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PRELIMINARY

BORROW SOURCE STUDY

MACKENZIE VALLEY CORRIDOR

VOLUME III

MAP BD9 to BD12



SITE BD9-01(3)

REFERENCE: Deposit (a) Area IV DIAND Granular Resource Inventory; Mahony Lake NTS 96F, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 15,000 cu.m (20,000 cu.yd.)

SITE DESCRIPTION: Esker ridge located approximately 19 km (12 mi.) north of the southern tip of Kelly Lake.

Thickness: 3 m (10 ft.)
Area: 7,800 sq m (85,000 sq ft.)
Perimeter: 2,600 m (8,400 ft.)

Map Reference: NTS 96F, Mahony Lake

UTM Reference: Zone 10; 371,000E 7,265,000N

ASSESSMENT: Suitable for development..

The source is located well outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over flat, thermokarst terrain and the rugged and irregular terrain of the Norman Range and its adjacent slopes.

SITE BD9-02(3)

REFERENCE: Deposit (a), Area V DIAND Granular Resource Inventory; Mahony Lake NTS 96F, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 55,000 cu.m (70,000 cu.yd.)

SITE DESCRIPTION: A series of esker ridges located approximately 16 km (10 mi.) east of the southern tip of Kelly Lake.

Thickness: 3 m (10 ft.)
Area: 30,000 sq m (320,000 sq ft.)
Perimeter: 9,700 m (32,000 ft.)

Map Reference: NTS 96F, Mahony Lake

UTM Reference: Zone 10; 388,000E 7,254,000N

ASSESSMENT: Suitable for development.

The source is located well outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat thermokarst terrain, rugged irregular terrain of the Norman Range and the adjacent slopes.

SITE BD9-03(4)

REFERENCE: Site 285, Norman Wells to Fort Good Hope, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, some silt, little gravel (SM-SW); Moderate to high ice content in alluvial fan deposits.

OVERBURDEN: Topsoil.

DEPTH OF ACTIVE LAYER:

RESERVES: Possible 450,000 cu.m (600,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Small kame hillocks and an alluvial fan located approximately 18 km (11 mi.) northwest of Norman Wells.

Vegetation: well developed stands of spruce.

Drainage: fair to southwest.

Thickness: 3 m (10 ft.)

Area: 150,000 sq.m (1,600,000 sq.ft.)

Perimeter: 4,600 m (15,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 587,600E 7,251,900N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for development because of limited quantities of low quality material.

The source is located near the center of the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline may be across the rugged terrain along the north end of the Norman Range. The local terrain is covered by numerous lakes and is thermally sensitive.

SITE BD9-04(3)

REFERENCE: Site NW19, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, medium grained, trace silt (SW-GM);
Maximum size 1.9 cm (3/4 in.);
Low to medium moisture content.

OVERBURDEN: Silt; 60 cm (2 ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Proven 50,000 cu.m (70,000 cu.yd.)
Probable 350,000 cu.m (450,000 cu.yd.)
Possible 700,000 cu.m (900,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. The middle mound contains best source of granular material and should be developed first. Heavy ripping equipment may be required for loosening frozen material if winter operations are required.

SITE DESCRIPTION: Three shallow sandy mounds (kame-esker complexes) located approximately 16 km (10 mi.) northwest from Norman Wells.

Vegetation: birch and scattered spruce.

Drainage: fair to south towards Mackenzie River.

Thickness: 9 m (30 ft.)
Area: 150,000 sq.m (1,600,000 sq.ft.)
Perimeter: 2,300 m (7,500 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 590,500E 7,250,000N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: Suitable for development. May be suitable for concrete with minor screening but further analysis is required.

SITE BD9-04(3)

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat and occasionally poorly drained terrain.

SITE BD9-05(R1)

REFERENCE: Site NW16X, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for the manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Limestone and siltstone, slightly weathered, sound;
Limestone is granulated and crystalline;
Siltstone is laminated and weak and may easily deteriorate when exposed to weathering process.

OVERBURDEN: Silt and clay; 45 cm (1½ ft.) to 270 cm (9 ft.)

DEPTH OF ACTIVE LAYER: Undetermined

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting.

SITE DESCRIPTION: Bedrock escarpment along the base of Discovery Ridge on the southern flank of the Norman Range, approximately 11 km (7 mi.) northwest of Norman Wells.

Vegetation: dense black spruce.

Drainage: fair to the southwest toward the Mackenzie River.

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 593,000E 7,249,200N

SITE INVESTIGATION: 3 drill holes.

ASSESSMENT: Suitable for development. The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across both sloping and flat terrain.

SITE BD9-06(3)

REFERENCE: Site NW15, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, some sand and silt, fine grained (GW-GM); Maximum size greater than 20 cm (8 in.); Medium moisture content.

OVERBURDEN: Peat and silt; 0 to 240 cm (8 ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES:

Proven	85,000 cu.m (100,000 cu.yd.)
Probable	850,000 cu.m (1,000,000 cu.yd.)
Possible	2,500,000 cu.m (3,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Borrow areas should be initiated in areas of proven granular materials. Relative to granular deposits adjacent to Bosworth Creek, development should commence farthest away from the water course. Buffer zones between water courses and excavation areas should be maintained.

SITE DESCRIPTION: A series of ice contact ridges and knolls located 6 km (4mi.) north of Norman Wells, in the vicinity of Bosworth Creek.

Vegetation: spruce and birch.

Drainage: fair.

Thickness: 3 m (10 ft.)

Area: 1,000,000 sq.m (11,000,000 sq.ft.)

Perimeter: 15,000 m (48,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 598,500E 7,246,400N

SITE INVESTIGATION: 11 drill holes.

ASSESSMENT: Suitable for development, although access is difficult and a large surficial area must be cleared to recover a relatively small quantity

SITE BD9-06(3)

of material.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across thermally sensitive terrain. Some muskeg bogs in the area remain unfrozen in the winter. Bosworth creek is utilized as a water supply for Norman Wells.

SITE BD9-07(R2)

REFERENCE: Site NW21X, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-2, Talus suitable for fair quality general fill in sub-grades.

MATERIAL DESCRIPTION: Angular limestone fragments in a silty matrix; High in situ ice content.

RESERVES: Possible 13,000,000 cu.m (17,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Not applicable.

SITE DESCRIPTION: Steep talus slopes and moderate slope wash terrain located approximately 10 km (6 mi.) north of Norman Wells.

Vegetation: sparse with occasional groups of spruce and tamarack.

Drainage: good to the north into Bosworth Creek.

Thickness: 4.5 m (15 ft.)
Area: 860,000 sq.m (9,300,000 sq.ft.)
Perimeter: 8,900 m (29,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 604,500E 7,245,700N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for development because of high ice content, difficult access and high environmental sensitivity with respect to Bosworth Creek which is currently used as a water supply for Norman Wells.

The source lies within the 28 km (17.5 mi.) pipeline corridor.

SITE BD9-08(2)

REFERENCE: Site NW3X, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base course, surface aggregate or concrete aggregate.

MATERIAL DESCRIPTION: Gravel, some sand (GM-GW).

OVERBURDEN: None.

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Possible 500,000 cu.m (700,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Excavate only dry bars and other areas removed from the stream channel. Borrow areas should be flexible geographically to allow for periodic shifting of the stream channel. Excavation should not occur 60cm (2 ft.) to 90 cm (3 ft.) below the groundwater table. Wet excavated material should not remain isolated from active stream channel. Buffer zones and sediment settling ponds should be maintained which separate the working area from the active stream channel. Adequate esthetic buffer zones should be maintained along stream banks.

SITE DESCRIPTION: Gravel bar deposit in the active stream channel of Bosworth Creek, extending 3 km (2 mi.) upstream from Site NW2X.

Vegetation: adjacent banks support growths of spruce. Tamarack is common in the localized wet, poorly drained areas.

Drainage: into the stream channel.

Thickness: 1.5 m (5 ft.)

Area: 330,000 sq.m (3,600,000 sq.ft.)

Perimeter: 6,200 m (20,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 598,100E 7,245,200N

SITE BD9-08(2)

SITE INVESTIGATION:

Nil.

ASSESSMENT:

Not suitable for development because Bosworth Creek is the primary water supply for Norman Wells. Most of the granular materials are within the braided channel and below the high water mark and the northern area of the site is of aesthetic value to the region.

The source is located inside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter over flat and poorly drained terrain.

SITE BD9-09(3)

REFERENCE: Site NW14, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand, some silt; fine to medium grained (SW-SM); Maximum size greater than 7.8 cm (3 in.); Medium moisture content.

OVERBURDEN: Silt and clay; 0 to 490 cm (16 ft.)

DEPTH OF ACTIVE LAYER: 90 cm (3 ft.)+

RESERVES: Proven 20,000 cu.m (25,000 cu.yd.)
 Probable 40,000 cu.m (50,000 cu.yd.)
 Possible 80,000 cu.m (100,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Winter operations may be required because of relatively soft and wet terrain.

SITE DESCRIPTION: A series of small discontinuous esker ridges located approximately 3 km (2 mi.) northeast of Norman Wells.

Vegetation: black spruce and birch.

Drainage: fair to the south.

Thickness: 9 m (30 ft.)
Area: 17,000 sq.m (190,000 sq.ft.)
Perimeter: 3,900 m (13,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 603,400E 7,244,200N

SITE INVESTIGATION: 11 drill holes, 1 test pit.

ASSESSMENT: Material is suitable for construction requirements. Since a relatively large surface area will have to be cleared to develop a comparatively small volume of material and extensive inter-deposit access is required across marginally soft and wet terrain, the development of this site is questionable.

SITE BD9-09(3)

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is presently along existing seismic cut lines from the all weather Kee Escarpment quarry access road. Access to the pipeline will be in the winter by truck across flat and poorly drained terrain.

SITE BD9-10(3)

REFERENCE: Site NW10X, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, medium grained (GW).

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Possible 2,000,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. The stream should be contained and diverted around borrow areas. Buffer zones should be maintained along active stream channels.

SITE DESCRIPTION: Large alluvial cone located at the mouth of Schonner Creek on the western shore of Hodgeson (Fish) Lake, approximately 6 km (4 mi.) northeast of Norman Wells.

Vegetation: spruce growth on northern edge tamarack on west side in muskeg area.

Drainage: good to the south and west.

Thickness: 6 m (20 ft.)
Area: 910,000 sq.m (9,800 sq.ft.)
Perimeter: 3,700 m (12,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 618,000E 7,244,900N

SITE INVESTIGATION: None.

ASSESSMENT: Suitable for development. The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across flat and occasionally poorly drained terrain.

SITE BD9-11(R1)

REFERENCE: Site NW4, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Limestone, weathered and fragmented at surface; Massive and competent at depth.

OVERBURDEN: Residual soil and colluvium; 30 cm (1 ft.) to 60 cm (2 ft.)

RESERVES: Possible Unlimited

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip the top 3 m (10 ft.) to 4.5 m (15 ft.) of extensively weathered and fractured surficial bedrock zone. Bedrock at depth will require controlled blasting for removal and exploitation.

SITE DESCRIPTION: A prominent ridge known as the Kee Escarpment located approximately 6 km (4 mi.) northeast of Norman Wells.

Vegetation: sparse growths of black spruce and small shrubs.

Drainage: good to west.

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 607,000E 7,244,000N

SITE INVESTIGATION: 1 pit face.

ASSESSMENT: Suitable for development. Good quality general fill is obtainable from the weathered and slightly weathered zones. Good quality aggregates can be produced by processing the competent limestone section through crushers after blasting.

Currently, the limey shale material which overlies the limestone at the northwest end of the quarry is being extracted and utilized as low quality general fill. The limey shale is very susceptible to deterioration by weathering.

The source is located within the 28 km (17.5 mi.)

SITE BD9-11(R1)

pipeline corridor. Existing access to Norman Wells is along an all weather road. In addition a temporary access road traverses the width of Site NW4. Access to the pipeline is by truck in the winter across flat to gently rolling terrain.

SITE BD9-12(3)

REFERENCE: Site NW2X, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand with gravel bars, some silt, variable (GM).

OVERBURDEN: None.

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Possible 250,000 cu.m (300,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Establish borrow areas which would be compatible with current and future industrial plans. Exploit dry areas as far as possible away from existing stream channel.

SITE DESCRIPTION: Sand and gravel bars in the downstream portion of Bosworth Creek located immediately west of Norman Wells.

Vegetation: willow, dwarfed spruce and some tamarack on adjacent wet boggy areas.

Drainage: good, into stream channel.

Thickness: 1.5 m (5 ft.)

Area: 150,000 sq.m (1,700,000 sq.ft.)

Perimeter: 5,000 m (17,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 599,000E 7,242,700N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for immediate development because the site is located in the active floodplain of Bosworth Creek therefore most granular material deposits are below the high water level of the creek. In addition, development logistics in the lower part of the creek would be difficult since this area is already undergoing major industrial development by virtue of the production operations in the Norman Wells oil field. Several

SITE BD9-12(3)

high pressure oil wells and their attendant facilities are in operation in this area.

The community of Norman Wells is dependent upon Bosworth Creek for their water supply, and borrow pit development could contaminate this source.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the downstream portion of the site is by numerous roads from Norman Wells. Access to the pipeline is by truck in the winter across flat lying and occasionally poorly drained terrain.

SITE BD9-13(2,3)

REFERENCE: Site NW8, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base course, surface aggregate or concrete aggregate.

Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel coarse, well graded (GW);
Gravel, little silt (GM);
Maximum size greater than 7.8 cm (3 in.).

OVERBURDEN: Topsoil (lower part of cone); 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Proven 500,000 cu.m (700,000 cu.yd.)
Probable 1,000,000 cu.m (1,500,000 cu.yd.)
Possible 2,500,000 cu.m (3,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. The stream should be contained over the cone. Excavation may be restricted during spring runoff. Buffer zones should be maintained along active stream channels. Wet materials should not be handled near flowing water courses.

SITE DESCRIPTION: Large alluvial cone, and wide stream channel located northeast of Kee Escarpment, approximately 13 km (8 mi.) from Norman Wells.

Vegetation: upper part of cone bare; lower part of cone has sparse growths of shrubs and tamarack.

Drainage: good to the west.

Thickness: 6 m (20 ft.)
Area: 1,100,000 sq.m (12,000,000 sq.ft.)
Perimeter: 8,000 m (26,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 613,000E 7,242,800N

SITE INVESTIGATION: 3 test pits.

SITE BD9-13(2,3)

ASSESSMENT:

Suitable for development. The active upper portion of the alluvial cone, at the apex, should be considered as the primary source of borrow material which contains good quality material and represents approximately $\frac{1}{4}$ of entire deposit. The lower terraces of the cone consist of fair quality material.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is across flat to gently rolling and occasionally poorly drained terrain.

SITE BD9-14(3)

REFERENCE: Site NW9, Norman Wells, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material for general fill.

MATERIAL DESCRIPTION: Gravel, some sand, well graded, medium grained
(GW);
Maximum size greater than 20 cm (8 in.).

OVERBURDEN: Topsoil 0 to 60 cm (2 ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Proven 65,000 cu.m (85,000 cu.yd.)
Probable 450,000 cu.m (600,000 cu.yd.)
Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Existing stream channel should be
deepened to ensure positive drainage during spring
runoff to east into Bandy Lake. Waste material
should be stockpiled along southern toe of the
cone to maintain drainage into adjacent lakes.

SITE DESCRIPTION: A large alluvial cone located approximately 15 km
(9.5 mi.) northeast of Norman Wells and situated
between Edie Lake and Bandy Lake.

Vegetation: sparse at apex of cone; sparse
stands of black spruce and the occasional
tamarack cover the lower reaches of the cone.

Drainage: good to the west.

Thickness: 2 m (6 ft.)
Area: 480,000 sq.m (5,100,000 sq.ft.)
Perimeter: 2,500 m (8,300 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 615,700E 7,241,500N

SITE INVESTIGATION: 3 test pits.

ASSESSMENT: Suitable for development. The source lies
within the 28 km (17.5 mi.) pipeline corridor.
Access to the pipeline is by truck in the winter
across flat to gently rolling terrain which is
occasionally poorly drained.

SITE BD9-15(3)

REFERENCE: Site NW1, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, some sand, little silt (GW); Maximum size greater than 20 cm (8 in.); Medium moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.) to 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 90 cm (3 ft.)+

RESERVES: Proven 70,000 cu.m (90,000 cu.yd.)
 Probable 150,000 cu.m (200,000 cu.yd.)
 Possible 250,000 cu.m (300,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip, doze and thaw. Increased quality of material can be achieved by stripping rather than mixing the thick layer of silt overlying the gravel layer. Drainage directly into gully and existing water course should be avoided. Continued development of pit is towards the east.

SITE DESCRIPTION: Occasionally operated community borrow pit located approximately $5\frac{1}{2}$ km ($3\frac{1}{2}$ mi.) east of Norman Wells. Consists of a long, narrow high terrace which parallels the east bank of the Mackenzie River.

Vegetation: spruce with dense willow and alder.

Drainage: fair to southeast.

Thickness: 3 m (10 ft.)
Area: 620,000 sq.m (810,000 sq.ft.)
Perimeter: 1,400 m (4,500 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 606,000E 7,239,800N

SITE INVESTIGATION: 6 drill holes, 2 test pits.

ASSESSMENT: Suitable for development. The source is located inside the 28 km (17.5 mi.) pipeline

SITE BD9-15(3)

corridor. An existing all weather road, immediately adjacent to the site area, provides excellent access to Norman Wells. Access to the pipeline is by truck in the winter across flat to gently rolling terrain.

Access along the adjacent Mackenzie River is possible by barge in the summer and truck in the winter.

SITE BD9-16(4)

REFERENCE: Site NW11, Norman Wells, Community Study Area, Stage I LIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, little silt, fine (SP).

OVERBURDEN: Topsoil; 15 cm (1½ ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Possible 2,500,000 cu.m (3,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vertical excavation should be considered.

SITE DESCRIPTION: A series of minor to moderately sized sand dunes located about 11 km (7 mi.) southwest of Norman Wells, between the south bank of the Mackenzie River and the abandoned Canol Camp airstrip.

Vegetation: scattered birch on dunes; dense tamarack and black spruce on adjacent poorly drained and wet terrain.

Drainage: good to the north on dunes; adjacent terrain poorly drained.

Thickness: 9 m (30 ft.)

Area: 580,000 sq.m (6,200,000 sq.ft.)

Perimeter: 11,000 m (35,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 588,500E 7,237,900

SITE INVESTIGATION: None.

ASSESSMENT: Suitable for development. The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline, located on the opposite bank of the Mackenzie River, would entail a barging operation in the summer or trucking and stockpiling in the winter. Locally the terrain is flat and poorly drained allowing only winter access.

SITE BD9-17(4)

REFERENCE: Site NW18, Norman Wells, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only
for marginal fill.

MATERIAL DESCRIPTION: Sand, little silt, trace gravel (SM);
Medium to high moisture content.

OVERBURDEN: Topsoil and till; 120 cm (4 ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Proven 1,000 cu.m (1,500 cu.yd.)
Probable 10,000 cu.m (15,000 cu.yd.)
Possible 85,000 cu.m (100,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Not applicable.

SITE DESCRIPTION: Narrow and small esker ridge located approxi-
mately 14 km (9 mi.) east of Norman Wells.

Vegetation: mixed growths of birch and spruce.

Drainage: good to southwest.

Thickness: 4.5 m (15 ft.)
Area: 38,000 sq.m (410,000 sq.ft.)
Perimeter: 2,300 m (7,500 ft.)

Map Refernece: NTS 96E, Norman Wells

UTM Reference: Zone 9; 613,500E 7,240,000N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: Not suitable for development because of
limited quantities, poor quality and thick over-
burden with high ice content.

SITE BD9-18(3)

REFERENCE: Site NW12, Norman Wells, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand, some silt, fine to medium grained (SW-SM);
Maximum size to 1 cm (3/8 in.);
Medium to low moisture content.

OVERBURDEN: Topsoil, organic silt and clay; 30 cm (1 ft.)
to 90 cm (3 ft.)

DEPTH OF ACTIVE LAYER: 90 cm (3 ft.)+

RESERVES: Proven 8,000 cu.m (10,000 cu.yd.)
Probable 80,000 cu.m (100,000 cu.yd.)
Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. The large esker located on the
western bank of Canyon Creek at the confluence
of Snowshoe Creek should be opened from the
western end to minimize any damage to existing
stream channels. Siltation controls be employed
to prevent waste materials from draining into
adjacent stream channels.

SITE DESCRIPTION: A series of small esker ridges on the western bank
of Canyon Creek near the confluence of Snowshoe
Creek, located approximately 14 km (9 mi.)
east of Norman Wells.

Vegetation: spruce and birch.

Drainage: good to southeast

Thickness: 7.5 m (25 ft.)
Area: 40,000 sq.m (430,000 sq.ft.)
Perimeter: 4,300 m (14,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 615,400E 7,238,600N

SITE INVESTIGATION: 5 drill holes, 1 test pit.

ASSESSMENT: Suitable for development although difficult

SITE BD9-18(3)

access and limited quantities limit the exploitation of this source for local projects.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across thermally sensitive terrain.

SITE BD9-19(2)

REFERENCE: Site 281, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Sand and gravel, some silt, variable gradation (SM-GM); Deleterious shale fragments in gravel quite significant; Maximum size 3.9 cm (1½ in.); Medium moisture content;

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: Not determined

RESERVES: Proven 250,000 cu.m (350,000 cu.yd.)
Probable 850,000 cu.m (1,000,000 cu.yd.)
Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vertical excavation and selective excavation procedures should be employed. Excavation should commence farthest from the water course and buffer zones should be maintained along final limits. Surficial wastes should not be allowed to drain into active stream channels,

SITE DESCRIPTION: A series of partially effaced kame hillocks and terraces located approximately 19 km (12 mi.) east of Norman Wells.

Vegetation: moderately dense spruce, birch and poplar.

Drainage: good to southwest.

Thickness: 5 m (16 ft.)
Area: 330,000 sq.m (3,500,000 sq.ft.)
Perimeter: 1,400 m (4,500 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 621,000E 7,238,000N

SITE BD9-19(2)

SITE INVESTIGATION:

11 drill holes.

ASSESSMENT:

Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is in the winter by truck across flat thermally sensitive terrain.

Concrete aggregates may be produced with a minimum of processing although additional laboratory analyses are required.

SITE BD9-20(3)

REFERENCE: Site NW13X, Norman Wells, Community Study Area, Stage I, DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, little silt; stratified (GW).

OVERBURDEN: None.

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Excavation of material should be restricted to areas away from the currently active stream channels. Operating periods should be restricted to low water period to minimize downstream siltation.

SITE DESCRIPTION: Gravel bars and terraces within the active stream channel of Canyon Creek, located approximately 16 km (10 mi.) east of Norman Wells.

Vegetation: spruce on adjacent areas.

Drainage: good into stream channel.

Thickness: 3 m (10 ft.)

Area: 460,000 sq.m (4,900,000 sq.ft.)

Perimeter: 5,900 m (20,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 616,000E 7,237,700N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for development because source is located within an active water course.

The source is located within the 28 km (17.5 mi.) pipeline corridor.

SITE BD9-21(3)

REFERENCE: Site 283, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, silt pockets (SM-GW);

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Possible 850,000 cu.m (1,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Fossil alluvial fan located approximately 18 km (11 mi.) east of Norman Wells.

Vegetation: moderate growths of spruce with irregular stands of poplar and birch.

Drainage: fair to poor into active stream channel.

Thickness: 3 m (10 ft.)
Area: 340,000 sq.m (3,700,000 sq.ft.)
Perimeter: 3,200 m (11,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 617,200E 7,237,800N

SITE INVESTIGATION: None

ASSESSMENT: May be suitable for development but requires further investigation, to establish the quality and quantity of granular materials.

The source is located inside the 28 km (17.5 mi.) pipeline corridor. Existing winter access is from CNT pole line along an extension of a seismic cut line. Access to the pipeline is across flat terrain.

SITE BD9-22(4)

REFERENCE: Site NW7, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, little silt, fine (SP);
Low moisture content above permafrost table.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Proven 1,000 cu.m (1,500 cu.yd.)
Probable 20,000 cu.m (30,000 cu.yd.)
Possible 250,000 cu.m (300,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze; stockpiling may be required because of seasonal access. Vertical excavation may be used to minimize erosion. Maintain vegetation buffer zones between work areas.

SITE DESCRIPTION: Large sand dune located on a glaciofluvial flood plain, approximately 14 km (8.5 mi.) southeast of Norman Wells on the south banks of the Mackenzie River.

Vegetation: birch on dunes; black spruce and tamarack on adjacent muskeg terrain.

Drainage: fair to northeast.

Thickness: 7.5 m (25 ft.)
Area: 67,000 sq.m (720,000 sq.ft.)
Perimeter: 3,700 m (12,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 591,800E 7,231,800N

SITE INVESTIGATION: 1 test pit.

ASSESSMENT: Suitable for development. The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline, located on the opposite side of the Mackenzie River, would require a barging operation in the summer and trucking

SITE BD9-22(4)

**in the winter across adjacent muskeg terrain.
Existing access is along a winter road from
the south bank of the Mackenzie River.**

SITE BD9-23(4)

REFERENCE: Site NW5, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, little silt, fine (SP); Low moisture content above groundwater table.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 240 cm (8 ft.)+

RESERVES: Proven 30,000 cu.m (40,000 cu.yd.)
Probable 60,000 cu.m (80,000 cu.yd.)
Possible 2,500,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Stockpiling may be required because of seasonal access. Extract materials from west end initially. Vertical excavation procedures should be employed. Vegetation buffer zones should be maintained between work areas.

SITE DESCRIPTION: Large sand dune located approximately 13 km (8 mi.) southwest of Norman Wells.

Vegetation: birch on dune; spruce and tamarack over adjacent flat muskeg terrain.

Drainage: good to northeast.

Thickness: 15 m (49 ft.)
Area: 330,000 sq.m (3,500,000 sq.ft.)
Perimeter: 5,300 m (17,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 592,000E 7,234,200N

SITE INVESTIGATION: 3 test pits.

ASSESSMENT: Suitable for development. The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline, located on the opposite side of the Mackenzie River, would require a barging operation in the summer or trucking, in the winter across adjacent muskeg terrain.

SITE BD9-23(4)

Existing access is along the winter road from
a south bank of the Mackenzie River.

SITE BD9-24(4)

REFERENCE: Site NW6, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, little silt, fine (SP); Low moisture content above the permafrost table.

OVERBURDEN: Topsoil, 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 210 cm (7 ft.)+

RESERVES: Proven 35,000 cu.m (45,000 cu.yd.)
 Probable 350,000 cu.m (450,000 cu.yd.)
 Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Stockpiling may be required because of seasonal access. Extract material initially from west end. Vertical excavation procedures should be employed. Vegetation buffer zones should be maintained between work areas.

SITE DESCRIPTION: A series of small sand dunes located approximately 16 km (10 mi.) southwest of Norman Wells.

Vegetation: birch on dunes; spruce and tamarack over flat muskeg.

Drainage: fair to the northeast.

Thickness: 6 m (20 ft.)
Area: 330,000 sq.m (3,600,000 sq.ft.)
Perimeter: 7,800 m (26,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 591,800E 7,231,800N

SITE INVESTIGATION: 1 test pit.

ASSESSMENT: Suitable for development. The source is located outside the 28 km (17.5 mi.) pipeline corridor.

SITE BD9-24(4)

Access to the pipeline, located on the opposite side of the Mackenzie River, would require a barging operation in the summer or trucking in the winter across adjacent muskeg terrain. Existing access is along a winter road from the south bank of the Mackenzie River.

SITE BD9-25(4)

REFERENCE: Site 282X, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Gravel, sand and silt, stratified, scattered, (SM-GM);
Maximum size greater than 7.8 cm (3 in.);
Medium to high moisture content;

OVERBURDEN: Topsoil and silt; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Proven 10,000 cu.m (15,000 cu.yd.)
Probable 100,000 cu.m (150,000 cu.yd.)
Possible 200,000 cu.m (300,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Two longitudinal and narrow beach ridge deposits located 19 km (12 mi.) southeast of Norman Wells.

