitoba Métis Federation, MCWS Wildlife Branch, Manitoba Trappers Association, Manitoba Wildlife Federation, Lac du Bonnet Wildlife Association, Pinawa Game and Fish Association, Brokenhead Game and Fish Association and local community members interested in the management and conservation of moose. The request was to adjust Line PQ95 Preferred Route alignment as close as possible to PR #304 but to maintain a forested buffer between the transmission ROW and PR #304 to reduce the potential for line of sight off the highway.

Outcome: The Preferred Route was adjusted to be closer to PR #304 while maintaining a forested buffer. Also resulting from these discussions for moose management in the area, Manitoba Hydro will, within practical limits, maintain shrub and understorey vegetation as visual buffers on the ROW where it crosses PR #304 to reduce the line of sight along the transmission line. The route adjustments affected two general areas, where portions of other alternative routes were used (Map 6-10).

6.8.4 Response to Specific Landowner Concerns

At the Round 1 Open House in Powerview-Pine Falls, a local business owner expressed concern that Alternative Route C, would infringe on future development

The owners attended the Round 2 Open House in Powerview-Pine Falls, and discussed options for adjusting the Preferred Route. While they recognized that the transmission structures and line are essentially on Manitoba Hydro property, they requested Manitoba Hydro consider realigning the route.

A meeting was held with the owner to discuss options. The owners requested that an underground cable be considered for Line PQ95. Manitoba Hydro's position was that the use of an underground cable would be too expensive (up to 15 times more expensive than convention overhead transmission) and was not a feasible option. Tower placement and minor realignment options were further investigated.

Outcome: As a result of the meeting and subsequent discussions, Manitoba Hydro realigned the route for Line PQ95 avoiding encroachment on the local business as much as possible. The realignment was acceptable to the owners as it addressed their concerns.

A local landowner attended the Round 1 Open House in Powerview-Pine Falls and expressed concern that all three alternative routes would be close to or cross their land. In a letter to Manitoba Hydro, they indicated their concerns to the routes

On October 26, 2012 the landowners followed up with their primary concern that the route alignment for Line PQ95 crossed their properties, which affected future development potential as well as future subdivision considerations. The landowners proposed a new alternative route. A review indicated that the proposed route was viable. This new alignment however would also affect an additional private property.

Outcome: Following discussion with the newly affected private land owners and confirmation with the original landowners, the route for Line PQ95 was realigned to incorporate the route adjustment. Both private property owners were accepting of this route refinement.

Map 6-2 shows the alignments for the Preferred Route and the Final Preferred Route.

6.9 FINAL PREFERRED ROUTE

Map 6-11 illustrates the Final Preferred Route proposed for Line PQ95. This route is described below.

The Final Preferred Route originates at the Pine Falls Generating Station switchyard, located south of the Pine Falls Generating Station. It proceeds north as an underground cable, and then crosses the Winnipeg River using existing conductor cable trays located on the underside of PR #304 located on the spillway side of the Pine Falls Generating Station. On the north shore of the Winnipeg River, the insulated cable is transferred onto transmission towers with overhead conductors.

The Final Preferred Route proceeds north in the Rural Municipality of Alexander, along PR #304 for 130 m, while located on property owned by Manitoba Hydro. The Preferred Route turns east-northeast and crosses to the east side of PR #304 and proceeds for 0.3 km, where it turns southeast and proceeds for another 0.3 km. It avoids private property currently being used as a RV park and campground. The route then turns northeast and proceeds to a point south of a private business access road, which is located on Manitoba Hydro property. These segments also run parallel to the Winnipeg River and the Pine Creek. A private business boat launch, constructed on Manitoba Hydro property, is located on Pine Creek approximately 75 m from the east end of this last segment. The Preferred Route turns north-northeast, crosses the private business access road, and proceeds for 0.3 km while on Manitoba Hydro property.. It turns north northeast and proceeds across Manitoba Hydro property and onto private property, currently under agricultural use. The route crosses one private property entitlement and crosses PR #304. The Preferred Route crosses an additional private property holding then angles northeast following parallel to PR #304 on provincial Crown Land.

