

FACILITIES

MACKENZIE GAS PROJECT
SUPPLEMENTAL INFORMATION
PROJECT UPDATE

INUVIK AREA FACILITY

4.1.1 DESIGN AND CONSTRUCTION

To address increased costs, the construction plan for the Inuvik area facility has been modified to incorporate up to four very large modules (VLMs). The site of the Inuvik area facility remains consistent with the 2005 Project Update. The process design and footprint required is fundamentally unchanged.

The VLMs are expected to weigh between about 3,300 t and 4,200 t. These modules will replace a number of the previously planned 122 t modules, which are transportable by truck. The VLMs will primarily contain the process equipment and will make up about 50% of the total material and equipment weight transported to the site. Other material and equipment transported will consist of:

- smaller modules
- pipe racks
- field-erected facilities, such as the slug catcher and storage tanks

4.1.2 TRANSPORTATION PLAN**4.1.2.1 Scope of Plan**

The change from truck transportable modules to VLMs requires:

- moving modules on ocean-going vessels through the Beaufort Sea and on river barges on the Mackenzie River to Inuvik
- additional infrastructure to enable the VLMs to be transported from the Inuvik South barge landing site to the proposed Inuvik area facility site

Detailed transportation plans for moving the VLMs and other modules will be developed during detailed engineering. The proponents will consult with appropriate government agencies, such as Fisheries and Oceans Canada, Environment Canada, Transport Canada and other regulatory bodies, to ensure that the appropriate plans are in place before the modules are transported.

4.1.2.2 Transportation Route

Transporting the VLMs involves:

- bringing the VLMs from the fabrication yard to the Beaufort Sea in ocean-going vessels, which might be heavy-lift vessels or ocean-going barges

4.1.2.2 Transportation Route (cont'd)

- transferring the VLMs from the ocean-going vessels to river barges. The point of transfer will be determined by the type of vessels being used. Potential locations include off the coast of Herschel Island or Tuktoyaktuk.
- transporting the VLMs by river barge to a new barge landing site south of Inuvik and storing them until the following winter
- using specialized wheeled equipment to move the VLMs from the barge landing site to the Inuvik area facility

4.1.2.3 Potential River Dredging

The barges used to ship the VLMs from the Beaufort Sea south to Inuvik will follow existing navigable channels in the Mackenzie River. Charts and data from the Canadian Hydrographic Service were used to identify the route and potential areas where water depth or channel configuration would affect the transit of the modules. Dredging might be required in these areas to enable the barges to pass. Based on currently available data, the identified locations and estimated dredging amounts along the Mackenzie River are listed in Table 4-1.

Table 4-1: Potential Dredging Volumes for Very Large Module Transport

Location	Distance from Inuvik (km)	Dredging Volumes for 4,200 t VLMs (m ³)	Length (m)
Confluence of Luker and Oniak Channels	29.1	45,000	750
Oniak Channel	27.5	6,500	500
Confluence of Oniak and East Channel	26.0	17,600	500
East Channel	19.9	43,800	110
East Channel	13.6	6,600	250
East Channel	11.9	6,500	500
East Channel	4.7	3,200	250
Total		129,200	2,860

Marine dredging for the Kittigazuit S-bends might require dredging volumes of up to 52,000 m³ over a length of about 3 km. This volume of material is included in the estimated dredging required for moving the Niglintgak gas conditioning facility barge. Therefore, no incremental dredging is required.

The potential locations for marine and river dredging are shown in Figure 4-1.

A bathymetric survey is planned in summer 2007 to collect river channel data. This information will be used to evaluate the VLM dimension and weight alternatives to determine the extent, if any, of the required dredging. For the purposes of this assessment, dredge volumes are assumed to be disposed of by sidecasting into the Mackenzie River.