Vegetation: light to moderate growths of spruce and birch to 9 m (30 ft.)

Drainage: poor to fair into adjacent stream channels.

Thickness: 3 m (10 ft.)
Area: 130,000 sq.m (1,400,000 sq.ft.)
Perimeter: 1,800 m (6,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 618,000E 7,235,200N

SITE INVESTIGATION: 5 drill holes, 5 test pits.

ASSESSMENT: Not suitable for development because of the minimal quantity of recoverable granular material and the extensive surficial disturbance required for exploitation of the source.

SITE BD9-25(4)

**The source lies within the 28 km (17.5 mi.)
pipeline corridor.**

SITE BD9-26(2)

REFERENCE: Site 278, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Sand and gravel, little to some silt (SM-GM); Deleterious shale fragments in gravel are quite significant; Maximum size greater than 7.8 cm (3 in.); Medium moisture content.

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Proven 20,000 cu.m (25,000 cu.yd.)
Probable 400,000 cu.m (500,000 cu.yd.)
Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Selective excavation procedures should be followed. Excavation should commence farthest from the existing water course and a buffer zone should be maintained along final limits..

SITE DESCRIPTION: A series of partially effaced kame hillocks and terraces located approximately 24 km (15 mi.) east of Norman Wells.

Vegetation: moderately dense growths of spruce, birch and poplar.

Drainage: good to the southwest.

Thickness: 3 m (10 ft.)
Area: 550,000 sq.m (5,900,000 sq.ft.)
Perimeter: 8,700 m (29,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 623,000E 7,263,300N

SITE INVESTIGATION: 7 drill holes.

SITE BD9-26(2)

ASSESSMENT:

Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Existing winter access is from CNT pole line along seismic cutlines. Access to the pipeline is by truck in the winter across thermally sensitive terrain.

SITE BD9-27(2)

REFERENCE: Site 280, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular, Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Sand and gravel, little silt (GW-SW); Maximum size greater than 20 cm (8 in.); Medium moisture content.

OVERBURDEN: Topsoil and peat; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Proven 550,000 cu.m. (700,000 cu.yd.)
Probable 1,500,000 cu.m (2,000,000 cu.yd.)
Possible 2,000,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vertical excavation and selective excavation procedures should be employed. Excavation should commence farthest from the water course and buffer zones should be maintained along final limits.

SITE DESCRIPTION: Alluvial fan deposit incised by Francis Creek, located approximately 23 km (14 mi.) east of Norman Wells.

Vegetation: light to moderate growths of spruce, birch and poplar.

Drainage: good to southwest.

Thickness: 5 m (16 ft.)
Area: 560,000 sq.m (6,000,000 sq.ft.)
Perimeter: 3,700 m (12,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 621,000E 7,238,000N

SITE INVESTIGATION: 10 drill holes.

ASSESSMENT: The material in the active apex of the alluvial fan is suitable for development.

SITE BD9-27(2)

The remainder of materials within the fan are not considered to be suitable as granular material.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Winter access exists from the CNT pole line along seismic tracts. Access to the pipeline is across flat terrain.

SITE BD9-28(4)

REFERENCE: Site 277, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Silty sand with some gravel (SM-GM);

OVERBURDEN: Topsoil; shallow

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Possible 10,000 cu.m (14,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Shallow esker ridge located between Francis Creek and Heleva Creek approximately 21 km (13 mi.) east of Norman Wells.

Vegetation: mixed growths of spruce and birch on ridge; tamarack and stunted black spruce over adjacent terrain.

Drainage: fair to adjacent terrain.

Thickness: 3 m (10 ft.)
Area: 7,000 sq.m (75,000 sq.ft.)
Perimeter: 2,300 m (7,500 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 622,300E 7,234,800N

SITE INVESTIGATION: None

ASSESSMENT: Unsuitable for development because of poor quality of material and limited quantities.

SITE BD9-29(3)

REFERENCE: Site 279, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, variable gradation and silt content (SM-GM);

OVERBURDEN: Topsoil and organic silt; 0 to 60 cm (2 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)

RESERVES: Proven 25,000 cu.m (35,000 cu.yd.)
Probable 850,000 cu.m (1,000,000 cu.yd.)
Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vertical excavation and selective excavation procedures should be employed. Excavation should commence farthest from the water course and buffer zones should be maintained along final limits.

SITE DESCRIPTION: Alluvial fan deposit which has been incised by Francis Creek and is located 22 km (14 mi.) east of Norman Wells.

Vegetation: light to moderate growths of spruce and birch.

Drainage: good to the west into Francis Creek.

Thickness: 5 m (16 ft.)
Area: 330,000 sq.m (3,500,000 sq.ft.)
Perimeter: 1,400 m (4,500 ft.)

Map Reference: NTS 96E, Norman Wells.

UTM Reference: Zone 9; 619,200E 7,233,600N

SITE INVESTIGATION: 5 drill holes.

ASSESSMENT: Suitable for development.

The source is located inside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is across flat to rolling terrain.

SITE BD9-30(3)

REFERENCE: Site 275, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, little to some silt (SM-GM); Maximum size greater than 7.8 cm (3 in.); Low to medium moisture content;

OVERBURDEN: Topsoil and silt; 0 to 60 cm (2 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Proven 700,000 cu.m (900,000 cu.yd.)
Probable 2,000,000 cu.m (3,000,000 cu.yd.)
Possible 5,000,000 cu.m (7,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vertical excavation and selective excavation should be considered. Development of the source should commence farthest from the water course and a buffer zone should be maintained along the final limits.

SITE DESCRIPTION: Alluvial fan deposit which has been incised by Christina Creek located approximately 27 km (17 mi.) east of Norman Wells.

Vegetation: light to moderate growths of spruce and birch.

Drainage: good to the southwest.

Thickness: 7.0 m (23 ft.)
Area: 940,000 sq.m (10,000,000 sq.ft.)
Perimeter: 4,100 m (14,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 626,600E 7,234,200N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Suitable for development.

SITE BD9-30(3)

The source is located within the 28 km (17.5 mi.) pipeline corridor. Existing winter access is along seismic cutlines from the CNT pole line. Access to the pipeline is across flat to gently rolling terrain.

SITE BD9-31(4)

REFERENCE: Site 274X, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for very marginal fill.

MATERIAL DESCRIPTION: Sand, little silt (SM-SP).

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Proven 30,000 cu.m (40,000 cu.yd.)
Probable 650,000 cu.m (850,000 cu.yd.)
Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Narrow, discontinuous beach ridge located approximately 27 km (17 mi.) east of Norman Wells.

Vegetation: light to moderate growths of spruce and birch.

Drainage: fair to southwest.

Thickness: 2 m (6 ft.)
Area: 530,000 sq.m (5,700,000 sq.ft.)
Perimeter: 9,100 m (30,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 626,700E 7,233,500N

SITE INVESTIGATION: 1 drill hole.

ASSESSMENT: Not suitable for development because only a minimal volume from a thin layer of very poor quality sand is available.

The source is located inside the 28 km (17.5 mi.) pipeline corridor. Access is presently in the winter along seismic cutlines from the CNT pole line.

SITE BD9-32(4)

REFERENCE: Site 276, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, little to some silt (SM-GM).

OVERBURDEN: Topsoil, silt and clay; 0 to 120 cm (4 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Proven 40,000 cu.m (55,000 cu.yd.)
Probable 150,000 cu.m (200,000 cu.yd.)
Possible 450,000 cu.m (600,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vertical excavation and selective excavation procedures should be employed. Excavation should commence farthest from the water courses and a buffer zone should be maintained along final limits.

SITE DESCRIPTION: A group of four fluvial fans which have been developed adjacent to the channels of Heleva Creek and Christina Creek located approximately 24 km (15 mi.) east of Norman Wells.

Vegetation: light to moderate growths of spruce, birch and tamarack.

Drainage: good to adjacent streams.

Thickness: 2 m (6.5 ft.)
Area: 290,000 sq.m (3,100,000 sq.ft.)
Perimeter: 3,000 m (9,800 ft.)

Map Reference: NTS 96E, Norman Wells.

UTM Reference: Zone 9; 622,000E 7,232,200N

SITE INVESTIGATION: 5 drill holes.

ASSESSMENT: Suitable for development.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline

SITE BD9-32(4)

corridor. Winter access is possible along
CNT pole line .4 km ($\frac{1}{4}$ mi.) away. Access to
the pipeline is across flat terrain.

SITE BD9-33(3)

REFERENCE: Site 273X, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, some silt (SM-GM); Maximum size greater than 20 cm (8 in.); Medium to low moisture content.

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Proven 35,000 cu.m (45,000 cu.yd.)
Probable 350,000 cu.m (450,000 cu.yd.)
Possible 700,000 cu.m (900,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Beach ridge deposits, abandoned strand lines and a small alluvial fan located approximately 27 km (17 mi.) east of Norman Wells.

Vegetation: light to moderate growths of spruce and birch.

Drainage: fair to the southwest

Thickness: 2 m (6 ft.)
Area: 40,000 sq.m (4,100,000 sq.ft.)
Perimeter: 12,000 m (39,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 625,800E 7,230,500N

SITE INVESTIGATION: 7 drill holes

ASSESSMENT: Unsuitable for development because available granular materials are very thin and the potentially recoverable volumes are quite minimal. The foraging for material in these widely scattered deposits could result in extensive surficial drainage.

SITE BD9-33(3)

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is presently in the winter along the CNT pole line. Access to the pipeline is across flat terrain.

SITE BD9-34(R1)

REFERENCE: Site 271, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for the manufacture of various construction aggregates.

MATERIAL DESCRIPTION: Limestone and shale;

OVERBURDEN: Glacial drift; discontinuous.

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Possible Unlimited

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting.

SITE DESCRIPTION: A series of bedrock ridges located on both sides of the upstream portion of Prohibition Creek.

Vegetation: moderate growths of spruce and irregular stands of poplar.

Drainage: good.

Map Reference: NTS 96E, Norman Wells.

UTM Reference: Zone 9; 632,500E 7,231,500N

SITE INVESTIGATION: none

ASSESSMENT: Suitable for development.

The source is located adjacent to the western boundary of the 28 km (17.5 mi.) pipeline corridor. Existing access to Vermillion Ridge is in the winter along seismic cut lines. Access to the other ridges is difficult because of eroded gullies and rugged terrain.

SITE BD9-35(4)

REFERENCE: Site NW17X, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Service "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, some silt, fine grained (SP).

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Stockpiling may be required because of seasonal access.

SITE DESCRIPTION: A large, longitudinally duned, sand-beach ridge located approximately 11 km (7 mi.) south of Norman Wells near Three Day Lake.

Vegetation: scattered birch on ridge; dense tamarack and black spruce on adjacent poorly drained terrain.

Drainage: good to the north.

Thickness: 6 m (20 ft.)

Area: 440,000 sq.m (4,700,000 sq.ft.)

Perimeter: 9,100 m (30,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 603,000E 7,229,500N

SITE INVESTIGATION: None,

ASSESSMENT: Suitable for development. The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline, located on the opposite bank of the Mackenzie River, is by truck in the winter across thermally sensitive terrain. A barging operation across the Mackenzie will be required in the summer.

SITE BD9-36(3)

REFERENCE: Deposit (b), Area VI DIAND Granular Resource Inventory, Norman Wells NTS 96E, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel;

RESERVES: Possible 60,000 cu.m (80,000 cu.yd.)

SITE DESCRIPTION: Esker ridge located approximately 18 km (11 mi.) SSE of Norman Wells.

Thickness: 6 m (20 ft.)

Area: 5,500 sq m (60,000 sq ft.)

Perimeter: 9,700 m (32,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 594,000E 7,226,000N

ASSESSMENT: Suitable for development, only for local projects because of low quantities of material.

The source is located well outside the 28 km (17.5 mi.) pipeline corridor. The winter road to the abandoned Canol Camp passes within 3 km (2 mi.) of the site. Access is by truck in the winter across flat thermokarst terrain.

SITE BD9-37 (NG)

REFERENCE: Site 272X, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for construction purposes.

MATERIAL DESCRIPTION: Silt, sandy and clayey (ML-MH); High moisture content.

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

MINIMUM HAUL DISTANCE:

SITE DESCRIPTION: Prominent narrow alluvial terrace on the north bank of the Mackenzie River located approximately 27 km (17 mi.) east of Norman Wells.

Vegetation: moderately dense spruce

Drainage: good

Map Reference: NTS 96E, Norman Wells.

UTM Reference: Zone 9; 623,000E 7,228,600N

SITE INVESTIGATION: 3 drill holes

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD9-38(3)

REFERENCE: Site 269, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, silt layers (SM-GW).

OVERBURDEN: Negligible

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Possible 2,500,000 cu.m (3,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Not applicable

SITE DESCRIPTION: Active stream channel of Prohibition Creek located approximately 29 km (18 mi.) southeast of Norman Wells.

Vegetation: sparse bushes on terraces.

Drainage: into stream channel.

Thickness: 2 m (6 ft.)

Area: 130,000 sq.m (14,000,000 sq.ft.)

Perimeter: 11,000 m (35,000 ft.)

Map Reference: NTS 96E, Norman Wells.

UTM Reference: Zone 9; 626,400E 7,228,100N

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development since the granular materials are located within the stream channel of an active water course.

SITE BD9-39(2)

REFERENCE: Site 270, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel, medium grained, some coarse grained sand, little silt (GW);
Maximum size to 5.1 cm (2 in.)

OVERBURDEN: Topsoil and peat; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 200 cm (6.5 ft.)

RESERVES: Proven 80,000 cu.m (100,000 cu.yd.)
Probable 300,000 cu.m (400,000 cu.yd.)
Possible 400,000 cu.m. (550,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Commence excavation farthest from water course. Buffer zones and siltation controls be maintained between borrow areas and adjacent stream channels.

SITE DESCRIPTION: Localized glaciofluvial outwash plain located approximately 30 km (19 mi.) east of Norman Wells.

Vegetation: moderate growths of spruce, birch and poplar.

Drainage: fair to good to the west into watershed of Prohibition Creek.

Thickness: 3 m (9 ft.)
Area: 150,000 sq.m (1,600,000 sq.ft.)
Perimeter: 3,700 m (12,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 627,500E 7,229,100N

SITE INVESTIGATION: 2 drill holes, 1 test pit.

ASSESSMENT: Suitable for development.

SITE BD9-39(2)

The source is adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Existing access is in the winter along a trail from the CNT pole line. Access to the pipeline is across flat, fairly well drained terrain.

SITE BD9-40(4)

REFERENCE:

Site 263, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY:

Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION:

Sand and gravel with silt and till pockets.

OVERBURDEN:

Not determined.

DEPTH OF ACTIVE LAYER:

30 cm (1 ft.)+

RESERVES: Possible

150,000 cu.m (200,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION:

Rip and doze.

SITE DESCRIPTION:

A series of small esker - kame complexes located adjacent to the western toe of the Norman Range and east of Nota Creek.

Vegetation: dense spruce and poplar.

Drainage: fair to good to adjacent terrain.

Thickness: 6 m (20 ft.)

Area: 47,000 sq.m (500,000 sq.ft.)

Perimeter: 4,800 m (1,600 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 638,000E 7,228,800N

SITE INVESTIGATION:

None.

ASSESSMENT:

May be suitable for development but will entail a large degree of surficial area being cleared relative to volume of material available.

The source is located near the center of the 28 km (17.5 mi.) pipeline corridor. Access is across flat, poorly drained terrain and existing access is along seismic cut lines.

SITE BD9-41(4)

REFERENCE: Site 267X, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for very marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained (ML-SM); Medium moisture content.

OVERBURDEN: Topsoil and silt; 0 to 240 cm (8 ft.)

DEPTH OF ACTIVE LAYER: 300 cm (9 ft.)+

RESERVES: Proven 100,000 cu.m (130,000 cu.yd.)
Probable 200,000 cu.m (250,000 cu.yd.)
Possible 400,000 cu.m (550,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Esker-like ridge deposit located approximately 1 km ($\frac{1}{2}$ mi.) west of Vermillion Creek.

Vegetation: sparse growths of spruce to 6 m (20 ft.) high

Drainage: good.

Thickness: 2 m (6 ft.)
Area: 760,000 sq.m (2,500,000 sq.ft.)
Perimeter: 3,400 m (11,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 634,900E 7,226,500N

SITE INVESTIGATION: 1 drill hole.

ASSESSMENT: Not suitable for development because of the poor quality material and the extensive thickness of overburden material.

SITE BD9-42(4)

REFERENCE: Site 268X, Fort Norman to Norman Wells, Intercommunity Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for very marginal fill.

MATERIAL DESCRIPTION: Gravel, some sand, medium grained (GP-GM);

OVERBURDEN: Peat and topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)

RESERVES: Proven 100,000 cu.m (130,000 cu.yd.)
Probable 200,000 cu.m (250,000 cu.yd.)
Possible 400,000 cu.m (550,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Segmented narrow strand lines located approximately 35 km (22 mi.) east of Norman Wells.

Vegetation: light to moderate growths of spruce and birch.

Drainage: fair to poor into Mackenzie River.

Thickness: 2 m (6 ft.)
Area: 760,000 sq.m (2,500,000 sq.ft.)
Perimeter: 3,400 m (11,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 632,000E 7,226,300N

SITE INVESTIGATION: 5 drill holes.

ASSESSMENT: Not suitable for development. The surficial gravels within the source are thin and scattered.

SITE BD9-43(R2)

REFERENCE: Site 264, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-2, Bedrock suitable for fair quality general fill in sub-grades.

MATERIAL DESCRIPTION: Limestone.

OVERBURDEN: Glacial drift; variable depth

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Possible Unlimited

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting.

SITE DESCRIPTION: Shallow bedrock ridge representing the eastern flank of the Vermillion Ridge located immediately southeast of the Vermillion Creek.

Vegetation: moderate growth of spruce and irregular stands of birch.

Drainage: good to the west and south.

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 638,800E 7,225,800N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development provided additional field drilling is carried out to determine the extent and quality of the limestone.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is across rugged and rolling terrain before descending onto a flat glaciolacustrine basin.

SITE BD9-44(R2)

REFERENCE: Site 265, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-2, Bedrock suitable for fair quality general fill in sub-grades.

MATERIAL DESCRIPTION: Shale and siltstone surficially weathered and friable;
Random ice lenses in top 90 cm (3 ft.) to 150 cm (5 ft.)

OVERBURDEN: Topsoil and a glacial till; 0 to 425 cm (14 ft.)
Weathered and calcareous shale; 90 cm (3 ft.) to 150 cm (5 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Possible unlimited

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze surficial material. Quarry and blasting at depth. Quarry operation should be initiated in elevated portions of the ridge where overburden is shallow and farthest from water course. Buffer zone be maintained between borrow areas and adjacent water courses.

SITE DESCRIPTION: Shallow bedrock ridge located approximately 42 km (26 mi.) east of Norman Wells.

Vegetation: sparse growth of spruce

Drainage: good to southwest.

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 636,800E 7,222,200N

SITE INVESTIGATION: 6 drill holes

ASSESSMENT: May be suitable for development although the thick overburden and low quality material limit the feasibility of development.

The source lies within the 28 km (17.5 mi.)

SITE BD9-44(R2)

pipeline corridor. Access is across gently rolling ground moraine which is surficially well drained.

SITE BD9-45(3)

REFERENCE: Site 266X, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, some silt (GM);
Medium to high ice content in alluvial terraces.

OVERBURDEN: Topsoil, peat and silt; 0 to 150 cm (5 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)

RESERVES: Possible 750,000 cu.m (1,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze

SITE DESCRIPTION: Inactive terraces and fans, gravel bars and active fans within the braided stream channel of Vermillion Creek located approximately 40 km (25 mi.) east of Norman Wells.

Vegetation: moderate growths of spruce and birch to heights of 6 m (20 ft.)

Drainage: fair into stream channel

Thickness: 1 m (3 ft.)
Area: 880,000 sq.m (4,500,000 sq.ft.)
Perimeter: 12,000 m (40,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 633,800E 7,221,500N

SITE INVESTIGATION: 3 drill holes.

ASSESSMENT: Not suitable for development because the granular materials are within active stream channel.

SITE BD9-46(4)

REFERENCE: Site 262, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and little gravel with possibly silt and till lenses (SM-GM).

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Possible 650,000 cu.m (850,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Narrow discontinuous train of shallow esker ridges locating on the sloping grounds adjacent to the western toe of the Norman Range and upstream section of Nota Creek.

Vegetation: spruce interspersed with poplar stand.

Drainage: fair to northwest into a depressional terrain.

Thickness: 6 m (20 ft.)
Area: 210,000 sq.m (2,300,000 sq.ft.)
Perimeter: 4,600 m (15,000 ft.)

Map Reference: NTS 96F, Mahony Lake

UTM Reference: Zone 10, 365,000E 7,218,500N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development although large surface area has to be cleared relative to the volume of material available.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is across fairly rugged terrain although existing access is along seismic cutlines.

SITE BD9-47(R1)

REFERENCE: Site 261, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing various construction aggregates.

MATERIAL DESCRIPTION: Limestone.

OVERBURDEN: Topsoil and till; 2 m (6 ft.) to greater than 6 m (20 ft.)

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

RESERVES: Possible Unlimited

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. Best quarry sites adjacent to the steep northern escarpment. Selective excavation can be anticipated. Staged development to allow thawing should be considered.

SITE DESCRIPTION: Prominent bedrock ridge located approximately 48 km (30 mi.) east of Norman Wells.

Vegetation: moderately dense growths of birch with occasional spruce and tamarack.

Drainage: good to southwest.

Map Reference: NTS 96F, Mahony Lake

UTM Reference: Zone 10; 360,000E 7,216,500N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Suitable for development. The source is located with the 28 km (17.5 mi.) pipeline corridor. Existing access is along the CNT pole line which crosses the site. Access to the pipeline is across flat terrain.

SITE BD9-48(3)

REFERENCE: Site NW20, Norman Wells, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, coarse grained, some silt (GM); Maximum size greater than 7.8 cm (3 in.); Low to medium moisture content.

OVERBURDEN: Topsoil, silt and sand; 90 cm (3 ft.)

DEPTH OF ACTIVE LAYER: 210 cm (7 ft.)+

RESERVES: Proven 2,500 cu.m (3,000 cu.yd.)
Probable 10,000 cu.m (15,000 cu.yd.)
Possible 25,000 cu.m (30,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Extraction should be commence at the river along western edge of borrow source. Silta-tion controls should be employed. Smooth pit faces and level pit floor is required to minimize erosion.

SITE DESCRIPTION: Small alluvial cone at the mouth of Joe Creek on the northern shore line of the Mackenzie River approximately 6 km (4 mi.) east of Norman Wells.

Vegetation: shrubs, spruce and occasional birch.

Drainage: good to south.

Thickness: .75 m (2 ft.)
Area: 30,000 sq.m (320,000 sq.ft.)
Perimeter: 900 m (3,000 ft.)

Map Reference: NTS 96E, Norman Wells

UTM Reference: Zone 9; 609,200E 7,238,100N

SITE INVESTIGATION: 2 drill holes, 1 test pit.

ASSESSMENT: Suitable for development only for local require-ments. Source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the Norman Wells is along an all weather road from

SITE BD9-48(3)

the radio tower installation at the western extremity of the site. Access to the pipeline is across flat and occasionally poorly drained terrain.

SITE BD9-49(NG)

REFERENCE: Site 284X, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for construction purposes.

MATERIAL DESCRIPTION: Silt, some clay, little gravel and sand (MH).

MINIMUM HAUL DISTANCE:

SITE DESCRIPTION: Shallow slope wash and glacial till materials on the west bank of Canyon Creek located approximately 18 km (11 mi.) east of Norman Wells.

Vegetation: light to moderate spruce.

Drainage: good into the watershed of Canyon and Snowshoe Creeks.

Map Reference: NTS 96E, Norman Wells.

UTM Reference: Zone 9; 618,100E 7,239,400N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD9-50(3)

REFERENCE: Deposit (a), Area III DIAND Granular Resource Inventory, Mahony Lake NTS 96F, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel;

RESERVES: Possible 15,000,000 cu.m (20,000,000 cu.yd.)

SITE DESCRIPTION: Hummocky glaciofluvial deposit located immediately north of the southwestern tip of Kelly Lake.

Thickness: 7.5 m (25 ft.)
Area: 4,500,000 sq m (49,000,000 sq ft.)
Perimeter: 5,500 m (18,000 ft.)

Map Reference: NTS 96F, Mahony Lake

UTM Reference: Zone 10; 364,500E 7,252,000N

ASSESSMENT: Suitable for development.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across the rugged irregular terrain of the McConnell Range. Kelly Lake will have to be crossed or bypassed.

SITE BD10-01(3)

REFERENCE: DIAND Granular Resource Inventory; Mahony Lake,
NTS 96F, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible Not determined.

SITE DESCRIPTION: A series of esker ridges located approximately
37 km (23 mi.) northeast of Fort Norman.

Map Reference: NTS 96F, Mahony Lake

UTM Reference: Zone 10; 405,000E 7,230,000N

ASSESSMENT: Suitable for development.

The source is located adjacent to the western
border of the 28 km (17.5 mi.) pipeline corridor.
Access is by truck in the winter across flat,
thermokarst terrain.

SITE BD10-02(3)

REFERENCE: DIAND Granular Resource Inventory; Mahony Lake
NTS 96F, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible Not determined.

SITE DESCRIPTION: Glaciofluvial terraces immediately adjacent to
the Great Bear River, located approximately
42 km (26 mi.) east of Fort Norman.

Map Reference: NTS 96F, Mahony Lake

UTM Reference: Zone 10; 423,000E 7,213,000N

ASSESSMENT: Suitable for development.

The source is located adjacent to the western
border of the 28 km (17.5 mi.) pipeline corridor.
Access is by truck in the winter across flat,
thermokarst terrain.

SITE BD10-03(3)

REFERENCE: DIAND Granular Resource Inventory; Mahony Lake
NTS 96F, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible Not determined..

SITE DESCRIPTION: A series of esker ridges and a hummocky glacio-
fluvial deposit located approximately 51 km
(32 mi.) ENE of Fort Norman.

Map Reference: NTS 96F, Mahony Lake

UTM Reference: Zone 10; 428,000E 7,218,000N

ASSESSMENT: Suitable for development..

The source is located outside the 28 km (17.5
mi.) pipeline corridor. Access is by truck
in the winter across flat, thermokarst terrain.
At least one major stream crossing will be
required..

SITE BD10-04(NG)

REFERENCE: Site FN17X, Fort Norman, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for
construction purposes.

MATERIAL DESCRIPTION: Silt, some sand, (ML);
Glacial till at depth;
High moisture content.

DEPTH OF ACTIVE LAYER: 75 cm (2.5 ft.)

SITE DESCRIPTION: Elevated glaciofluvial plain located approximat-
ely 14 km (9 mi.) north of Fort Norman.

Vegetation: spruce and birch.

Drainage: very poor.

Map Reference: NTS 96F, Mahoney Lake
NTS 96C, Fort Norman

UTM Reference: Zone 10; 380,000E 7,212,500N

SITE INVESTIGATION: 2 drill holes, 2 test pits.

ASSESSMENT: Material is not suitable for construction purpos-
es.

SITE BD10-05(R1)

REFERENCE: Site FN25, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing various construction aggregates.

MATERIAL DESCRIPTION: Limestone, dolomitic, weathered and fractured.

OVERBURDEN: Topsoil and clay till; 150 to 400 cm (5 to 13 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. The best quarry locations based upon quality of extractable materials, general access to exposed rock outcrops and approachability are in the southern portion of the site area adjacent to the existing winter road.

SITE DESCRIPTION: Devonian limestone exposures which can be considered as the northern extension of the pronounced Bear Rock massif located approximately 16 km (10 mi.) northwest of Fort Norman.

