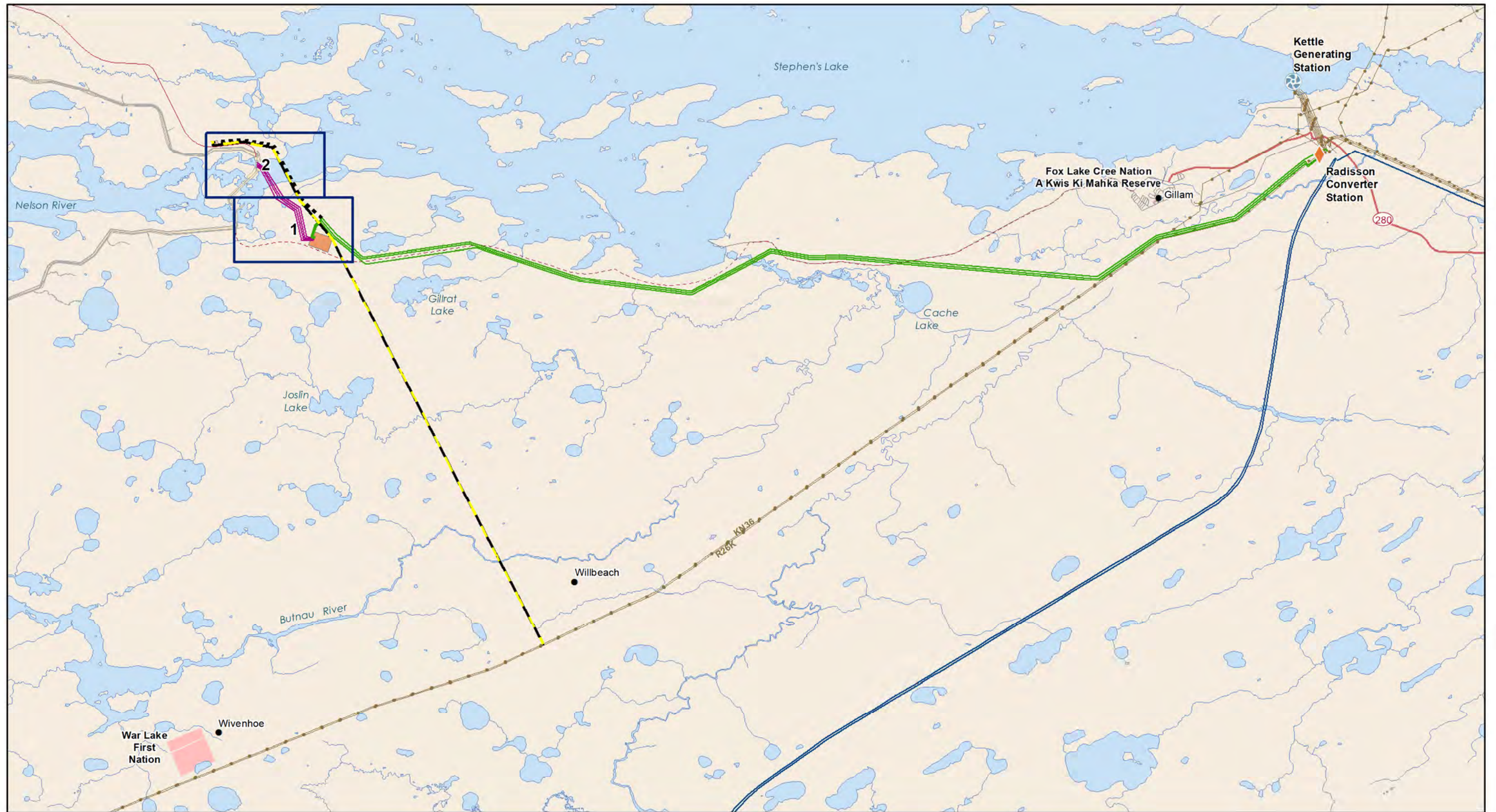


Document Owner:
Licensing and Environmental Assessment Department
Transmission Planning and Design Division
Transmission Business Unit
Manitoba Hydro