Following north to the Manigotagan Corner Station Site, the Preferred Route is located on provincial Crown Land currently designated as Forest Management Licence 01. The Preferred Route continues north-northeast, on the west side of PR #304, for 0.2 km before turning northeast to proceed for 10.3 km along PR #304 maintaining a separation distance of 0.5 km to 0.7 km from PR #304. It turns northwest and proceeds for 10.7 km, with a separation of 0.3 km to 1.2 km from the west side of PR #304. Continuing northwest for 4.8 km, to the south side of

the O'Hanly River, the Preferred Route parallels the west side of PR #304 with a separation of 0.3 km. The Preferred Route turns north-northwest, crosses the O'Hanly River and then crosses to the east side of PR #304 within the next 0.6 km. It continues to proceed north-northwest for 8.2 km, to the south side of the Black River, where it maintains a separation from the east side of PR #304 that ranges from 0.2 km to 0.8 km. The Preferred Route turns north, crosses the Black River, and proceeds 4.3 km where it crosses to the west side of PR #304. This segment also runs parallel to the highway with a separation of 0.7 km. It turns north-northeast and proceeds for 8.8 km, to the north shore of the Sandy River, where it is located 0.3 km from PR #304. The separation, from the west side of PR #304, in this segment ranges from 0.2 km to 1.5 km. The Preferred Route turns northwest and proceeds for 6.2 km to the north side of Duncan Creek, while paralleling the highway with a separation that ranges from 0.2 km to 0.5 km. It turns north, crosses to the east side of PR #304, and continues north for 8.4 km to the north shore of the Manigotagan River, where it is located 0.8 km from PR #304. In this segment, the highway curves away from the Preferred Route to a maximum distance of 2.3 km. The Preferred Route turns northeast and then east-northeast and proceeds for 5.7 km where it terminates at the Manigotagan Corner Station Site. In this final segment, separation from PR #304 ranges from 0.9 km to 0.2 km.

Total line length of the Final Preferred Route is 71.6 km.

6.10 MANIGOTAGAN CORNER STATION

6.10.1 Background and Project Area

Both Line PQ95 and Manigotagan Corner Station are needed to provide firm capacity for area load, and to maintain effective control of the voltage at Bloodvein, Little Grand Rapids, Berens River and Poplar River into the future. The new 115-66 kV Manigotagan Corner Station will be the termination point of Line PQ95. The Manigotagan Corner Station will also serve for sectionalizing the existing 66 kV sub-transmission line which connects Pine Falls Generating Station switchyard to several sub-stations including those local communities both within the Project Study Area as well as to the north and east of the study area.

6.10.2 Siting Area for the Manigotagan Corner Station

A general siting area for the Manigotagan Corner Station was identified based on the need to locate the station site close to PR #304 for all weather road access. A location south of PR #304 will allow for ease of future 115 kV development to Bloodvein, Little Grand Rapids, Berens River and Poplar River. Also having the station site located near the intersection of PR #304 and the Rice River Road will maintain separation from Manigotagan community. This general area also provides for several important operational and maintenance requirements, such as suitable ground conditions and reasonably level terrain for site development.

The Siting Area and potential station sites are identified in Map 6-12.

6.10.3 Site Selection Criteria

A combination of engineering and environmental criteria was considered important for the identification and comparison of station site options. Cost and public input were also integrated into this process. The following (Table 6-2) outlines those criteria.

Table 6-2: Criteria for Station Site Identification and Selection

Technical Criteria	<ul style="list-style-type: none"> - all-weather road access for construction and maintenance; - proximity to the electrical load centre for the 66 kV Lines; - suitability for oil containment; and - suitable grounding capability.
Environmental Criteria	<ul style="list-style-type: none"> - social and environmental effects such as proximity to communities; - minimizing land use conflict (such as property ownership, highway setbacks); and - avoiding biophysical factors such as streams and other water bodies.
Public Input	<ul style="list-style-type: none"> - Local community opinion and public support.
Cost Factors	<ul style="list-style-type: none"> - overall project costs; - ingress and egress options of the 66 kV and PQ95 line; and - flat level terrain.

6.10.4 Alternative Station Sites

The fenced station dimensions required for the immediate development is 94 m x 105 m. A total station area of 300 m x 194 m will be purchased to accommodate ultimate development. Four potential station sites were identified in the Siting Area. Each of the site options satisfied the required immediate and future development needs for this station.

The four potential station site locations are identified on Map 6-12.

6.10.5 Site Evaluation

A station site comparison was conducted according to the criteria identified in Table 6-3. The result of the comparison was integrated into the overall PEP for the Line PQ95 in 2012. The following are the results of the station site comparison.