Vegetation: sparse growths of spruce and tamarack.

Drainage: good to the west and east.

Map Reference: NTS 96C, Fort Norman.

UTM Reference: Zone 10; 370,700E 7,210,000N

SITE INVESTIGATION: 3 drill holes.

ASSESSMENT: Suitable for development as a source of general fill from the weathered and fragmented surficial material and as a source of better quality aggregates produced from the fresh limestone beds at depth.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across locally rugged and irregular terrain. An existing winter road passes through the center of the site.

SITE BD10-06(4)

REFERENCE: Site FN5X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable for marginal fill.

MATERIAL DESCRIPTION: Sand, very fine, some silt (SP); Medium moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 105 cm (3.5 ft.)

RESERVES: Proven 6,000 cu.m (7,500 cu.yd.)
Probable 20,000 cu.m (30,000 cu.yd.)
Possible 60,000 cu.m (75,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Very small eolian sand dune on the southern shoreline of a small lake located approximately 16 km (10 mi.) north of Fort Norman.

Vegetation: sparse growth of spruce and birch.

Drainage: good

Thickness: 4.5 m (15 ft.)
Area: 25,000 sq.m (270,000 sq.ft.)
Perimeter: 900 m (3,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 383,000E 7,209,200N

SITE INVESTIGATION: 1 test pit

ASSESSMENT: Suitable for development for local projects only.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling, poorly drained terrain.

SITE BD10-07(2)

REFERENCE: Site FN29, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregates.

MATERIAL DESCRIPTION: Sands and gravels, fine to medium graded (GW-SW);
Maximum size greater than 20 cm (18 in.).

OVERBURDEN: Peat and silt; 30 cm (1 ft.)+

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)

RESERVES: Proven 100,000 cu.m (150,000 cu.yd.)
Probable 600,000 cu.m (800,000 cu.yd.)
Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MAINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. The development of borrow pits should be initiated from the northern extremity of the site.

SITE DESCRIPTION: Glacial outwash deposit on the western flanks of the Bear Rock massif located approximately 14 km (8.5 mi.) north of Fort Norman.

Vegetation: moderate growth of spruce with occasional stands of poplar and birch.

Drainage: fair to the west.

Thickness: 3 m (10 ft.)
Area: 390,000 sq m (4,200,000 sq.ft.)
Perimeter: 6,400 m (21,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 369,700E 7,209,500N

SITE INVESTIGATION: 5 drill holes.

ASSESSMENT: Suitable for development as a source of good quality fill material in the pit run condition.

The source lies within the 28 km (17.5 mi.)

SITE BD10-07(2)

**pipeline corridor. Access is by truck in
the winter across flat to gently rolling
terrain.**

SITE BD10-08(NG)

REFERENCE: Site FN9X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material not suitable for construction purposes.

MATERIAL DESCRIPTION: Silt, some sand, traces of clay (ML-MH).

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

SITE DESCRIPTION: Alluvial flood plain located approximately 10 km (6 mi.) north of Fort Norman at the confluence of the Brackett and Great Bear River.

Vegetation: moderately dense growths of spruce with some birch and poplar.

Drainage: fair.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 383,900E 7,206,900N

SITE INVESTIGATION: 3 test pits.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD10-09(4)

REFERENCE: Site FN11X, Fort Norman, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only
for marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained, some silt (SP);
Maximum size #10 sieve;
Low moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft)+

RESERVES: Proven 20,000 cu.m (30,000 cu.yd.)
Probable 2,000,000 cu.m (3,000,000 cu.yd.)
Possible 3,000,000 cu.m (4,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Steep east banks of the Great Bear River consist-
ing of proglacial lake sediments located
approximately 11 km (7 mi.) north of Fort Norman.

Vegetation: spruce to 9 m (30 ft.) high.

Drainage: fair.

Thickness: 6 m (20 ft.)
Area: 510,000 sq m (5,500,000 sq.ft.)
Perimeter: 3,000 m (9,800 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 385,500E 7,206,900N

SITE INVESTIGATION: 1 test pit.

ASSESSMENT: Suitable for development. The source is located
within the 28 km (17.5 mi.) pipeline corridor.
Access is by truck in the winter across relativ-
ely flat and generally wet muskeg terrain with
numerous small lakes.

SITE BD10-10(3)

REFERENCE: Site FN12X, Fort Norman Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sands and gravels, medium to coarse grained (GW-SW).

OVERBURDEN: Topsoil and silty sands; 6 m (20 ft)+

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Not applicable

SITE DESCRIPTION: Tertiary sands and gravels overlain by layers of glaciolacustrine sands and gravels located approximately 10 km (6 mi.) north of Fort Norman on the east bank of Great Bear River, opposite the confluence of Brackett River.

Vegetation: relatively dense growths of spruce and birch.

Drainage: fair to southwest.

Thickness: 17 m (55 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 384,400E 7,206,600N

SITE INVESTIGATION: 1 bank exposure.

ASSESSMENT: Not suitable for development because of excessive depths of overburden.

SITE BD10-11(4)

REFERENCE: Site FN22, Fort Norman, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable for
marginal fill only.

MATERIAL DESCRIPTION: Sand, some gravel and silt (SM-GM);
Maximum size greater than 20 cm (8 in.);
Medium moisture content.

OVERBURDEN: Topsoil 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 45 cm (1.5 ft.)+

RESERVES: Proven 30,000 cu.m (40,000 cu.yd.)
Probable 150,000 cu.m (200,000 cu.yd.)
Possible 800,000 cu.m (1,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should
be retained between working areas and small
lakes that border the site.

SITE DESCRIPTION: Small outwash remnant located approximately
11 km (7 mi.) northwest of Fort Norman near
the base of Bear Rock.

Vegetation: sparse growths of spruce and
birch.

Drainage: very poor

Thickness: 3 m (10 ft.)
Area: 260,000 sq.m (2,800,000 sq.ft.)
Perimeter: 2,300 m (7,500 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 375,000E 7,207,400N

SITE INVESTIGATION: 2 test pits.

ASSESSMENT: Suitable for development although only limited
quantities of material is available.

The source is located within the 28 km (17.5 mi.)
pipeline corridor. Access is by truck in the

SITE BD10-11(4)

winter across flat terrain.

SITE BD10-12(2)

REFERENCE: Site FN26, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregates.

MATERIAL DESCRIPTION: Sands and gravels, fine to medium grained, little silt (SM-GW);
Maximum size greater than 20 cm (8 in);
Medium moisture content.

OVERBURDEN: Topsoil and silt; 30 cm to 120 cm (1 ft to 4 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 65,000 cu.m (85,000 cu.yd.)
Probable 1,000,000 cu.m (1,500,000 cu.yd.)
Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. The development of borrow pits should be initiated from the northeastern portion of the esker ridge. Surficial waste materials should not drain into the small stream channel on the southwest flank of the esker ridge. Vertical excavation should be adopted to minimize erosion and allow selective excavations.

SITE DESCRIPTION: Narrow sinuous esker ridge located approximately 18 km (11 mi.) northwest of Fort Norman on the west flank of Bear Rock.

Vegetation: sparse growths of spruce and birch.

Drainage: good.

Thickness: 6 m (20 ft.)
Area: 530,000 sq.m (5,700,000 sq.ft.)
Perimeter: 9,600 m (32,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 369,600E 7,207,500N

SITE INVESTIGATION: 3 drill holes, 1 test pit.

SITE BD10-12(2)

ASSESSMENT:

Suitable for development.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, poorly drained terrain characterized by numerous lakes and ponds.

SITE BD10-13(4)

REFERENCE: Site 260X, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for very marginal fill.

MATERIAL DESCRIPTION: Sand, trace silt (SP);
Maximum size #40 sieve;
Low moisture content.

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 245 cm (8 ft.)

RESERVES: Proven 25,000 cu.m (35,000 cu.yd.)
Probable 150,000 cu.m (300,000 cu.yd.)
Possible 300,000 cu.m (400,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze

SITE DESCRIPTION: Small, narrow sand dune located approximately 51 km (32 mi.) east of Norman Wells.

Vegetation: moderately dense spruce, birch and poplar to heights greater than 9 m (30 ft.)
Light to moderate growth of spruce and tamarack on adjacent terrain.

Drainage: good to adjacent terrain.

Thickness: 9 m (30 ft.)
Area: 67,000 sq m (720,000 sq ft.)
Perimeter: 2,500 m (8,300 ft.)

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development because of poor quality of material and limited quantity.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck across poorly drained, thermally sensitive terrain.

SITE BD10-14(R1)

REFERENCE: Site FN1, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Limestone, dolomite weathered and fractured, subordinate inclusions of gypsum and anhydrite; Minimal ice content except in shale.

OVERBURDEN: Residual soil and colluvium; localized depressions.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. Steep and high rock faces forming the east side of the massif are not suitable for locating quarry operations. The best quarry locations are in the north portion adjacent to the existing winter road. Selective quarrying can be anticipated.

SITE DESCRIPTION: Rugged and pronounced bedrock formation known as Bear Rock at the southern extremities of the Norman Range, located approximately 5 km (3 mi.) west of Fort Norman.

Vegetation: very sparse, growths of dwarfed spruce and tamarack.

Drainage: good; water percolating from upper lakes causes karst erosion.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 372,500E 7,204,500N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development as a source of general fill from the weathered and fragmented surficial zone, and as a source of better quality aggregate produced from fresh limestone at greater depths.

SITE BD10-14(R1)

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over irregular terrain. Potential quarry sites with immediate access to the Mackenzie River which would allow barge haul of granular materials.

SITE BD10-15(4)

REFERENCE: Site FN10, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and silts, fine grained, small pockets of gravel (SM).

OVERBURDEN: Silt, sandy; variable depth.

DEPTH OF ACTIVE LAYER: 105 cm (3.5 ft.)

RESERVES: Proven 100,000 cu.m (150,000 cu.yd.)
Probable 300,000 cu.m (400,000 cu.yd.)
Possible 800,000 cu.m (1,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Erosional river terrace on the west bank of the great Bear River, located approximately 7 km (4½ mi.) north of Fort Norman.

Vegetation: sparse growth of spruce and birch trees.

Drainage: fair to southeast.

Thickness: 2 m (6½ ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 382,200E 7,205,600N

SITE INVESTIGATION: 3 drill holes, 2 test pits.

ASSESSMENT: Not suitable for development because of poor quality, limited volume and scattered nature of the deposit.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain.

SITE BD10-16(4)

REFERENCE: Site FN13, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, silty (SM-SP) pockets of gravel; Maximum size greater than 7.8 cm (3 in.); Medium to high moisture content.

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 350,000 cu.m (450,000 cu.yd.)
Probable 2,500,000 cu.m (3,000,000 cu.yd.)
Possible 3,500,000 cu.m (4,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Crescent shaped river terrace at the mouth of a major erosional gully located approximately 8 km (5 mi.) northeast of Fort Norman.

Vegetation: relatively sparse growths of dwarfed spruce and occasional birch.

Drainage: fair to the west.

Thickness: 5 m (16 ft.)
Area: 710,000 sq m (7,700,000 sq.ft.)
Perimeter: 4,100 m (14,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 384,100E 7,205,100N

SITE INVESTIGATION: 6 drill holes.

ASSESSMENT: Suitable for development. The source is located within the 28 km (17.5mi.) pipeline corridor. Access is by truck in the winter across flat, poorly drained terrain frequently exhibiting thermokarst features.

SITE BD10-17(4)

REFERENCE: Site FN16, Fort Norman, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only
for marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained, trace silt (SP);
Medium moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Proven 30,000 cu.m (35,000 cu.yd.)
Probable 550,000 cu.m (700,000 cu.yd.)
Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vertical excavation should be
considered. Vegetation buffer zones should
be maintained between work areas.

SITE DESCRIPTION: Group of eolian sand dunes located approximately
13 km (8 mi.) northeast of Fort Norman.

Vegetation: birch

Drainage: good.

Thickness: 8 m (26 ft.)
Area: 350,000 sq.m (3,800,000 sq.ft.)
Perimeter: 8,200 m (27,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 390,500E 7,203,200N

SITE INVESTIGATION: 1 test pit.

ASSESSMENT: Suitable for development. The source lies with-
in the 28 km (17.5 mi.) pipeline corridor. Access
is by truck in the winter across flat poorly
drained thermally sensitive terrain.

SITE BD10-18(4)

REFERENCE: Deposit (a) Area XXIV DIAND Granular Resource Inventory; Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, little silt.

RESERVES: Possible 140,000,000 cu.m (185,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial outwash deposit located approximately 43 km (27 mi.) east of Fort Norman.

Thickness: 9 m (30 ft.)
Area: 19,000,000 sq m (210,000,000 sq ft.)
Perimeter: 38,000 m (125,000,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 425,000E 7,200,000N

ASSESSMENT: Suitable for development.

The source is located adjacent to the eastern border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain.

SITE BD10-19(3)

REFERENCE: Deposit (a) Area XXIII DIAND Granular Resource Inventory; Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 30,000,000 cu.m (40,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial channel complex located 120 km (76 mi.) east of Fort Norman.

Thickness: 4.5 m (15 ft.)
Area: 8,400,000 sq m (90,000,000 sq ft.)
Perimeter: 21,000 m (68,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 445,000E 7,200,000N

ASSESSMENT: Suitable for development.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over flat, thermokarst terrain.

SITE BD10-20(NG)

REFERENCE: Site FN30X, Fort Norman, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material not suitable
for construction purposes.

MATERIAL DESCRIPTION: Sand, some silt, very fine grained (SM-SP).

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)

SITE DESCRIPTION: Glaciolacustrine plain located approximately
1.5 km (1 mi.) north of Fort Norman along the
eastern banks of the Great Bear River.

Vegetation: dense growths of spruce.

Drainage: poor

Map Reference: NTS 96C, Fort Norman.

UTM Reference: Zone 10; 382,000E 7,204,000N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Material is not suitable for construction
purposes.

SITE BD10-21(NG)

REFERENCE: Site FN15X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for construction purposes.

MATERIAL DESCRIPTION: Silt, some sand (ML);
Glacial till at depth.

SITE DESCRIPTION: A group of partially eroded hummocks located approximately 3½ km (2¼ mi.) northwest of Fort Norman.

Vegetation: spruce with occasional birch.

Drainage: poor

Map Reference: NTS 96, Fort Norman

UTM Reference: Zone 10; 380,800E 7,203,400N

SITE INVESTIGATION: 2 test pits.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD10-22(3)

REFERENCE: Site FN31, Fort Norman, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand, some silt, gravel pockets (SP-GP);
Maximum size greater than 7.8 cm (3 in.).

OVERBURDEN: Topsoil and silt; 0 to 150 cm (5 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 10,000 cu.m (15,000 cu.yd.)
Probable 60,000 cu.m (80,000 cu.yd.)
Possible 400,000 cu.m (500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Fluvial fan deposited at the mouth of a former
meltwater channel located approximately 4 km
(2.5 mi.) west of Fort Norman.

Vegetation: moderate growths of spruce with
occasional stands of poplar and birch.

Drainage: poor.

Thickness: 2 m (6 ft.)
Area: 260,000 sq.m (2,800,000 sq.ft.)
Perimeter: 1,800 m (6,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 375,500E 7,203,100N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Suitable for development as a source marginally
suitable for general fill in the pit run
condition.

The source is located adjacent to the western
border of the 28 km (17.5 mi.) pipeline corridor.
Access is by truck in the winter over flat
terrain.

SITE BD10-23(R2)

REFERENCE: Site FN3X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-2, Talus slopes suitable for fair quality general fill in sub-grades.

MATERIAL DESCRIPTION: Limestone, weathered and finely fragmented; Maximum size to 7.8 cm (3 in.).

OVERBURDEN: None.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)

RESERVES: Proven 10,000 cu.m (15,000 cu.yd.)
Probable 100,000 cu.m (150,000 cu.yd.)
Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Flat alluvial fan located approximately 4 km (2½ mi.) west of Fort Norman at the base of an erosional gully incised in the southeast escarpment of Bear Rock.

Vegetation: none.

Drainage: good to the southeast.

Thickness: 9 m (30 ft.)
Area: 220,000 sq.m (2,300,000 sq.ft.)
Perimeter: 1,800 m (6,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 374,600E 7,202,000N

SITE INVESTIGATION: 1 test pit.

ASSESSMENT: May be suitable for development. The material available at this site is weakly cemented and would very likely deteriorate if exposed to atmospheric conditions. The ground water table lies near the ground surface.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor.

SITE BD10-23(R2)

Access is by truck in the winter across irregular terrain and possibly some unnamed streams.

SITE BD10-24(NG)

REFERENCE: Site 259X, Fort Norman to Norman Wells, Inter-community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for construction purposes.

MATERIAL DESCRIPTION: Silt, fine grained, thin layers of sand and gravel (ML).

DEPTH OF ACTIVE LAYER: 30 cm (1 ft.)+

SIDE DESCRIPTION: Narrow alluvial terrace on the north bank of the Mackenzie River located 52 km (32 mi.) east of Norman Wells.

Vegetation: moderately dense spruce.

Drainage: good in all directions.

Map Reference: NIS 96C, Fort Norman

UTM Reference: Zone 10; 361,000E 7,203,600N

SITE INVESTIGATION: 3 drill holes.

ASSESSMENT: Material is unsuitable for construction purposes

SITE BD10-25(4)

REFERENCE: Site FN27, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable for marginal fill only.

MATERIAL DESCRIPTION: Sand, some silt, small pockets of gravel (SM-SP);
Maximum size 1.9 cm (3/4 in.);
Low moisture content.

OVERBURDEN: Topsoil and silt; 180 cm (6 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft)+

RESERVES: Proven 300,000 cu.m (400,000 cu.yd.)
Probable 3,000,000 cu.m (4,000,000 cu.yd.)
Possible 4,000,000 cu.m (5,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Buffer zones be developed between the final limit of the borrow area and all water courses.

SITE DESCRIPTION: Elevated terrace deposit located 14 km (9 mi.) west of Fort Norman.

Drainage: fair to the south

Thickness: 4.5 m (15 ft.)
Area: 920,000 sq m (9,900,000 sq.ft.)
Perimeter: 2,500 m (8,300 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 365,700E 7,204,000N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: May be suitable for development although very fine gravel sand with high silt contents make the granular materials suitable only for a very marginal fill.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across relat-

SITE BD10-25(4)

ively flat, thermally sensitive terrain that is inundated with numerous lakes of various size.

SITE BD10-26(R2)

REFERENCE: Site FN2X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-2, Talus slopes suitable for fair quality general fill in sub-grades.

MATERIAL DESCRIPTION: Limestone fragments and blocks, trace of sand.

OVERBURDEN: None

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 25,000 cu.m (35,000 cu.yd.)
Probable 250,000 cu.m (350,000 cu.yd.)
Possible 9,000,000 cu.m (12,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Small alluvial cone flanked by talus slopes located approximately 4 km (2.5 mi.) west of Fort Norman along the southeastern toe slopes of Bear Rock.

Vegetation: upper slopes devoid of vegetation; light spruce along the outer perimeter of the site.

Drainage: good to the east.

Thickness: 60 m (200 ft.)
Area: 300,000 sq.m (320,000 sq.ft.)
Perimeter: 3,400 m (11,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 373,800E 7,201,200N

SITE INVESTIGATION: 2 test pits.

ASSESSMENT: May be suitable for development. The available material is very coarse and would require crushing or selective screening even for utilization for general fill. The deposit is frozen at very shallow depths for most of the year. Therefore, removal of the fragmented limestone material may be difficult.

SITE BD10-26(R2)

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over irregular terrain and required a number of stream crossings.

SITE BD10-27(4)

REFERENCE: Site FN14, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained, some silt (SP);
Maximum size #10 sieve;
Low moisture content.

OVERBURDEN: Topsoil and silt; 30 to 105 cm (1 to 3.5 ft.)

DEPTH OF ACTIVE LAYER: 105 cm (3.5 ft.)

RESERVES: Proven 70,000 cu.m (90,000 cu.yd.)
Probable 85,000 cu.m (100,000 cu.yd.)
Possible 300,000 cu.m (400,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. The areal extent of the borrow pit should be compatible with current and future regional town planning schemes. Recontouring of the borrow pit area should be maintained during the periodic exploitation of materials from the pit to minimize detrimental erosion effects and instability of exposed pit slopes.

DITE DESCRIPTION: Existing borrow pit located approximately 1 km ($\frac{1}{2}$ mi.) northeast of Fort Norman immediately adjacent to the southern edge of the airstrip.

Vegetation: spruce with scattered birch.

Drainage: fair

Thickness: 3 m (10 ft.)
Area: 92,000 sq.m (99,000 sq.ft.)
Perimeter: 1,400 m (4,500 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 389,000E 7,200,400N

SITE INVESTIGATION: 2 test pits.

ASSESSMENT: Suitable for development. The consultant report recommends that this material should be restrict-

SITE BD10-27(4)

ed to immediate local needs. The pit is presently being operated to supply the domestic requirements of the Fort Norman Community.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. An existing all weather road provides good access to the site area from the townsite of Fort Norman. Access to the pipeline is by truck in the winter across flat and occasionally poorly drained terrain exhibiting slight thermokarst features.

SITE BD10-28(R2)

REFERENCE: Site FN4, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-2, Talus slopes suitable for fair quality general fill in sub-grades.

MATERIAL DESCRIPTION: Limestone fragments.

OVERBURDEN: Topsoil and silt; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 105 cm (2.5 ft)

RESERVES: Proven 40,000 cu.m (50,000 cu.yd.)
Probable 200,000 cu.m (250,000 cu.yd.)
Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer strip should be left between the working area and the Mackenzie River. Careful stripping and stockpiling of organic topsoil is required to prevent drainage of waste materials into adjacent water courses. Dikes and ditches should be constructed if necessary to control surficial drainage patterns.

SITE DESCRIPTION: Flat alluvial fan situated at the mouth of an erosional gully which is deeply incised into the southeastern escarpment of Bear Rock; located 4 km (2½ mi.) west of Fort Norman.

Vegetation: relatively dense growth of spruce, birch and occasional poplar.

Drainage: good to southeast.

Thickness: 9 m (30 ft.)
Area: 210,000 sq.m (2,300,000 sq.ft.)
Perimeter: 1,600 m (5,300 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10;373,400E 7,200,600N

SITE INVESTIGATION: 2 test pits

ASSESSMENT: May be suitable for development, although frozen

SITE BD10-28(R2)

material was not encountered to depths investigated. Local experience indicates that these deposits are frozen and are not easily ripped during the winter season.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over irregular terrain.

SITE BD10-29(4)

REFERENCE: Site FN6X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, silty, gravel pockets (SP-SM); Maximum size to 3.2 cm (1¼ in.); Low moisture content.

OVERBURDEN: Topsoil and silt; 0 to 150 cm (5 ft.)

DEPTH OF ACTIVE LAYER: 90 cm (3 ft.)

RESERVES: Proven 60,000 cu.m (80,000 cu.yd.)
Probable 100,000 cu.m (150,000 cu.yd.)
Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: River terrace and the crescent shaped edge of a reworked glaciated plain, located approximately 1 km (½ mi.) west of Fort Norman.

Drainage: good to the south and east on the edge of a glaciated plain and poor on river terrace.

Thickness: 3 m (10 ft.)
Area: 390,000 sq.m (4,200,000 sq.ft.)
Perimeter: 4,600 m (15,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 376,500E 7,201,500N

SITE INVESTIGATION: 9 drill holes, 2 test pits.

ASSESSMENT: Not suitable for development because the availability of useable granular materials is restricted to small isolated pockets. Harvesting of these scattered pockets of material would result in extensive terrain disturbance. Exploration of the gravel bed in the river is not practical.

SITE BD10-29(4)

**The source is located adjacent to the western
border of the 28 km (17.5 mi.) pipeline corridor.**

SITE BD10-30(3)

REFERENCE: Site FN7X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable only for general fill.

MATERIAL DESCRIPTION: Gravel, medium grained, very sandy and silty (GM);
Maximum size greater than 6.4 cm (2.5 in.);
Low to medium moisture content.

OVERBURDEN: Topsoil and silt; 30 to 75 cm (1 to 2½ ft.)

DEPTH OF ACTIVE LAYER: 75 cm (2.5 ft.)+

RESERVES: Proven 20,000 cu.m (25,000 cu.yd.)
Probable 65,000 cu.m (90,000 cu.yd.)
Possible 200,000 cu.m (300,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Alluvial cone remnant located at the mouth of a stream which discharges into the Mackenzie River, located approximately 2 km (¼ mi.) west of Fort Norman.

Vegetation: birch, spruce and occasional poplar.

Drainage: poor to the west

Thickness: 6 m (20 ft.)
Area: 92,000 sq.m (990,000 sq.ft.)
Perimeter: 1,100 m (3,800 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 374,700E 7,200,000 N

SITE INVESTIGATION: 11 test pits.

ASSESSMENT: Not suitable for development because an active stream channel flows through the middle of the site area; therefore development would have detrimental environmental effects on the stream regime since excavation near the stream would be necessary in order to harvest a large part

SITE BD10-30(3)

of the limited volume of materials.

The overburden is substantial, especially when considered in relation to the minimal volumes of granular materials that are available for excavation.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain.

SITE BD10-31(3)

REFERENCE: Site FN20, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Silt and sand, pockets of gravel, stratified (SM-GW);
Maximum size greater than 20 cm (8in.).

OVERBURDEN: Topsoil and silt; 4 m (13 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 80,000 cu.m (100,000 cu.yd.)
Probable 800,000 cu.m (1,000,000 cu.yd.)
Possible 2,000,000 cu m (2,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Elevated river terrace located approximately 17 km (10.5 mi.) west of Fort Norman.

Vegetation: sparse growths of spruce and birch.

Drainage: fair to the north.

Thickness: 3 m (10 ft.)
Area: 590,000 sq.m (6,300,000 sq.ft.)
Perimeter: 3,400 m (11,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 361,700E 7,201,800N

SITE INVESTIGATION: 1 bank exposure.

ASSESSMENT: Not suitable for development because source is very sensitive to environmental disturbance by borrow pit operations and overburden thickness is excessive.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline located on the opposite side of the Mackenzie River will require either an ice bridge in the

SITE BD10-31(3)

winter or a barging operation in the summer.
The barging operation may require stockpiling
because of seasonal land access.

SITE BD10-32(3)

REFERENCE: Site FN21X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable only for general fill.

MATERIAL DESCRIPTION: Gravel, coarse to medium grained (GW).

OVERBURDEN: None

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)

RESERVES: Possible 25,000,000 cu m (35,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze, dredging may be required.

SITE DESCRIPTION: Alluvial deposit in the active floodplain of Little Bear River, located approximately 16 km (10 mi.) southwest of Fort Norman.

Vegetation: sparse growths of spruce, birch and occasional poplar.

Drainage: into adjacent stream

Thickness: 4 m (13 ft.)

Area: 6,700,000+ sq.m (72,000,000 + sq.ft.)

Perimeter: 11,000+ m (35,000+ ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 363,000E 7,200,000N

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development because granular material deposits are located below the high water level of the river. High environmental sensitivity.

The source lies outside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline located on the opposite banks of the Mackenzie River will require either an ice bridge in the winter or a barging operation in the summer.

SITE BD10-33(2)

REFERENCE: Site FN23, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Sand and gravel, medium grained, stratified (SW-GW).

OVERBURDEN: Silt, 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 300 cm (10 ft.)+

RESERVES: Proven 35,000 cu.m (45,000 cu.yd.)
Probable 70,000 cu.m (90,000 cu.yd.)
Possible 70,000 cu.m (90,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Exposed gravel bar or terrace on the north shore of the Mackenzie River, located approximately 1 km ($\frac{1}{2}$ mi.) south of Fort Norman.

Vegetation: None

Drainage: good to the west.

Thickness: 2 m (6 ft.)
Area: 5,000 sq.m (50,000 sq.ft.)
Perimeter: 300 m (1,100 ft.)

