2 Project Setting

This section describes the biophysical and human environment within which the construction and operations of the Project will take place. This information will be supplemented, as necessary, by consultation and studies being or to be undertaken by Gateway to support the ESA.

2.1 Environmental Setting

A brief overview of the ecological regions and zones, vegetation communities, wildlife communities and fisheries of the biophysical environment that will be crossed by the pipeline RoW, beginning near Edmonton and ending with the Gateway marine terminal, including aspects of the marine environment near the marine terminal, follows.

2.1.1 Alberta

Enbridge has an existing terminal east of Edmonton. If this site is used, this land terminal may be upgraded and expanded. The area where the new facilities could be located is heavily industrialized and contains little to no natural vegetation. The area within which the terminal expansion could occur is agricultural land and is generally flat.

For an illustration of the pipeline route through Alberta, including the Natural Subregions along the route, see Figure 2-1.

2.1.1.1 Natural Subregions and Vegetation

The first 70 km of the pipeline route extends northwest near Edmonton to Morinville, traversing the Central Mixedwood and the Central Parkland natural subregions[2]. That portion of the pipeline route occurring in the Central Mixedwood Natural Subregion encounters land that has largely been converted to agricultural, industrial and residential uses. The Central Parkland Natural Subregion is characterized by variation between grasslands with aspen groves, with a gradual transition to closed aspen and balsam poplar forests at the northern extent of the subregion. Little natural vegetation remains for this section of the pipeline route because of clearing for agricultural purposes. Terrain across this segment of the route is generally flat.

The proposed pipeline route continues into the Dry Mixedwood Natural Subregion for about 105 km to Cherhill, where it parallels Highway 43 northwest of Mayerthorpe. This subregion is characterized by a variety of vegetation types including aspen stands, balsam poplar stands and, through succession, white spruce and potentially balsam fir. On more poorly drained sites, a variety of peat accumulating wetlands exists. It is expected that all of these vegetation types will be encountered along the pipeline route; however, much of the land has been

[2] In Alberta, natural regions represent a combination of similar vegetation, soil and landform features, while natural subregions characterize areas that contain landscape patterns that are unique from other subregions.

cleared for agricultural purposes. The topography along the route within this subregion is generally level to undulating.

The final 325 km of the proposed pipeline route in Alberta traverses alternating sections of the Central Mixedwood Subregion and the Lower Foothills Subregion. The route parallels Highway 43 north of Whitecourt to Fox Creek and continues northwest, south of Valleyview and Grande Prairie, toward the British Columbia border. Vegetation in the Central Mixedwood Subregion is similar to the Dry Mixedwood Subregion. At higher elevations and farther west along the pipeline route, coniferous forests are more common and interspersed with localized wetlands. This vegetation type is also more typical of the Lower Foothills Subregion, through which much of the route passes. This segment of the pipeline route is largely forested, with only limited amounts of clearing for agriculture, forestry and oil and gas activities. The topography along this segment of the route is generally of low relief, with the exception of locally incised river and stream valleys.

2.1.1.2 Wildlife

The Central Parkland Subregion supports a wide variety of bird and mammal species. Common species include broad-winged hawk, spruce grouse, rose-breasted grosbeak, red-eyed vireo, red-tailed hawk, least flycatcher and Baltimore oriole. Common mammal species include white-tailed deer, northern pocket gopher, porcupine and snowshoe hare.

Characteristic bird species of deciduous forests in the Dry Mixedwood Subregion include least flycatcher, house wren, ovenbird, red-eyed and warbling vireos, Baltimore oriole and rose-breasted grosbeak. Common species occurring in Central Mixedwood forests include yellow-bellied sapsucker, Swainson's thrush, solitary vireo, magnolia warbler, white-throated sparrow, pileated woodpecker and northern goshawk. Mammals typically occurring in these subregions include beaver, moose, hare, black bear, wolf, lynx and ermine.

The Lower Foothills Subregion supports several wide-ranging mammal species that are common to spruce and pine forests, including moose, deer, wolverine and woodland caribou. Deciduous forests in the subregion provide habitat for elk, black bear, moose and deer, and for a variety of small mammals. Bird species common to coniferous forests include boreal chickadee, spruce grouse, ruby-crowned kinglet and white-winged crossbill.

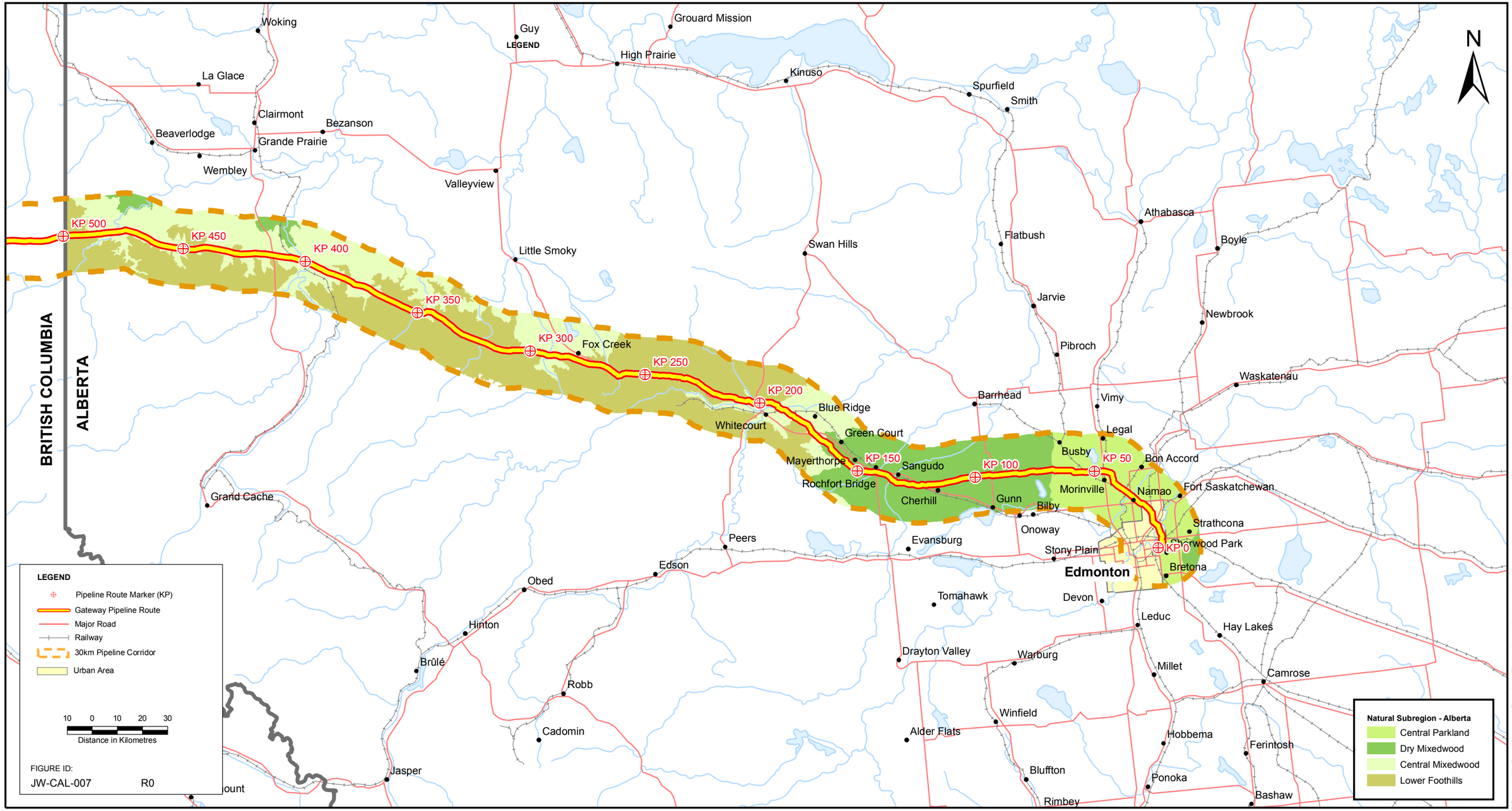

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FIGURE NO.