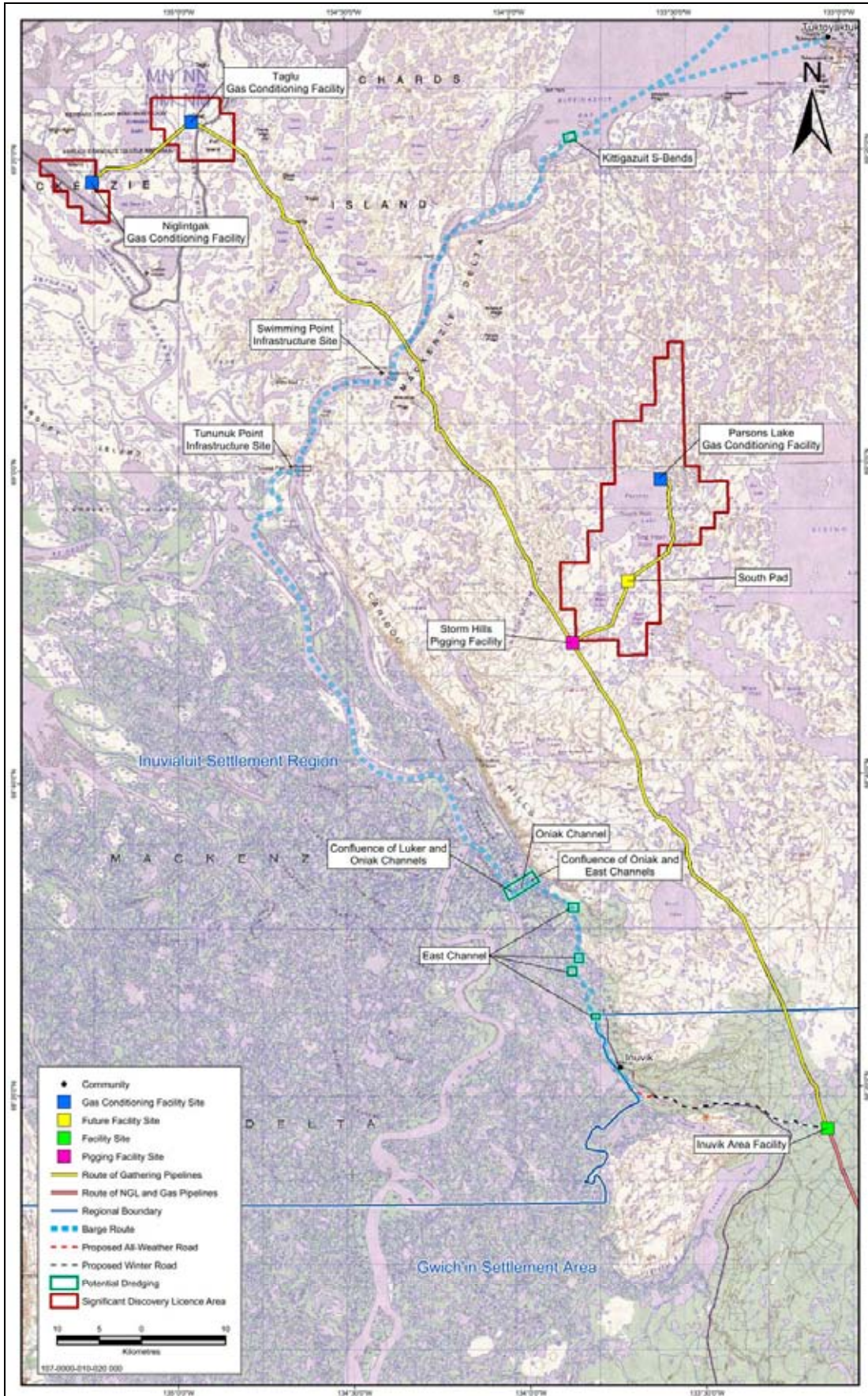


Figure 4-1: Locations of Potential Marine and River Dredging

4.1.2.4 Barge Landing Site

The existing road infrastructure within the town of Inuvik and the Dempster Highway precludes moving the VLMs from the existing barge landing site. A new dock and barge landing site is required, south of the town of Inuvik, on the East Channel. This site would allow VLMs and other project materials to be unloaded, such as:

- pipe
- camp modules
- equipment

Unloading project materials at the new barge landing site will also reduce activity at the Northern Transportation Company Ltd. (NTCL) dock in Inuvik. All fuel required by the project would continue to be unloaded at the existing NTCL dock facilities.

The locations of the required infrastructure are shown in Figure 4-2.

4.1.2.5 Road Access

A new 2.8 km all-weather access road will be constructed from the new barge landing site to a stockpile site beside the Dempster Highway. This will allow this barge landing site to receive other project materials and reduce truck traffic through the Inuvik townsite. The stockpile site will be used to store the VLMs until they can be transported to the Inuvik area facility site in the winter of 2013–2014.