Map Reference: NTS 96C, Fort Norman.

UTM Reference: Zone 10; 379,100E 7,199,300N

SITE INVESTIGATION: 1 test pit.

ASSESSMENT: Suitable for development. The consultant report recommends that the material be reserved for the Fort Norman community. The small quantity of material is not sufficient for large industrial projects.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor.

SITE BD10-34(NG)

RESERVES: Site FN24X, Fort Norman, Community Study Area,
Stage I DIAND Granular Materials Inventory;
PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material not suitable
for construction purposes.

MATERIAL DESCRIPTION: Silts and clays.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)

SITE DESCRIPTION: Interbedded clay and coal strata with overlying
silty and clayey lacustrine sediments located
immediately upstream from Fort Norman.

Drainage: good to west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 384,600E 7,199,300N

SITE INVESTIGATION: None.

ASSESSMENT: Material is not suitable for construction
purposes

SITE BD10-35(3)

REFERENCE: Site FN8, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sands and gravels, medium to coarse grained, cemented (GW-SW);
Maximum size to 3.8 cm (1½ in.);
Medium to high moisture content.

OVERBURDEN: Silt, sandy and clayey; 15 cm (50 ft.)+

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 6,000,000 cu.m (8,000,000 cu.yd.)
Probable 6,000,000 cu.m (8,000,000 cu.yd.)
Possible 6,000,000 cu.m (8,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Tertiary sands and gravels overlain by deep lacustrine deposits located approximately 6.5 km (4 mi.) east of Fort Norman.

Vegetation: moderately dense spruce.

Drainage: good.

Thickness: 8 m (26 ft.)
Area: 820,000 sq.m (8,800,000 sq.ft.)
Perimeter: 3,800 m (12,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 388,000E 7,198,800N

SITE INVESTIGATION: 17 drill holes, 1 bank exposure.

ASSESSMENT: Not suitable for development because of extensive overburden depths.

The source is located adjacent to the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain containing numerous small lakes.

SITE BD10-36(NG)

REFERENCE: Site FN18X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for construction purposes.

MATERIAL DESCRIPTION: Silt, sandy with layers and pockets of sand (ML).

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

SITE DESCRIPTION: River bar located approximately 13 km (8 mi.) east of Fort Norman on the south bank of the Mackenzie River.

Vegetation: dense growth of spruce, birch and poplar.

Drainage: fair.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 388,200E 7,196,400N

SITE INVESTIGATION: None.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD10-37(NG)

REFERENCES: Site 258X, Wrigley to Fort Norman Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material not suitable for construction purposes.

MATERIAL DESCRIPTION: Sand, some silt, fine grained (SM); Low to medium moisture content.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

SITE DESCRIPTION: A better drained segment of a glaciolacustrine plain, located approximately 24 km (15 mi.) southeast of Fort Norman.

Vegetation: moderately dense spruce, poplar and tamarack.

Drainage: fair to southwest.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 401,400E 7,195,100N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD10-38(4)

REFERENCES: Site 257, Wrigley to Fort Norman Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained (SP); Low moisture content.

OVERBURDEN: Organic silt; 0 to 60 cm (2 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 60,000 cu.m (80,000 cu.yd.)
Probable 600,000 cu.m (800,000 cu.yd.)
Possible 600,000 cu.m (800,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained between work areas; vertical excavation should be considered.

SITE DESCRIPTION: Small sand dune located approximately 27 km (17 mi.) southeast of Fort Norman.

Vegetation: dense growth of spruce, poplar and tamarack to 12 m (40 ft.) on dunes.

Drainage: good.

Thickness: 9 m (30 ft.)
Area: 130,000 sq m (1,400,000 sq ft.)
Perimeter: 2,500 m (8,300 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 404,000E 7,192,600N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: May be suitable for development although borrow material quality is very poor. The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline will be by truck in the winter across flat, poorly drained thermokarst terrain.

SITE BD10-39(4)

REFERENCES: Site 253, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained (SP);
Low moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 365 cm (12 ft.)

RESERVES: Proven 200,000 cu.m (250,000 cu.yd.)
Probable 2,000,000 cu.m (2,500,000 cu.yd.)
Possible 3,500,000 cu.m (5,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained between work areas; vertical excavation should be considered.

SITE DESCRIPTION: Two large sand dunes which comprise a portion of a major sand dune complex located 35 km (22 mi.) southeast of Fort Norman.

Vegetation: dense growth of spruce, poplar and tamarack to 12 m (40 ft.) high.

Drainage: good.

Thickness: 9.1 m (30 ft.)
Area: 800,000 sq m (8,600,000 sq.ft.)
Perimeter: 9,100 m (30,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 411,500E 7,188,500N

SITE INVESTIGATION: 1 drill hole.

ASSESSMENT: May be suitable for development although the borrow material is of poor quality.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Existing access is along

SITE BD10-39(4)

**seismic cutlines from the CNT pole line.
Access to the pipeline is by truck in the
winter across thermally sensitive, poorly
drained terrain.**

SITE BD10-40(4)

REFERENCES: Site 256, Wrigley to Fort Norman Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable for marginal fill only.

MATERIAL DESCRIPTION: Sand, fine grained, trace silt (SP); Low moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 300,000 cu.m (400,000 cu.yd.)
Probable 2,000,000 cu.m (3,000,000 cu.yd.)
Possible 2,000,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained between work areas; vertical excavation should be considered.

SITE DESCRIPTION: A large sand dune located approximately 34 km (21 mi.) southeast of Fort Norman.

Vegetation: dense growth of spruce, poplar and tamarack ranging to 12 m (40 ft.) high.

Drainage: good.

Thickness: 9 m (30 ft.)
Area: 460,000 sq m (5,000,000 sq ft.)
Perimeter: 5,300 m (17,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 406,100E 7,187,000N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: May be suitable for development although borrow material is of very low quality.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across thermally sensitive, poorly drained terrain.

SITE BD10-41(4)

RESERVES: Site 254, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained, trace silt (SP); Low moisture content.

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 3,000,000 cu.m (4,500,000 cu.yd.)
Probable 1,500,000 cu.m (2,000,000 cu.yd.)
Possible 80,000 cu. m (100,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained between work areas; vertical excavation should be considered.

SITE DESCRIPTION: A large sand dune located approximately 34 km (21 mi.) southeast of Norman Wells.

Vegetation: dense growth of spruce, poplar and tamarack.

Drainage: good.

Thickness: 9 m (30 ft.)
Area: 720,000 sq.m (7,700,000 sq ft.)
Perimeter: 6,600 m (22,000 ft.)

Map Reference: NTS 96C, Fort Norman.

UTM Reference: Zone 10; 407,600E 7,186,600N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: May be suitable for development although borrow material is of poor quality.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Existing access is along seismic cutlines from the CNT pole line. Access to the pipeline is by truck in the winter across

SITE BD10-41(4)

thermally sensitive, poorly drained terrain.

SITE BD10-42(4)

REFERENCES: Site 252, Wrigley to Fort Norman Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained (SP);
Medium to high moisture content;

OVERBURDEN: Topsoil, 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 240 cm (8 ft.)

RESERVES: Proven 75,000 cu.m (100,000 cu.yd.)
Probable 800,000 cu.m (1,000,000 cu.yd.)
Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained between work areas; vertical excavation should be considered.

SITE DESCRIPTION: A large, longitudinal sand dune located 37 km (23 mi.) southeast of Fort Norman.

Vegetation: dense growth of spruce, birch and poplar to 12 m (40 ft.) high.

Drainage: good.

Thickness: 9 m (30 ft.)
Area: 330,000 sq.m (3,500,000 sq.ft.)
Perimeter: 4,800 m (16,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 412,000E 7,186,800N

SITE INVESTIGATION: 2 drill holes

ASSESSMENT: May be suitable for development although borrow material is of poor quality.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Existing access is along seismic cutlines from the CNT pole line. Access to the pipeline is by truck in the winter across thermally sensitive, poorly drained terrain.

SITE BD10-43(4)

REFERENCES: Site 255, Wrigley to Fort Norman Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Silt, fine grained, trace silt (SP); Low moisture content.

OVERBURDEN: Silty organic topsoil; 0 to 60 cm (2 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 750,000 cu.m (1,000,000 cu.yd.)
Probable 7,500,000 cu.m (10,000,000 cu.yd.)
Possible 7,500,000 cu.m (10,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained between work areas; vertical excavation should be considered.

SITE DESCRIPTION: A large sand dune located approximately 35 km (22 mi.) southeast of Fort Norman.

Vegetation: dense growth of spruce, poplar and tamarack to 12 m (40 ft.) high.

Drainage: good.

Thickness: 9 m (30 ft.)
Area: 1,700,000 sq m (18,000,000 sq.ft.)
Perimeter: 13,000 m (43,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 405,500E 7,182,600N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: May be suitable for development although borrow material is of poor quality.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across thermally sensitive, poorly drained terrain.

SITE BD10-44(4)

REFERENCES: Site 251, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, trace silt, fine grained(SP).

OVERBURDEN: Topsoil to 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible 4,500,000 cu.m (6,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained between work areas to minimize erosion. Vertical excavation should be considered.

SITE DESCRIPTION: Four large sand dune deposits located approximately 37 km (23 mi.) southeast of Fort Norman.

Vegetation: dense growth of spruce, poplar and tamarack.

Drainage: good.

Thickness: 9 m (30 ft.)

Area: 1,000,000 sq.m (11,000,000 sq.ft.)

Perimeter: 17,000 m (55,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 414,500E 7,182,500N

SITE INVESTIGATION: None

ASSESSMENT: May be suitable for development although the borrow material is of poor quality.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Existing access is along seismic cutlines from the CNT pole line. Access to the pipeline is by truck in the winter across thermally sensitive, poorly drained terrain.

SITE BD10-45(4)

REFERENCES: Site 249, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for very marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained, trace silt (SP); Low to medium moisture content.

OVERBURDEN: Peat; 60 cm (2 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 15,000 cu.m (20,000 cu.yd.)
Probable 350,000 cu.m (450,000 cu.yd.)
Possible 700,000 cu.m (900,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained. Vertical excavation should be considered.

SITE DESCRIPTION: Small sand dune located approximately 40 km (25 mi.) southeast of Fort Norman.

Vegetation: dense growth of spruce, poplar and tamarack.

Drainage: good.

Thickness: 5 m (16 ft.)
Area: 220,000 sq.m (2,400,000 sq.ft.)
Perimeter: 4,600 m (15,000 ft.)

Map Reference: NTS 96C, Fort Norman.

UTM Reference: Zone 10; 405,600E 7,178,500N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: Suitable for development. The source is located adjacent to the western boundary of the 28 km (17.5 mi.) pipeline corridor. Existing winter access is along seismic cutlines from the CNT pole line. Access to the pipeline is by truck in the winter across poorly drained thermokarst terrain.

SITE BD10-46(NG)

REFERENCES: Site 250X, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material not suitable for construction purposes.

MATERIAL DESCRIPTION: Sand, some silt, fine grained (SM); High ice content.

DEPTH OF ACTIVE LAYER: Not determined.

SITE DESCRIPTION: A better drained segment of the glaciolacustrine plain, located approximately 42 km (26 mi.) southeast of Fort Norman.

Vegetation: moderately dense growths of spruce, poplar and tamarack.

Drainage: fair to southwest.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 408,600E 7,177,500N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD10-47(3)

REFERENCE: Deposit (b), Area XXI DIAND Granular Resource Inventory, Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand, gravel and silt.

RESERVES: Possible 75,000 cu.m (100,000 cu.yd.)

SITE DESCRIPTION: Four esker ridges located approximately 22 km (14 mi.) ENE of the confluence of the Big Smith Creek and the Mackenzie River.

Thickness: 6 m (20 ft.)
Area: 150,000 sq m (1,600,000 sq ft.)
Perimeter: 13,000 m (43,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 426,000E 7,177,000N

ASSESSMENT: Suitable for development.

The source is located near the center of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain.

SITE BD10-48(4)

REFERENCE: Site 247, Wrigley to Fort Norman, Inter-community Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for very marginal fill.

MATERIAL DESCRIPTION: Sands and silts, fine grained, stratified ML-SM).

OVERBURDEN: Topsoil and organic silt; variable thickness.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Not applicable

SITE DESCRIPTION: Shallow alluvial terrace, paralleling the active Mackenzie River stream channel, located on the west side of the Mackenzie River within its broad flood plain and dissected by Little Birch River.

Vegetation: moderately dense willow, poplar, birch and spruce.

Drainage: fair to north and south.

Map Reference: NTS 96C, Fort Norman.

UTM Reference: Zone 10; 402,100E 7,172,500N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for development because of poor quality and difficult access.

The source is located well outside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline located on the opposite bank of the Mackenzie River is by truck in the winter or by barge in the summer.

SITE BD10-49(3)

REFERENCE: Deposit (b), Area V DIAND Granular Resource Inventory, Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 2,000,000 cu.m (2,500,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial deposit covered by eolian silt veneer, located approximately 32 km (20 mi.) SSE of the confluence of the Little Bear and the Mackenzie Rivers.

Thickness: 4.5 m (15 ft.)
Area: 490,000 sq m (5,300,000 sq ft.)
Perimeter: 10,000 m (33,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 381,000E 7,175,000N

ASSESSMENT: Suitable for development.

The source is located well outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain. Access includes crossing the Mackenzie River either by truck in the winter or by barge in the summer. A barging operation may require stockpiling because of seasonal land access.

SITE BD10-50(3)

REFERENCE: Deposit (a), Area V DIAND Granular Resource Inventory, Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 5,500,000 cu.m (7,500,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial channel complex covered by eolian silt veneer located approximately 32km (20mi.) SSE of the confluence of the Little Bear and the Mackenzie Rivers.

Thickness: 4.5 m (15 ft.)
Area: 1,500,000 sq m (16,000,000 sq ft.)
Perimeter: 8,500 m (28,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 380,000E 7,172,000N

ASSESSMENT: Suitable for development.

The source is located well outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain. Access also includes crossing the Mackenzie River either by truck in the winter or by barge in the summer. A barging operation may require stockpiling because of seasonal land access.

SITE BD10-51(3)

REFERENCE: Deposit (c), Area V DIAND Granular Resource Inventory, Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 20,000 cu.m (25,000 cu.yd.)

SITE DESCRIPTION: Two small eskers located approximately 14 km (9 mi.) west of the confluence of the Little Birch and the Mackenzie Rivers.

Thickness: 6 m (20 ft.)
Area: 37,000 sq m (4,000,000 sq ft.)
Perimeter: 4,600 m (15,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 387,000E 7,173,000N

ASSESSMENT: Suitable for development.

The source is located well outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain. Access also includes crossing the Mackenzie River by either truck in the winter or by barge in the summer. A barging operation may require stockpiling because of seasonal land access.

SITE BD10-52(4)

REFERENCE: Site 246, Wrigley to Fort Norman Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for very marginal fill.

MATERIAL DESCRIPTION: Sands, silty, fine grained stratified with silt layers, (SM).

OVERBURDEN: Topsoil and organic silt; variable thickness.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible 20,000,000 cu.m (25,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE INVESTIGATION: Alluvial terrace located within the broad flood plain on the west bank of the Mackenzie River, approximately 10 km (6 mi.) west of Old Fort Point.

Vegetation: moderately dense growths of willow, poplar, birch and spruce.

Drainage: fair to good to the east and west.

Thickness: 3 m (26 ft.)

Area: 3,300,000 sq.m (36,000,000 sq.ft.)

Perimeter: 9,800 m (22,000 ft.)

Map Reference: NTS 96C, Fort Norman.

UTM Reference: Zone 10; 401,500E 7,170,000N

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development because of poor quality of material and difficult access.

The source is located well outside the 28 km (17.5 mi.) pipeline corridor.

SITE BD10-53(NG)

REFERENCE: Site 248X, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for construction purposes.

MATERIAL DESCRIPTION: Sand and silt, fine grained (SM);
Very high ice content;

DEPTH OF ACTIVE LAYER: Not determined.

SITE DESCRIPTION: Deltaic sand and silt deposits in a broad lacustrine plain located 1.5 km (1 mi.) north of Big Smith Creek.

Vegetation: light to moderate growth of spruce and birch to greater than 9 m (30 ft.) high.

Drainage: poor to the south.

Map Reference: NTS 96C, Fort Norman.

UTM Reference: Zone 10; 409,500E 7,169,000N

SITE INVESTIGATION: 3 drill holes.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD10-54(3)

REFERENCE: Deposit (c), Area V DIAND Granular Resource Inventory, Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 6,000 cu.m (7,500 cu.yd.)

SITE DESCRIPTION: Small esker ridge located approximately 16 km (10 mi.) southwest of the confluence of the Little Birch and Mackenzie Rivers.

Thickness: 4.5 m (15 ft.)
Area: 12,000 sq m (1,300,000 sq ft.)
Perimeter: 2,400 m (7,900 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 392,000E 7,160,500N

ASSESSMENT: Not suitable for development because of extremely long and difficult access and quantities of available granular materials are minimal.

The source is located well outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain. Access also includes crossing the Mackenzie River by either truck in the winter or by barge in the summer. A barging operation may require stockpiling because of seasonal land access.

SITE BD10-55(4)

REFERENCE: Borrow Area 150BH Main Canadian Route, CAGSL Pipeline Related Borrow Studies; Northern Engineering Services Co. Ltd., 1974.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and silt (SP-SM); Medium moisture content.

OVERBURDEN: Topsoil and silt; 0 to 60 cm (2 ft.)

RESERVES: Possible 30,000,000 cu.m+ (40,000,000 cu.yd.+)

MINIMUM HAUL DISTANCE:

SITE DESCRIPTION: Glaciofluvial plain located approximately 16 km (10 mi.) north of the confluence of the Big Smith Creek and the Mackenzie River.

Drainage: good to numerous lakes.

Thickness: 6 m+ (20 ft.+)

Area: 5,000,000 sq.m+ (55,000,000 sq ft+)

Perimeter: Not determined.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 408,000E 7,179,000N

SITE INVESTIGATION: 1 drill hole.

ASSESSMENT: Suitable for development as a source of marginal fill.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain.

Selected by CAGSL as a primary source of material for construction of a facility.

SITE BD10-56(2)

REFERENCE: Site FN19, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel, medium grained (GW);
Maximum size to 5 cm (2 in.);
Medium to high moisture content;

OVERBURDEN: Topsoil, silt and silty sand; 45 to 150 cm (1.5 to 5 ft.).

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 2,500,000 cu.m (3,500,000 cu.yd.)
Probable 25,000,000 cu.m (35,000,000 cu.yd.)
Possible 80,000,000 cu.m (100,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Borrow pit areas should be commenced at the extreme northern end of the site. Siltation controls be used to prevent surficial waste materials from draining into the active Little Bear River. A vegetation buffer zone of adequate height and breadth should be maintained between the outer limits of the borrow pit and the east shoreline of the Little Bear River. The extent of ground ice at greater depths may dictate the use of heavier equipment or staged pit development. The adverse effects of in situ ground ice are considered to be quite minimal.

SITE DESCRIPTION: Large glacial outwash plain bordering on the active stream channel of the Little Bear River, located approximately 18 km (11 mi.) southwest of Fort Norman.

Vegetation: dense growths of spruce and birch to more than 9 m (30 ft.) to 15 m (50 ft.)

Drainage: good.

Thickness: 9 m (30 ft.)
Area: 400,000,000 sq.m (4,400,000,000 sq.ft.)

SITE BD10-56(2)

Perimeter: 100,000 m² (300,000 ft.²)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 364,500E 7,196,700N

SITE INVESTIGATION:

3 drill holes, 1 bank exposure.

ASSESSMENT:

Suitable for development as a source of quality surface course and possibly concrete aggregates. The production of higher quality aggregates will require screening, crushing and washing.

The source lies outside the 28 km (17.5 mi.) pipeline corridor. Access may be by truck in the winter across flat poorly drained terrain and involves the crossing of the Mackenzie River channel. Stockpiling facilities for various grades of aggregates should be considered adjacent to the Mackenzie River.

SITE BD10-57 (NG)

REFERENCE: Site FN28X, Fort Norman, Community Study Area, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material not suitable for construction purposes.

MATERIAL DESCRIPTION: Silt, some clay, few pebbles (Till-like) (ML); High moisture content.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

SITE DESCRIPTION: Glacial outwash deposits partially overlain by talus cones, located approximately 18 km (11 mi.) northwest of Fort Norman along the base of the western escarpment of Bear Rock.

Vegetation: sparse growth of spruce, occasional poplar and birch.

Drainage: good to the southwest.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 366,400E 7,209,500N

SITE INVESTIGATION: 5 drill holes.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD11-01(3)

REFERENCE: Deposit (a), Area XXII DIAND Granular Resource Inventory; Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 4,000,000 cu.m (5,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial deposit located approximately 27 km (17 mi.) east of the confluence of Big Smith Creek and the Mackenzie River.

Thickness: 4.5 m (15 ft.)
Area: 980,000 sq m (11,000,000 sq ft.)
Perimeter: 4,000 m (13,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 440,000E 7,173,000N

ASSESSMENT: Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to irregular terrain exhibiting slight thermokarst features.

SITE BD11-03(3)

REFERENCE: Deposit (b), Area XXII DIAND Granular Resource Inventory; Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 60,000 cu.m (80,000 cu.yd.)

SITE DESCRIPTION: Three esker ridges located 37 km (23 mi.) north-east of the confluence of Little Smith Creek and Mackenzie River.

Thickness: 6 m (20 ft.)
Area: 149,000 sq m (1,600,000 sq ft.)
Perimeter: 9,800 m (32,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 442,000E 7,168,000N

ASSESSMENT: Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to irregular terrain exhibiting slight thermokarst features.

SITE BD11-04(4)

REFERENCE: Site 240, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for very marginal fill.

MATERIAL DESCRIPTION: Sand and silt; (SM-ML).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: An abandoned strand line located 2½ km (1½ mi.) east of Big Smith Creek.

Vegetation: better stands of mixed black spruce and poplar.

Drainage: poor.

Thickness: 1.5 m (5 ft.)

Area: 28,000 sq.m (300,000 sq.ft.)

Perimeter: 5,000 m (15,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 418,000E 7,166,400N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development although material is very poor quality. Require additional field investigation to determine the quantity and quality of available material.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat-lying terrain.

SITE BD11-05(NG)

REFERENCE: Site 239, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for construction purposes.

MATERIAL DESCRIPTION: Silt and sand (ML-SM).

SITE DESCRIPTION: Fine grained alluvial sediments deposited at the mouth of a major gully located approximately 4 km (2½ mi.) east of Big Smith Creek.

Vegetation: black spruce.

Drainage: into stream channel.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 420,600E 7,166,100N

SITE INVESTIGATION: None,

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD11-06(4)

REFERENCE: Site 238, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72" 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Silt and sand, trace gravel (SM-ML); High moisture content.

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 300,000 cu.m (400,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Alluvial fan located approximately 4 km (2½ mi.) east of Big Smith Creek.

Vegetation: well developed stands of black spruce.

Drainage: poor to the northwest.

Thickness: 4.5 m (15 ft.)
Area: 160,000 sq.m (1,700,000 sq.ft.)
Perimeter: 1,800 m (6,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 420,000E 7,165,900N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development although site consists of very poor quality material. Additional field investigation is required to determine the quantity and quality of material.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain to the south and west and rugged irregular terrain to the north and east.

SITE BD11-07(4)

REFERENCE: Site 237, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Silt and sand, trace gravel (SM-ML).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Scree and other slope wash deposits located approximately 5 km (3 mi.) east of Big Smith Creek.

Vegetation: dense stands of black spruce and minor groups of poplar.

Drainage: fair to poor to the south.

Thickness: 4.5 m (15 ft.)
Area: 550,000 sq.m (6,000,000 sq.ft.)
Perimeter: 4,800 m (16,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 420,000E 7,164,200N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development although material is of poor quality. Site will require additional field investigation to determine the quantity and quality of available material.

Source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain to the northwest and south.

SITE BD11-08(4)

REFERENCE: Site 245, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, stratified, fine to coarse grained (SP-SM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible 3,000,000 cu.m (4,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Wide alluvial flood plain of the meandering Big Smith Creek located in the east side of Mackenzie River.

Vegetation: moderately dense growths of spruce and willow.

Drainage: good into adjacent stream channel.

Thickness: 3 m (10 ft.)

Area: 3,600,000 sq.m (39,000,000 sq.ft.)

Perimeter: 11,000 m (39,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 414,500E 7,165,500N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development but requires additional field investigation to determine the quantity and quality of available material. Review environmental sensitivity since the deposit is within an active stream channel.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter over poorly drained thermokarst terrain to the north and south or higher more rugged and irregular terrain to the east.

SITE BD11-09(4)

REFERENCE: Site 244, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, little silt, fine grained (SP); Low moisture content.

OVERBURDEN: Silt; 90 cm (3 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 200,000 cu.m (250,000 cu.yd.)
Probable 3,000,000 cu.m (4,000,000 cu.yd.)
Possible 4,000,000 cu.m (6,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained between work areas and adjacent water courses. Vertical excavation should be considered.

SITE DESCRIPTION: Deltaic deposit rising slightly above the adjacent, flat glaciolacustrine plain, located immediately adjacent to the southern crest line of Big Smith Creek.

Vegetation: moderately dense growths of spruce and poplar to 15 m (50 ft.) high.

Drainage: fair to the north and south.

Thickness: 9 m (30 ft.)
Area: 3,200,000 sq.m (35,000,000 sq.ft.)
Perimeter: 9,600 m (32,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 411,500E 7,162,200N

SITE INVESTIGATION: 3 drill holes.

ASSESSMENT: Suitable for development although material is of very poor quality.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter over poorly drained thermokarst terrain.

SITE BD11-10(4)

REFERENCE: Site 242, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM); Silt beds and till lenses may also be common.

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 2,500,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Hummocky kame field and narrow discontinuous esker ridge located approximately 4 km (2.5 mi.) south-east of Big Smith Creek.

Vegetation: well developed stands of spruce and poplar.

Drainage: fair to poor to the west.

Thickness: 6 m (20 ft.)
Area: 400,000 sq.m (4,300,000 sq.ft.)
Perimeter: 4,800 m (16,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 418,000E 7,162,000N

SITE INVESTIGATION: None.

ASSESSMENT: Maybe suitable for development but requires further field investigation to determine the quantity and quality of available materials. A large degree of surficial area would have to be cleared to obtain a relatively minimal volume of material from the esker ridge.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across flat thermokarst

SITE BD11-11(3)

REFERENCE: Site 236, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GW); Pockets of ablation till and silt may occur in the deposit.

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 3,500,000 cu.m (4,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Kame terrace along the toe of the McConnell Range, located approximately 13 km (8 mi.) east of the Mackenzie River between Big Smith and Little Smith Creeks.

Vegetation: black spruce.

Drainage: good into stream channel.

Thickness: 6 m (20 ft.)

Area: 560,000 sq.m (6,000,000 sq.ft.)

Perimeter: 5,300 m (17,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 420,600E 7,162,500N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development but requires additional field investigation to determine the quality and quantity of available material.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain to the northwest and southwest or across irregular rugged terrain to the northeast.

SITE BD11-12(4)

REFERENCE: Site 241, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory: PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and silt, some gravel (SM-ML).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 6,000,000 cu.m (8,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Slope wash deposits and screes which mantle the northern face of a rocky hill located approximately 6 km (4 mi.) south of Big Smith Creek.

Vegetation: black spruce.

Drainage: poor; excessive surficial runoff.

Thickness: 3 m (10 ft.)

Area: 4,200,000 sq.m (45,000,000 sq.ft.)

Perimeter: 17,000 m (55,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 419,000E 7,161,800N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development but will require additional field investigation to determine the quality and quantity of available material.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter over rugged terrain to the northeast and flat terrain to the west and south.