Table 6-3: Assessment of Alternative Station Sites Based on Siting Criteria

Siting Criteria	Site 1	Site 2	Site 3	Site 4
All - weather access	Acceptable	Acceptable	Acceptable	Acceptable
Proximity to the electrical load centre	Good	Good	Good	Slightly better

Table 6-3: Assessment of Alternative Station Sites Based on Siting Criteria

Siting Criteria	Site 1	Site 2	Site 3	Site 4
Conditions for Oil containment	Good	Good	Good	Slightly better
Suitable grounding capability	Exposed rock throughout the site	Exposed rock throughout the site	Exposed rock throughout the site	No exposed rock formation visible
Environmental	Similar	Similar	Similar	Similar
Property Ownership	Crown with 1 private property or lease holder	Crown with 1 private property or lease holder	Crown with 1 private property or lease holder	Crown – no permit holders
Local Community Input				Positive
Cost	Good	Good	Good	Slightly better

Site #4 is identified as the Preferred Station Site. This site is located on provincial Crown Lands with no registered lease holders. The terrain conditions are flat and level, making it compatible for station site development. The lack of exposed rock formation suggests that blasting can be minimized and station grounding can be located directly within the station site. The Preferred Station Site was also vetted through the Manigotagan leadership and was acceptable from a community perspective.

Sites 1, 2 and 3 are less desirable as though they were located on provincial Crown Land, these sites also have a tenant/permit holder. Additionally, exposed rock throughout these sites is an indicator that suitability for station grounding might be an issue. Terrain conditions such as exposed rock is also an indicator that additional blasting and site preparation once clearing is complete, might be required.

Map 6-13 identifies the Footprint and the Preferred Station Site location.

6.10.6 Integration into the Public Engagement Program

The Preferred Station Site was shared with local communities as part of the overall PEP. There were several inquiries but no major concerns expressed from communities regarding the Preferred Station Site.

The following comments related to the station site were received during the PEP process. These inquiries along with Manitoba Hydro's follow-up are as follows:

- a community resident indicated that an area of medicinal plant collection extends onto the fringes of the Preferred Station Site; as other areas are more available for the collection of this plant, this would not be an issue;

- aesthetics of the station if it was located close to the Waabanong Anishinaabe Interpretive Centre. Manitoba Hydro followed up by providing photos of similar stations for review; it was concluded by the community representative that this site was far enough away from the Waabanong Anishinaabe Learning Centre that aesthetics would not be an issue; and
- a dogsled trail transects all four station sites; this does not appear to be problematic as the Line PQ95 ROW leading to the station site can also be used as part of the dogsled trail; the dogsled trail can be adjusted to accommodate the station site.

6.10.7 Environmental Overview of the Preferred Manigotagan Corner Station Site

A description by environmental components for the proposed Manigotagan Corner Station Site is provided below.

Aquatics

The Preferred Station Site is located approximately 1.8 km from the nearest watercourse (the Wanipigow River). The station site has no direct surface connection (e.g., via creeks, rivers or ditches) to the Wanipigow River, and thus there is no potential for overlap between the Preferred Station Site and the aquatic ecosystem.

Vegetation

A fern (Sensitive Fern *Onoclea sensibilis*) listed as S3S4 was identified on the Preferred Station Site. This fern is not uncommon and was found at other sites as well. No issues for rare plants have been identified.

Wildlife

There are no known wildlife issues. The size and location of the Preferred Station Site dictates that there are not expected to be any significant wildlife effects related to the site.

Forestry

From a forestry perspective, the station site footprint is not extensive (fenced area of 94 m x 105 m) and the forest cover types are not of particular concern. Due to the limited size and nature of forestry impacts related to this site, this has been integrated with the transmission line to provide an overall forest effects perspective.

Heritage

The Preferred Station Site was investigated in 2011 under Historical Resources Impact Assessment Permit A53-11. A pedestrian survey was completed within the proposed development with no heritage materials observed. There are no other heritage issues with this area.

Cultural Resources

Of the Cultural Resources that were identified through the ATK process, only two were noted as being CSS occurring within 100 m of the Preferred Route; one is located at the proposed terminus of the Preferred Station Site. This region is a winter track that is still maintained and utilized for traditional dog sled races. A portion of this race track would run directly through the Preferred Station Site. The other CSS is part of a polygon of medicinal plant gathering that was identified during the key person interviews. This also occurs at the Preferred Station Site. Both of these concerns were addressed during the PEP process.

Land Use

The proposed site is designated as provincial Crown Land with no known permits associated with this parcel.

6.11 ENVIRONMENTAL FOLLOW UP FOR THE FINAL PREFERRED ROUTE AND PREFERRED STATION SITE

A Final Preferred Route has been identified for Line PQ95 and a Preferred Station Site has been identified for the Manigotagan Corner Station. A detailed review of the environmental effects for each of these project components has been conducted. This review describes the environmental effects and proposes mitigation measures to address these effects. The effects assessment and corresponding mitigative recommendations are outlined in the Chapter 7.0.