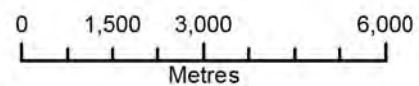
Final 4.0

List of Revisions – Keeyask Transmission Project Unit (KE) Lines Section

Number	Nature of Revision	Page/Map #	Revised By	Date
3.01	KR1 Tap and KN36 Tap alignment change at the Construction Power Station	KUL Map #2	Kris Watts	2015-12-01
3.02	Updated Imagery	All	Kris Watts	2015-12-23
4.00	As directed by transmission line design the “KUL” line designation was updated to “KE”	All	Kris Watts	20161212



Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, ProvMB, NRCAN
Date Created: April 17, 2014
Version: FINAL

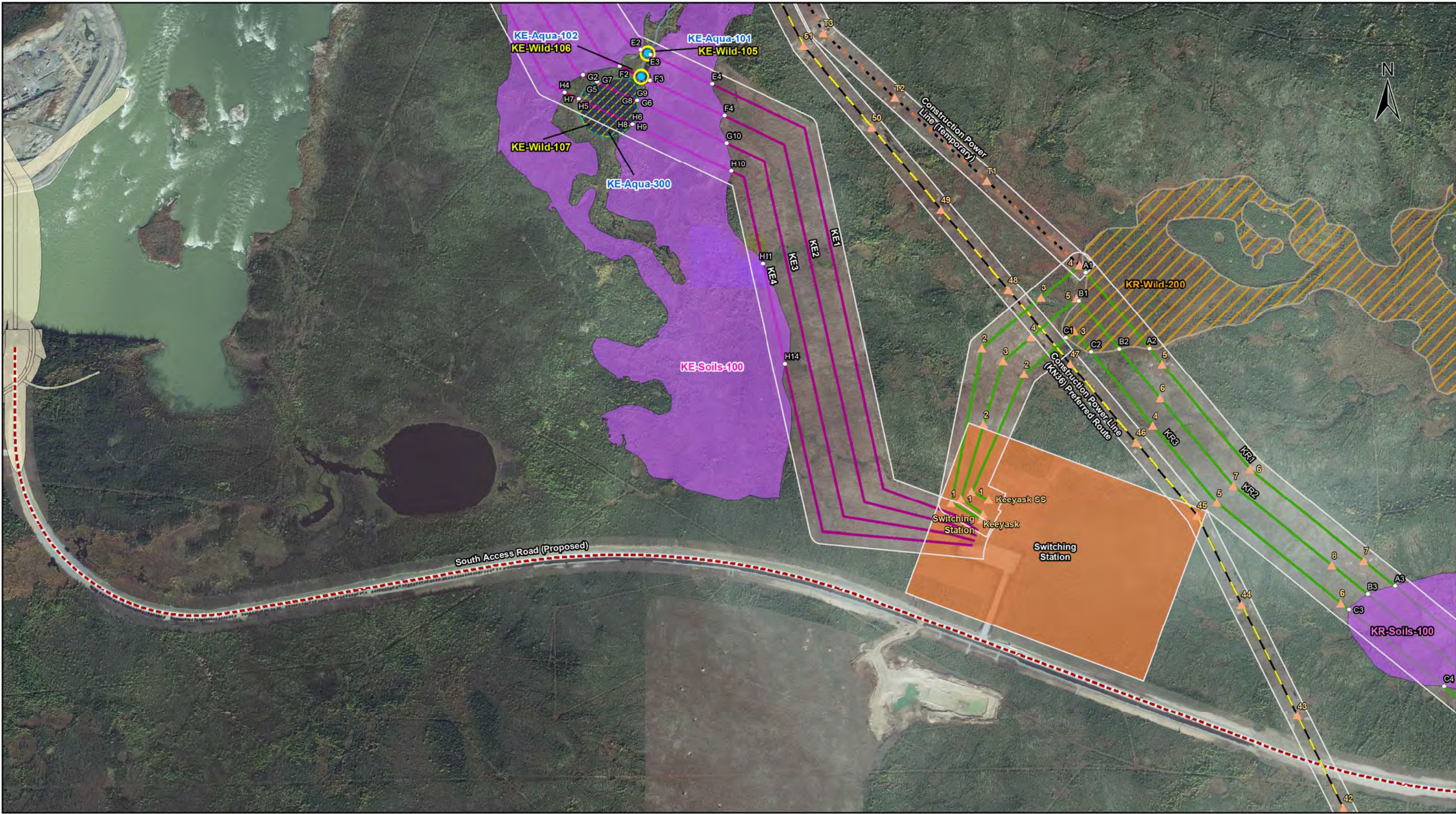


Legend

- Generation Outlet Transmission Lines
- - - Construction Power Line (KN36) Preferred Route
- - - Construction Power Line (Temporary)
- Unit Lines
- Construction Power Station Site
- Switching Station Site
- Keeyask Generation Infrastructure

- ◆ Converter Station
- ◆ Generating Station
- Bipole I and II (Existing 500 kV DC Line)
- Transmission Line
- North Access Road
- - - South Access Road (Proposed)
- First Nation

Keeyask Transmission Project Construction Environmental Protection Plan Environmentally Sensitive Site Locations Key Map Index





Coordinate System: UTM Zone 15N NAD83
Data Source: MB Hydro, ProvMB, NRCAN
Date Created: December 13, 2016
Version: Final 4.0

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Metres

1:10,000

Land Base

- Bipole I and II
- Transmission Line
- Proposed Roads
- Active Railway
- Abandoned Railway

Project Infrastructure

- Towers (Preliminary)*
- Generation Outlet Transmission Line
- Construction Power Line (Kn36)
- Construction Power Line (Temporary)

Project Footprint (ROW)

- Unit Lines
- Switching Station Site

ESS Features

- Archaeological Site
- Historical
- Water Crossing
- Birds and Habitat
- Mammals and Habitat
