
TITLE	ISR Application for a Type A Water Licence
SECTION	3: Overview of Activities in the ISR
SUBJECT	3: Project Schedule

SCHEDULE OF PROJECT ACTIVITIES

A preliminary multi-year construction plan has been developed for the project.

The construction schedule incorporates the timing of regulatory approvals described in the Cooperation Plan for the Environmental Impact Assessment and Regulatory Review of a Northern Gas Pipeline Project through the Northwest Territories developed by the Northern Pipeline Environmental Assessment and Regulatory Chairs' Committee.

The preliminary plan assumes three years of construction for the gathering pipelines and associated facilities, followed by construction cleanup, demobilization and reclamation (see [Table 3-3](#)).

The first year involves preparatory activities starting in the summer of 2006. These activities include building the infrastructure needed for construction and clearing the rights-of-way and facility sites.

The second and third years involve completing preparatory activities and constructing the gathering pipelines and associated facilities.

Camp and equipment demobilization, construction cleanup and site reclamation will start in the third year and will be substantially complete in the fourth year.

Most gathering pipeline installation activities will be completed during the winter. Some activities, such as watercourse crossings and borrow site development, might occur in the summer, where access to the work site is practical. Summer activities are critical to the schedule, as these will allow development of infrastructure needed to support winter construction.

Construction plans include the receipt of regulatory approvals, permits, and authorizations in time to begin infrastructure construction in the second half of 2006.

Table 3-3: Pipeline and Facilities Construction Schedule for the ISR

Season	Activity
Summer 2006	<ul style="list-style-type: none"> • Mobilize equipment, small camps and fuel for gathering pipeline rights-of-way clearing. • Mobilize equipment and fuel for initial site development at the Swimming Point site. • Mobilize and install additional camp trailers at the existing Swimming Point camp. • Begin to develop and operate borrow sites. • Begin construction of the Swimming Point infrastructure site.
Winter 2006–2007	<ul style="list-style-type: none"> • Begin surveying, clearing and drilling boreholes, and digging test pits along the gathering pipeline rights-of-way (Spread E1). • Continue developing and operating borrow sites. • Continue constructing the Swimming Point infrastructure site. • Develop infrastructure for HDD sites. • Construct the pad for the Harry Channel and East Channel HDD crossings.
Summer 2007	<ul style="list-style-type: none"> • Install a 950-person pipeline construction camp at the Swimming Point infrastructure site. • Erect fuel facilities at the Swimming Point infrastructure site. • Start mobilizing components for the Storm Hills pigging facility to the staging area. • Mobilize pipe and HDD equipment.
Winter 2007-2008 First pipe-laying season	<ul style="list-style-type: none"> • Continue surveys, clearing and drilling boreholes, and digging test pits along the gathering pipeline rights-of-way (Spread E2). • Continue operating borrow sites. • Construct winter access roads for the Storm Hills pigging facility. • Construct the Storm Hills pigging facility pad. • Mobilize equipment, fuel and the 40-person camp at the Storm Hills pigging facility. • Install pile foundations for the Storm Hills pigging facility. • Transport from staging area and start installing components for the Storm Hills pigging facility. • Begin gathering pipeline construction Spread E1 in the ISR starting at Niglintgak. • Install all HDD crossings for Spread E1. • Begin gathering pipeline right-of-way reclamation.

Table 3-3: Pipeline and Facilities Construction Schedule for the ISR (cont'd)

Season	Activity
Summer 2008	<ul style="list-style-type: none"> • Move-in pipe, equipment and fuel to support main gathering pipeline construction effort. • Continue mobilizing components at the staging area for the Storm Hills pigging facility. • Begin post-construction monitoring.
Winter 2008-2009 Second pipe-laying season	<ul style="list-style-type: none"> • Complete gathering pipeline construction involving Spreads E1 and E2. • Transport from staging area and complete installing components for the Storm Hills pigging facility. • Continue operating borrow sites. • Continue gathering pipeline rights-of-way reclamation. • Begin commissioning and start-up activities for the Storm Hills pigging facility and pipelines.
Summer 2009	<ul style="list-style-type: none"> • Continue commissioning and start-up activities. • Begin infrastructure site and borrow site reclamation. • Continue gathering pipeline rights-of-way reclamation. • Continue post-construction monitoring. • Begin demobilizing construction equipment and camps.
Winter 2009-2010	<ul style="list-style-type: none"> • Complete commissioning and start-up activities. • Start up and begin operating facilities and pipelines. • Continue demobilization. • Continue reclaiming construction equipment and camps. • Complete gathering pipeline rights-of-way reclamation and reclamation of infrastructure sites not required for operations.
Summer 2010	<ul style="list-style-type: none"> • Complete demobilization. • Continue post-construction monitoring.