2-1

Alberta Pipeline Route and Natural Subregions

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2.1.1.3 Fisheries

The project will cross at least 360 watercourses in Alberta (as defined by the Code of Practice). On-ground assessments might determine an increase in watercourse crossings along the route of about 30 percent. Streams and rivers that occur in the Central Parkland Subregion are generally lower gradient, with a high degree of meandering. Along the first 75 km of the route, west of the Alberta border, larger stream and river crossings include the North Saskatchewan River, Horsehills Creek, Barre River, Sturgeon River, Pembina River, Paddle River and Little Paddle River. The freshwater fish community along this segment of the route is entirely coolwater. Sport fish likely to occur include northern pike, walleye, sauger, goldeye, yellow perch and lake sturgeon, all of which are spring spawners.

The freshwater fish communities that occur in the Dry Mixedwood, Central Mixedwood and Lower Foothills subregions represent a transition from coolwater to coldwater species. The coldwater fish community consists primarily of arctic grayling, mountain whitefish, bull trout, rainbow trout and brook trout. These coldwater species are found throughout large and small river systems, particularly in the higher elevation headwater areas. Larger stream and river crossings in this segment, as they occur from east to west, include the Athabasca River, Sakwatamau River, Chickadee Creek, Two Creeks, Little Smoky River, Waskahigan River, Simonette River, Latornell River, Smoky River, Gold Creek, Stony Creek, Pinto Creek and Wapiti River.

2.1.2 British Columbia

For the pipeline route through British Columbia, including the biogeoclimatic zones along the route, see Figure 2-2.

2.1.2.1 Biogeoclimatic Zones and Vegetation

The pipeline route enters British Columbia near the Redwillow River and traverses westward for about 150 km south of Tumbler Ridge and over the Continental Divide to the Parsnip River. This section of the pipeline route traverses three biogeoclimatic zones:[3] the Boreal White and Black Spruce, the Sub-Boreal Spruce and the Alpine Tundra zones. The first two zones, which occur at lower to mid-elevations, are characterized by mixed stands of aspen and spruce, lodgepole pine and black spruce. The Alpine Tundra is essentially a treeless region characterized by dwarf shrubs, herbs, mosses and lichens. No agricultural areas occur in this portion of the route, although forestry and oil and gas activities are commonly encountered. The topography associated with these biogeoclimatic zones ranges from generally flat plateaus to rolling foothills to more rugged mountain terrain.

The next 380 km, through the interior of British Columbia, traverses the Sub-Boreal Spruce biogeoclimatic zone, which contains mainly dense coniferous forests of white spruce and subalpine fir, with occasional black spruce.

[3] Biogeoclimatic zones are part of British Columbia's hierarchical Biogeoclimatic Ecological Classification system. Biogeoclimatic zones represent broad regional areas that differ in climate, soil, topography and characteristic vegetation.

Topography along this section of the pipeline route is gently rolling. Forestry is the most common land use activity encountered along this portion of the route.

The final segment of the pipeline route extends about 120 km west and south to the marine terminal that will be located near Kitimat. This segment of the pipeline transects three biogeoclimatic zones: the Coastal Western Hemlock zone at lower and mid-elevations and the Mountain Hemlock and Alpine Tundra zones at higher elevations. This segment of the route occurs within the Coastal Western Hemlock Zone. Vegetation common in the Mountain Hemlock and Coastal Western Hemlock zones generally includes mountain hemlock, western hemlock, amabilis fir, cedar, Douglas fir and white pine. The occurrence of species depends strongly on the elevation and precipitation. The Alpine Tundra zone is typically scarcely vegetated. The topography of these zones is generally rolling to rugged mountainous terrain. Forestry is the most common land use activity encountered along this portion of the route.

2.1.2.2 Wildlife

The Boreal White and Black Spruce biogeoclimatic zone supports about 341 wildlife species, including five amphibians, two reptiles, 277 birds and 57 mammals. Large mammal species include moose, mule deer, woodland caribou, grizzly bear, black bear and wolf. Smaller furbearers typically include marten, fisher and wolverine. Less common mammals include elk, bighorn sheep and mountain goat. Bird species that commonly occur in this zone are gray jay, red crossbill, white-winged crossbill and pine siskin. Golden eagle occurs less commonly.

About 316 wildlife species occur in the Sub-Boreal Spruce biogeoclimatic zone, including five amphibians, two reptiles, 252 birds and 57 mammals. Common mammal species include moose, mule deer, snowshoe hare, wolf, grizzly bear, black bear, fisher and marten. Common bird species include pine siskin, pine grosbeak, magnolia warbler, great grey owl and great horned owl. The many wetlands also support abundant populations of breeding waterfowl.

The Engelmann Spruce-Subalpine Fir zone supports about 203 wildlife species, including five amphibians, four reptiles, 126 birds and 68 mammals. The Mountain Hemlock zone supports about 164 wildlife species, including five amphibians, 106 birds and 53 mammals. Most of the wildlife species that occur in these high elevation zones are adapted to survive long cold winters with deep snow. Common species include lynx, mountain goat and caribou (in the Engelmann Spruce-Subalpine Fir zone only). The Engelmann Spruce-Subalpine Fir zone provides important habitat for grizzly bear seasonal foraging and denning. Avifauna species characteristic of these high elevation forests include Clark's nutcracker, golden-crowned sparrow, hermit thrush and willow and rock ptarmigan.

The Coastal Western Hemlock zone supports the greatest diversity of wildlife in British Columbia because of its proximity to the marine environment. This zone provides habitat for species that are found from sea level to the Coast Mountains. About 451 species have been identified, including 13 amphibians, six reptiles, 327 birds and 105 mammal species. Grizzly and black bears are abundant and several species of special conservation status also occur, including coastal tailed frog and marbled murrelet.