- Marsh Habitat
- Water and Wetland Habitat
- Permafrost

Towers are subject to change, and are only use as a rough guide

ESS Group: Birds and Habitat

Sec-ID	ESS ID	ESS Name	Easting	Northing	UTM Zone
KE2	KUL-Wild-105	Unnamed Tributary	364931	6245941	15N
KE3	KUL-Wild-106	Unnamed Tributary	364914	6245877	15N

Sec-ID	ESS ID	ESS Name	Location	Start	Stop	UTM Zone	Distance
KE3	KE-Wild-107	Unnamed Wetland	Site: G7 to G8	E-364791 N-6245863	E-6245901 N-6245811	15N	123m
KE4	KE-Wild-107	Unnamed Wetland	Site: H7 to H8	E-364740 N-6245816	E-364889 N-6245745	15N	121m

Potential Effects:

Potential loss of Species at Risk habitat; Higher risk of wire collision within the ROW

Specific Mitigation:

- Adhere to reduced risk timing windows for protection of birds by conducting clearing activities between August 1st and April 30th
- Maintain applicable setback during nesting and breeding timing window (May 1st to July 31st)
- Conduct priority assessment for bird diverters and other measures prior to transmission line stringing
- Install bird diverters or other measures at high priority sites
- Where possible maintain a 100m buffer of shrub and herbaceous vegetation around lakes and off-system marsh locations.
- Where possible, maintain 15 metres of riparian area from the high water mark of 1st and 2nd order creeks, and 30 metres from the high water mark of 3rd order and higher streams and rivers

ESS Group: Wetland

Sec-ID	ESS ID	ESS Name	Location	Start	Stop	UTM Zone	Distance
KE3	KE-Aqua-300	Unnamed Wetland	Site: G5 to G6	E-364791 N-6245863	E-364901 N-6245811	15N	121 m
KE4	KE-Aqua-300	Unnamed Wetland	Site: H5 to H6	E-364740 N-6245815	E-364888 N-6245745	15N	190 m

Potential Effects:

Increased erosion and sedimentation of streams; rutting of floodplains, loss of riparian vegetation