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SUBJECT	4: Project Activities – Infrastructure

INFRASTRUCTURE

Barge Landing Sites

Existing barge infrastructure will be the main mode for transporting materials and supplies, facility modules, camps, pipe, valves, construction equipment and fuel for construction activities north of Fort Simpson.

Materials and equipment delivered by vehicle or rail to Hay River, and by vehicle to Fort Simpson, will be transferred to barges for transport downstream. The barges will be moved by tugs. A single tug will be capable of pushing or pulling up to six fully laden barges. The towed barges will be moored to buoys at the barge landings. Tugs will pull each barge to the near shore landing area for unloading.

No new barge landings are planned for the ISR. The existing barge landing site at Swimming Point will be used with a temporary spud barge. New land requirements of 0.6 ha have been identified for the Swimming Point barge landing site.

Pipeline and Facility Construction Camps

New temporary camps, stationary and mobile, will be needed in the ISR to house the workers required to build the proposed facilities and infrastructure, and construct the gathering pipelines for the project.

Stationary Camps

Stationary camps are required at the Storm Hills pigging facility and at the Swimming Point infrastructure site.

The camp at the Storm Hills pigging facility will be designed to accommodate 40 people. The camp at Swimming Point on private land will be designed to accommodate 950 people. These camps will typically consist of modular units arranged in conventional construction field camp configurations, and will have footprints of about 0.4 ha at the Storm Hills pigging facility and 5.3 ha at the Swimming Point site. The camps will be self-sufficient and they will include sleeper, lavatory, shower, kitchen and dining units, recreational facilities, first aid stations, generator sets and water treatment units. They might also have offices, maintenance shops and bulk storage trailers (an artist's impression of a 950-person stationary camp is shown in [Figure 3-3](#)).

Figure 3.3 has been moved to reduce file size. To view it, click on the link to the figure in the web page List of Figures for this document.

The foundation design for the temporary stationary camps will be based on a site-specific geotechnical assessment. The camp layout and footprint will be subject to site-specific influences such as terrain and environment. Site security plans will be developed, as required, to address the health and safety of personnel, and the security of equipment and materials.

Water for the Storm Hills piggery facility and the Swimming Point camp will likely be obtained from nearby lakes and the East Channel of the Mackenzie River. The water will be transported by truck to the sites. The daily requirements are estimated at 9 m³ at the Storm Hills piggery facility and 216 m³ at the Swimming Point camp. These estimates are based on a consumption rate of 227 L per day per person.

Mobile Camps

About 20 mobile camps will be required for the project, some of which will be used in the ISR. Mobile camps are small, self-contained units that might be based on barges or on land. They will be moved frequently during construction and will typically be used for the crews developing new stationary camps, expanding existing camps, or installing storage facilities, barge landing sites, borrow sources and access roads. The land-based mobile camps will accommodate 35 to 70 people.

When sites for barge camps have been selected, access to development sites will be determined.

Site location, seasonal conditions, and travel distances will determine the water sources for the mobile camps. In most cases, the water will be obtained off site and delivered by truck.

The mobile camps will be self-sufficient in terms of power, water supply, water treatment, sewage and solid waste treatment and disposal and communications capabilities.

As with the stationary camps, site security plans for mobile camps will be developed as required, to address the health and safety of personnel, and the security of equipment and materials.

Pipe and Equipment Stockpile Sites

Two stockpile sites will be developed in the ISR to store pipe, materials and equipment after they have been delivered and before they are needed for construction purposes. These sites might also store construction equipment when it is not being used. They will be developed between 2006 and 2007.

The proposed stockpiles will be within the footprints of the Storm Hills pigging facility and the Swimming Point site. Both will be used for materials and equipment storage. The Swimming Point site will also be used to store line pipe.