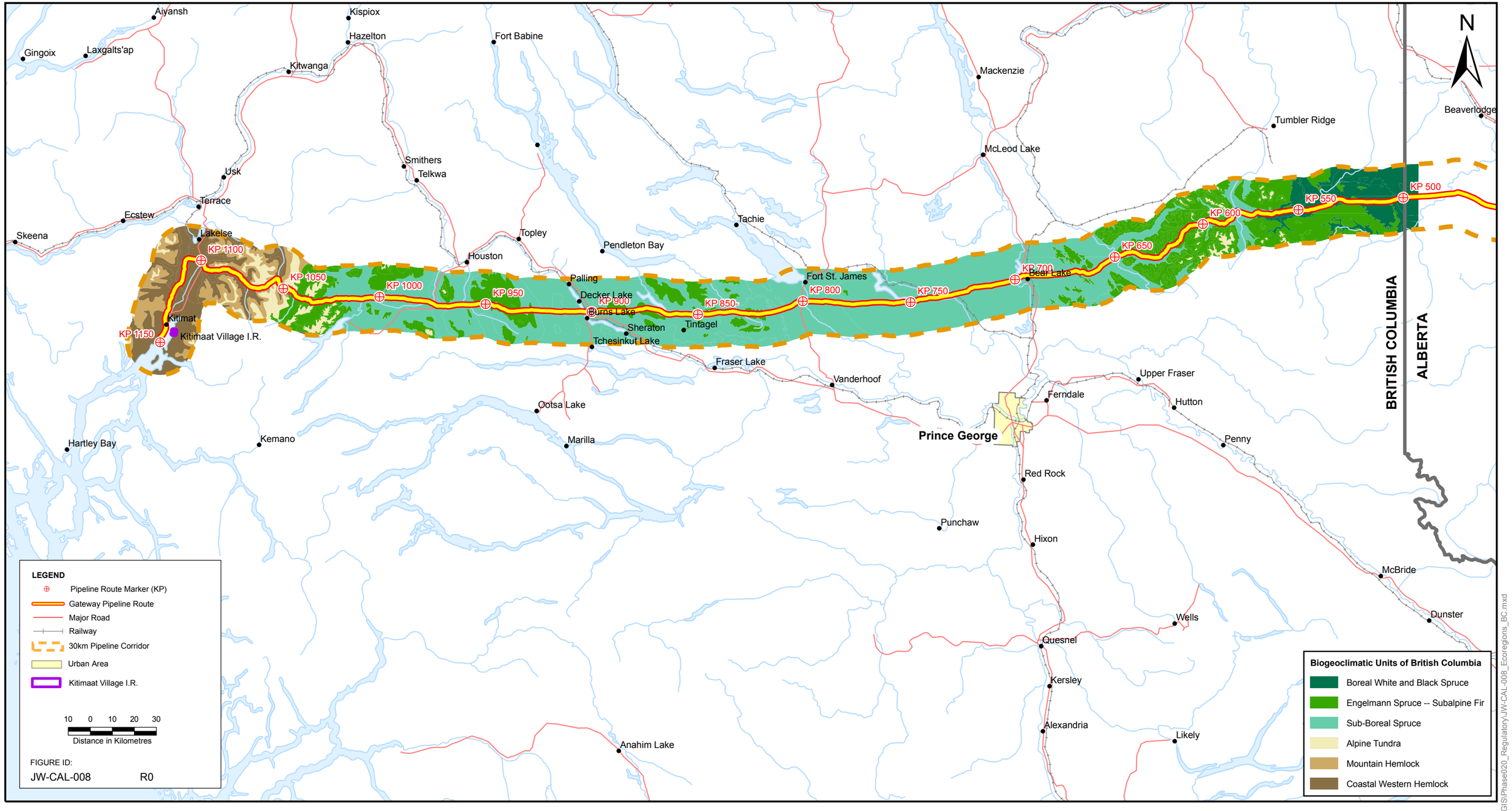

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FIGURE NO.
2-2

British Columbia Pipeline Route and Biogeoclimatic Zones

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2.1.2.3 Fisheries

The Project will cross at least 870 watercourses in British Columbia. On-ground assessments may determine an increase in watercourse crossings along the route of about 30 percent. Fish species present along the first 75 km of the pipeline route in British Columbia (west of the Alberta border) generally include arctic grayling, bull trout and mountain whitefish. Larger stream and river crossings include Hiding Creek, Redwillow River and Honeymoon Creek. Fish species that are more common along the eastern portion of the route in the Sub-Boreal Spruce zone include arctic grayling, bull trout and mountain whitefish. Common fish species likely present along the final western portion of the Sub-Boreal Spruce biogeoclimatic zone include anadromous salmon, trout and char. Large stream and river crossings, from east to west, include Kinuseo Creek, Murray River, Parsnip River, Wicheedo River, Crooked River, Muskeg River, Salmon River, Stuart River, Endako River, Morice River and Thautil River. Fish species present along the final segment of the pipeline include anadromous salmon, char, trout and whitefish.

2.1.2.4 Gateway Marine Terminal

A new marine terminal will be required near Kitimat that will include tankage for oil and condensate. The Gateway marine terminal will be on the northwest side of Kitimat Arm, just north of Bish Cove (Figure 2-3). Tankage will be set back some distance from the shoreline. However, the terminal will include marine infrastructure at tidewater for loading and unloading oil and condensate tankers.

Terrestrial Setting

The marine terminal facility along the Douglas Channel near Bish Cove is in the Very Wet Maritime Coastal Western Hemlock biogeoclimatic subzone. This subzone typically has a cool mesothermal or maritime climate, with cool summers and relatively mild, wet winters.

Western hemlock, amabilis fir, western red cedar, Sitka spruce and (especially with increasing elevation) yellow cedar dominate the marine terminal facility location where mature forest stands remain. Recently harvested areas (i.e., cutblocks) support early seral vegetation communities (herbs, shrubs and regenerating trees). The Coastal Western Hemlock biogeoclimatic zone provides highly diverse habitat and, therefore, has a high diversity of wildlife species. Excluding fish and marine mammals, about 408 vertebrate animal species can be found in the maritime subzones of the CWH biogeoclimatic zone, including six reptiles, 14 amphibians, 310 birds and 78 terrestrial mammals. The most common large mammals are black-tailed deer, moose, gray wolf and black and grizzly bear.

Species of special conservation status that could occur in the area of the Gateway marine terminal include grizzly bear, coastal tailed frog and great blue heron. These species are all Blue Listed in British Columbia and federally listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as *Special Concern* (see Appendix A).

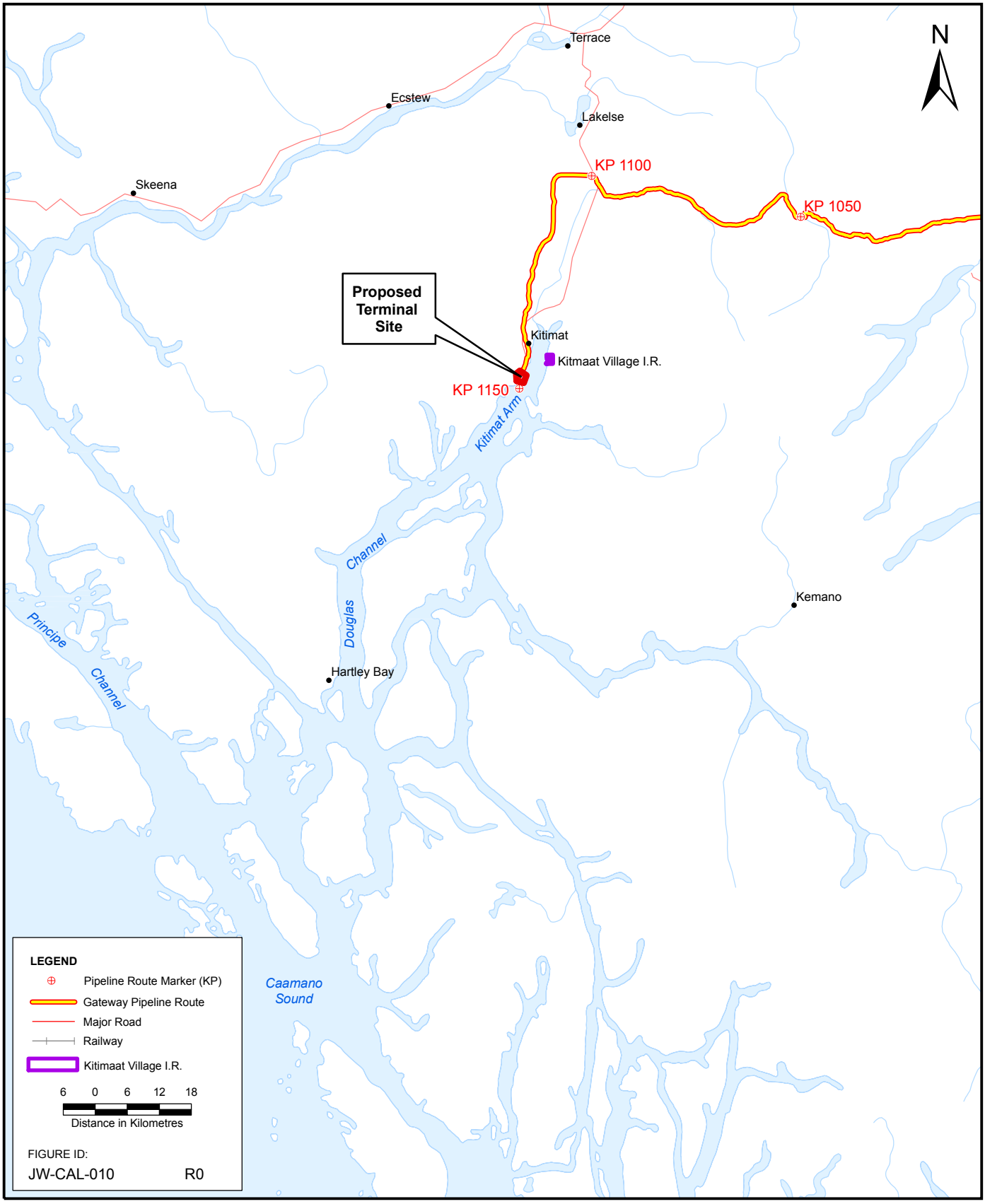

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FIGURE NO. 2-3	**Location of Gateway Marine Terminal**	PREPARED FOR ENBRIDGE

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Marine Setting

Kitimat Arm and Douglas Channel are part of the Inner Pacific Marine Shelf ecoregion. These deep narrow fjords, with high coastal relief, are typical of the North Coast Fjord ecosection and contain sheltered waters with restricted water circulation. This leads to relatively low species diversity and productivity because of poor water exchange and nutrient depletion. The tides in the region are semidiurnal, with maximum tides of about 7 m and mean tides of about 4 m. Douglas Channel receives an appreciable amount of freshwater runoff from the surrounding landscape, with peak runoff from melting snow at high altitudes occurring in May and June. The Kitimat River creates a surface layer of freshwater in Kitimat Arm from late spring to late fall.