A winter road is required to move the VLMs from the stockpile site to the Inuvik area facility. This road will be about 22 km long and, for most of the route, will parallel the Dempster Highway up to a point just before the Campbell Creek Bridge. The road will then traverse cross-country to the Inuvik area facility site. The proposed route has been selected for its gentle grade and the avoidance of wet terrain conditions.

The 5 km all-weather road planned from the Dempster Highway to the Inuvik area facility has not changed and is required for construction and long-term operations use.

4.1.3 INUVIK AREA FACILITY SITE LAYOUT

The module layout within the Inuvik area facility site will depend on the number of VLMs installed, which is expected to be up to four. The Inuvik area facility site has been designed to accommodate facilities required for handling future gas volumes. The site area of 48 ha remains the same to accommodate potential future expansions.

FACILITIES

INUUVIK AREA FACILITY

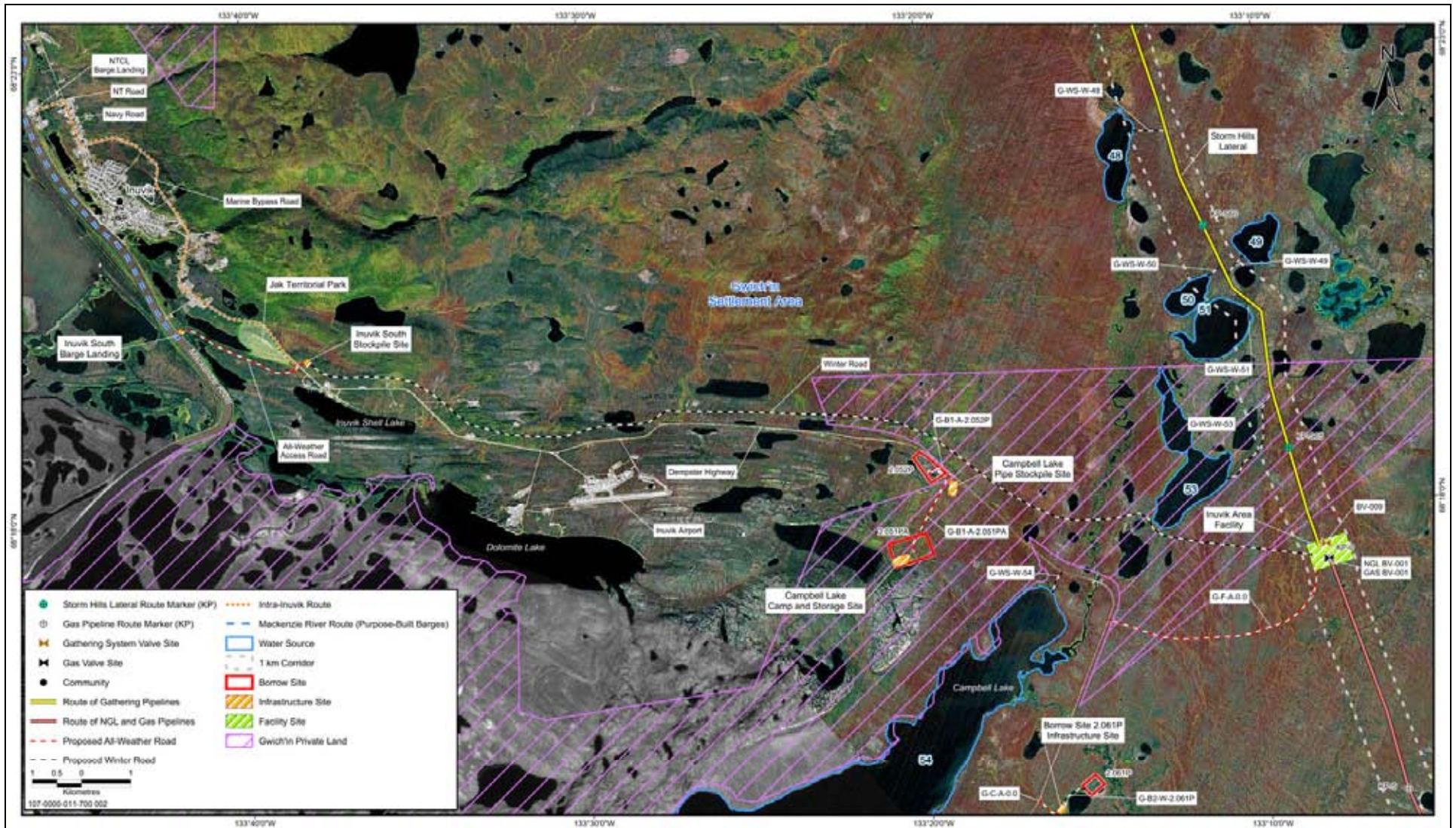


Figure 4-2: Inuvik Area Facility Infrastructure

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GREAT BEAR RIVER COMPRESSOR STATION