Stockpile sites will typically be about seven hectares in area. The dimensions will depend on-site location and the quantity and size of pipe and other materials to be stored. In most cases, a road will be constructed to connect the sites to a gathering pipeline right-of-way or facility site.

Site preparation methods will depend on the conditions at each location. The sites will be developed to allow safe movement of trucks and equipment, and safe crane operations. The portions used for vehicle traffic will be graveled.

Fuel Storage Sites

Fuel storage sites will be developed at the Storm Hills pigging facility and at the Swimming Point site. Both will be located within the site footprint. Use of existing fuel storage at Swimming Point is also planned.

The primary fuel for camp uses, construction equipment and light duty trucks will be diesel. Chartered air carriers will supply their own aviation fuel. The volumes of fuel to be stored will be about 250,000 L at the Storm Hills pigging facility and about 0.4 million L at the Swimming Point site.

The fuel storage sites will be set back at least 100 m from any body of water or will be protected from flooding, unless otherwise authorized. These sites will be several hectares in area, depending on the tank size, location and quantity of fuel to be stored. The fuel tanks will either be double-walled or single-walled with secondary containment systems.

Most fuel storage facilities will be located on compacted gravel foundations. The tanks will be placed on skids if they need to be mobile, or on sleeper footings or pilings, if they are stationary.

At mobile camps, in the first season of construction, fuel will be stored onboard barge camps or on trucks for land-based mobile camps.

Access Roads

Existing winter roads will be used for the project wherever practical.

An estimated 149.2 km of new winter access roads will be required in the ISR to transport personnel, material and equipment to and from the gathering pipeline rights-of-way, facilities, camps and stockpile sites, water sources and borrow sites (see [Table 3-4](#)). About 42.5 km of these roads are on Inuvialuit private land. The remaining 106.7 km are on Crown land. The estimates include a 30% allowance for approaches, topography and routing uncertainties.

Table 3-4: Type and Length of New Access Roads

Purpose	Number of Roads	Estimated Length (km)
Borrow Sites	20	112.4
Water Sources	34	33.2
Air Strips	0	0
Camps	0	0
Stockpiles	0	0
Facilities	0	0
Gathering Pipeline (ROW access)	1	3.6
Total	55	149.2

A travel lane will also be installed within the gathering pipeline rights-of-way for winter construction. An example is shown in [Figure 3-4](#) and is discussed in the gathering pipeline right-of-way topic.

**Figure 3-4: Example of Right-of-Way with Travel Lane**

Types of Roads

Temporary winter access roads will be constructed by Imperial in the ISR. The design for the winter access roads will be site specific and will consider factors such as:

- community input
- geotechnical conditions and terrain features, including drainage patterns
- load weight and size
- type of borrow material available, such as till, gravel, shale or rock
- seasonal reinstallation of winter access roads
- water sources for winter access road construction

A road allowance about 20 m wide will be required in all cases.

Winter Access Roads

In addition to the gathering pipeline travel lanes and existing winter roads, new winter access roads will be constructed and maintained for development activities. Some of these roads will be required for more than one season. A typical winter access road is shown in [Figure 3-5](#).

Winter access road construction will start once a sufficient frozen ground depth, suitable for supporting heavy equipment, is achieved. Vegetation will be cut off at ground level and windrowed. Snow, brush and vegetative material will be compacted with light tracked equipment. Continued compaction will be achieved with snow and water by using progressively heavier equipment. Excess snow accumulations will be ploughed to the side of the travel surface.

By using equipment with a protected blade or equivalent, the disturbance of the surface organic layer will be limited. The road will be built up to strength by continuing to add water and snow in areas of sensitive terrain and where practical. A smooth, hardwearing road surface will be achieved by dragging and surface grading. Maintenance will be done on an ongoing basis using conventional construction equipment, water and snow.

Winter access roads will be designed to protect the tundra by building up a layer of ice and snow about 10 cm thick for the travel portion of the roadbed over land, or as authorized by the applicable authorities. Where the snow cover is limited, water will be added to the available snow cover to create the required thickness. Roads constructed on lakes and rivers will require minimum ice depths of about 1.2 m.