Intertidal Community

The intertidal community's diversity is limited by wide variations in salinity. The dominant macrophyte species on rocky intertidal shorelines are rockweed and *Enteromorpha* spp., with barnacles, mussels, periwinkles and limpets being the most common fauna. In sandy intertidal habitat, the invertebrate community includes clams, gammarid amphipods and polychaete worms. Isopods, gastropods, brachyurans and oligochaetes typically occur along steep and rocky shores of the Kitimat Arm.

Subtidal Benthic Community

Species commonly found in the subtidal benthic community include sea urchins, moon snails, green sea anemones, sea stars and the California sea cucumber. The soft-bottom estuaries are dominated by the marine vascular plant, eelgrass (*Zostera marina*). The muddy substrate typical of Upper Kitimat Arm is characteristic of most British Columbia northern fjords. Characteristic infauna includes polychaetes, mollusc and foraminifera.

Douglas Channel

About 42 marine fish species are known to occur in Douglas Channel. Several of the fish species inhabiting Kitimat Arm are important commercial species and are recognized as traditional Aboriginal resources. These include chum, coho, chinook and pink salmon, eulachon, steelhead, herring, capelin and halibut. During late spring and early summer, Bish and Emsley Coves are used extensively by rearing juvenile salmonids, particularly coho, chum and chinook salmon. During mid-late summer and early fall, mature adults, including chinook, chum and coho, return to Bish and Emsley Cove to stage before migrating upstream to natal streams. These zones also provide a rich feeding area for older, larger adult fish. Shallow, estuarine, brackish foreshore areas provide critical life stage habitat for most anadromous salmonid species present in Douglas Channel watersheds.

Marine mammals most common to the Douglas Channel include killer whale, humpback whale, grey whale, Dall's porpoise, harbour seal and the northern sea lion. They are considered species of special conservation status in federal and provincial listings. The majority of these mammals are most common to the area during the summer months as they feed on the anadromous fish spawning runs. The marine mammals that commonly occur in Kitimat Arm and Douglas Channel

are distributed widely along the northern British Columbia coast. A small proportion of each species is present in the Kitimat Arm and Douglas Channel for at least a part of their life cycle. However, killer whale, harbour porpoise and Dall's porpoise frequent the Douglas Channel, but not the Kitimat estuary.

Kitimat is an important waterfowl and seabird area. Large flocks of ducks and geese frequent the area during fall and spring migrations. The many small estuaries in Douglas Channel are also important areas to waterfowl for overwintering, migration and breeding. The marbled murrelet, a species listed as *Threatened* under the *Species at Risk Act (SARA)* and by COSEWIC (see Appendix A), is known to occur in Douglas Channel's sheltered fjords.

2.1.3 Species of Special Conservation Status

The federal government, Alberta, British Columbia and COSEWIC consider some of the species that could occur along the proposed pipeline route and near the marine terminal to be species of special conservation status. For an explanation of the provincial and federal ranking systems and a listing of the species, see Appendix A.

2.2 Human Environment Setting

A description of the communities and local government jurisdictions, including Aboriginal communities, whose territories and interests could be affected by the proposed Project follows. The communities selected for the socio-economic assessment of the Project are preliminary and were selected according to the following criteria:

- population greater than 1000 and within a 40-km radius of the proposed RoW
- population of less than 1000 and within a 10-km radius of the proposed RoW and major facilities
- have traditional land and resource use areas that could be directly affected by the Project facilities or operations
- have populations likely to provide a significant number of employees for construction or operations jobs
- might service the Project's construction or operations phases (some of these communities are more than 40 km from the pipeline corridor)

The list of Aboriginal communities included in the socio-economic assessment may differ slightly from the communities selected to be a part of the Aboriginal engagement and traditional knowledge program. The communities providing Aboriginal traditional knowledge were selected based on the following criteria:

- whose territory is directly crossed by the pipeline corridor
- who have identified themselves as having traditional territories that will be affected by potential secondary effects along the pipeline corridor

As Project consultation activities proceed, the configuration of communities could be altered. Some additional communities may be selected for inclusion, while others could be amalgamated as part of a region or no longer included in the socio-economic assessment.

Following is a brief description of the people and their communities that could be affected by the Project. The socio-economic assessment considers the effects of the Project on valued components of the human environment that have not yet been identified. These components will be selected and verified during the course of baseline data collection and stakeholder consultation. However, for a preliminary list of the components of the human environment most likely to be affected, see Appendix B.

2.2.1 Socio-economic Characteristics of Project Area Communities

Background information on Project area communities is separated into Alberta and British Columbia communities. For a map of non-Aboriginal communities and municipalities and Aboriginal communities in:

- Alberta, see Figure 2-4
- British Columbia, see Figure 2-5

Socio-economic information on all identified communities will be collected through existing data sources, detailed socio-economic information gathering visits, Aboriginal engagement and traditional knowledge gathering activities presently being done by Gateway.

2.2.1.1 Alberta

There are 21 non-Aboriginal communities and counties (with a population of approximately 1.2 million in 2001) and 15 Aboriginal groups and municipalities (with a total population of approximately 15,000, although data is not available for some communities) included in the socio-economic assessment. For an alphabetical listing, see Table 2-1. The RoW crosses the boundaries for six counties and the affected communities are characterized by the preliminary baseline data.

The Project area communities in Alberta range from the City of Edmonton, with almost 1 million residents, to small population centres in the County of Grande Prairie and close to the British Columbia border. The economy in these communities is heavily influenced by the oil and gas industry, especially in Peace Country to the north and west of Grande Prairie. The population has a familiarity with oil and gas pipeline projects and, in the late 1990s, witnessed the construction of the Alliance Pipeline. Forestry and agriculture also serve as important economic drivers. Construction, transportation, manufacturing, the commercial and service sector and government play major roles as well. In recent years, the regional economy has become increasingly diversified and economic growth has been less affected by the cyclical trends in any one sector. Some local governments, such as the County of Grande Prairie, have shown a keen interest in the discussion of a trade and transportation corridor stretching from Edmonton to deep-water ports at Prince Rupert and Kitimat.

Table 2-1 Communities in Alberta

Non-Aboriginal Communities and Municipalities	Aboriginal Groups
Beaverlodge	Alexander First Nation
Bon Accord	Alexis Nakota Sioux Nation
Edmonton	Aseniwuche Winewak Nation
Fort Saskatchewan	Driftpile First Nation [a]
Fox Creek	Duncan's First Nation [b]
Grande Prairie	Enoch Cree Nation #440
Legal	Grande Cache Métis Local #1994 [c]
Mayerthorpe	Horse Lake First Nation [b]
Morinville	Kapawe'no First Nation [a]
Sangudo	Métis Regional Council – Zone IV
Sherwood Park	Paul First Nation
Spruce Grove	Sawridge Band [a]
St. Albert	Sturgeon Lake Cree Nation [b]
Stony Plain	Sucker Creek First Nation [a]
Whitecourt	Swan River First Nation [a]
County of Grande Prairie	
Lac Ste. Anne County	
Municipal District of Greenview No. 16	
Strathcona County	
Sturgeon County	
Woodlands County	

NOTES:
[a]This group is represented by the Lesser Slave Lake Indian Regional Council.
[b]This group is represented by the Western Cree Tribal Council.
[c]This Métis Local has asked to be represented by the Métis Regional Council – Zone IV.

The population of the Alberta communities is largely non-Aboriginal, with Aboriginal people accounting for approximately 7 percent of residents. Differences exist in the proportion of the population under the age of 25, over the age of 54, and in the ratio of males to females. Rural and less-populated municipalities tend to have older populations. Higher male-to-female ratios are characteristic of municipalities where employment is predominantly in agriculture, forestry and oil and gas. Generally, all of the selected communities have high participation and low unemployment rates. Average earnings are higher in municipalities with oil-and-gas-sector jobs.