SITE BD11-13(3)

REFERENCE: Site 235, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 800,000 cu.m (1,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Four kame fields scattered at the toe of the McConnell Range, located approximately 3 km (2mi.) north of Little Smith Creek.

Vegetation: good stands of spruce.

Drainage: fair to good.

Thickness: 6 m (20 ft.)

Area: 330,000 sq.m (3,500,000 sq.ft.)

Perimeter: 6,200 m (20,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 424,400E 7,160,000N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across locally rugged and irregular terrain.

SITE BD11-14(NG)

REFERENCE: Site 243, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material not suitable for construction purposes.

MATERIAL DESCRIPTION: Silt, sand, clay mixture (Glacial Till).

SITE DESCRIPTION: Drumloid till plain located approximately 7 km (4½ mi.) east of the Mackenzie River and 6 km (4 mi.) south of Big Smith Creek.

Vegetation: good stands of black spruce mixed with irregular groups of poplar.

Drainage: fair to the west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 417,500E 7,158,600N

SITE INVESTIGATION: None.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD11-15(R1)

REFERENCE: Site 234, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for the manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Dolomite and shale of the Franklin Mountain Formation.

OVERBRIDEN: Glacial drift; discontinuous

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and blast fractured surficial bedrock zone. Fresh massive beds of dolomite expected at depth will require blasting and crushing. Bluffs along the northern perimeter and ridges within the eastern portion would be most suitable for quarry locations.

SITE DESCRIPTION: Bedrock bluffs, ridges and hills located within the western margin of the McConnell Range, some 10 km (6 mi.) from the Mackenzie River and 5 km (3 mi.) north of Little Smith Creek.

Vegetation: spruce with minor stands of poplar.

Drainage: good.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 420,000E 7,160,000N

SITE INVESTIGATION: None.

ASSESSMENT: Suitable for development. The fractured surficial zone can produce good quality general fill and the fresh dolomite at depth can be crushed and screened for the production of good quality aggregates for surface courses.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over very rugged terrain locally and flat terrain to south and west.

SITE BD11-16(3)

REFERENCE: Deposit (a), Area XXI DIAND Granular Resource Inventory, Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel;

RESERVES: Possible 750,000 cu.m (1,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial deposit located adjacent to Little Smith Creek and approximately 29 km (18 mi.) north of the confluence of the Saline and Mackenzie Rivers.

Thickness: 4.5 m (15 ft.)
Area: 230,000 sq m (2,500,000 sq ft.)
Perimeter: 2,100 m (7,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 430,700E 7,158,400N

ASSESSMENT: Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over flat terrain.

SITE BD11-17(3)

REFERENCE: Site 232, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, coarse grained (SW-GP); Maximum size greater than 2.5 cm (1 in.); Medium moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.) to 45 cm ($1\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 90,000 cu.m (120,000 cu.yd.)
Probable 500,000 cu.m (650,000 cu.yd.)
Possible 3,000,000 cu.m (4,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Excavation should commence from the northwestern extremity where better quality materials are available. Drainage directly into adjacent natural water courses should be avoided. Heavy rippers may be required at depth.

SITE DESCRIPTION: Partially effaced, sinuous esker ridge located approximately 4 km (2.5 mi.) north of Little Smith Creek.

Vegetation: dense growths of spruce and poplar with occasional clusters of willow and birch.

Drainage: good to the southwest.

Thickness: 6 m (20 ft.)
Area: 640,000 sq.m (6,900,000 sq.ft.)
Perimeter: 5,500 m (18,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 422,700E 7,156,300N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain.

SITE BD11-18(3)

REFERENCE: Site 233, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 650,000 cu.m (850,000 cu.yd.)

MINIMUM FAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: A group of narrow esker ridges located on the north side of Little Smith Creek.

Vegetation: good stands of spruce, birch and poplar.

Drainage: good to southeast.

Thickness: 12 m (40 ft.)

Area: 93,000 sq.m (1,100,000 sq.ft.)

Perimeter: 4,100 m (14,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 424,000E 7,156,000N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development but requires additional field investigation to determine the quantity and quality of the granular material.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain.

SITE BD11-19(3)

REFERENCE: Deposit (b), Area XX DIAND Granular Resource Inventory; Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 10,000,000 cu.m (15,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial channel complex located immediately north of Mount Clark.

Thickness: 9 m (30 ft.)
Area: 1,500,000 sq m (16,000,000 sq ft.)
Perimeter: 2,700 m (9,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 436,000E 7,151,000N

ASSESSMENT: Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain.

SITE BD11-20(R1)

REFERENCE: Site 226, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for the manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Limestone, surficially weathered.

OVERBURDEN: Topsoil, colluvium and till; 30 cm (1 ft.)+

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Both the surficial bedrock zone and massive underlying bedrock will require blasting. The southern and northwestern perimeters of the site are best suited for quarry locations.

SITE DESCRIPTION: Prominent bedrock ridge located approximately 1½ km (1 mi.) southeast of Little Smith Creek.

Vegetation: sparse growth of spruce.

Drainage: good to the west and south.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 423,600E 7,149,700N

SITE INVESTIGATION: 1 drill hole.

ASSESSMENT: Suitable for development. Good quality fill can be produced from the fractured surficial bedrock zones. Aggregates for surface courses can be produced from the fresh and massive underlying dolomite and limestone beds.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is across flat to gently rolling terrain to the west and south and across rugged and irregular terrain to the north.

SITE BD11-21(4)

REFERENCE: Site 230, Wirgley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and silt (ML-SM).

SITE DESCRIPTION: Alluvial terrace located within the broad flood plain on the western side of the Mackenzie River and approximately 3 km (2 mi.) north of the Keele River.

Vegetation: moderately dense growths of spruce willow, poplar and birch.

Drainage: fair to northeast.

Thickness: 4.5 m (15 ft.)
Area: 1,700,000 sq.m (23,000,000 sq.ft.)
Perimeter: 8,900 m (29,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 410,000E 7,148,100N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for development because of the poor quality of material and very difficult access to the pipeline route.

SITE BD11-22(4)

REFERENCE: Site 231, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, with silt layers or pockets (SW).

OVERBURDEN: Organic silt.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible 20,000,000 cu.m (25,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Meandering alluvial flood plain of Little Smith Creek which contains shallow terraces, located on the east side of the Mackenzie River.

Vegetation: dense growths of spruce, poplar and willow.

Drainage: fair into stream channel.

Thickness: 3 m (10 ft.)

Area: 5,900,000 sq.m (63,000,000 sq.ft.)

Perimeter: 20,000 m (67,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 416,300E 7,148,000N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for development because the granular materials are located within or immediately adjacent to the active stream channel of Little Smith Creek.

The source is located within the 28 km (17.5 mi.) pipeline corridor.

SITE BD11-23(4)

REFERENCE: Site 225, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 200,000 cu.m (300,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: A series of small hummocks formed by glaciofluvial outwash deposits, located approximately 3 km (2mi.) southeast of Little Smith Creek.

Vegetation: spruce and poplar.

Drainage: good to the north.

Thickness: 4 m (13 ft.)

Area: 140,000 sq.m (1,500,000 sq.ft.)

Perimeter: 2,700 m (9,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 423,800E 7,147,000N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development but requires additional field investigation to determine quantity and quality of possible borrow materials.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is across flat terrain.

SITE BD11-24(2)

REFERENCE: Site 227, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PENCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregates.

MATERIAL DESCRIPTION: Sand and gravel, medium grained (SW-GW); Maximum size great than 20 cm (8 in.); Low moisture content.

OVERBURDEN: Topsoil; 15 cm (6½ ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 10,000,000 cu.m (15,000,000 cu.yd.)
 Probable 20,000,000 cu.m (25,000,000 cu.yd.)
 Possible 25,000,000 cu.m (35,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Surficial waste materials should not drain into natural water courses. A vegetation buffer zone between the excavation and the natural water courses should be maintained.

SITE DESCRIPTION: Large glaciofluvial outwash plain located immediately adjacent to the south bank of Little Smith Creek.

Vegetation: dense growths of spruce and birch to 12 m (40 ft.) high.

Drainage: good to north and west.

Thickness: 7 m (23 ft.)
Area: 4,000,000 sq.m (43,000,000 sq.ft.)
Perimeter: 7,500 m (25,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 417,300E 7,146,500N

SITE INVESTIGATION: 8 drill holes.

ASSESSMENT: Suitable for development. Material suitable for quality granular fill in the pit run condition. The coarse grained gravels may be used in the production of concrete, base and surface course aggregate..

SITE BD11-24(2)

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across flat terrain.

SITE BD11-25(2)

REFERENCE: Site 228, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Sand and gravel, medium grained (SW-GW); Maximum size greater than 20 cm (8 in.); Low moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 180 cm (6 ft.)+

RESERVES: Proven 3,000,000 cu.m (4,000,000 cu.yd.)
Probable 6,000,000 cu.m (8,000,000 cu.yd.)
Possible 20,000,000 cu.m (24,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Surficial waste material should not drain into the active stream channels. A vegetation buffer zone should be maintained between the excavation and adjacent water courses.

SITE DESCRIPTION: Large glaciofluvial outwash plain located adjacent to the southeast bank of Little Smith Creek.

Vegetation: dense growths of spruce and birch to 12 m (40 ft.) high.

Drainage: good to adjacent streams.

Thickness: 9 m (30 ft.)
Area: 2,100,000 sq.m (22,000,000 sq.ft.)
Perimeter: 11,000 m (36,000 ft.)

Map Reference: NTS 96C Fort Norman

UTM Reference: Zone 10; 417,300E 7,146,500N

SITE INVESTIGATION: 7 drill holes, 1 test pit.

ASSESSMENT: Suitable for development as a source of quality granular material in the pit run condition. The production of higher quality aggregates will require screening, crushing and washing. Additional laboratory tests to evaluate specific properties

SITE BD11-25(2)

of the granular materials will be required, if the material is to be considered for the production of concrete aggregate.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across flat terrain.

SITE BD11-26(2)

REFERENCE: Site 224, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fills, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel and sand, high variable gradation, trace silt (GW-SW);
Maximum size greater than 20 cm (8 in.);
Low to medium moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.) to 45 cm ($1\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 80,000 cu.m (100,000 cu.yd.)
Probable 1,500,000 cu.m (2,000,000 cu.yd.)
Possible 6,500,000 cu.m (9,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Surficial waste materials should not drain into natural water courses. Heavier ripping equipment may be required if higher ground ice contents are encountered at depth.

SITE DESCRIPTION: Partially eroded kame-esker complex on the western slopes of the McConnell Range, located approximately 9 km ($5\frac{1}{2}$ mi.) south of Little Smith Creek.

Vegetation: spruce and tamarack with interspersed sparse growths of birch and poplar.

Drainage: good to the west.

Thickness: 15 m (50 ft.)
Area: 890,000 sq.m (9,500,000 sq.ft.)
Perimeter: 15,000 m (49,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 427,000E 7,144,800N

SITE INVESTIGATION: 6 drill holes.

ASSESSMENT: Suitable for development as a source of quality fill in the pit run condition. Pockets and

SITE BD11-26(2)

shallow layers of better quality gravels may be selectively recovered for production of various construction aggregates. The better quality granular materials are located in the large prominent esker ridge which is located along the southern perimeter of the area.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter although the surrounding terrain is of low thermal sensitivity. Access may involve the crossing of several deeply incised stream channels.

SITE BD11-27(4)

REFERENCE:

Site 229, Wrigley to Fort Norman; Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY:

Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION:

Silt and sand, gravel bars (ML-SM,GW).

SITE DESCRIPTION:

The downstream segment of the alluvial flood plain of the Keele River, located on the west side of the Mackenzie River.

Drainage: into the stream channel.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 412,000E 7,143,500N

SITE INVESTIGATION:

None.

ASSESSMENT:

Not suitable for development because granular materials are located within the upstream segment of an active water course and access to the pipeline route is very difficult.

SITE BD11-28(R1)

REFERENCE: Site 221X, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for the manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Limestone.

OVERBURDEN: Peat and topsoil and silt; 180 cm (6 ft.) to 240 cm (8 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting.

SITE DESCRIPTION: Narrow bedrock ridge overlain by a layer of fluvial silt, located approximately 3 km (2 mi.) south of Little Smith Creek.

Vegetation: light to moderate growths of spruce to 9 m (30 ft.) high.

Drainage: good to the southwest and northeast.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 416,800E 7,140,000N

SITE INVESTIGATION: 3 drill holes.

ASSESSMENT: Not suitable for development because of significant depth of silt overburden with high ice content.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor.

SITE BD11-29(4)

REFERENCE: Site 219, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 700,000 cu.m (950,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: A series of small, partly interconnected kame ridges located on the western slopes adjacent to the toe of the McConnell Range and approximately 5 km (3 mi.) north of Saline River.

Vegetation: spruce interspersed with poplar stands.

Drainage: good to the southwest.

Thickness: 6 m (20 ft.)
Area: 230,000 sq.m (2,500,000 sq.ft.)
Perimeter: 8,500 m (28,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 425,300E 7,139,000N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development, although comparatively large degree of surficial area will be cleared relative to the volume of recoverable material.

The source is located near the center of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain.

SITE BD11-30(NG)

REFERENCE: Site 223, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG; Non-granular material not suitable for construction purposes.

MATERIAL DESCRIPTION: Sand, silty (SM).

SITE DESCRIPTION: A large alluvial terrace which parallels the west bank of the Mackenzie River, located immediately south of the mouth of the Keele River.

Vegetation: moderately dense growths of spruce, poplar and birch.

Drainage: fair to good to the east..

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 413,500E 7,139,200N

SITE INVESTIGATION: None.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD11-31(R1)

REFERENCE: Site 220, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Limestone.

OVERBURDEN: Topsoil and till; 0 to 3 m (10 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. The best quarry location is adjacent to the eastern escarpment where overburden is relatively shallow. Selective excavation can be anticipated. Rip and doze weathered, friable surficial bedrock. Blast and crush competent limestone at depth. Staged development of quarry operations should be considered to allow summer thawing of frozen bedrock in order to minimize the effort required for the removal of limestone bedrock material.

SITE DESCRIPTION: Prominent bedrock ridge located approximately 5 km (3 mi.) north of Saline River.

Vegetation: moderately dense growths of spruce and birch.

Drainage: good to the west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 423,000E 7,135,200N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: Suitable for development because various categories of construction aggregates can be manufactured from the bedrock formation if quarry operations are initiated. The weathered and friable surficial bedrock is suitable for general fill requirements in the pit run condition.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor.

SITE BD11-31(R1)

Access is by truck in the winter over flat
to gently rolling terrain.

SITE BD11-32(R1)

REFERENCE: Site 218, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing various construction aggregates.

MATERIAL DESCRIPTION: Dolomite.

OVERBURDEN: Slope wash and glacial shift; shallow

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Strip overburden. Quarry and blasting. Height of quarry high wall may be in excess of 15 m (50 ft.)

SITE DESCRIPTION: Three narrow elongated bedrock ridges paralleling a major hill, located approximately 5.5 km (3.5 mi.) north of Saline River.

Vegetation: good stands of spruce, poplar and birch.

Drainage: good to west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 424,600E 7,136,500N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development. Since the depth of competent rock is not known, the possibility of producing better quality construction aggregates would be subject to further investigation.

The source is located inside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain.

SITE BD11-33(3)

REFERENCE: Deposit (b), Area XVI DIAND Granular Resource Inventory; Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 7,500,000 cu.m (10,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial channel complex adjacent to the Saline River, located approximately 13 km (9 mi.) upstream from its confluence with the Mackenzie River.

Thickness: 6 m (20 ft.)
Area: 1,800,000 sq m (20,000,000 sq ft.)
Perimeter: 7,300 m (24,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 440,000E 7,137,000N

ASSESSMENT: Suitable for development.

The source is located near the center of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to irregular terrain exhibiting slight thermokarst features.

SITE BD11-34(3)

REFERENCE: Deposit (b), Area XVI DIAND Granular Resource Inventory; Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 7,500,000 cu.m (10,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial channel complex adjacent to both sides of the Saline River approximately 13 km (8 mi.) upstream from its confluence with the Mackenzie River.

Thickness: 6 m (20 ft.)
Area: 1,800,000 sq m (20,000,000 sq ft.)
Perimeter: 26,000 m (86,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 443,500E 7,135,500N

ASSESSMENT: Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain.

SITE BD11-35(3)

REFERENCE: Site 212, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 6,000,000 cu.m (8,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: A series of kame fields and individual kame mounds located immediately south of the Saline River on the western slopes adjacent to the McConnell Range.

Vegetation: relatively dense growths of spruce and poplar.

Drainage: good.

Thickness: 4.5 m (15 ft.)
Area: 1,500,000 sq.m (16,000,000 sq.ft.)
Perimeter: 13,000 m (44,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 435,000E 7,134,100N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development. Isolated pockets of better quality material may exist which would be difficult for selective exploitation.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across irregular terrain and deeply incised stream channels.

SITE BD11-36(3)

REFERENCE: Site 214, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand, gravel pockets (SM-GM).

OVERBURDEN: Topsoil and silt.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Not applicable.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Not applicable.

SITE DESCRIPTION: Alluvial plain of the Saline River including several shallow terraces bordering the stream, located on the east side of the Mackenzie River.

Vegetation: dense spruce on terraces.

Drainage: good into adjacent river.

Thickness: 1.5 m (5 ft.)
Area: 740,000 sq.m (7,900,000 sq.ft.)
Perimeter: 15,000 m (48,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 428,600E 7,131,000N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for development since the granular material is located within or immediately adjacent to the stream channel of the Saline River.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor.

SITE BD11-37(4)

REFERENCE: Site 217, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I, DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Alluvial fan located approximately 4 km (2.5 mi.) northwest of Saline River and immediately adjacent to the east bank of the Mackenzie River.

Vegetation: well developed stands of black spruce.

Drainage: good to south.

Thickness: 4.5 m (15 ft.)

Area: 530,000 sq.m (5,700,000 sq.ft.)

Perimeter: 3,400 m (11,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 423,200E 7,132,900N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development. Environmental implications relative to the stream channel crossing the southern sector of the site and the vicinity of the Mackenzie River channel should be taken into consideration if this site is to be developed.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain or along the Mackenzie River. Barging along the Mackenzie River is possible during the summer.

SITE BD11-38(NG)

REFERENCE: Site 215X, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for construction purposes.

MATERIAL DESCRIPTION: Silt and sand, some clay, fine grained (SM-ML).

SITE DESCRIPTION: A very small remnant of a glaciofluvial terrace located immediately adjacent to the north bank of the Saline River.

Vegetation: dense growths of spruce to heights in excess of 6 m (20 ft.).

Drainage: good to south and west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 428,000E 7,131,200N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD11-39(4)

REFERENCE: Site 222, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, silty (SM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 5,000,000 cu.m (6,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: An alluvial terrace paralleling the west bank of the Mackenzie River, located approximately 9 km (6 mi.) north of Redstone River.

Vegetation: moderately dense spruce with poplar and birch.

Drainage: fair to good to the northeast.

Thickness: 6 m (20 ft.)

Area: 780,000 sq.m (8,400,000 sq.ft.)

Perimeter: 7,100 m (23,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 415,200E 7,134,000N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development as a very marginal fill.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline on the opposite bank of the Mackenzie River, is by truck in the winter across the locally poorly drained, thermokarst terrain. In the summer a barging operation is possible but stockpiling may be required because of seasonal access.

SITE BD11-40(3)

REFERENCE: Area X, DIAND Granular Resource Inventory;
Fort Norman NTS 96C, Geological Survey of
Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Gravel and silt.

RESERVES: Possible 55,000,000 cu.m (75,000,000 cu.yd.)

SITE DESCRIPTION: Fluvial deposit consisting of a section of the
modern floodplain and the adjacent low terraces
of the Kelly River.

Thickness: 4.5 m (15 ft.)
Area: 20,000,000 sq m (220,000,000 sq ft.)
Perimeter: 30,000 m (100,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 410,000E 7,130,000N

ASSESSMENT: Not suitable for development because the available
granular materials are located within or immediat-
ely adjacent to the active stream channel of the
Kelly River.

The source is located outside the 28 km (17.5 mi.)
pipeline corridor. Access is by truck in the
winter across flat, slightly thermokarst terrain.
Access also includes crossing the Mackenzie
River either by barge in the summer or by truck
in the winter. A barging operation may require
stockpiling because of seasonal land access.

SITE BD11-41(3)

REFERENCE: Site 213, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand, fine to medium grained, little gravel variable silt content (SW-GM); Maximum size to 2.5 cm (1 in.); Medium to high moisture content.

OVERBURDEN: Topsoil; 30 cm (1 ft.)+

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 550,000 cu.m (700,000 cu.yd.)
Probable 5,500,000 cu.m (7,000,000 cu.yd.)
Possible 15,000,000 cu.m (25,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Excavation should commence from northwestern extremities of the site because of better quality materials indicated within that section. Surficial waste materials should not be allowed to drain directly into active water courses. A vegetative buffer zone of adequate breadth should be maintained between final limits of excavation and the Saline River.

SITE DESCRIPTION: Large glaciofluvial plain located immediately adjacent to the south bank of the Saline River.

Vegetation: moderate growths of spruce to 9 m (30 ft.) high.

Drainage: good into adjacent river.

Thickness: 5 m (16 ft.)
Area: 3,600,000 sq.m (38,000,000 sq.ft.)
Perimeter: 8,200 m (27,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 430,000E 7,130,000N

SITE INVESTIGATION: 6 drill holes.

ASSESSMENT: Suitable for development.

SITE BD11-41(3)

The source is located within the 28 km (17.5 mi.) pipeline corridor. Existing winter access is along seismic cutlines from the CNT pole line. Access to the pipeline is by truck in the winter across flat terrain.

SITE BD11-42(4)

REFERENCE: Site 211, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 2,000,000 cu.m (2,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Two small and shallow segments of glaciofluvial outwash deposits located at the eastern margin of the Mackenzie Plain and approximately 4 km (2½ mi.) southeast of Saline River.

Vegetation: well developed stands of spruce and poplar.

Drainage: fair to the west.

Thickness: 6 m (20 ft.)
Area: 270,000 sq.m (2,900,000 sq.ft.)
Perimeter: 5,000 m (17,000 ft.)

Map Reference: NTS 96C, Fcrt Norman

UTM Reference: Zone 10; 432,500E 7,127,500N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development as a source of marginal fill. Better quality materials may occur in isolated pockets which would be difficult for selective excavation.

The source is located inside the 28 km (17.5 mi.) pipeline corridor. Access is across irregular terrain and deeply incised stream channels.

SITE BD11-43(4)

REFERENCE: Site 205, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, silty, gravelly (SM-SW).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 600,000 cu.m (800,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: A series of interconnected and partially segmented small kame hillocks located approximately 11 km (7 mi.) south of the Saline River on slopes forming the western toe of the McConnell Range.

Vegetation: well developed stand of spruce and poplar.

Drainage: fair to southwest.

Thickness: 6 m (20 ft.)
Area: 190,000 sq.m (2,100,000 sq.ft.)
Perimeter: 6,900 m (15,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 437,700E 7,125,600N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development. Better quality materials may occur in isolated pockets which would be difficult for selective excavation.

The source is located with the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain and deeply incised stream channels.

SITE BD11-44(4)

REFERENCE: Site 204, Wrigley to Fort Norman Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM); Medium to high ice content.

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 3,500,000 cu.m (4,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: One large and a series of minor kame fields located immediately north of Steep Creek and approximately 14 km (9 mi.) south of Saline River on the slopes paralleling the western toe of the McConnell Range.

Vegetation: relatively dense growths of spruce and poplar.

Drainage: good to south and west.

Thickness: 6 m (20 ft.)

Area: 120,000 sq.m (12,000,000 sq.ft.)

Perimeter: 15,000 m (50,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 441,800E 7,121,900N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development as a source of marginal fill. Better quality materials may occur in isolated pockets which would be difficult for selective excavation.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across deeply incised stream channels surrounding the site.

SITE BD11-45(R1)

REFERENCE: Site 206, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Dolomite with minor shale inclusions.

OVERBURDEN: Glacial drift and slope wash.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting.

SITE DESCRIPTION: A series of narrow bedrock ridges with dolomite exposures located approximately 5 km (3 mi.) north of Steep Creek and 11 km (7 mi.) south of Saline Creek.

Vegetation: moderate to dense growths of spruce and irregular stands of birch and poplar.

Drainage: good to the west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 434,000E 7,124,200N

SITE INVESTIGATION: None.

ASSESSMENT: Suitable for development as a source of general fill. Aggregates for base and surface courses can probably be produced by crushing and screening of fresh limestone.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over slight thermokarstic terrain.

SITE BD11-46(4)

REFERENCE: Site 210, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand, silty (SM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 35,000,000 cu.m (50,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Alluvial terraces paralleling the west side of the Mackenzie River, located approximately 10 km (6 mi.) south of Redstone River.

Vegetation: moderately dense growth of willows, spruce and occasional birch.

Drainage: fair to west and east.

Thickness: 6 m (20 ft.)
Area: 6,100,000 sq.m (65,000,000 sq.ft.)
Perimeter: 19,000 m (62,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 428,500E 7,118,500N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat poorly drained terrain and requires the crossing of the Mackenzie River.

SITE BD11-47(3)

REFERENCE: Deposit (a), Area VIII DIAND Granular Resource Inventory; Blackwater Lake NTS 96B, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 20,000,000 cu.m (25,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial deposit in the McConnell Range, located approximately 35 km (22 mi.) northeast of the confluence of the Blackwater and Mackenzie Rivers.

Thickness: 7.5 m (25 ft.)
Area: 2,900,000 sq m (31,000,000 sq ft.)
Perimeter: 7,300 m (24,000 ft.)

Map Reference: NTS 96B, Blackwater Lake

UTM Reference: Zone 10; 460,000E 7,122,000N

ASSESSMENT: May be suitable for development but access is extremely difficult.

The source is located adjacent to the eastern boundary of the 28km (17.5 mi.) pipeline corridor. Access is by truck in the winter across the rugged and irregular terrain of the McConnell Range.

SITE BD11-48(NG)

REFERENCE: Site 207X, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material not suitable for construction purposes.

MATERIAL DESCRIPTION: Glacial till, silt matrix, few pebbles (ML-CL).

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)

SITE DESCRIPTION: A partially eroded and rounded knoll of glacial till location immediately adjacent to the north bank of Steep Creek.

Vegetation: moderate to dense growths of spruce, poplar and birch to 9 m (30 ft.) high.

Drainage: good to west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 435,000E 7,120,000N

SITE DESCRIPTION: 3 drill holes.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD11-49(3)

REFERENCE: Site 203, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM); Medium to high ice content.

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 2,500,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: A series of relatively small kame fields and individual kame hillocks located approximately 29 km (18 mi.) north of Blackwater River and 19 km (12 mi.) south of Saline River in the western slopes adjacent to the McConnell Range.

Vegetation: relatively dense spruce and poplar.

Drainage: good.

Thickness: 6 m (20 ft.)
Area: 760,000 sq.m (8,200,000 sq.ft.)
Perimeter: 7,800 m (26,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 444,500E 7,118,500N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development as a source of general fill. Better quality materials may occur in isolated pockets which would be difficult for selective excavation.

The source lies near the center of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter and is extremely difficult because of deeply incised erosional gullies surrounding the site area.

SITE BD11-50(3)

REFERENCE: Site 208X, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, variable gradation and silt content (SM-GM);
Maximum size greater than 7.8 cm (3 in.).

OVERBURDEN: Silt and peat; 0 to 2 m (6½ ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 800,000 cu.m (100,000 cu.yd.)
Probable 2,000,000 cu.m (2,500,000 cu.yd.)
Possible 7,500,000 cu.m (10,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Only dry bars and other areas removed from the stream channel should be developed. Exploitation of borrow areas should be geographically flexible within the site in order to allow for periodic shifting of the stream channel. Excavation should not occur more than 60 cm (2 ft.) to 90 cm (3 ft.) below the ground water table. In such cases, wet material should remain isolated from the active stream channel. Buffer zones and settling ponds should be maintained to separate working areas from the active stream channel.