Specific Mitigation:

- Riparian Buffers shall be a minimum of 30m and increase in size based on slope of land entering waterway. Within these buffers shrub and herbaceous understory veg will be maintained along with trees that do not violate MH Veg Clearance Requirements
- 7m no machine zone will restrict equipment in close proximity to the waterbody except at the trail crossing
- Where possible maintain a 100m buffer of shrub and herbaceous vegetation around lakes and off-system marsh locations.
- Where possible, maintain 15 metres of riparian area from the high water mark of 1st and 2nd order creeks, and 30 meters from the high water mark of 3rd order and higher streams and rivers

ESS Group: Permafrost

Sec-ID	ESS ID	ESS Name	Location	Start	Stop	UTM Zone	Distance
KE1	KE -Soils-100	Permafrost-Extensive Discontinuous	Site: E1 to E2	E-364669 N-6246287	E-364911 N-6246286	15N	370m
KE 1	KE -Soils-100	Permafrost-Extensive Discontinuous	Site: E3 to E4	E-364938 N-6245937	E-365108 N-6245857	15N	166m
KE 2	KE -Soils-100	Permafrost-Extensive Discontinuous	Site: F1 to F2	E-364615 N-6246237	E-364853 N-6245906	15N	420m
KE 2	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: F3 to F4	E-364937 N-6245866	E-365142 N-6245769	15N	244m
KE 3	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: G1 to G2	E-364571 N-6246169	E-364752 N-6245882	15N	391m
KE 3	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: G9 to G10	E-364901 N-6245811	E-365149 N-6245694	15N	261 m
KE 4	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: H1 to H4	E-364512 N-6246130	E-364702 N-6245834	15N	362m
KE 4	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: H9 to H10	E-364889 N-6245745	E-365161 N-6245616	15N	313 m
KE 4	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: H11 to H14	E-365248 N-6245361	E-365310 N-6245084	15N	290 m

Potential Effects:

Melting or loss of permafrost due to disturbance of the active layer

Specific Mitigation:

- Carry out construction activities on frozen ground to minimize surface damage and rutting
- Use existing trails, roads or cut lines whenever possible as access routes
- Avoid disturbance to the organic layer
- Maintain shrub and herbaceous vegetation to the extent possible
- Remove trees by low-disturbance methods
- Confine vehicle traffic to established trails to the extent possible

ESS Group: Water Crossing

Sec-ID	ESS ID	ESS Name	Easting	Northing	UTM Zone	Channel Width	Wet Width	Fish Habitat Class	Habitat Sensitivity
KE1	KE1-Aqua-101	Unnamed Tributary	364931	6245941	15N	N/A	N/A	N/A	N/A
KE2	KE2-Aqua-102	Unnamed Tributary	364914	6245877	15N	N/A	N/A	N/A	N/A

Potential Effects:

Habitat loss & contamination from structure foundations & installations; Increased erosion & sedimentation of streams; Damage to stream banks; Loss of riparian vegetation; Fish habitat disturbance & impeded fish movement; Rutting of floodplain

Specific Mitigation:

- Carry out construction activities on frozen ground to minimize surface damage, rutting and erosion
- Use existing trails, roads or cut lines whenever possible as access routes
- Identify and flag buffer areas prior to start of work
- Riparian Buffers shall be a minimum of 30m and increase in size based on slope of land entering waterway. Within these buffers shrub and herbaceous understory veg will be maintained along with trees that do not violate MH Veg Clearance Requirements
- 7m no machine zone will restrict equipment in close proximity to the waterbody except at the trail crossing





Coordinate System: UTM Zone 15N NAD83
Data Source: MB Hydro, ProvMB, NRCAN
Date Created: December 13, 2016
Version: Final 4.0

0 120 240 480
Metres
1:10,000

Land Base

- Bipole I and II
- Transmission Line
- Proposed Roads
- Active Railway
- Abandoned Railway

Project Infrastructure

- Towers (Preliminary)*
- Construction Power Line (Kn36)
- Construction Power Line (Temporary)
- Project Footprint (ROW)