For the basic demographic characteristics of the non-Aboriginal communities in Alberta (based on Statistics Canada's analysis of the 2001 census), see Table 2-2.

First Nation Council and/or Métis Office Location	
First Nation Council	**Location**
Lesser Slave Lake Indian Regional Council	Slave Lake, Alberta
Western Cree Tribal Council	Valleyview, Alberta
Métis Association	**Location**
Métis Regional Council - Zone IV	Edmonton, Alberta

Counties and MD's of Alberta	
No.	**Region**
1	Strathcona County
2	Sturgeon County
3	Lac Ste. Anne County
4	Woodlands County
5	M.D. of Greenview No. 16
6	County of Grande Prairie

N

Peace River
Duncan's First Nation
Dawson Creek
Kelly Lake Metis Settlement Society (Tomslake)
BRITISH COLUMBIA
Kelly Lake Cree Nation
Kelly Lake First Nation
Tumbler Ridge
Horse Lake First Nation
6
Beaverlodge
Grande Prairie
Sturgeon Lake Cree Nation
Valleyview (Western Cree Tribal Council)
ALBERTA
Kapawe'no First Nation
Lesser Slave Lake
Sucker Creek First Nation
Driftpile First Nation
Swan First Nation
Sawridge First Nation
Slave Lake (Lesser Slave Lake Indian Regional Council)
KP 500
KP 550
KP 450
KP 400
5
KP 350
KP 300
Fox Creek
KP 250
Alexander First Nation
Alexis Nakota Sioux Nation
4
KP 200
Whitecourt
Aseniwuche Winewak
Mayerthorpe
Sangudo
KP 150
KP 100
3
Alexis Nakota Sioux Nation
Morinville
Alexander First Nation
KP 50
Legal
Bon Accord
2
Fort Saskatchewan
St. Albert
Spruce Grove
Edmonton
KP 0
1
Sherwood Park
Stony Plain
Paul First Nation
Enoch Cree Nation #440

LEGEND
- Kilometre Post
- Community
- Study Area Community
- Aboriginal Community
- Gateway Pipeline Route
- Major Road
- Railway
- Socio-Economic Study Area
- Aboriginal Territory
- Rural Municipality
- City

25 0 25 50
Distance in Kilometres

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FIGURE NO. **2-4**

Study Area Communities, Rural Municipalities and Aboriginal Territories in Alberta

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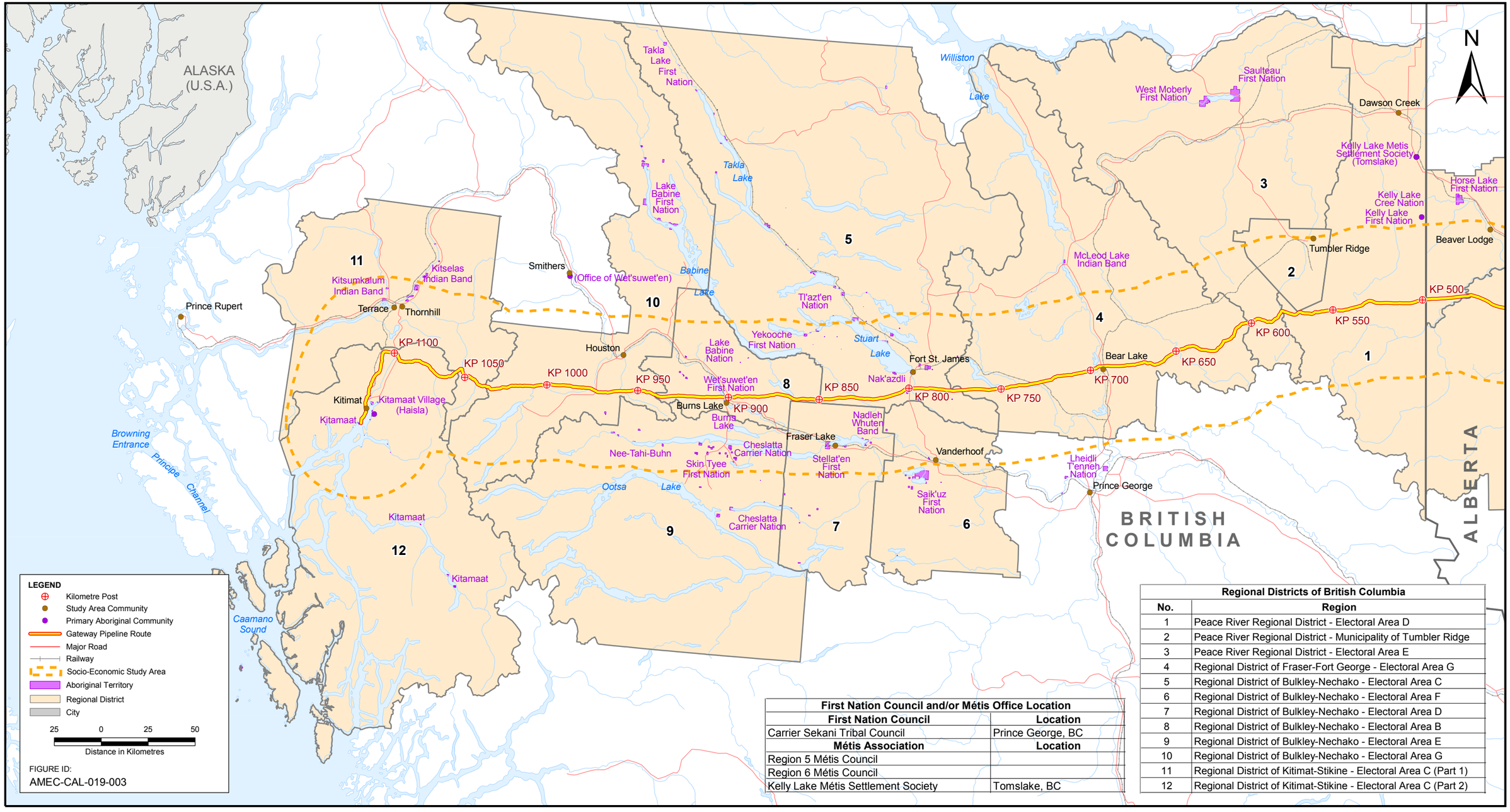

LEGEND

- Kilometre Post
- Study Area Community
- Primary Aboriginal Community
- Gateway Pipeline Route
- Major Road
- Railway
- Socio-Economic Study Area
- Aboriginal Territory
- Regional District
- City

25 0 25 50
Distance in Kilometres

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First Nation Council and/or Métis Office Location	
First Nation Council	**Location**
Carrier Sekani Tribal Council	Prince George, BC
Métis Association	**Location**
Region 5 Métis Council	
Region 6 Métis Council	
Kelly Lake Métis Settlement Society	Tomslake, BC

Regional Districts of British Columbia	
No.	**Region**
1	Peace River Regional District - Electoral Area D
2	Peace River Regional District - Municipality of Tumbler Ridge
3	Peace River Regional District - Electoral Area E
4	Regional District of Fraser-Fort George - Electoral Area G
5	Regional District of Bulkley-Nechako - Electoral Area C
6	Regional District of Bulkley-Nechako - Electoral Area F
7	Regional District of Bulkley-Nechako - Electoral Area D
8	Regional District of Bulkley-Nechako - Electoral Area B
9	Regional District of Bulkley-Nechako - Electoral Area E
10	Regional District of Bulkley-Nechako - Electoral Area G
11	Regional District of Kitimat-Stikine - Electoral Area C (Part 1)
12	Regional District of Kitimat-Stikine - Electoral Area C (Part 2)

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FIGURE NO.
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Study Area Communities, Rural Municipalities and Aboriginal Territories in British Columbia

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Table 2-2 Non-Aboriginal Communities in Alberta – Demographic Characteristics (2001 and 1996)