SITE DESCRIPTION: Sand and gravel bars within the active stream channel of the downstream portion of Steep Creek.

Vegetation: small shrubs.

Drainage: fair to north and west.

Thickness: 4.5 m (15 ft.)
Area: 950,000 sq.m (10,000,000 sq.ft.)
Perimeter: 9,100 m (30,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 433,900E 7,118,500N

SITE INVESTIGATION: 4 drill holes.

SITE BD11-50(3)

ASSESSMENT:

Not suitable for development because the granular material deposits are located within the active stream channel of Steep Creek.

The source is located adjacent to the western boundary of the 28 km (17.5 mi.) pipeline corridor. Existing access is along the CNT pole by truck. Access to the pipeline is by truck in the winter across flat terrain.

SITE BD11-51(R1)

REFERENCE: Site 199, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Limestone, fractured and massive.

OVERBURDEN: Drift and screes.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. The northernmost exposures would be most suitable with respect to the heights of a quarry highwall.

SITE DESCRIPTION: Northern tip of a western flank of McConnell Range located between the Soline and Blackwater Rivers.

Drainage: good to west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 438,000E 7,115,500N

SITE INVESTIGATION: None.

ASSESSMENT: Suitable for development. Good quality general fill can be obtained from fractured and surficial bedrock zones. Aggregates for surface courses can be produced by screening and crushing of fresh and massive limestone.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain.

SITE BD11-52(4)

REFERENCE: Site 202, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel; silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 4,000,000 cu.m (5,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: A large series of kame hillocks located at the toe of the western flank of the McConnell Range and approximately 29 km (18 mi.) north of Blackwater River.

Vegetation: well developed stands of spruce and poplar.

Drainage: fair to northwest.

Thickness: 6 m (20 ft.)
Area: 1,300,000 sq.m (14,000,000 sq.ft.)
Perimeter: 22,000 m (93,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 446,500E 7,117,100N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development as a source of marginal fill. Better quality materials may occur in isolated pockets which would be difficult for selective exploitation.

The source is located near the center of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over flat to gently rolling terrain and across numerous erosional gullies.

SITE BD11-53(3)

REFERENCE: Deposit (a), Area VIII DIAND Granular Resource Inventory; Blackwater Lake NTS 96B, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 75,000,000 cu.m (100,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial deposit in the McConnell Range located approximately 32 km (20 mi.) northeast of the confluence of the Blackwater and Mackenzie Rivers.

Thickness: 7.5 m (25 ft.)
Area: 15,000,000 sq m (160,000,000 sq ft.)
Perimeter: 35,000 m (115,000 ft.)

Map Reference: NTS 96B, Blackwater Lake

UTM Reference: Zone 10; 466,000E 7,114,000N

ASSESSMENT: May be suitable for development but access is extremely difficult.

The source is located adjacent to the eastern border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across the rugged and irregular terrain of the McConnell Range.

SITE BD11-54(3)

REFERENCE: Deposit (c), Area VIII DIAND Granular Resource Inventory; Blackwater Lake NTS 96B, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 4,500,000 cu.m (5,500,000 cu.yd.)

SITE DESCRIPTION: Fluvial deposit along an unnamed stream in the McConnell Range, located approximately 35 km (22 mi.) east of the Mackenzie River.

Thickness: 3.5 m (10 ft.)
Area: 4,600,000 sq m (49,000,000 sq ft.)
Perimeter: 29,000 m (94,000 ft.)

Map Reference: NTS 96B, Blackwater River

UTM Reference: Zone 10; 465,000E 7,113,000N

ASSESSMENT: May be suitable for development but access is extremely difficult.

The source is located adjacent to the eastern border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck across the rugged and irregular terrain of the McConnell Range.

SITE BD11-55(4)

REFERENCE: Site 209, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PIMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for very marginal fill.

MATERIAL DESCRIPTION: Sand, fine grained, trace silt (SP); Low moisture content.

OVERBURDEN: Topsoil; 15 cm (6 in.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 30,000 cu.m (40,000 cu.yd.)
 Probable 3,000,000 cu.m (4,000,000 cu.yd.)
 Possible 6,500,000 cu.m (8,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Vegetation buffer zones should be maintained between work areas and adjacent courses; vertical excavation should be considered.

SITE DESCRIPTION: A deltaic deposit within a glaciolacustrine plain located approximately 2½ km (1½ mi.) south of Steep Creek.

Vegetation: moderately dense growths of spruce and birch with the occasional pine.

Drainage: fair to the north and west.

Thickness: 6 m (20 ft.)
Area: 1,100,000 sq.m (12,000,000 sq.ft.)
Perimeter: 4,800 m (16,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 434,000E 7,144,800N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: May be suitable for development although material is of very poor quality.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain.

SITE BD11-56(4)

REFERENCE: Site 201, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM);

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: A series of small, partly interconnected kame hillocks located on the western slopes adjacent to the toe of the McConnell Range approximately 24 km (15 mi.) north of Blackwater River.

Vegetation: well developed stands of spruce and poplar.

Drainage: fair to the west.

Thickness: 6 m (20 ft.)

Area: 330,000 sq.m (3,500,000 sq.ft.)

Perimeter: 6,900 m (23,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 440,000E 7,114,600N

SITE INVESTIGATION: None.

ASSESSMENT: Suitable for development as a source of marginal fill. Better quality materials may occur in isolated pockets which would require selective exploitation.

The source is located near the center of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over flat to gently rolling terrain and across numerous erosional gullies.

SITE BD11-57(3)

REFERENCE: Area X DIAND Granular Resource Inventory Fort Norman NTS 96C, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and silt

RESERVES: Possible 85,000,000 cu.m (110,000,000 cu.yd.)

SITE DESCRIPTION: Fluvial deposit consisting of the modern flood plain of the Redstone River and the adjacent low terraces.

Thickness: 4.5 m (15 ft.)
Area: 31,000,000 sq m (340,000,000 sq ft.)
Perimeter: 76,000 m (250,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 420,000E 7,120,000N

ASSESSMENT: Not suitable for development because the available granular materials are located within or immediately adjacent to the active stream channel of the Redstone River.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access includes crossing the Mackenzie River either by truck in the winter or by barge in the summer. A barging operation may require stockpiling because of seasonal land access.

SITE BD11-58(4)

REFERENCE: Site 200. Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 250,000 cu.m (350,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Shallow esker-kame ridge located on the western flank adjacent to the McConnell Range approximately 22 km (14 mi.) north of Blackwater River.

Vegetation: spruce and poplar.

Drainage: fair to southwest.

Thickness: 6 m (20 ft.)

Area: 95,000 sq.m (1,000,000 sq.ft.)

Perimeter: 2,700 m (9,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 445,100E 7,111,300N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development.

The source is located near the center of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over flat to gently rolling terrain and numerous erosional gullies.

SITE BD11-59(NG)

REFERENCE: Site 198X, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for construction purposes.

MATERIAL DESCRIPTION: Silt and sand, limestone fragments, fine grained (ML);
High moisture content.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

SITE DESCRIPTION: Slopewash material intermixed with glaciolacustrine silts along the western slopes of the McConnell Range, located approximately 7 km (4½ mi.) south of Steep Creek.

Vegetation: dense growths of spruce and birch to 9 m (30 ft.) high.

Drainage: good to west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 437,000E 7,110,000N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD11-60(3)

REFERENCE: Deposit (b), Area VIII DIAND Granular Resource Inventory; Blackwater Lake NTS 96B, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 4,000,000 cu.m (5,000,000 cu.yd.)

SITE DESCRIPTION: Channelled glaciofluvial deposit within the McConnell Range, located approximately 37 km (23 mi.) ENE of the confluence of the Blackwater and the Mackenzie Rivers.

Thickness: 4.5 m (15 ft.)
Area: 1,000,000 sq m (11,000,000 sq ft.)
Perimeter: 8,900 m (29,000 ft.)

Map Reference: NTS 96B, Blackwater Lake

UTM Reference: Zone 10; 475,000E 7,110,000N

ASSESSMENT: May be suitable for development but access is extremely difficult.

The source is located adjacent to the eastern border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across the rugged and irregular terrain of the McConnell Range or around the McConnell Range across sloping, thermokarst terrain.

SITE BD11-61(3)

REFERENCE: Deposit (a), Area VIII DIAND Granular Resource Inventory; Blackwater Lake NTS 96B, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 35,000,000 cu.m (45,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial deposit in the McConnell Range, Located approximately 29 km (18 mi.) ENE of the confluence of the Blackwater and Mackenzie Rivers.

Thickness: 7.5 m (25 ft.)
Area: 5,800,000 sq m (62,000,000 sq ft.)
Perimeter: 15,000 m (50,000 ft.)

Map Reference: NTS 96B, Blackwater Lake

UTM Reference: Zone 10; 469,000E 7,105,000N

ASSESSMENT: May be suitable for development but access is extremely difficult.

The source is located adjacent to the eastern border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across the rugged and irregular terrain of the McConnell Range.

SITE BD11-62(4)

REFERENCE: Site 193, Wrigley to Fort Norman, Intercommunity Study Area, Book II, STAGE I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Silt and sand, little gravel (SM-ML).

OVERBURDEN: Topsoil

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Flat alluvial cones and a narrow belt of slope debris located approximately 10 km (6 mi.) north of Blackwater River at the western toe of the McConnell Range.

Vegetation: moderate to dense stands of spruce with interspersed birch and poplar.

Drainage: fair to west.

Thickness: 15 m (50 ft.)
Area: 1,600,000 sq.m (17,000,000 sq.ft.)
Perimeter: 11,000 m (35,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 444,000E 7,103,500N

SITE INVESTIGATION: None.

ASSESSMENT: Suitable for development although material is of very poor quality.

The source is located near the center of the 28 km (17.5 m.) pipeline corridor. Access is by truck in the winter across flat, poorly drained thermo-karst terrain.

SITE BD11-63(2)

REFERENCE: Site 197, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel and sand, varying size stratified (GW-SW);
Maximum size greater than 7.8 cm (3 in.);
High moisture content.

OVERBURDEN: Topsoil, clay and muskeg; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 8,000,000 cu.m (10,000,000 cu.yd.)
 Probable 15,000,000 cu.m (20,000,000 cu.yd.)
 Possible 25,000,000 cu.m (35,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. An adequate esthetic buffer zone between excavation and the proposed Mackenzie Highway right-of-ways be retained.

SITE DESCRIPTION: Large, longitudinal remnant of glaciofluvial plain located 11 km (7 mi.) north of Blackwater River.

Vegetation: dense growths of spruce, poplar and birch to 9 m (30 ft.) high. Adjacent terrain supports partially stunted growths of spruce, willow and tamarack.

Drainage: fair.

Thickness: 6 m (20 ft.)
Area: 4,300,000 sq.m (46,000,000 sq.ft.)
Perimeter: 16,000 m (54,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 434,500E 7,104,900N

SITE INVESTIGATION: 12 drill holes.

ASSESSMENT: Suitable for development. Selective excavation, additional screening, crushing and washing may

SITE BD11-63(2)

produce concrete aggregates.

Additional laboratory tests to evaluate specific properties of the granular materials will be required, if material is to be considered for the production of concrete aggregates.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, poorly drained, thermally sensitive terrain characterized by numerous lakes, ponds and bogs.

SITE BD11-64(2)

REFERENCE: Site 196, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel and sand, varying size, stratified (GW-SW);
Maximum size greater than 20 cm (8 in.);
Low moisture content.

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 2,500,000 cu.m (3,000,000 cu.yd.)
Probable 45,000,000 cu.m (60,000,000 cu.yd.)
Possible 90,000,000 cu.m (120,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Large, longitudinal remnant of a glaciofluvial plain located approximately 11 km (7 mi.) north of Blackwater River.

Vegetation: dense growths of spruce, birch and poplar; adjacent terrain supports partially stunted growths of spruce, tamarack and willow.

Drainage: fair.

Thickness: 7.5 m (25 ft.)
Area: 9,200,000 sq.m (130,000,000 sq.ft.)
Perimeter: 15,000 m (51,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 433,000E 7,103,000N

SITE INVESTIGATION: 7 drill holes.

ASSESSMENT: Suitable for development. Selective excavation, additional screening, crushing and washing may produce concrete aggregate. Additional laboratory tests to evaluate specific properties of the granular materials will be required, if material is to be considered for the production of concrete

SITE BD11-64(2)

aggregate.

The source is adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is across flat, poorly drained thermally sensitive terrain characterized by numerous lakes, ponds and bogs.

SITE BD11-65(2)

REFERENCE: Site 195, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fills, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel and sand, varying size, stratified (GW-SW);
Maximum size greater than 20 cm (8 in.);
Low moisture content.

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 3,000,000 cu.m (4,000,000 cu.yd.)
 Probable 20,000,000 cu.m (25,000,000 cu.yd.)
 Possible 55,000,000 cu.m (75,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Selective excavation may produce quality surface course and concrete aggregate material.

SITE DESCRIPTION: Large, longitudinal remnant of a glaciofluvial plain located approximately 11 km (7 mi.) north of Blackwater River.

Vegetation: dense growths of spruce, birch and poplar; adjacent terrain supports partially stunted growths of spruce, tamarack and willow.

Drainage: fair to adjacent terrain.

Thickness: 7.5 m (25 ft.)
Area: 7,400,000 sq.m (79,000,000 sq.ft.)
Perimeter: 20,000 m (65,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10, 434,000E 7,097,500N

SITE INVESTIGATION: 7 drill holes.

ASSESSMENT: Suitable for development as a source of quality surface course material and by selective excavation quality concrete aggregate may be produced by additionally screening, crushing and washing.

SITE BD11-65(2)

Additional laboratory tests to evaluate specific properties of the granular materials will be required, if material is to be considered for the production of concrete aggregate.

The source is adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is across flat, poorly drained thermally sensitive terrain characterized by numerous lakes, ponds and bogs.

SITE BD11-66(R1)

REFERENCE: Site 192, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing various construction aggregates.

MATERIAL DESCRIPTION: Limestone.

OVERBURDEN: Topsoil and drift.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. The southern ends of the ridges would be most suitable for a quarry location.

SITE DESCRIPTION: Shallow, longitudinal bedrock ridge located 6 km (4 mi.) north of Blackwater River at the western toe of the McConnell Range.

Vegetation: moderate to dense growths of spruce and irregular stands of birch and poplar.

Drainage: good to the west.

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 445,200E 7,100,000N

SITE INVESTIGATION: None.

ASSESSMENT: Suitable for development as a source of good quality general fill. Aggregates for surface course can be produced by crushing and screening of fresh limestone.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat poorly drained terrain.

SITE BD11-67(3)

REFERENCE: Site 194, Wrigley to Fort Norman, Intercommunity Study Area, Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and sand (GW-SW).

OVERBURDEN: Topsoil.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible 15,000,000 cu.m (20,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Large longitudinal segment of a glaciofluvial plain located 8 km (5 mi.) northwest of Blackwater River.

Vegetation: dense spruce, poplar and birch.

Drainage: fair to adjacent terrain.

Thickness: 6 m (20 ft.)

Area: 2,200,000 sq.m (24,000,000 sq.ft.)

Perimeter: 9,100 m (30,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 435,000E 7,098,000

SITE INVESTIGATION: None.

ASSESSMENT: Suitable for development.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across the slightly depressional, thermally sensitive terrain. Access is also possible along the adjacent Mackenzie River by barge in the summer and by truck in the winter.

SITE BD11-68(3)

REFERENCE: Deposit N44-N48, DIAND Granular Resource Inventory; Dahadinni River NTS 95N, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, sand and silt.

RESERVES: Possible 60,000,000 cu.m (80,000,000 cu.yd.)

SITE DESCRIPTION: Alluvial flood plain and adjacent low terraces of the Dahadinni River and its tributary.

Thickness: 12 m (40 ft.)
Area: 17,000,000 sq m (180,000,000 sq ft.)
Perimeter: 59,000 m (190,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 426,000E 7,093,000N

ASSESSMENT: Not suitable for development because all available granular materials are within or immediately adjacent to the active stream channel of the Dahadinni River and the source lies within a critical wildlife area.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over flat, thermokarst terrain. Access includes crossing the Mackenzie River either by truck in the winter or by barge in the summer. A barging operation may require stockpiling because of seasonal land access.

The source is located within the critical wintering range of the woodland caribou.

SITE BD11-69(3)

REFERENCE: Deposit N4a, DIAND Granular Resource Inventory; Dahadinni River NTS 95N, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and silt.

RESERVES: Possible 20,000,000 cu.m (25,000,000 cu.yd.)

SITE DESCRIPTION: Alluvial flood plain and adjacent low terraces of an unnamed river located on the west bank of the Mackenzie River opposite the confluence of the Blackwater River.

Thickness: 9 m (30 ft.)
Area: 3,800 sq m (41,000 sq ft.)
Perimeter: 30,000 m (99,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 440,000E 7,090,000N

ASSESSMENT: Not suitable for development because the available granular materials occur within or immediately adjacent to an active stream channel, the access to the source is difficult and the source lies within a critical wildlife area.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain, and involves crossing the river either by truck in the winter or by barge in the summer. A barging operation may require stockpiling because of seasonal land access.

The source lies within the critical wintering range of the woodland caribou.

SITE BD11-70(3)

REFERENCE: Site 187, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and sand, silty (GW-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 15,000,000 cu.m (20,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: High fluvial terrace located immediately opposite the mouth of the Blackwater River and paralleling the west bank of the Mackenzie River.

Vegetation: relatively dense growths of spruce.

Drainage: Good into adjacent river.

Thickness: 6 m (20 ft.)
Area: 2,800,000 sq.m (30,000,000 sq.ft.)
Perimeter: 8,800 m (29,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 440,800E 7,091,900N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development. The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by barge in the summer or possibly by truck in the winter, across the Mackenzie River. However, open water on the Mackenzie River was noted during the winter drilling program which may indicate that an ice bridge at this point will not be possible. Barging may require stockpiling because of seasonal land access.

SITE BD11-71(3)

REFERENCE: Site 188X, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, variable gradation and silt content, stratified (SM-GM); Maximum size greater than 20 cm (8 in.).

OVERBURDEN: Silt; 60 cm (2 ft.) to 270 cm (9 ft.)

DEPTH OF ACTIVE LAYER: Not Determined.

RESERVES: Proven 1,500,000 cu.m (2,000,000 cu.yd.)
 Probable 15,000,000 cu.m (20,000,000 cu.yd.)
 Possible 20,000,000 cu.m (25,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Only dry bars or other areas removed from the stream channel should be developed. Excavation should not occur more than 60 cm (2 ft.) to 90 cm (3 ft.) below the ground water table. In such cases, wet material should remain isolated from the active stream channel. Buffer zones and settling ponds should be established to separate the working area from the active stream channel.

SITE DESCRIPTION: Sand and gravel bars within the active stream channel of the downstream section of the Blackwater River.

Vegetation: sparse shrubs and grass on some gravel bars.

Drainage: into stream channel.

Thickness: 8 m (26 ft.)
Area: 5,100,000 sq.m (55,000,000 sq.ft.)
Perimeter: 13,000 m (42,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 444,300E 7,091,600N

SITE INVESTIGATION: 7 drill holes.

SITE BD11-71(3)

ASSESSMENT:

Not suitable for development because the granular material deposits are located within the active stream channel of the Blackwater River.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor.

SITE BD11-72(3)

REFERENCE: Site 189X, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, little silt, medium grained (GW);
Maximum size greater than 20 cm (8 in.);
Low moisture content.

OVERBURDEN: Topsoil, clay and silt; 30 cm (1 ft.) to 180 cm (6 ft.)

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)

RESERVES:	Proven	15,000 cu.m (20,000 cu.yd.)
	Probable	65,000 cu.m (90,000 cu.yd.)
	Possible	250,000 cu.m (350,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Erosional glacial till remnant overlain by fluvial gravels, located approximately 350 m (1,150 ft.) south of Blackwater River.

Vegetation: moderate to dense growths of spruce, birch and poplar.

Drainage: good.

Thickness: 4 m (13 ft.)

Area: 67,000 sq.m (720,000 sq.ft.)

Perimeter: 900 m (300 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 433,600E 7,090,900N

SITE INVESTIGATION: 3 drill holes.

ASSESSMENT: Suitable for development.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across irregular terrain locally with access to the top of the knoll being difficult. Access along the nearby

SITE BD11-72(3)

Mackenzie River is possible by truck in the winter and barge in the summer.

Other sites with extensive quantities of similar quality granular materials are available in the immediate vicinity of this deposit.

SITE BD11-73(2)

REFERENCE: Site 191, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Sand and gravel, varying gradation, stratified (SW-GW),
Maximum size greater than 7.8 (3 in.)

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 300,000 cu.m (400,000 cu.yd.)
 Probable 30,000,000 cu.m (40,000,000 cu.yd.)
 Possible 35,000,000 cu.m (50,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the Blackwater River and the final limits of the borrow area. Surficial waste materials should not drain directly into Blackwater River.

SITE DESCRIPTION: Large glaciofluvial plain locate on the northern crest line of the Blackwater River.

Vegetation: dense growths of spruce, poplar and birch to 9 m (30 ft.) high.

Drainage: fair to the south.

Thickness: 7.6 m (25 ft.)
Area: 4,800,000sq.m (52,000,000 sq.ft.)
Perimeter: 10,000 m (33,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 448,500E 7,090,800N

SITE INVESTIGATION: 1 bank exposure.

ASSESSMENT: Suitable for development. Selective excavation and additionally screening, crushing and washing may produce concrete aggregates. Additional laboratory tests to evaluate specific properties

SITE BD11-73(2)

of the granular materials will be required, if the material is to be considered for concrete aggregate.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access may involve crossing the Blackwater River. Access, in general, will be by truck in the winter across thermally sensitive terrain characterized by numerous lakes, ponds and bogs.

SITE BD11-74(2)

REFERENCE: Site 190, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel and sand, medium to coarse grained, stratified (GW-SW);
Maximum size greater than 20 cm (8 in.)
Low moisture content.

OVERBURDEN: Topsoil and silt; 30 cm (1 ft.) to 120 cm (4 ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 2,000,000 cu.m (3,000,000 cu.yd.)
Probable 15,000,000 cu.m (20,000,000 cu.yd.)
Possible 45,000,000 cu.m (35,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the Blackwater River and the final limits of the borrow pit areas. Surficial waste materials should not drain into the Blackwater River.

SITE DESCRIPTION: A partly eroded, glaciofluvial plain located adjacent to the south bank of the Blackwater River,

Vegetation: moderately dense growths of spruce, poplar and birch.

Drainage: good the east, west and north.

Thickness: 7.5 m (25 ft.)
Area: 4,300,000 sq.m (46,000,000 sq.ft.)
Perimeter: 11,000 m (37,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 445,500E 7,091,000N

SITE INVESTIGATION: 5 drill holes.

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing may produce concrete aggregates. Additional

SITE BD11-74(2)

laboratory tests to evaluate specific properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregates.

The source is located adjacent to the western boundary of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain and may require a crossing of the Blackwater River.

SITE BD11-75(3)

REFERENCE: Site 186, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and sand, silty (GW-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 10,000,000 cu.m (15,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: High fluvial terrace paralleling the western bank of the Mackenzie River, located about 2½ km (1½ mi.) south of Blackwater River.

Vegetation: relatively dense growths of spruce.

Drainage: good to the west and northeast.

Thickness: 6 m (20 ft.)

Area: 2,100,000 sq.m (23,000,000 sq.ft.)

Perimeter: 6,400 m (21,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 442,000E 7,088,800N

SITE INVESTIGATION: None.

ASSESSMENT: May be suitable for development as a source of general fill or possibly as a source of base and surface course aggregates depending upon the actual grain size distribution and silt content of the material.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by barge in the summer across the Mackenzie River. Stockpiling may be required because of seasonal land access. Access across the Mackenzie River by truck may not be possible as open water was observed in the river during the winter drilling program.

SITE BD11-76(3)

REFERENCE: Site 185, Wrigley to Fort Norman, Intercommunity Study Area Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, some sand, little silt and clay, medium grained (GW-GM);
Maximum size greater than 20 cm (8 in.);
Low moisture content.

OVERBURDEN: Silt and fine sand; 30 cm (1 ft.) to 300 cm (10 ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES:

Proven	250,000 cu.m (350,000 cu.yd.)
Probable	2,500,000 cu.m (3,500,000 cu.yd.)
Possible	8,500,000 cu.m (10,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the Mackenzie River and the final limits of the borrow pit area. Surficial waste materials should not drain directly into the active Mackenzie River channel.

SITE DESCRIPTION:

Alluvial terrace located approximately 5 km (3 mi.) south of Blackwater River.

Vegetation: light to moderate growths of spruce and birch.

Drainage: fair to the west and east.

Thickness: 3 m (10 ft.)

Area: 2,800 sq.m (30,000,000 sq.ft.)

Perimeter: 7,900 m (26,000 ft.)

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 446,000E 7,086,600N

SITE INVESTIGATION: 7 drill holes.

ASSESSMENT: Suitable for development. Quality surface course aggregates may be developed by selective excavation or concrete quality aggregates may be produced by screening, crushing and washing.

SITE BD11-76(3)

Additional laboratory tests to evaluate specific properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregates.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat and partially thermokarst terrain. Access along the adjacent Mackenzie River is possible by barge in the summer.

SITE BD11-77(3)

REFERENCE: Site 216, Wrigley to Fort Norman, Intercommunity Study Area Book II, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Silt and sand, gravel bars (ML-SM, SM-GW).

OVERBURDEN: Topsoil and silt.

DEPTH OF ACTIVE LAYER:

RESERVES: Possible 20,000,000+ cu.m (25,000,000+ cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Not applicable.

SITE DESCRIPTION: The downstream segment of the alluvial flood plain of the Redstone River, which consists of low terraces bordering the braided active stream channel and is located on the west side of the Mackenzie River.

Drainage: fair into adjacent stream channel.

Thickness: 1.5 m (5 ft.)

Area: 13,000,000 sq.m (140,000,000 sq.ft.)

Perimeter: 20,000 m (66,000 ft.)

Map Reference: NTS 96C, Fort Norman

UTM Reference: Zone 10; 424,000E 7,130,000N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for development since the granular material is located within an active water course.

The source is located outside the 28 km (17.5 mi.) pipeline corridor.

SITE BD12-01(2)

REFERENCE: Deposit (0-47), Area II, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel, some sand.

RESERVES: Possible 35,000,000 cu.m (45,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial ridge and hummocky deposit located in the McConnell Range, approximately 10 km (6 mi.) NNW of the western tip of Blackwater Lake.

Thickness: 15 m (50 ft.)
Area: 3,000,000 sq.m (33,000,000 sq.ft.)
Perimeter: 3,000 m (10,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 479,000E 7,996,000N

ASSESSMENT: May be suitable for development but access is extremely difficult.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck across the extremely rugged and irregular terrain of the McConnell Range.

SITE BD12-02(2)

REFERENCE:

Deposit (0-46), Area II, DIAND Granular Resource Inventory, Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY:

Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION:

Gravel.

RESERVES: Possible

3,000,000 cu.m (4,000,000 cu.yd.)

SITE DESCRIPTION:

Glaciofluvial outwash plain deposit located approximately 3 km (2 mi.) north of the western tip of Blackwater Lake.

Thickness: 15 m (50 ft.)

Area: 490,000 sq.m (5,000,000 sq.ft.)

Perimeter: 4,100 m (14,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 485,000E 7,093,000N

ASSESSMENT:

Suitable for development.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across steep to gently rolling terrain along the Blackwater River Valley.

SITE BD12-03(3)

REFERENCE: Deposit (0-160), Area II, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and sand.

RESERVES: Possible 75,000 cu.m (100,000 cu.yd.)

SITE DESCRIPTION: Till ridge located immediately north of the western tip of Blackwater Lake.