4.2.1 RELOCATION PLAN

The process design and land requirements for the Great Bear River compressor station are unchanged. However, in response to a request by the community of Tulita, the Great Bear River compressor station will be relocated about 8 km downstream, across the Great Bear River, closer to Tulita. A realignment of the existing 1-km-wide pipeline corridor is required to accommodate this relocation.

The pipeline crossing of the Great Bear River will not be changed by the compressor station's relocation. However, the annual average operating temperature of the pipeline at the Great Bear River crossing will be reduced from 2°C to about -7°C. The inlet temperature to the Great Bear River compressor station is unchanged despite its new location, as identified in Undertaking J U-23 (JRP Exhibit J-IORVL-00501).

The summer design capacity of the Mackenzie Valley pipeline is unchanged for the:

- one-compressor station case at 27.3 Mm³/d
- three-compressor station case at 34.3 Mm³/d

The monthly average capability for the three-compressor station case has improved by 0.3% to 36.8 Mm³/d.

4.2.2 SITE SELECTION

4.2.2.1 Site Location

Relocating the Great Bear River compressor station will add about 1.4 km to the length of the pipeline. This new compressor site will be on drier ground than was available for sites in the original corridor. The coordinates for the corners of the relocated Great Bear River compressor station site are shown in Table 4-2.

Table 4-2: Great Bear River Compressor Station Site Coordinates

Location	Northwest	Southwest	Northeast	Southeast
Easting	383,987	383,870	383,755	383,638
Northing	7,201,718	7,201,345	7,201,790	7,201,417
Note: Coordinates are from North American Datum 1983 Universal Transverse Mercator (NAD 83 UTM) Zone 10 projection.				

4.2.2.2 Effects of the Relocation

The relocation of the compressor station to the east side of the Great Bear River results in modifications to the infrastructure required to support construction. This includes:

- reducing the size of the Tulita West infrastructure site to that required to support pipeline activities on the west side of Great Bear River, and changing road access from Tulita West to the pipeline right-of-way from all-weather access to winter access
- relocating the 120-person camp from Tulita West to a location on the east side of the Great Bear River in the Four Mile Creek area, after pipelining activities are complete on the west side of the Great Bear River. This camp will then be used for further infrastructure development, facility construction and the HDD crossing of the Great Bear River.
- constructing a barge landing site at Tulita East, near the existing GNWT Department of Transportation's bypass road
- constructing a 6 km all-weather access road from the river barge landing site to the compressor station site, using mostly previously disturbed areas
- eliminating the 12 Mile Point barge landing and infrastructure site

A borrow source with up to three new sites is required to prepare a granular pad for the 120-person construction camp and the line pipe stockpile and fuel storage sites between the barge landing site and the compressor station site along Four Mile Creek Road. The three new sites are:

- 8.003AP
- 8.003BP
- 8.003CP

These new sites will supply about 0.3 Mm³ of material. This reduces the need for topping material from Borrow Site 7.155AP on the south side of the Mackenzie River.

The locations of infrastructure, facilities and the gas pipeline for the Great Bear River area are shown in Figure 4-3.