Community	Population		Aboriginal People[a] (%)	Under Age 25[a] (%)	Over Age 54[a] (%)	M:F Ratio[a]	Municipal Status
	2001	1996					
Beaverlodge	2,110	1,997	7.1	39.8	21.3	1.03:1	Town
Bon Accord	1,532	1,493	4.5	41.2	10.1	1:07:1	Town
Edmonton	937,845	862,597	4.4	35.0	18.9	0.98:1	City
Fort Saskatchewan	13,121	12,408	1.8	36.7	17.9	0.99:1	City
Fox Creek	2,337	2,321	5.1	32.3	19.2	0.93:1	Town
Grande Prairie	36,983	31,353	7.1	40.8	11.9	1.02:1	City
Legal	1,058	1,095	3.5	37.2	21.2	1.04:1	Town
Mayerthorpe	1,570	1,669	4.1	36.0	26.4	0.89:1	Town
Morinville	6,540	6,226	4.2	42.2	11.8	1.01:1	Town
Sangudo	377	398	3.9	29.3	29.3	0.95:1	Village
Sherwood Park[b]	b	b	b	b	b	b	b
Spruce Grove	15,983	14,271	4.1	38.4	15.2	1:1	City
St. Albert	53,081	46,888	2.3	36.7	14.8	0.97:1	City
Stony Plain	9,589	8,274	3.0	37.6	19.4	0.94:1	Town
Whitecourt	8,334	7,783	7.7	42.2	8.7	1.10:1	Town
County of Grande Prairie No. 1	15,638	13,537	4.4	38.3	15.7	1.01:1	County (Municipality)
Lac Ste. Anne County	8,948	8,737	7.1	31.7	23.9	1.12:1	MD
Municipal District of Greenview No. 16	5,439	5,433	10.6	37.2	19.7	1.09:1	MD
Strathcona County	71,986	64,176	7.2	36.5	17.0	1.00:1	Specialized Municipality
Sturgeon County	18,067	15,945	4.12	39.3	15.2	1.16:1	MD
Woodlands County	3,818	3,699	6.9	35.7	16.6	1.14:1	MD

NOTES:
[a]Data are for 2001.
[b]Data for Sherwood Park are included in the Strathcona County totals and are not reported separately.

SOURCE: Statistics Canada (2005a, 2005b)

For economic data for the selected non-Aboriginal communities in Alberta, see Table 2-3.

Table 2-3 Non-Aboriginal Communities in Alberta – Economic Data (2001)

Community	Labour Force[a] (No.)	Participation Rate (%)	Unemployment Rate (%)	Average Earnings (Age 15+) ($)
Beaverlodge	1,155	71.7	8.2	27,181
Bon Accord	845	74.8	4.1	28,790
Edmonton	370,920	70.3	6.0	30,534
Fort Saskatchewan	7,255	72.8	4.2	34,322
Fox Creek	1,490	85.6	2.7	37,188
Grand Prairie	22,695	81.0	5.5	32,788
Legal	545	73.2	9.2	27,512
Mayerthorpe	735	66.8	5.4	26,296
Morinville	3,590	77.5	5.6	29,376
Sangudo	3,590	60.9	5.1	24,429
Sherwood Park	[b]	[b]	[b]	[b]
Spruce Grove	9,320	76.5	4.6	32,128
St. Albert	31,385	76.5	4.1	39,782
Stony Plain	4,970	70.1	3.4	30,588
Whitecourt	5,020	83.6	7.4	36,154
County of Grande Prairie	9,150	77.5	5.3	33,455
Lac Ste. Anne County	4,960	72.2	4.1	25,548
MD of Greenview No. 16	3,265	79.9	2.0	28,749
Strathcona County	42,460	77.3	3.8	38,096
Sturgeon County	10,700	78.6	2.8	35,801
Woodlands County	2,165	74.6	7.1	28,500

NOTES:
[a]Total experienced labour force
[b]Data for Sherwood Park are included in the Strathcona County totals and are not reported separately.

SOURCE: Statistics Canada (2001)

For the basic demographic characteristics of the First Nations and Métis Groups in Alberta–which will be included in the socio-economic assessment–see Table 2-4. Economic data are presently not available on First Nations and Métis communities in Alberta.

Table 2-4 Aboriginal Groups in Alberta - Demographic Characteristics (2005)

Community	Registered Population[a]			
	Total	Living On the Reserve[b]	Living On Crown Lands[c]	Living Off the Reserve[d]
Alexander First Nation	839[e]	–	–	–
Alexis Nakota Sioux First Nation	1,470	884	2	584
Aseniwuche Winewak Nation	–	–	–	–
Driftpile First Nation	2,169	793	0	1,376
Duncan's First Nation	210	124	0	86
Enoch Cree Nation #440	1,942	1,486	3	453
Horse Lake First Nation	816	356	0	460
Kapawe'no First Nation	282	87	0	195
Métis Regional Council – Zone IV • Grande Cache Métis Local #1994	–	–	–	–
Paul First Nation	1,682	1,198	1	483
Sawridge Band	–	–	–	–
Sturgeon Lake Cree Nation	2,442	1,245	0	1,197
Sucker Creek First Nation	2,227	625	8	1,594
Swan River First Nation	1,034	327	0	707

NOTES:
– Data not available.
[a]INAC (2005)
[b]On reserve = living on a reserve
[c]On Crown lands = living on own Crown lands or other band Crown lands
[d]Off reserve = living off the reserve
[e]Statistics Canada (2005)

2.2.1.2 British Columbia

The socio-economic assessment will include 18 non-Aboriginal communities and regional districts (with a population of approximately 370,000, although data is not available for some communities) and 31 Aboriginal groups (with a population greater than 10,000) in British Columbia (Table 2-5). The RoW will also cross the boundaries of four regional districts, which are characterized by the preliminary baseline data.

The British Columbia communities in the Project area fall into two groups: coastal (or northwest) communities and those located in central and northeastern British Columbia.

In the coastal area, the main centres are Prince Rupert, Terrace, Kitimat and Smithers with a combined population of 42,454 people (2001 Census). Terrace acts as the primary service centre for Prince Rupert and the Nass Valley (Nisgh'a), Kitimat, Stewart and Smithers. Prince Rupert's economy was historically dominated by the fishing and forestry sectors. The area's economy is slowly emerging from a downward turn after the closure of sawmills. Recent and

upcoming projects such as a container port, limited reopening of a sawmill, and cruise-ship-related tourism have contributed to some revitalization of the economy. Mineral exploration has also played a historically significant role in this area and is on the rise because of commercial conditions for mineral commodities. In the Bulkley Valley, ranching and agriculture also contribute to the economic mainstay. As with other parts of British Columbia, the mountain pine beetle is forcing significant mature pine harvesting, which is expected to carry on for at least a decade. The oil and gas sector is not as predominant as in northeastern British Columbia, though it is growing as a regional revenue generator.

Table 2-5 Communities in British Columbia

Non-Aboriginal Communities and Municipalities	Aboriginal Groups
Bear Lake	Burns Lake Indian Band [a]
Burns Lake	Cheslatta Carrier Nation
Dawson Creek	Kelly Lake Cree Nation
Fort St. James	Kelly Lake First Nation
Fraser Lake	Kelly Lake Métis Settlement Society
Houston	Kitamaat Village Council (Haisla First Nation)
Kitimat	Kitselas Indian Band
Prince George	Kitsumkalum Indian Band
Prince Rupert	Lake Babine First Nation
Smithers	Lheidli T'enneh Nation
Terrace	McLeod Lake Indian Band
Thornhill	Nahdleh Whut'en Band [a]
Tumbler Ridge	Nak'azdli Indian Band [a]
Vanderhoof	Nee Tai Buhn First Nation
Peace River Regional District	Office of the Wet'suwet'en (Wet'suwet'en Nation)
Regional District of Bulkley-Nechako	Region 5 Métis Council (North Central)
Regional District of Fraser-Fort George	• Fort George Métis Association
Regional District of Kitimat-Stikine	• New Caledonia Métis Association
	Region 6 Métis Council (Northwest)
	• North West BC Métis Association
	• North West Métis Association
	• Tri-River Métis Association
	Saik'uz First Nation [a]
	Saulteau First Nation
	Skin Tyee First Nation
	Stellat'en First Nation
	Takla Lake First Nation [a]
	Tl'azt'en Nation [a]
	West Moberly First Nation
	Wet'suwet'en First Nation [a]
	Yekooche First Nation

NOTE:
[a]This group is represented by the Carrier Sekani Tribal Council.