Thickness: 2.5 m (8 ft.)
Perimeter: 12,000 m (39,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 483,000E 7,090,000N

ASSESSMENT: Suitable for development.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over steep to gently sloping terrain along the Blackwater River Valley.

SITE BD12-04(3)

REFERENCE: Deposit (0-49), Area I; DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 10,000,000 cu.m (15,000,000 cu.yd.)

SITE DESCRIPTION: Alluvial flood plain of the Blackwater River.

Thickness: 2.5 m (8 ft.)
Area: 40,000,000 sq.m (430,000,000 sq.ft.)
Perimeter: 96,000,000 m (315,000,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 470,000E 7,086,000N

ASSESSMENT: Only the alluvial terraces above high water mark are suitable for development. The remainder of the source is not suitable for development because the available granular materials are located within the active stream channel of the Blackwater River.

The source is located almost entirely within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over flat to rolling, thermokarst terrain adjacent to the downstream section of the flood plain. Access from the upstream portion is by truck in the winter along the Blackwater River valley which cuts through the very rugged McConnell Range.

SITE BD12-05(R1)

REFERENCE: Site 182, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing various construction aggregates.

MATERIAL DESCRIPTION: Limestone and dolomite.

OVERBURDEN: Glacial moraine sediments.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. The steep rock walls forming the western side of the ridge will be suitable for a quarry location.

SITE DESCRIPTION: A longitudinal bedrock ridge located less than 10 km (6 mi.) southeast of the Blackwater River.

Vegetation: moderate to dense growths of spruce and irregular stands of birch and poplar.

Drainage: good to the west.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 453,500E 7,083,200N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development as a source of good quality general fill from the surficial bedrock zone and as a source of aggregates for base and surface course by crushing and screening the fresh limestone.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over irregular and rugged terrain on the west and flat to gently rolling terrain, exhibiting light thermokarst features, to the east.

SITE BD12-06(3)

REFERENCE: Deposit (0-50), Area II, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 4,000,000 cu.m (5,000,000 cu.yd.)

SITE DESCRIPTION: Alluvial fan along the western flank of the McConnell Range, located approximately 3 km (2 mi.) south of Blackwater River.

Thickness: 7.5 m (25 ft.)

Area: 1,000,000 sq.m (11,000,000 sq.ft.)

Perimeter: 3,000 m (10,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 465,500E 6,083,000N

ASSESSMENT: Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across locally rugged terrain and flat to rolling, thermokarst terrain to the north and west.

SITE BD12-07(R1)

REFERENCE: Site 181, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PELCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing various construction aggregates.

MATERIAL DESCRIPTION: Limestone and dolomite with minor shale inclusions.

OVERBURDEN: Glaciolacustrine sediments.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting.

SITE DESCRIPTION: A series of longitudinal bedrock ridges located approximately 60 km (6 mi.) southwest of Blackwater River.

Vegetation: moderate to dense growths of spruce and irregular stands of birch and poplar.

Drainage: good to the west.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 453,000E 7,081,000N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development as a source of good quality general fill obtained from the surficial bedrock layer and as a source of aggregates for base and surface course by crushing and screening the fresh limestone at depth.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter over irregular and rugged terrain to the east or across flat terrain, exhibiting light thermokarst features, to the east.

SITE BD12-08(3)

REFERENCES: Site 184, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, some sand, little silt and clay, coarse grained (GW-GM);
Low moisture content;
Maximum size greater than 20 cm (8 in.).

OVERBURDEN: Peat and silt; 0 to 150 cm (5ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 1,500,000 cu.m (2,000,000 cu.yd.)
Probable 3,000,000 cu.m (4,000,000 cu.yd.)
Possible 9,000,000 cu.m (11,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the Mackenzie River and the final limits of the excavation. Surficial waste materials should not drain into the active Mackenzie River channel.

SITE DESCRIPTION: Small alluvial terrace located approximately 16 km (10 mi.) south of the Blackwater River.

Vegetation: moderately dense growths of spruce and birch.

Drainage: good to the west.

Thickness: 7.5 m (25 ft.)
Area: 2,300,000 sq m (25,000,000 sq ft.)
Perimeter: 3,700m (12,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 451,500E 7,076,900N

SITE INVESTIGATION: 5 drill holes

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing

SITE BD12-08(3)

may produce concrete aggregates. Additional laboratory tests to evaluate specific properties of the granular materials will be required if the material is to be considered for the production of concrete aggregates.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain exhibiting slight thermokarst features. Barging in the summer along the adjacent Mackenzie River is also possible.

SITE BD12-09(3)

REFERENCE: Site 183, Wrigley to Fort Norman, Intercommunity Study Area, Book I Stage I DIAND Granular Materials Inventory; PENCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, little silt and clay, medium gravel (GM-GC);
Low moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 70,000 cu.m (90,000 cu.yd.)
Probable 700,000 cu.m (900,000 cu.yd.)
Possible 1,000,000 cu.m (1,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the Mackenzie River and the final limits of the excavation. Surficial waste materials should not drain into the active Mackenzie River channel.

SITE DESCRIPTION: Narrow alluvial terrace located approximately 18 km (11 mi.) south of the Blackwater River.

Vegetation: moderately dense growths of spruce to more than 6 m (20 ft.) high.

Drainage: fair to the west

Thickness: 4 m (13 ft.)
Area: 280,000 sq m (3,000,000 sq ft.)
Perimeter: 3,200 m (11,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 451,600E 7,075,600N

SITE INVESTIGATION: 2 drill holes

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing of the material may produce concrete aggregates.

The source lies within the 28 km (17.5 mi.) pipe-

SITE BD12-09(3)

line corridor. Access is by truck in the winter across flat terrain which exhibits slight thermokarst features.

SITE BD12-10(3)

REFERENCE: Area II, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 7,000,000 cu.m (9,000,000 cu.yd.)

SITE DESCRIPTION: Alluvial plain located with the eastern flanks of the McConnell Range, approximately 11 km (7 mi.) south of the western tip of Blackwater Lake.

Thickness: 7.5 m (25 ft.)
Area: 930,000 sq.m (10,000,000 sq.ft.)
Perimeter: 4,900 m (16,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 485,500E 7,073,500N

ASSESSMENT: May be suitable for development although access is difficult and long.

The source is located adjacent to the eastern border of the 28 km (17.5 mi.) pipeline. Access is by truck along a very steep - sided and rugged mountain valley trending north-south. The only access across the McConnell Range is along the Blackwater River valley.

SITE BD12-11(3)

REFERENCES: Site 180, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Topsoil and silt.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: High fluvial terrace located immediately north of the mouth of the Johnson River on the west side of the Mackenzie River.

Vegetation: dense growths of spruce, birch and poplar.

Drainage: fair to good to the east and south.

Thickness: 6 m (20 ft.)

Area: 1,000,000 sq m (11,000,000 sq ft.)

Perimeter: 4,600 m (15,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 453,200E 7,066,300N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development. The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline requires crossing the Mackenzie River. A barging operation in the summer may require stockpiling because of seasonal access to the site.

SITE BD12-12(4)

REFERENCES: Site 179, Wrigley to Fort Norman Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Silt and sand, gravel pockets (SM-ML,GM).

OVERBURDEN: Topsoil and silt.

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Possible 5,000,000 cu.m (6,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Downstream segment of the wide alluvial flood plain of Johnson River located approximately 58 km (36 mi.) North of Wrigley.

Vegetation: willow, dwarfed spruce and some poplar on shallow terraces bordering the stream channel.

Drainage: fair into stream channel.

Thickness: 3 m (10 ft.)
Area: 3,000,000 sq m (33,000,000 sq ft.)
Perimeter: 14,000 m (45,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 454,100E 7,665,400N

SITE INVESTIGATION: None.

ASSESSMENT: Not suitable for development because of very poor quality material and the deposits location within or in the immediate vicinity of the stream channel.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline would require crossing the Mackenzie River and its relatively steep valley walls.

SITE ED12-13(3)

REFERENCES: Site 178, Wrigley to Fort Norman Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, little silt, medium grained, stratified (SM-GM);
Maximum size 1.9 cm (3/4 in.);
Low moisture content.

OVERBURDEN: Topsoil, silt and clay; 30 cm to 180 cm (1 ft to 6 ft.)+

DEPTH OF ACTIVE LAYER: 60 cm (2 ft.)+

RESERVES: Proven 150,000 cu.m (200,000 cu.yd.
Probable 1,000,000 cu.m (1,500,000 cu.yd.)
Possible 4,500,000 cu.m (6,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width should be maintained between the final limits of the pit and the Mackenzie River. Surficial waste materials should not drain directly into the active Mackenzie River stream channel.

SITE DESCRIPTION: Alluvial terrace extending 3 km (2 mi.) north of Rainbow Creek along the east bank of the Mackenzie River.

Vegetation: dense growths of spruce to more than 6 m (20 ft.) high.

Drainage: fair to the west.

Thickness: 5 m (16.5 ft.)
Area: 7,700,000 sq m (10,000,000 sq ft.)
Perimeter: 7,400 m (24,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 457,200E 7,064,200N

SITE INVESTIGATION: 7 drill holes

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing

SITE BD12-13(3)

of material may produce concrete aggregates. Additional laboratory tests to evaluate specific properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregates.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across flat terrain.

SITE BD12-14(3)

REFERENCE: Site 177, Wrigley to Fort Norman, Intercommunity Study Area, Look I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, little silt, medium grained, stratified (GM-SM);
Maximum size greater than 30 cm (12 in.);
Low moisture content in gravel.

OVERBURDEN: Topsoil and silt; 30 to 180 cm (1 ft to 6 ft.)+

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 150,000 cu.m (200,000 cu.yd.)
Probable 700,000 cu.m (900,000 cu.yd.)
Possible 2,000,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the final excavation and the Mackenzie River. Surface waste materials should not drain in the active Mackenzie River channel.

SITE DESCRIPTION: Alluvial river terrace located approximately 1.5 km (1 mi.) south of Rainbow Creek.

Vegetation: moderately dense growths of spruce to greater than 6 m (20 ft.) high.

Drainage: fair to the west.

Thickness: 8 m (26 ft.)
Area: 280,000 sq m (3,000,000 sq ft.)
Perimeter: 3,700 m (12,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 458,600E 7,061,500N

SITE INVESTIGATION: 3 drill holes.

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing of the material may produce concrete aggregates.

SITE BD12-14(3)

Additional laboratory tests to evaluate specific properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregate.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across flat terrain exhibiting light thermokarst features. Barging along the Mackenzie River in the summer is also possible.

SITE BD12-15(3)

REFERENCE: Area II, DIAND Granular Resource Inventory;
Wrigley NTS 95-0, Geological Survey of
Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 5,000,000 cu.m (6,500,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial ridge and alluvial terrace located
within the eastern flanks of the McConnell Range
and approximately 26 km (16 mi.) south of the
western tip of Blackwater Lake.

Thickness: 7.5 m (25 ft.)
Area: 650,000 sq.m (7,000,000 sq.ft.)
Perimeter: 4,000 m (13,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 483,000E 7,060,000N

ASSESSMENT: May be suitable for development although access
is very long and difficult.

The source is located within the 28 km (17.5 mi.)
pipeline corridor. Access is by truck along a very
narrow, steep-sided mountain valley, trending
north-south.

SITE BD12-16(3)

REFERENCE: Site 176, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, little silt, medium grained, stratified (GM-SM);
Maximum size greater than 20 cm (8 in.);
Low moisture content in gravel.

OVERBURDEN: Topsoil and silt; 30 cm to 300 cm (1 ft to 10 ft.)+

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 2,500,000 cu.m (3,000,000 cu.yd.)
Probable 5,000,000 cu.m (7,000,000 cu.yd.)
Possible 11,000,000 cu.m (15,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the final excavation and the Mackenzie River. Surficial waste materials should not drain in the active Mackenzie River channel.

SITE DESCRIPTION: Alluvial river terrace located approximately 16 km (10 mi.) north of Ochre River.

Vegetation: moderately dense growths of spruce to greater than 6 m (20 ft.) high..

Drainage: fair to the west.

Thickness: 8 m (26 ft.)
Area: 2,500,000 sq m (26,000,000 sq ft.)
Perimeter: 17,000 m (55,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 460,800E 7,055,400N

SITE INVESTIGATION: 12 drill holes.

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing of the material may produce concrete aggregates.

SITE BD12-16(3)

Additional laboratory tests to evaluate specific properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregates.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is across flat terrain. Barging along the Mackenzie River in the summer is also possible.

SITE BD12-17(R1)

REFERENCES: Site 175, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing various construction aggregates.

MATERIAL DESCRIPTION: Limestone and dolomite.

OVERBURDEN: Scree and glacial drift; discontinuous.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting.

SITE DESCRIPTION: Bedrock ridge representing a small segment of the western flank of McConnell Range located approximately 48 km (30 mi) north of Wrigley.

Vegetation: moderate growths of spruce and poplar.

Drainage: good.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 470,000E 7,055,800N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development as a source of construction aggregates which may require screening and crushing. An alluvial cone in the western face of the ridge may be a source of common fill.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain containing numerous shallow gullies and localized muskeg areas.

SITE BD12-18(3)

REFERENCES: Site 174, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEICAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and sand (GW-SW).

OVERBURDEN: Topsoil; very thin.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 2,000,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze; possible dredging.

SITE DESCRIPTION: Alluvial plain of the meandering Whitesand Creek located approximately 54 km (30 mi.) north of Wrigley.

Vegetation: bushes.

Drainage: within the active stream

Thickness: 3 m (10 ft.)

Area: 730,000 sq m (7,900,000 sq ft.)

Perimeter: 9,700 m (32,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 468,000E 7,052,700N

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development because the granular materials are located within or immediately adjacent to an active stream channel.

The source lies within the 28 km (17.5 mi.) pipeline corridor.

SITE BD12-19(R1)

REFERENCE: Site 173, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for the manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Limestone and dolomite.

OVERBURDEN: Screes and glacial drift; discontinuous.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting.

SITE DESCRIPTION: A group of rocky hills paralleling the eastern limit of the Mackenzie Plain located approximately 43 km (27 mi.) north of Wrigley along the western flanks of the McConnell Range.

Vegetation: moderate growths of spruce and poplar.

Drainage: good.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 469,600E 7,051,600N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development as a source of various construction aggregates which may require screening and crushing. Materials extracted from the alluvial cones formed at the mouths of erosional gullies along the western face of the center hill may be used as common fill.

The source lies within the 23 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across locally irregular and rugged terrain. At least one major stream crossing will probably be required.

SITE BD12-20(3)

REFERENCE: Area II, DIAND Granular Resource Inventory;
Wrigley NTS 95-0, Geological Survey of Canada,
1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 4,000,000 cu.m (5,500,000 cu.yd.)

SITE DESCRIPTION: A group of alluvial fans within the McConnell
Range, located 18 km (11 mi.) northeast of
the confluence of the Ochre and Mackenzie Rivers.

Thickness: 7.5 m (25 ft.)
Area: 560,000 sq.m (6,000,000 sq.ft.)
Perimeter: 5,600 m (18,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 480,000E 7,050,000N

ASSESSMENT: May be suitable for development although access
is difficult.

The source is located near the center of the 28km
(17.5 mi.) pipeline corridor. Access is by truck
along narrow steep-sided mountain valley.

SITE BD12-21(3)

REFERENCE: Deposit (0-130), Area III, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 5,500,000 cu.m (7,000,000,000 cu.yd.)

SITE DESCRIPTION: Esker ridges located adjacent to the Ochre River on the east side of the McConnell Range.

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 510,000E 7,050,000N

ASSESSMENT: Suitable for development.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter along the Ochre River valley, through the McConnell Range.

SITE BD12-22(2)

REFERENCE: Deposit (0-15), Area III, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel.

RESERVES: Possible 25,000,000 cu.m (30,000,000 cu.yd.)

SITE DESCRIPTION: Hummocky glaciofluvial deposit adjacent to the Ochre River on the east side of the McConnell Range.

Thickness: 15 m (50 ft.)
Area: 2,100,000 sq.m (23,000,000 sq.ft.)
Perimeter: 9,500 m (31,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 507,500E 7,048,000N

ASSESSMENT: May be suitable for development although access is both difficult and long.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter along the Ochre River valley, through the McConnell Range.

SITE BD12-23(3)

REFERENCE: Site 172, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel (SW-GW).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 450,000 cu.m (600,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Shallow alluvial terraces bordering the centre section of the Whitesand Creek channel located approximately 42 km (26 mi.) north of Wrigley.

Vegetation: dense growths of spruce and poplar.

Drainage: good into stream channel.

Thickness: 3 m (10 ft.)

Area: 150,000 sq m (1,600,000 sq ft.)

Perimeter: 3,000 m (9,800 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 467,200E 7,047,500N

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development because of immediate proximity to Whitesand Creek.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is difficult because of the steep valley walls. Access to the pipeline is across flat terrain occasionally exhibiting light thermokarst features.

SITE BD12-24(3)

REFERENCE: Site 170, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Clas 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, little silt, medium grained, stratified (SM-GM);
Maximum size greater than 7.8 cm (3 in.);
Low moisture content in gravel.

OVERBURDEN: Topsoil and silt; 30 cm (1 ft.) to 365 cm (12 ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 1,000,000 cu.m (1,500,000 cu.yd.)
Probable 1,500,000 cu.m (2,000,000 cu.yd.)
Possible 15,000,000 cu.m (20,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the final excavation and the Mackenzie River. Surficial waste materials should not drain in the active Mackenzie River channel.

SITE DESCRIPTION: Alluvial river terrace located at the confluence of the Whitesand Creek.

Vegetation: moderately dense growths of spruce to greater than 6 m (20 ft.) high.

Drainage: fair to the west.

Thickness: 8 m (26 ft.)
Area: 2,200,000 sq m (23,000,000 sq ft.)
Perimeter: 8,500 m (28,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 463,100E 7,047,400N

SITE INVESTIGATION: 12 drill holes.

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing of the material may produce concrete aggregates. Additional laboratory tests to evaluate specific

SITE BD12-24(3)

properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregates.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter over flat terrain exhibiting light thermokarst features. Access along Mackenzie River in summer by barge is also possible.

SITE BD12-25(4)

REFERENCE: Site 171, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel, silty (SM-GM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 2,000,000 cu.m (2,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Fluvial deposits forming a high terrace, located on the west banks of the Mackenzie River opposite the mouth of Whitesand Creek and approximately 42 km (26 mi.) north of Wrigley.

Vegetation: moderately dense spruce with the occasional stand of birch and poplar.

Drainage: good into adjacent river.

Thickness: 6 m (20 ft.)
Area: 1,300,000 sq m (14,000,000 sq ft.)
Perimeter: 8,000 m (26,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 461,500E 7,647,100N

SITE INVESTIGATION: None

ASSESSMENT: May be suitable for development. The source lies adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline will involve crossing the Mackenzie River either by truck in the winter or by barge in the summer. A barging operation may require stockpiling because of seasonal land access.

SITE BD12-26(3)

REFERENCE: Deposit N52-N55; DIAND Granular Resource Inventory; Dahadinni River NTS 95N, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and sand.

RESERVES: Possible 25,000,000 cu.m (35,000,000 cu.yd.)

SITE DESCRIPTION: Alluvial flood plain and adjacent terraces of the Johnson River.

Area: 19,000,000 sq.m (210,000,000 sq.ft.)
Perimeter: 52,000,000 m (170,000,000 ft.)

Map Reference: NTS 95N, Dahadinni

UTM Reference: Zone 10; 443,000E 7,050,000N

ASSESSMENT: Not suitable for development because the available granular materials are within or immediately adjacent to the active stream channel of the Johnson River and the source lies within a critical wildlife area.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain exhibiting very slight thermokarst features. Access also includes crossing the Mackenzie River either by barge in the summer or by truck in the winter. A barging operation may require stockpiling because of seasonal land access.

The source lies within the critical wintering range of the woodland caribou.

SITE BD12-27(3)

REFERENCE: Site 169, Wrigley to Fort Norman, Intercommunity Study Area, Book I Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, little silt, medium grained, stratified (GM-SM);
Maximum size greater than 7.8 cm (3 in.);
Low moisture content in gravel.

OVERBURDEN: Topsoil and silt; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 300 cm (8 ft.)+

RESERVES: Proven 500,000 cu.m (600,000 cu.yd.)
Probable 1,500,000 cu.m (2,000,000 cu.yd.)
Possible 5,000,000 cu.m (6,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the final excavation and the Mackenzie River. Surficial waste materials should not drain in the active Mackenzie River channel.

SITE DESCRIPTION: Alluvial river terrace located at the confluence of the Mackenzie River and Whitesand Creek.

Vegetation: moderately dense growths of spruce to greater than 6 m (20 ft.) high.

Drainage: fair to the west.

Thickness: 8 m (26 ft.)
Area: 640,000 sq m (6,900,000 sq ft.)
Perimeter: 3,000 m (9,800 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 464,200E 7,044,400N

SITE INVESTIGATION: 8 drill holes, 1 test pit.

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing of the material may produce concrete aggregates.

SITE BL12-27(3)

Additional laboratory tests to evaluate specific properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregates.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across flat terrain exhibiting light thermokarst features. Access in the summer may be by barge along the Mackenzie River.

SITE BD12-28(R1)

REFERENCE: Site 166, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing various construction aggregates.

MATERIAL DESCRIPTION: Limestone and dolomite, surficially weathered.

OVERBURDEN: Glacial till; thin veneer.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. The southwestern portion of the site is best suited for quarry locations. Both the surficial layer and the massive bedrock at depth will require blasting.

SITE DESCRIPTION: Ridges of bedrock outcrops along the western flanks of the McConnell Range, located approximately 1.5 km (1 mi.) north of the Ochre River.

Vegetation: sparse growths of spruce.

Drainage: good to the northwest.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 470,000E 7,042,800N

SITE INVESTIGATION: 1 drill hole.

ASSESSMENT: Suitable for development as a source of good quality general fill produced from the fractured surficial bedrock zone and as a source of aggregates for surface course produced from the fresh massive underlying limestone and dolomite.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across locally rolling terrain and farther to the west across flat, poorly drained terrain which exhibits thermokarst features as characterized by lakes, ponds and bogs.

SITE BD12-29(2)

REFERENCE: Deposit (0-14), Area III, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel.

RESERVES: Possible 5,500,000 cu.m (7,500,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial terrace adjacent to the Ochre River, located approximately 17 km (11 mi.) east of its confluence with the Mackenzie River.

Thickness: 15 m (50 ft.)
Area: 740,000 sq.m (8,000,000 sq.ft.)
Perimeter: 4,100 m (14,000 ft.)

Map Reference: NTS 95-0, Wrigley
UTM Reference: Zone 10; 480,000E 7,044,000N

ASSESSMENT: Suitable for development.

The source is located near the center of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across sloping to flat terrain exhibiting slight thermokarst features.

SITE BD12-30(2)

REFERENCE: Deposit (0-13), Area III, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel.

RESERVES: Possible 6,000,000 cu.m (8,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial terrace adjacent to the Ochre River, located approximately 17 km (11 mi.) east of its confluence with the Mackenzie River.

Thickness: 24 m (80 ft.)

Area: 490,000 sq.m (5,300,000 sq.ft.)

Perimeter: 2,400 m (7,800 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 483,000E 7,042,200N

ASSESSMENT: Suitable for development.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across sloping to flat terrain exhibiting slight thermokarst features.

SITE BD12-31(2)

REFERENCE: Deposit (0-12), Area III, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 2, Good quality material suitable for embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel.

RESERVES: Possible 2,500,000 cu.m (3,500,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial outwash plain adjacent to the Ochre River located approximately 17 km (11 mi.) east of its confluence with the Mackenzie River.

Thickness: 15 m (50 ft.)

Area: 410,000 sq.m (4,500,000 sq.ft.)

Perimeter: 1,600 m (5,200 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 483,000E 7,042,400N

ASSESSMENT: Suitable for development.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to sloping terrain exhibiting slight thermokarst features.

SITE BD12-32(3)

REFERENCE: Deposit (0-57 and 0-58), Area II, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and sand.

RESERVES: Possible 65,000,000 cu.m (85,000,000 cu.yd.)

SITE DESCRIPTION: Alluvial flood plain of the Ochre River.

Thickness: 9 m (30 ft.)
Area: 17,000,000 sq. m (190,000,000 sq.ft.)
Perimeter: 91,000,000 m (300,000,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 486,000E 7,042,000N

ASSESSMENT: Not suitable for development because the available granular materials are located within or immediately adjacent to the active stream channel of the Ochre River.

The source extends across and to the east of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across rolling and irregular terrain.

SITE BD12-33(3)

REFERENCE: Site 168, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, little silt, medium grained stratified (SM-GM);
Maximum size greater than 20 cm (8 in.);
Low moisture content in gravel.

OVERBURDEN: Topsoil 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven	800,000 cu.m (1,000,000 cu.yd.)
Probable	4,000,000 cu.m (5,000,000 cu.yd.)
Possible	15,000,000 cu.m (20,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the final excavation and the Mackenzie River. Surficial waste materials should not drain in the active Mackenzie River channel.

SITE DESCRIPTION: Alluvial river terrace located at the confluence of the Ochre and Mackenzie Rivers.

Vegetation: moderately dense growths of spruce to greater than 6 m (20 ft.) high

Drainage: fair to the west.

Thickness: 8 m (26 ft.)

Area: 2,200,000 sq m (24,000,000 sq ft.)

Perimeter: 7,800 m (76,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 465,500E 7,039,000N

SITE INVESTIGATION: 6 drill holes.

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing of the material may produce concrete aggregates.

SITE BD12-33(3)

Additional laboratory tests to evaluate specific properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregates.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain exhibiting slight thermokarst features. Access along the Mackenzie River by barge in the summer is also possible.

SITE ED12-34(4)

REFERENCE: Site 165, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PETCAN Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only for marginal fill.

MATERIAL DESCRIPTION: Sand and gravel pockets, silty (SM-GM).

OVERBURDEN: Topsoil and silt, variable depth.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 4,500,000 cu.m (6,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: The alluvial plain of the meandering Ochre River including several shallow terraces bordering the active stream channel, located approximately 32 km (20 mi.) north of Wrigley.

Vegetation: dense growths of spruce and poplar.

Drainage: good into stream channel

Thickness: 3 m (10 ft.)

Area: 1,500,000 sq m (16,000,000 sq ft.)

Perimeter: 16,000 m (53,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 468,600E 7,039,600N

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development since the deposit is located within or immediately adjacent to the stream channel of an active water course.

The source is located adjacent to the 28 km (17.5 mi.) pipeline corridor.

SITE BD12-35(3)

REFERENCE: Site 164, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel, little silt, medium grained stratified (GM-SM);
Low moisture content in gravel;
Maximum size greater than 20 cm (8 in.).

OVERBURDEN: Topsoil and silt; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 250,000 cu.m (350,000 cu.yd.)
Probable 1,000,000 cu.m (1,500,000 cu.yd.)
Possible 5,500,000 cu.m (7,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. A buffer zone of adequate width and breadth should be maintained between the final excavation and the Mackenzie River. Surficial waste materials should not drain in active Mackenzie River channel.

SITE DESCRIPTION: Alluvial river terrace located at the mouth of the Ochre River.

Vegetation: moderately dense growths of spruce to greater than 6 m (20 ft.) high.

Drainage: fair to the west.

Thickness: 8 m (26 ft.)
Area: 710,000 sq m. (7,700,000 sq ft.)
Perimeter: 4,100 m (14,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 465,500E 7,637,000N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Suitable for development. Selective excavation and additional screening, crushing and washing of the material may produce concrete aggregates.

SITE BD12-35(3)

Additional laboratory tests to evaluate specific properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregate.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat terrain exhibiting slight thermokarst features.

SITE BD12-36(R1)

REFERENCE: Site 161, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing various construction aggregates.