Unit Lines

- Unit Lines
- Construction Power Station Site

*Towers are subject to change, and are only use as a rough guide

ESS Features

- Archaeological Site
- Historical
- Water Crossing
- Birds and Habitat
- Mammals and Habitat
- Marsh Habitat
- Water and Wetland Habitat
- Permafrost

Keeyask Transmission Project
Construction Environmental Protection Plan
Environmentally Sensitive Site Locations
Unit (KE) Lines

Map 2

ESS Group: Birds and Habitat

Sec-ID	ESS ID	ESS Name	Easting	Northing	UTM Zone
KE1	KE1-Wild-100	Nelson River	364340	6246785	15N
KE2	KE2-Wild-101	Nelson River	364296	6246757	15N
KE3	KE3-Wild-102	Nelson River	364251	6246727	15N
KE4	KE4-Wild-103	Nelson River	364203	6246702	15N

Potential Effects:

Higher risk of wire collision within the ROW

Specific Mitigation:

- Adhere to reduced risk timing windows for protection of birds by conducting clearing activities between August 1st and April 30th
- Maintain applicable setback during nesting and breeding timing window (May 1st to July 31st)
- Conduct priority assessment for bird diverters and other measures prior to transmission line stringing
- Install bird diverters or other measures at high priority sites
- Where possible maintain a 100m buffer of shrub and herbaceous vegetation around lakes and off-system marsh locations.
- Where possible, maintain 15 metres of riparian area from the high water mark of 1st and 2nd order creeks, and 30 metres from the high water mark of 3rd order and higher streams and rivers

ESS Group: Water Crossing

Sec-ID	ESS ID	ESS Name	Easting	Northing	UTM Zone	Channel Width	Wet Width	Fish Habitat Class	Habitat Sensitivity
KE1	KE1-Aqua-100a	Nelson River	364340	6246785	15N	N/A	N/A	N/A	N/A
KE2	KE2-Aqua-100b	Nelson River	364296	6246757	15N	N/A	N/A	N/A	N/A
KE3	KE3-Aqua-100c	Nelson River	364251	6246727	15N	N/A	N/A	N/A	N/A
KE4	KE4-Aqua-100d	Nelson River	364203	6246702	15N	N/A	N/A	N/A	N/A

Potential Effects:

Habitat loss & contamination from structure foundations & installations; Increased erosion & sedimentation of streams; Damage to stream banks; Loss of riparian vegetation; Fish habitat disturbance.

Specific Mitigation:

- Carry out construction activities on frozen ground to minimize surface damage, rutting and erosion
- Use existing trails, roads or cut lines whenever possible as access routes
- Identify and flag buffer areas prior to start of work

- Riparian Buffers shall be a minimum of 30m and increase in size based on slope of land entering waterway. Within these buffers shrub and herbaceous understory veg will be maintained along with trees that do not violate MH Veg Clearance Requirements
- 7m no machine zone will restrict equipment in close proximity to the waterbody except at the trail crossing

ESS Group: Permafrost

Sec-ID	ESS ID	ESS Name	Location	Start	Stop	UTM Zone	Distance
KE1	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: E1 to E2	E-364668 N-6246286	E-364911 N-6245950	15N	370m
KE2	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: F1 to F2	E-364615 N-6246237	E-364853 N-6245906	15N	420m
KE3	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: G1 to G2	E-364571 N-6246169	E-364751 N-6245882	15N	391m
KE4	KE-Soils-100	Permafrost-Extensive Discontinuous	Site: H1 to H4	E-364512 N-6246130	E-364702 N-6245834	15N	362m

Potential Effects:

Melting or loss of permafrost due to disturbance of the active layer

Specific Mitigation:

- Carry out construction activities on frozen ground to minimize surface damage and rutting
- Use existing trails, roads or cut lines whenever possible as access routes
- Avoid disturbance to the organic layer
- Maintain shrub and herbaceous vegetation to the extent possible
- Remove trees by low-disturbance methods
- Confine vehicle traffic to established trails to the extent possible

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