In the central and eastern portions of the province, the city of Prince George is the largest community, with, according to a 2001 Census, over 72,000 residents. It acts as a service centre to all of the British Columbia communities selected for the socio-economic assessment. The economy is dominated by the forestry sector, including logging, sawmills and manufacturing of forest products such as oriented strand board (although the industry is being challenged by the spread of the mountain pine beetle and the widespread loss of mature pine forests). Ranching and agriculture also serve as an economic mainstay. Some local central British Columbia governments, such as the city of Prince George, have shown a keen interest in the discussion of a trade and transportation corridor stretching from Edmonton to deep-water ports along the British Columbia coast. Other proposals receiving attention are a rail link to Alaska and improved air cargo service.

Oil and gas has become increasingly important in northeast British Columbia, especially around Dawson Creek, where the population is familiar with the oil and gas industry and pipeline projects. There has been a steady rise in tourism, especially connected with travel to points north along the Alaska Highway. Forestry is also prevalent in this portion of British Columbia, although the industry here is also challenged by the spread of the mountain pine beetle and the widespread loss of mature pine forests.

The population of the British Columbia communities is largely non-Aboriginal, but the northwest coastal communities have substantial populations of Aboriginal people. About 30 percent of Prince Rupert's population are Aboriginal people, compared with about 15 percent in Terrace and in Burns Lake Village and 5 percent in Kitimat. The selected communities have populations where almost 40 percent of the people are under 25 and, on average, 16 percent of the population is over 54, although there is considerable variation among communities. There is typically a higher male-to-female ratio, which is characteristic of resource-based communities. Many of the selected communities have average or below-average participation and average to high unemployment rates.

For the basic demographic characteristics of the non-Aboriginal communities in British Columbia based on Statistics Canada's analysis of the 2001 census, see Table 2-6. For economic data for the selected non-Aboriginal communities in British Columbia, see Table 2-7.

Table 2-6 Non-Aboriginal Communities in British Columbia – Demographic Characteristics (2001 and 1996)

Community	Population		Aboriginal People[a] (%)	Under Age 25[a] (%)	Over Age 54[a] (%)	M:F Ratio[a]	Municipal Status
	2001	1996					
Bear Lake	[b]	[b]	[b]	[b]	[b]	[b]	[b]
Burns Lake	1,942	1,793	14.2	39.5	17.7	1:1	Village
Dawson Creek	10,755	11,125	19.4	37.2	19.0	0.96:1	City
Fort St. James	1,927	2,046	26.0	37.9	14.3	1.06:1	District municipality
Fraser Lake	1,269	1,344	9.4	38.3	17.0	1.02:1	Village

Table 2-6 Non-Aboriginal Communities in British Columbia – Demographic Characteristics (2001 and 1996) (cont'd)

Community	Population		Aboriginal People[a] (%)	Under Age 25[a] (%)	Over Age 54[a] (%)	M:F Ratio[a]	Municipal Status
	2001	1996					
Houston	3,577	3,934	9.4	39.3	13.8	1.13:1	District municipality
Kitimat	10,285	11,136	5.2	36.1	17.2	1.01:1	District municipality
Prince George	72,406	75,150	9.9	36.8	16.3	1:1	City
Prince Rupert	14,643	16,714	29.6	36.9	16.9	1.03:1	City
Smithers	5,414	5,624	9.9	38.8	17.5	0.96:1	Town
Terrace	12,109	12,783	14.7	38.2	17.2	1.02:1	City
Thornhill	[c]	[c]	[c]	[c]	[c]	[c]	[c]
Tumbler Ridge	1,851	3,775	7.8	34.0	18.3	1.08:1	District municipality
Vanderhoof	4,390	4,401	5.3	40.3	17.0	0.96:1	District municipality
Peace River Regional District	55,080	56,477	13.1	40.0	15.8	1.04:1	Census division
Regional District of Bulkley-Nechako	40,856	41,642	14.8	38.9	16.7	1.06:1	Census division
Regional District of Fraser-Fort George	95,317	98,974	9.3	36.5	16.1	1.03:1	Census division
Regional District of Kitimat-Stikine	40,876	43,618	26.9	37.9	16.6	1.07:1	Census division

NOTES:
– Data not available
[a]Data are for 2001.
[b]Data for Bear Lake are included in the Regional District of Fraser-Fort George, Electoral District G totals and are not reported separately.
[c]Data for Thornhill are included in the Regional District of Kitimat-Stikine totals and aren't reported separately.

SOURCE: Statistics Canada (2005a, 2005b)

Table 2-7 Non-Aboriginal Communities in British Columbia – Economic Data (2001)

Community	Labour Force[a] (No.)	Participation Rate (%)	Unemployment Rate (%)	Average Earnings (Age 15+) ($)
Bear Lake	[b]	[b]	[b]	[b]
Burns Lake	995	71.5	15.8	28,611
Dawson Creek	5,675	69.6	10.3	29,519
Fort St. James	1,105	73.1	7.2	31,237
Fraser Lake	685	72.4	15.8	31,639
Houston	2,025	75.9	12.0	34,338
Kitimat	5,195	68.0	11.8	41,483
Prince George	39,650	72.1	11.4	32,559
Prince Rupert	7,895	73.4	15.4	30,685
Smithers	2,970	74.7	9.3	31,543
Terrace	6,230	70.5	13.5	32,204
Thornhill	[c]	[c]	[c]	[c]
Tumbler Ridge	1,050	71.8	10.0	34,814
Vanderhoof	2,270	69.6	10.6	32,243
Peace River Regional District	30,245	73.4	9.7	31,273
Regional District of Bulkley-Nechako	21,200	70.3	12.6	30,190
Regional District of Fraser-Fort George	52,565	72.4	11.1	32,522
Regional District of Kitimat-Stikine	20,215	68.1	17.1	31,937

NOTES:
– Data not available.
[a]Total experienced labour force.
[b]Data for Bear Lake are included in the Regional District of Fraser-Fort George, Electoral District G totals and are not reported separately.
[c]Data for Thornhill are included in the Regional District of Kitimat-Stikine totals and aren't reported separately.

SOURCE: Statistics Canada (2001)

For the basic demographic characteristics of the Aboriginal communities in British Columbia that will be included in the socio-economic assessment, see Table 2-8. Economic data is presently not available on First Nations and Métis communities in British Columbia.

Table 2-8 Aboriginal Groups in British Columbia – Demographic Characteristics (2005)

Community	Registered Population (2005)			
	Total	Living on Reserve[a]	Living on Crown Land[b]	Living off Reserve[c]
Burns Lake Indian Band	97	39	0	58
Cheslatta Carrier Nation	298	152	4	142
Kelly Lake Cree Nation	–	–	–	–
Kelly Lake First Nation	–	–	–	–
Kelly Lake Métis Settlement Society	–	–	–	–
Kitamaat Village Council (Haisla First Nation)	1,550	668	0	882
Kitselas Indian Band	498	173	0	325
Kitsemkalum Indian Band	639	212	0	427
Lake Babine First Nation	2,158	1,403	1	754
Lheidli T'enneh Nation	312	98	0	214
McLeod Lake Indian Band	–	–	–	–
Nahdleh Whut'en Band	407	253	0	154
Nak'azdli Indian Band	–	–	–	–
Nee Tai Buhn First Nation	132	58	0	74
Office of the Wet'suwet'en (Wet'suwet'en Nation)	–	–	–	–
Region 5 Métis Council (North Central)	–	–	–	–
Region 6 Métis Council (Northwest)	–	–	–	–
Saik'uz First Nation	862	542	0	320
Saulteau First Nation	–	–	–	–
Skin Tyee First Nation	130	51	0	79
Stellat'en First Nation	408	221	0	187
Takla Lake First Nation	629	328	0	301
Tl'azt'en First Nation	1,461	606	0	855
West Moberly First Nation	186	78	0	108
Wet'suwet'en First Nation	–	–	–	–
Yekooche First Nation	205	157	0	48

NOTES:
– Data not available.
[a]On reserve = living on a reserve
[b]On Crown land = living on own Crown land or other band Crown land
[c]Off reserve = living off the reserve

SOURCE: INAC (2005)

2.2.2 Land and Water Use

2.2.2.1 Land Ownership

The pipeline and associated facilities in Alberta and British Columbia will be located on or will traverse Crown and private lands.