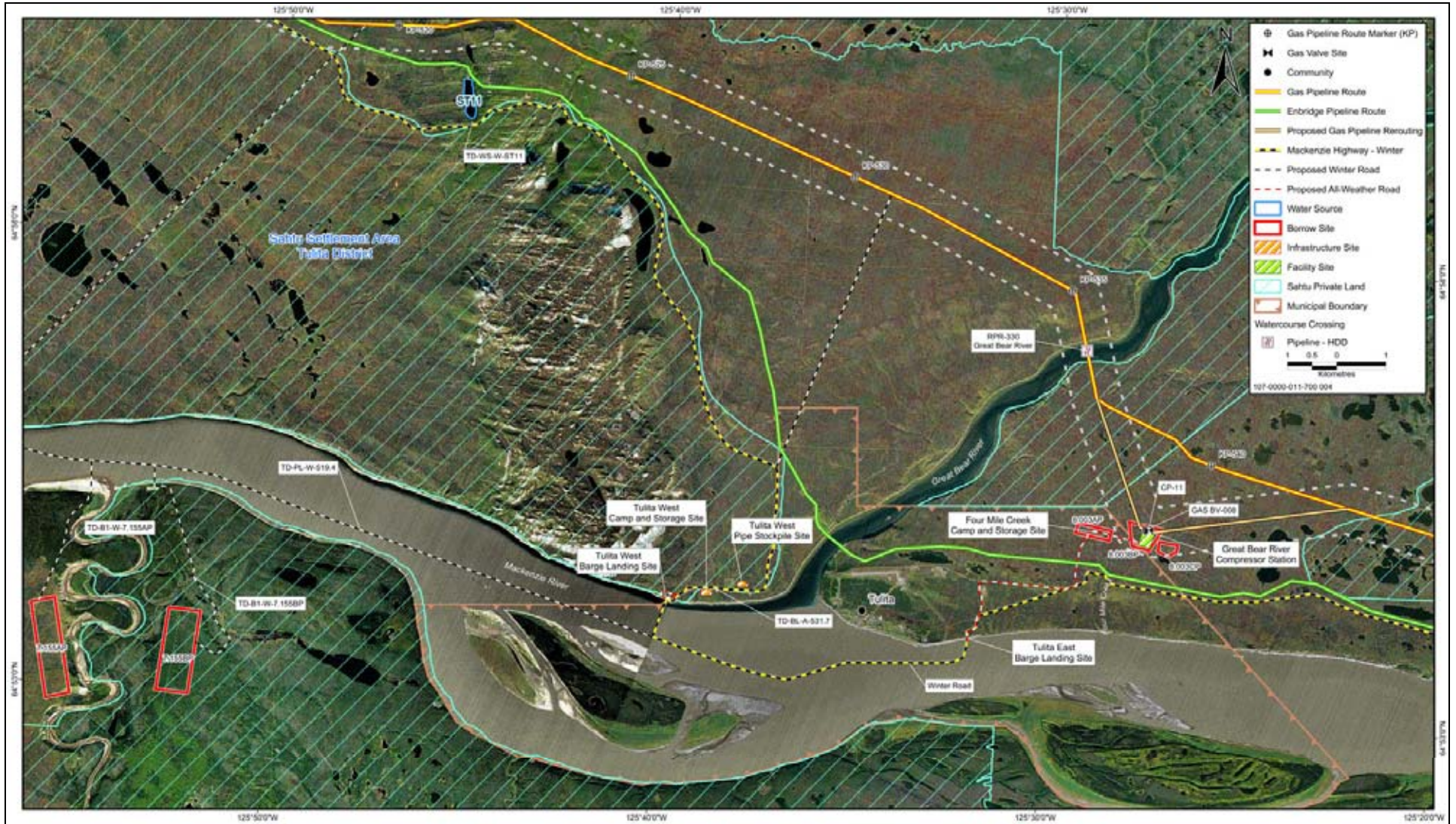


Figure 4-3: Great Bear River Compressor Station Facilities and Infrastructure

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OTHER FACILITIES

4.3.1 NGL SHIPPING

The interconnection between the NGL and Enbridge pipelines at Norman Wells will require new facilities or the modification of existing facilities for the batching of NGL and crude oil. The modifications required to batch NGL and crude oil through facilities at Norman Wells and the Enbridge and Rainbow pipelines will be undertaken by the operators of those facilities.

The operator of the facilities will work with the appropriate regulatory authorities to obtain regulatory approval for the modifications and operational changes.

The required facilities were described in the report *Norman Wells Integration Assessment Study Results* (NEB Exhibit IORVL-61 and JRP J-IORVL-00319).

4.3.2 FUTURE PIPELINE FACILITIES**4.3.2.1 Gas Pipeline Compressor and Heater Stations**

As previously described in the EIS and in the regulatory applications and updates, the flexibility to transport a wide range of natural gas volumes has not changed.

The anchor field owners have contracted in aggregate for a capacity of 23.5 Mm³/d (0.83 Bcf/d). The remaining capacity is uncommitted and available for contracting. The proponents understand that other companies are in various stages of exploration and development in the Mackenzie Delta and the Mackenzie Valley. As the results of these activities become known, other companies might contract for any remaining capacity.