The potential water use requirements for the winter access roads and the gathering pipeline travel lanes in the ISR are estimated at about 285,500 m³ and 780,000 m³ per construction season, respectively.

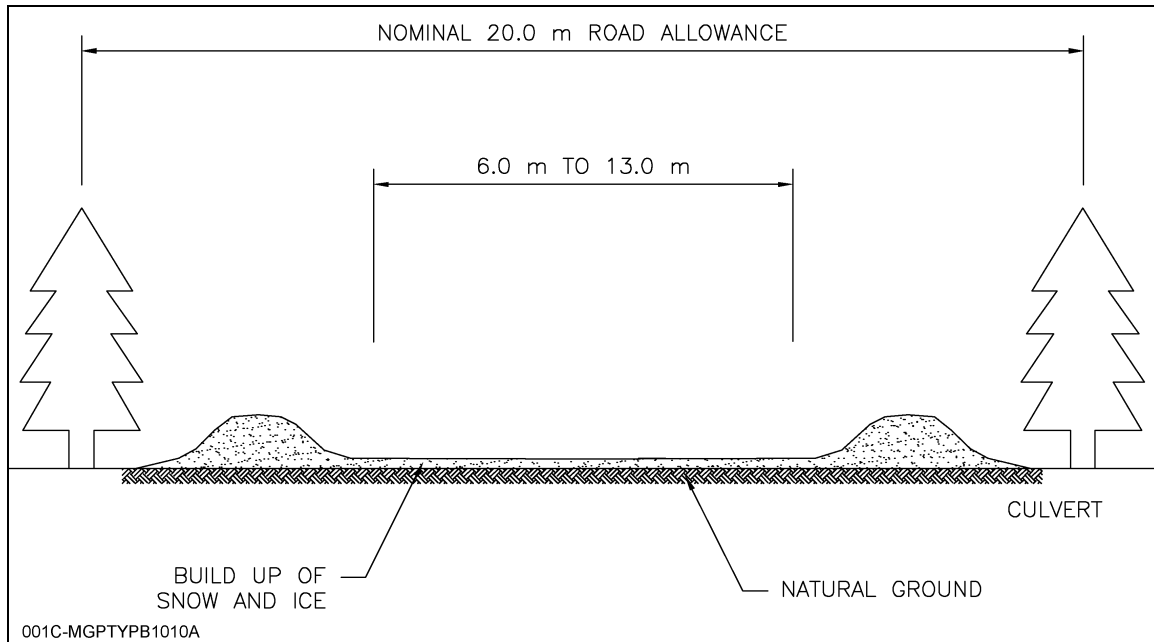


Figure 3-5: Typical Winter Access Road

Water Supply Intake Systems

Temporary water intake systems will be required to obtain water from potential water sources. These might include a temporary hose from water sources or trucks and portable pumping systems that are fed directly from openings in the ice of water sources.

Airstrips and Helipads

The commercial airport in Inuvik, which is capable of handling heavy aircraft will be used. No new airstrips are planned for the ISR.

A helicopter landing area will be developed within the footprint of the Storm Hills pigging facility. Helipad dimensions will typically range from about 30 x 30 m (0.1 ha) to about 36 x 135 m (0.5 ha).

The Swimming Point site includes an existing landing area for helicopters and an existing airstrip. The airstrip will be upgraded and will be capable of handling Twin Otter aircraft.

Communications

Communication equipment will be included at the Storm Hills pigging facility, and the Swimming Point site. The communications will be through public systems, such as the NorthwTel network or by satellite. A backup system will be provided in case the primary system fails.

The communication infrastructure will support:

- telephone and fax systems
- Internet and e-mail service
- multiple channel very high frequency radio, both hand-held and in-vehicle radios
- satellite telephones
- satellite television and radio at the camps
- air-to-ground communication at airstrips and helipads
- communication links with the truck, barge and air transport providers

Repeater towers might be required to increase communication coverage along the gathering pipeline corridors. The repeater tower range is estimated at between 10 and 20 km.

At points along the gathering pipelines in the ISR, personnel will use hand-held radios to communicate within work parties. Portable satellite phones will be used for external communication. Air-to-ground communication will be provided for areas with airstrips and helipads. Marine communication will be available, as required, for river transport.