The proposed pipeline will be about 1150 km in length. About 500 km of the route will be within Alberta and about 650 km of the route will be within British Columbia. Approximately 250 km of the Alberta portion of the route will traverse private land and 250 km will traverse Crown lands. More than 90 percent of the British Columbia portion of the route will be on Crown lands.

The lands that the route will traverse are managed by various plans and policies, including:

- Municipal Development Plans (Alberta)
- Integrated Resource Management Plans (Alberta)
- Watershed Management Plans (Alberta)
- Official Community Plans (British Columbia)
- Integrated Land Use Management Plans (British Columbia)
- Regional Land Use Plans (British Columbia)
- Land and Resource Management Plans (British Columbia)
- Sustainable Resource Management Plans (British Columbia)

2.2.2.2 Land Use

There are many surface and mineral land use dispositions and activities on Crown lands along the pipeline route and near Project facilities, including:

- environmentally protected areas
- forestry resources and activities
- oil and gas and other energy resources and activities
- mineral and granular resources and mining activities
- agricultural activities
- consumptive recreation and non-traditional resource harvesting, including trapping and guide outfitting
- tourism and non-consumptive recreation

The privately held land in Alberta that is along the proposed pipeline route is predominantly agricultural. In British Columbia, private lands are largely forested and are used as woodlots and for residential purposes.

2.2.2.3 Watercourse Use

The watercourses near the propose pipeline route might be used for a variety of purposes including licensed water withdrawal and effluent discharge, water-based recreation, and traditional, sport and commercial fishing.

The Project will include marine terminal infrastructure that will be in areas with fishing, shipping and other marine resource use.

2.2.2.4 Indian Reserves and Lands

Efforts were made to select a preliminary alignment that would avoid Indian Reserve land; however, the recently obtained legal land information indicates the pipeline RoW traverses or is proximal to a number of lands of varying legal status. The RoW:

- aligns immediately north of Alexander First Nation Indian Reserve 134 (KP 63 to 72 west of Morinville, Alberta). One quarter section of this land is owned by trustees of Alexander First Nation for future inclusion as Reserve lands
- aligns immediately south of Alexis Nakota Sioux Nation 437 (KP 205 to 210 west of Whitecourt, Alberta)
- traverses lands held by Alexander First Nation #134 (KP251 to 253 east of Fox Creek, Alberta) and also traverses land held by Alberta Crown for transfer to the Federal Crown for future inclusion as Alexander First Nation Reserve lands (KP253 to 254). Where the Project pipeline does cross Alexander First Nation, the RoW follows the Alliance pipeline.
- traverses reservation notation of first Nations Treaty Area (KP 701 near Bear Lake, British Columbia)
- traverses Poison Creek Indian Reserve #17A (KP 900 near Burns Lake, British Columbia)

Aboriginal communities discussed in this document might also have traditional lands or territories traversed or affected by the Project.

As Project work progresses and routing is better defined, Gateway will work with potentially affected communities to identify concerns and consider alternative routing in these areas, if required.

2.2.2.5 Proximity to Parks and Protected Areas

The proposed pipeline route has been selected to avoid national or provincial parks in Alberta or British Columbia. The route, however, will run next to Monkman Provincial Park in British Columbia, and the Paddle River Dam Provincial Recreation Area and Kakina Lake Natural Area in Alberta.

Although they have no protected status in legislation, Alberta has identified some environmentally significant areas for potential future designation based on criteria such as representation, diversity, naturalness and ecological integrity. Additionally, each area is assigned a significance level: provincial, national or international. The pipeline route will cross through the following environmentally identified areas that are rated as provincially significant:

- Athabasca River-Foothills
- Little Smoky River
- Simonnette River
- Stoney Creek Moose and Grizzly Range
- Wapiti River

In British Columbia, the Land and Resource Management Planning (LRMP) process includes the British Columbia protected area strategy (PAS) that recommends areas for protected area status. Within the LRMP process, both

environmental and socio-economic criteria were considered in determining and designating protected area status.

Under the sub-regional LRMP initiatives in British Columbia, environmentally significant areas are designated as protected areas. The pipeline route will pass through or near to the following British Columbia protected areas:

- the Stuart River Protected Area Resource Management Zone as defined by the Fort St. James/Vanderhoof LRMP. The pipeline route is less than 1 km outside the protected area's northern boundary.
- the Burnie-Shea Lakes (Tazdli Wiyez Bin) Protected Area Resource Management Zone as defined by the Morice LRMP. The pipeline route passes through this protected area.
- the Sutherland River Protected Area Resource Management Zone as defined by the Vanderhoof LRMP. The pipeline route is less than 1 km outside of the protected area's southern boundary.

Other environmentally sensitive areas that are proximal to the corridor will be assessed in the ESA

2.2.2.6 Proximity to Urban Areas

The proposed route is less than or equal to 10 km from one incorporated community with a population less than 1000. It is less than or equal to 40 km from 27 communities with populations of more than 1000.

2.2.3 Heritage Resources

2.2.3.1 Cultural Resources

The proposed corridor crosses several archaeologically recognized cultural areas that are characterized by regional adaptations to local environments spanning the last 10,000 years. Although many segments along this corridor have not been investigated for cultural remains, regional information is available for estimating the nature and time of past land occupation.

In the area of the parkland and western boreal forest (between Edmonton and the eastern slopes of British Columbia), it is expected that the archaeological sites encountered could represent the full temporal range of occupations from the earliest post-glacial to the recent proto-historic periods. Of particular note is the potential for identification of early post-glacial occupations along the eastern slopes and adjacent boreal forest. Recognizing that the regional environment has changed over the last 10,000 years, it is still possible to predict that the cultural material will be associated with such terrain features as shorelines of extinct glacial lakes and outwash channels as well as more recent features in borders of modern rivers, lakes and streams. Hinterland areas away from these primary features are expected to contain archaeological sites associated with a transitory use of the landscape (e.g., hunting and gathering biotic resources). Sites in this segment of the corridor are expected to relate predominantly to the established chronology for the northern plains, with more limited relationships to the northern boreal forest and western plateau regions.

Of note is the potential to intercept early man sites in the interior regions as exemplified by the Charlie Lake and Pink Mountain sites in northeastern British Columbia. This portion of the route is probably least well known. The recorded sites in this region are largely culturally modified trees that date to the late precontact-early contact periods. However, precontact materials indicative of regionally focused exploitation of ungulates and fish resources are on record in this region and are strongly associated with lakes and river valleys. Quarry and quarry processing sites are expected in areas of suitable bedrock exposures and river cobbles.

The coastal segment of the corridor is characterized by the occurrence of culturally modified trees, burials, rock art and village and midden sites associated with exploitation of maritime resources. These sites generally post-date to 5000 years ago. Several rock art sites have been recorded along Kitimat Arm near the pipeline corridor and the marine terminal location. A midden was recently identified in Emsley Cove that appears to date to the protohistoric period and holds potentially significant implications to more recent precontact use of the region.

Sites of the historic period are also expected along the corridor. These sites represent early exploration, fur trade activities and agrarian settlement. Later sites relate to development of communities and mineral resource exploitation. Sites of Aboriginal traditional use occur throughout the length of the corridor. Of particular note are the many early historic trails that are crossed by the proposed corridor and the culturally modified trees documenting Aboriginal use of the region.

2.2.3.2 Palaeontological Resources

The proposed corridor crosses several fossil-bearing formations that effectively span most (500 million years) of the Phanerozoic. These formations relate to the Palaeocene (Scollard, Paskapoo), Cretaceous (Horseshoe Canyon, Scollard, Smoky Group, Dunvegan, Bullhead Group, Minnes Group), Devonian (Fairholme Group), Mississippian and Permian (Rundle and Ishbel Groups), Triassic (Spray River Group) and Upper Ordovician-Lower Silurian (Beaverhill) periods. Fossils contained in these formations consist of invertebrate and vertebrate remains, as well as macroflora. In addition, fossils of both pre- and post-glacial fauna (mammoth, horse, bison, caribou, muskox, camel, lion, antelope, bear, beaver, ground sloth and ground squirrel) may occur in the sands and gravels of central Alberta. Exposures and near-surface deposits of these formations crossed by the proposed corridor have the potential to contain fossil remains.