Only one compressor station at Great Bear River is required to transport the currently contracted volumes. Figure 4-4 shows the flexibility of the pipeline system for three flow scenarios. Initial facilities are highlighted in yellow.

Facilities required to support the capability of shipping 34.3 Mm³/d (1.2 Bcf/d) of gas will be deferred until shipping commitments for the additional volumes are made. These facilities include:

- Loon River North compressor station
- River Between Two Mountains compressor station
- Trout River heater station

4.3.2.1 Gas Pipeline Compressor and Heater Stations (cont'd)

For planning purposes, construction of these additional facilities is assumed to take place three years after the initial project start-up. Flexibility to advance this construction will be maintained if shipping commitments are made early enough to enable the project proponents to use personnel, suppliers and equipment involved in the construction of the initial facilities.

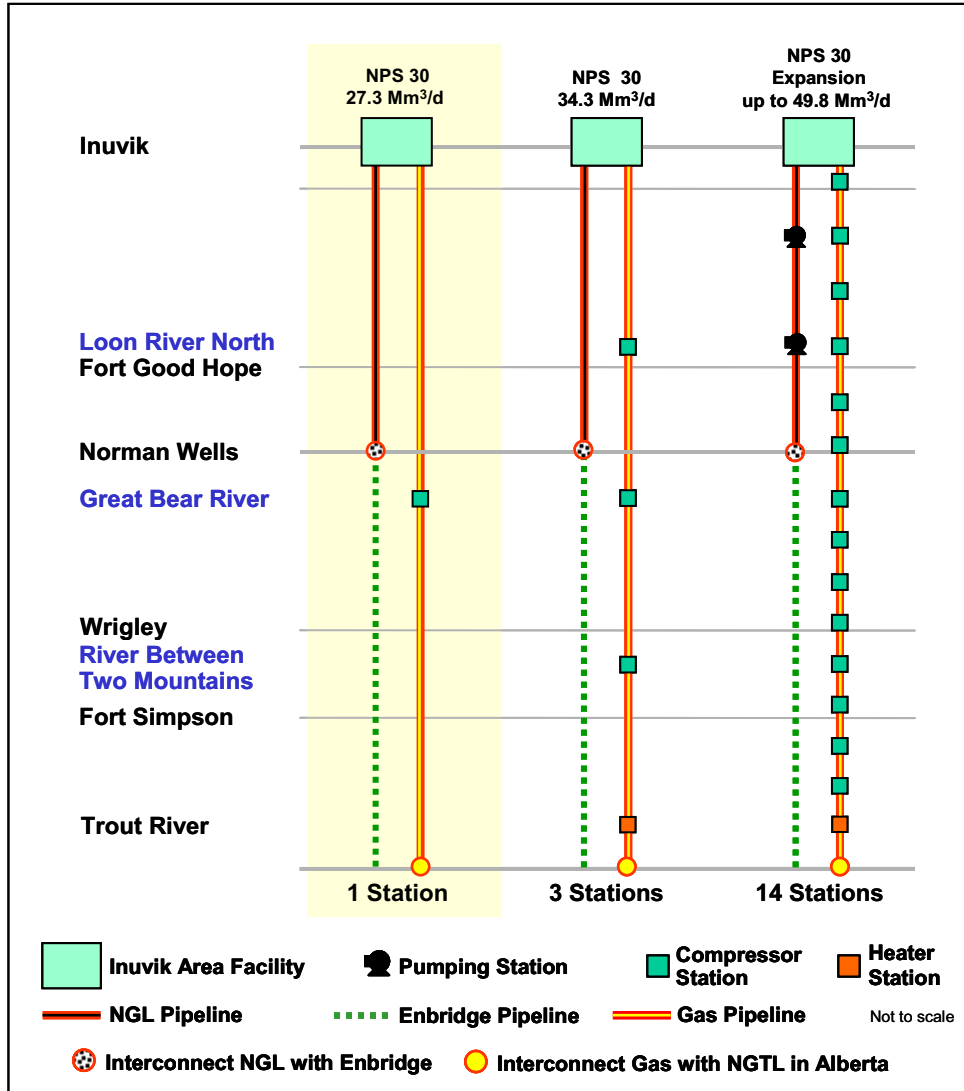


Figure 4-4: Mackenzie Valley Pipeline Daily Throughput Flexibility