MATERIAL DESCRIPTION: Limestone

OVERBURDEN: Discontinuous screes.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. The numerous prominent rock walls and localized ridges along the site perimeter may be suitable for a quarry location.

SITE DESCRIPTION: Rocky hills forming the western segment of the McConnell Range, located approximately 26 km (16 mi.) north of Wrigley.

Vegetation: spruce and occasional birch.

Drainage: good.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 475,300E 7,034,100N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development. The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain.

SITE BD12-37(R1)

REFERENCE: Site 162, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing of various construction aggregates.

MATERIAL DESCRIPTION: Limestone and dolomite.

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. The southwestern portion of the limestone ridge is best suited for quarry locations.

SITE DESCRIPTION: A rugged bedrock ridge with thin glacial till deposits along its western flanks, located approximately 10 km (6 mi.) south of the Ochre River along the western flanks of the McConnell Range.

Vegetation: dense growths of spruce, birch and poplar.

Drainage: good into the river channel

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 473,000E 7,032,200N

SITE INVESTIGATION: 2 drill holes.

ASSESSMENT: Suitable for development as a source of good quality general fill produced from the fractured surficial bedrock zone or as a source of aggregates for surface course produced from the fresh massive underlying dolomite and limestone.

The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain exhibiting slight thermokarst features.

SITE BD12-38(3)

REFERENCE: Site 163, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel; (GM-SM).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 2,000,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Fluvial granular deposits forming a narrow terrace segment located on the west bank of the Mackenzie River, approximately 27 km (17 mi.) north of Wrigley.

Vegetation: dense growth of spruce, birch and poplar.

Drainage: good to the east.

Thickness: 9 m (30 ft.)
Area: 710,000 sq m (7,700,000 sq ft.)
Perimeter: 5,700 m (18,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 465,500E 7,637,000N

SITE INVESTIGATION: None

ASSESSMENT: May be suitable for development. The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access involves the crossing of the Mackenzie River.

Unless stringent operations procedures are enforced, the proximity of the site to the shoreline of the Mackenzie River could result in undesirable effects.

SITE BD12-39(R1)

REFERENCE: Site 160, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for construction of various construction aggregates.

MATERIAL DESCRIPTION: Limestone.

OVERBURDEN: Discontinuous screes and glacial drift, variable thickness.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. Bedrock exposures on the east side of the ridge form a prominent wall and are suitable for a quarry location. Both the weathered surficial bedrock zone and the massive fresh rock at depth will require blasting.

SITE DESCRIPTION: Bedrock ridge forming a separated northern tip of the range cartographically designated as Mount Gaudet.

Vegetation: dense growths of spruce, poplar, birch and pine on western side.

Drainage: good to west and east.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 470,600E 7,029,000N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development. The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat to gently rolling terrain.

SITE BD12-40(3)

REFERENCE: Site 159, Wrigley to Fort Norman, Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, medium grained, trace silt (GW-SW); Maximum size greater than 20 cm (8 in.); Low moisture content.

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Proven 1,000,000 cu.m (1,500,000 cu.yd.)
Probable 2,500,000 cu.m (3,000,000 cu.yd.)
Possible 3,000,000 cu.m (4,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. The waste material should be stockpiled along the toe of the cone to maintain drainage of spring runoff water into the adjacent glaciolacustrine plain. A channel should be cut into the cone from the mouth of the valley to the adjacent lake to prevent indiscriminant discharge of spring runoff over the face of the cone. In view of the possible late spring and early summer runoff water condition, extraction of borrow material from the site will likely have to be restricted to a late summer, fall and winter operation. Buffer zones should be maintained so that working areas are isolated from active stream channels.

SITE DESCRIPTION: Large alluvial cone at the mouth of a deeply incised erosional gully on the western flanks of the McConnell Range, located approximately 3 km (2 mi.) north of Hodgson Creek.

Vegetation: sparse growths of spruce and jack-pine.

Drainage: good to the west.

Thickness: 6 m (20 ft.)
Area: 930,000 sq m (10,000,000 sq ft.)
Perimeter: 4,100 m (14,000 ft.)

SITE BD12-40(3)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 475,600E 7,026,800N

SITE INVESTIGATION:

5 drill holes.

ASSESSMENT:

Suitable for development. The source lies within the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across highly thermally sensitive terrain to the west. The upper portion of the cone should be considered the primary location for development because of greater quantity of better quality, coarse gravels.

SITE BD12-41(R1)

REFERENCE: Site W15X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing
various construction aggregates.

MATERIAL DESCRIPTION: Limestone and massive brecciated dolomite;
Material is massive and breaks in large blocks.

OVERBURDEN: Colluvium; 30 cm (1 ft.)+

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited.

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting

SITE DESCRIPTION: Rocky hills known as Mount Gaudet and Rache
Qui Trempe a l'Eau. Thermal saline springs are
present along the southwestern toe of this range.

Drainage: good

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 469,100E 7,022,000N

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development because quarry
operations will require blasting and crushing;
which may disturb the existing hydrological
equilibrium of the site area by opening new
cracks and fissures.

The source is located adjacent to the western
border of the 28 km (17.5 mi.) pipeline corridor.
Access to the northwest is by truck in the winter
across very rugged and irregular terrain. Access
to the east is by truck in the winter across flat
poorly drained terrain characterized by numerous
lakes.

SITE BD12-42(3)

REFERENCE: Site W16X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand and gravel, limestone fragments, (SW-SM);
Maximum size 10 cm (4 in.)

OVERBURDEN: Topsoil 5 cm (1/6 ft.)

DEPTH OF ACTIVE LAYER: 120 cm (4 ft.)+

RESERVES: Proven 25,000 cu.m (35,000 cu.yd.)
Probable 550,000 cu.m (750,000 cu.yd.)
Possible 1,500,000 cu.m (2,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Screes and slope wash deposits along the western
slopes of Mount Gaudet forming a narrow, flat
river terrace adjacent to the east bank of the
Mackenzie River; located approximately 13 km
(9 mi.) northwest of Wrigley.

Vegetation: moderate growths of birch and spruce
with some poplar.

Drainage: good to the west.

Thickness: 5 m (16 ft.)
Area: 470,000 sq m (5,000,000 sq ft.)
Perimeter: 3,400 m (11,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 468,200E 7,022,500N

SITE INVESTIGATION: 2 test pits.

ASSESSMENT: May be suitable for development although esthetic
are of poor quality and terrain exhibits
conditions such as thermal springs and unique
surrounding vegetation.

The source is located adjacent to the western

SITE BD12-42(3)

border of the 28 km (17.5 mi.) pipeline corridor.
Access is by truck in the winter across rolling
terrain.

SITE BD12-43(R2)

REFERENCE: Site W14X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class R-2, Talus slopes suitable for fair
quality general fill in sub-grades.

MATERIAL DESCRIPTION: Limestone fragments, sand and silt.

OVERBURDEN: Topsoil; shallow

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 500,000 cu.m (600,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Limestone fragments overlying bedrock along the
southeast base of Roche Qui Trempe a l'Eau located
approximately 11 km (7 mi.) northwest of Wrigley.

Vegetation: moderate growths of spruce, birch
and poplar.

Drainage: good to the south.

Thickness: 2 m (5 ft.)
Area: 250,000 sq m (2,800,000 sq ft.)
Perimeter: 1,600 m (5,400 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 469,100E 7,018,800N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development although site is environ-
mentally sensitive because of nearby thermal
springs and unique vegetation.

The source is located adjacent to the western
border of the 28 km (17.5 mi.) pipeline corridor.
Access is by truck in the winter across flat
poorly drained terrain characterized by numerous
lakes.

SITE BD12-44(2)

REFERENCE: Site W9, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for
embankment fill, base and surface course aggregates.

MATERIAL DESCRIPTION: Gravel, medium to coarse grained, some sand
(GW);
Maximum size greater than 20 cm (8 in.).

OVERBURDEN: Topsoil and silt; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 90 cm (3 ft.)+

RESERVES: Proven 200,000 cu.m (250,000 cu.yd.)
Probable 3,500,000 cu.m (4,500,000 cu.yd.)
Possible 10,000,000 cu.m (15,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Large alluvial fan located at the base of the
McConnell Range where Hogdson Creek is incised
into the foothills; located approximately 14 km
(9 mi.) north of Wrigley.

Vegetation: moderately dense growths of spruce
with sparsely interspersed growths of poplar.

Drainage: fair to the west.

Thickness: 3 m (10 ft.)
Area: 5,900,000 sq m (63,000,000 sq ft.)
Perimeter: 15,000 m (48,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 475,600E 7,012,000N

SITE INVESTIGATION: 6 test pits.

ASSESSMENT: Suitable for development following an assessment
of development procedures and establishment of
environmentally acceptable restoration guidelines.

The source lies within the 28 km (17.5 mi.) pipe-

SITE BD12-44(2)

line corridor. Access is by truck in the winter across flat to gently rolling terrain and localized poorly drained, thermally sensitive terrain.

SITE BD12-45(3).

REFERENCE: Deposit (0-154), Area II, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel.

RESERVES: Possible 650,000 cu.m (850,000 cu.yd.)

SITE DESCRIPTION: Till ridge located approximately 16 km (10 mi.) northeast of Wrigley in the McConnell Range

Thickness: 2.5 m (8 ft.)
Perimeter: 4,000 m (13,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 490,000E 7,020,700N

ASSESSMENT: May be suitable for development but access is extremely difficult.

The source is located within the 28 km (17.5 mi.) pipeline corridor. Access is by truck across the very rugged and irregular terrain of the McConnell Range.

SITE BD12-46(3)

REFERENCE: Area III, DIAND Granular Resource Inventory;
Wrigley NTS 95-0, Geological Survey of Canada,
1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION:

RESERVES: Possible Not determined.

SITE DESCRIPTION: Two alluvial fans located on the eastern flanks
of the McConnell Range, approximately 26 km
(16 mi.) east of Wrigley.

Thickness: 7.5 m (25 ft.)
Area: 190,000 sq.m (2,000,000 sq.ft.)
Perimeter: 1,200 m (4,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 494,500E 7,018,500N

ASSESSMENT: Suitable for development although access is very
difficult.

The source is located within the 28 km (17.5 mi.)
pipeline corridor. Access is by truck in the
winter across the steep rugged terrain of the
McConnell Range.

SITE BD12-47(3)

REFERENCE: Site W8X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand and gravel (GW-SW);
Maximum size greater than 7.8 cm (3 in.).

OVERBURDEN: Not determined.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible 30,000,000 cu.m (40,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze; possible dredging.

SITE DESCRIPTION: Gravel deposits in the active stream channel
of Hogdson Creek and extends from the base of
the McConnell Range to the mouth of the Mackenz-
ie River.

Vegetation: sparsely wooded with spruce, pine,
birch and poplar.

Drainage: good into stream channel

Thickness: 3 m (10 ft.)
Area: 9,800,000 sq m (110,000,000 sq ft.)
Perimeter: 33,000 m (110,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 475,600E 7,017,500N

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development beacuse the deposit
is located entirely in the active stream of
Hogdson Creek.

The source lies within the 28 km (17.5 mi.)
pipeline corridor.

SITE BD12-48(R1)

REFERENCE: Site W4X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class R-1, Bedrock suitable for manufacturing
various construction aggregates.

MATERIAL DESCRIPTION: Limestone, brecciated dolomite.

OVERBURDEN: Screes and talus slopes.

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Quarry and blasting. Quarries can be located
and developed at numerous bluffs along the
base of the mountain range.

SITE DESCRIPTION: Southern and western portions of the McConnell
Range, located approximately 4 km (2.5 mi.)
east of Wrigley.

Vegetation: spruce and occasional birch.

Drainage: good surficially.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 485,000E 7,015,000N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development. The source lies within
the 28 km (17.5 mi.) pipeline corridor. Access
is by truck in the winter across steeply sloping
terrain bordering the southern section of the
McConnell Range or across localized zones of
thermally sensitive terrain.

SITE BD12-49(R2)

REFERENCE: Site W17X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PENCAN
Services "72", 1973.

MATERIAL QUALITY: Class R-2, Bedrock suitable for fair quality
general fill in sub-grades.

MATERIAL DESCRIPTION: Sandstone and shale fragments with silt and
sand.

OVERBURDEN: Colluvium; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: Not determined.

RESERVES: Possible Unlimited

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze; possible blasting.

SITE DESCRIPTION: Sandstone and shale ridge mantled with colluvium
and residual soil, located approximately 9 km
(5 mi.) northwest of Wrigley in the west bank of
the Mackenzie River at the confluence of the
Wrigley River.

Vegetation: sparse growths of birch and poplar.

Drainage: good

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 469,200E 7,014,000N

SITE INVESTIGATION: None

ASSESSMENT: Not suitable for development because of very
difficult access involving crossing the Mackenz-
ie River.

The source lies outside the 28 km (17.5 mi.)
pipeline corridor.

SITE BD12-50(2)

REFERENCE: Site W13, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for
embankment fill, base and surface course aggregates.

MATERIAL DESCRIPTION: Gravel, well graded, medium grained, some sand
(GW);
Maximum size 5 km (2 in.).

OVERBURDEN: Topsoil and silt; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Proven 600,000 cu.m (800,000 cu.yd.)
Probable 1,500,000 cu.m (2,000,000 cu.yd.)
Possible 2,500,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Large, flat ridge considered to be a glacial
outwash deposit or a remnant of an early post
glacial terrace, located approximately 4 km
(2.5 mi.) north of Wrigley.

Vegetation: moderate growths of spruce, birch
and poplar ranging from 3 m (10 ft.) to 12 m
(40 ft.) high.

Drainage: fair to the northwest.

Thickness: 6 m (20 ft.)
Area: 390,000 sq m (4,200,000 sq ft.)
Perimeter: 2,700 m (9,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 473,000E 7,013,200N

SITE INVESTIGATION: 3 drill holes, 1 test pit.

ASSESSMENT: Suitable for development.

The source is located adjacent to the western
border of the 28 km (17.5 mi.) pipeline corridor.

SITE BD12-50(2)

Access is by truck in the winter across flat poorly drained terrain characterized by numerous lakes.

SITE BD12-51(3)

REFERENCE: Site W7, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Sand, little gravel, medium grained (SW);
Maximum size greater than 20 cm (8 in.).

OVERBURDEN: Topsoil and silt; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: 425 cm (14 ft.)

RESERVES: Proven 40,000 cu.m (50,000 cu.yd.)
Probable 200,000 cu.m (250,000 cu.yd.)
Possible 300,000 cu.m (400,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: River terrace located approximately 1.5 km (1 mi.)
northeast of Wrigley on the south bank of
Hodgson Creek.

Vegetation: dense growths of spruce and pine.

Drainage: good into adjacent creek

Thickness 6 m (20 ft.)
Area: 50,000 sq m (540,000 sq.ft.)
Perimeter: 900 m (3,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 476,000E 7,012,700N

SITE INVESTIGATION: 1 test pit

ASSESSMENT: May be suitable for development although diff-
culty may be experienced in developing the
source because of the steep valley walls. In
addition the close proximity of the active stream
channel of Hodgson Creek may have serious enviro-
nmental implications on any proposed development
in the area. Prior to developing the source, an
assessment of development procedures coupled with
environmentally acceptable restoration guidelines

SITE BD12-51(3)

should be established. The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor.

Access is by truck in the winter across flat to gently rolling terrain.

SITE BD12-52(2)

REFERENCE: Site W12, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for
embankment fill, base and surface course aggregate.

MATERIAL DESCRIPTION: Gravel, well graded, medium grained, some sand
(GW);
Maximum size greater than 20 cm (8 in.);
Low to medium moisture content.

OVERBURDEN: Topsoil and silt; 30 to 140 cm (1 to 4.5 ft.)

DEPTH OF ACTIVE LAYER: 120 cm (4 ft.)+

RESERVES: Proven 250,000 cu.m (300,000 cu.yd.)
Probable 500,000 cu.m (650,000 cu.yd.)
Possible 3,500,000 cu.m (5,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Fluvial terrace along east bank of the Mackenzie
River, located approximately 4 km (2.5 mi.) north
of Wrigley.

Vegetation: moderately dense growth of spruce
with the occasional stand of birch and poplar.

Drainage: good to the west.

Thickness: 6 m (30 ft.)
Area: 390,000 sq m (4,200,000 sq ft.)
Perimeter: 4,300 m (14,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 472,100E 7,013,300N

SITE INVESTIGATION: 3 test pits.

ASSESSMENT: May be suitable for development but stringent
operation procedures must be enforced to ensure
that undesirable environmental effects do not
occur.

The source is located adjacent to the western

SITE BD12-52(2)

border of the 28 km (17.5 mi.) pipeline corridor.
Access is by truck in the winter across flat,
poorly drained terrain characterized by numerous
lakes.

SITE BD12-53(3)

REFERENCE: Site W10X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 3, Fair quality material suitable for
general fill.

MATERIAL DESCRIPTION: Gravel, some sand, well graded, medium grained
(GW);
Maximum size greater than 20 cm (8 in.)

OVERBURDEN: Topsoil and silt; 90 cm (3 ft.)

DEPTH OF ACTIVE LAYER: 230 cm (7.5 ft.)

RESERVES: Proven 15,000 cu.m (20,000 cu.yd.)
Probable 150,000 cu.m (200,000 cu.yd.)
Possible 700,000 cu. m (900,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Fluvial terrace remnant located approximately
1 km ($\frac{1}{2}$ mi.) northwest of Wrigley on the west
banks of Hogdson Creek.

Vegetation: dense growth of spruce to 9 M (30 ft.)
high

Drainage: fair to the south into the adjacent
creek.

Thickness: 6 m (20 ft.)
Area: 110,000 sq m (1,200,000 sq ft.)
Perimeter: 1,100 m (3,800 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 475,600E 7,012,000N

SITE INVESTIGATION: 1 test pit.

ASSESSMENT: Not suitable for development because existing
overburden is thick and the terrace deposit
is located immediately adjacent to the active
stream channel of Hogdson Creek with serious
environmental implications.

The source is located adjacent to the western

SITE BD12-53(3)

border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across relatively flat muskeg terrain which is poorly drained.

SITE BD12-54(2)

REFERENCE: Site W11, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PENCAN
Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for
embankment fill, base and surface course
aggregate.

MATERIAL DESCRIPTION: Gravel, well graded, coarse grained, some sand
(GW);
Maximum size 7.8 cm (3 in.).

OVERBURDEN: Topsoil; 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 120 cm (4 ft.)

RESERVES: Proven 100,000 cu.m (150,000 cu.yd.)
Probable 250,000 cu.m (350,000 cu.yd.)
Possible 2,000,000 cu.m (3,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Adequate buffer zones should
be established between the Mackenzie River and
the outer limits of the excavation.

SITE DESCRIPTION: River terrace on the east bank of the Mackenzie
River, located approximately 2.5 km (1.5 mi.)
north of Wrigley.

Vegetation: moderate growths of spruce, birch
and poplar.

Drainage: good to the west into the Mackenzie
River.

Thickness: 9 m (30 ft.)
Area: 230,000 sq m (2,500,000 sq ft.)
Perimeter: 2,700 m (9,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 474,000E 7,011,800N

SITE INVESTIGATION: 3 test pits.

ASSESSMENT: May be suitable for development but stringent
operation procedures must be enforced to ensure
that undesirable environmental effects do not

SITE BD12-54(2)

occur.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, poorly drained terrain characterized by numerous lakes.

SITE BD12-55(2)

REFERENCE: Site W6, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for
embankment fill, base and surface course
aggregates.

MATERIAL DESCRIPTION: Gravel and sand, medium grained, stratified (GW);
Maximum size greater than 20 cm (8 in.);
Low to medium moisture content.

OVERBURDEN: Topsoil and silt; 30 to 90 cm (1 to 3 ft.)

DEPTH OF ACTIVE LAYER: 150 cm (5 ft.)+

RESERVES: Proven 400,000 cu.m (550,000 cu.yd.)
Probable 1,500,000 cu.m (2,000,000 cu.yd.)
Possible 3,000,000 cu.m (3,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Elevated terrace deposited within the wide glacial
meltwater channel paralleling the Mackenzie
River, located approximately $\frac{1}{2}$ km ($\frac{1}{4}$ mi.) north
of Wrigley.

Vegetation: spruce, birch, poplar and occasional
pine.

Drainage: good to the north.

Thickness: 6 m (20 ft.)
Area: 470,000 sq m (5,000,000 sq ft.)
Perimeter: 3,200 m (11,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 476,900E 7,011,300N

SITE INVESTIGATION: 4 drill holes, 2 test pits.

ASSESSMENT: May be suitable for development although the area
may be considered for future expansion of the
immediately adjacent townsite of Wrigley.

The source is located adjacent to the western

SITE BD12-55(2)

border of the 28 km (17.5 mi.) pipeline corridor. An existing winter road provides direct access to the western edge of the terrace. Access to the pipeline is by truck in the winter across flat to gently rolling terrain.

SITE BD12-56(NG)

REFERENCE: Site W18X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material unsuitable for
construction purposes.

MATERIAL DESCRIPTION: Sand, some silt (SM-ML).

SITE DESCRIPTION: Alluvial fan at the mouth of Olson Creek located
approximately 3 km (2 mi.) west of Wrigley on
the west bank of the Mackenzie River.

Vegetation: sparse growths of bushes and muskeg
vegetation.

Drainage: poor

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 474,100E 7,010,000N

SITE INVESTIGATION: None

ASSESSMENT: Material is not suitable for construction purpos-
es

SITE BD12-57(3)

REFERENCE: Deposit (0-10, 0-11), Area I, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel and sand.

RESERVES: Possible 45,000,000 cu.m (60,000,000 cu.yd.)

SITE DESCRIPTION: Glaciofluvial outwash plain adjacent to the downstream portion of the Wrigley River.

Thickness: 15 m (50 ft.)
Area: 7,200,000 sq.m (77,000,000 sq.ft.)
Perimeter: 38,000,000 m (125,000,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 465,000E 710,000,000N

ASSESSMENT: May be suitable for development although the source lies with a critical wildlife area.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain. Access includes crossing the Mackenzie River either by barge in the summer or truck in the winter. A barging operation may require stockpiling because of seasonal land access.

The source lies within the critical wintering range of the woodland caribou.

SITE BD12-58(3)

REFERENCE: Deposit (0-82), Area I, DIAND Granular Resource Inventory; Wrigley NTS 95-0, Geological Survey of Canada, 1972.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Gravel, sand and silt.

RESERVES: Possible 7,500,000 cu.m (10,000,000 cu.yd.)

SITE DESCRIPTION: Alluvial flood plain of the downstream portion of the Wrigley River and two of its tributaries.

Thickness: 2.5 m (8 ft.)
Area: 32,000,000 sq.m (340,000,000 sq.ft.)
Perimeter: 73,000,000 m (240,000,000 ft.)

Map Reference: NTS 95-0, Wrigley

UTM Reference: Zone 10; 465,000E 7,005,000

ASSESSMENT: Not suitable for development because all available granular material is located within or immediately adjacent to the active stream channel of the Wrigley River and the site is within a critical wildlife area.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access involves crossing the Mackenzie River either by barge in the summer or truck in the winter. A barging operation may require stockpiling because of seasonal land access.

The source lies within the critical wintering range for the woodland caribou.

SITE BD12-59(2)

REFERENCE: Site W5, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 2, good quality material suitable for
embankment fill, base and surface course
aggregate.

MATERIAL DESCRIPTION: Gravel, coarse, some sand (GW);
Maximum size greater than 24 cm (8 in.);
Medium moisture content.

OVERBURDEN: Topsoil and silt; 45 cm (1.5 ft.)

DEPTH OF ACTIVE LAYER: 120 cm (4 ft.)+

RESERVES: Proven 5,500,000 cu.m (7,500,000 cu.yd.)
Probable 10,000,000 cu.m (15,000,000 cu.yd.)
Possible 15,000,000 cu.m (20,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. The development of borrow pit
areas should be commenced at the southeastern
extremity of the site. Surficial waste mater-
ials be prevented from draining into the active
Mackenzie River channel or adjacent lakes.

SITE DESCRIPTION: Large high river terrace located in the immed-
iate vicinity of Wrigley. The Wrigley airstrip
and ancillary structures are located within
source area.

Vegetation: moderately dense spruce and occasion-
al pine.

Drainage: good to the west.

Thickness: 4.5 m (15 ft.)
Area: 3,500,000 sq m (38,000,000 sq ft.)
Perimeter: 12,000 m (38,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 478,500E 7,009,200N

SITE INVESTIGATION: 9 drill holes, 5 test pits.

ASSESSMENT: Suitable for development as a source of quality
surface course and concrete aggregate. The

SITE BD12-59(2)

production of higher quality aggregates will require screening, crushing and possibly washing. Additional laboratory tests to evaluate specific properties of the granular materials will be required, if the material is to be considered for the production of concrete aggregates.

The regional community planning guidelines relative to the future development of the Wrigley townsite should be considered prior to the selection of future borrow pit areas. The consultants report recommends the site as a primary source for granular materials for the community of Wrigley.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Access to the pipeline is by truck in the winter across flat to gently rolling terrain.

A borrow pit is currently being operated on the southwest shore of the large lake adjacent to the source.

SITE BD12-60(NG)

REFERENCE: Site W19X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular material not suitable
for construction purposes.

MATERIAL DESCRIPTION: Sand and silt (SP-SM).

DEPTH OF ACTIVE LAYER: 75 cm (3 ft.)+

SITE DESCRIPTION: Pronounced river terrace located approximately
3 km (2 mi.) southwest of Wrigley.

Vegetation: moderate growths of spruce, birch
and poplar ranging from 3 m (10 ft.) to 12 m
(40 ft.) high.

Drainage: good to the east.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 477,400E 7,007,000N

SITE INVESTIGATION: 3 test pits.

ASSESSMENT: Material is not suitable for construction
purposes.

SITE BD12-61(2)

REFERENCE: Site W2, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 2, Good quality material suitable for
embankment fill, base and surface course
aggregate.

MATERIAL DESCRIPTION: Gravel, coarse, some sand (GW);
Maximum size 7.8 cm (3 in.);
Low moisture content.

OVERBURDEN: Topsoil and silt 60 cm (2 ft.)

DEPTH OF ACTIVE LAYER: 105 cm (3.5 ft.)

RESERVES: Proven 3,000,000 cu.m (4,000,000 cu.yd.)
Probable 6,000,000 cu.m (8,000,000 cu.yd.)
Possible 30,000,000 cu m (40,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Development of borrow pit areas
should be commenced at the northwestern extremities of the site. Surficial wastes should not be
allowed to drain into the active Mackenzie River
channel. A vegetation buffer zone of adequate
height and breadth should be maintained between
the outer limits of the borrow pit and the east
shoreline of the Mackenzie River.

SITE DESCRIPTION: Large river terrace located immediately adjacent
and parallel to the east bank of the Mackenzie
River, located approximately 6 km (4 mi.) south
east of Wrigley.

Vegetation: dense growth of spruce with occasional
clusters of birch, poplar and pine from 9 m
(50 ft.) in height.

Drainage: good to the east and west.

Thickness: 12 m (40 ft.)
Area: 2,600,000 sq m (28,000,000 sq ft.)
Perimeter: 7,800 m (76,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 482,000E 7,006,200N

SITE BD12-61(2)

SITE INVESTIGATION:

7 drill holes, 5 test pits.

ASSESSMENT:

Suitable for development as a source of quality surface course and concrete aggregates. The production of higher quality aggregates will require screening, crushing and possibly washing. The consultants report recommends this site as a major source of granular material for the community of Wrigley.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Existing access for winter is along the road flanking the CNT pole line. Access to the pipeline is by truck in the winter across flat to gently rolling terrain.

SITE BD12-62(4)

REFERENCE: Site W3X, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only
for marginal fill.

MATERIAL DESCRIPTION: Gravel and silt, stratified (GM-ML);
Maximum size 2.5 cm (1 in.);
Medium moisture content;
Relatively high ground water table at depth.

OVERBURDEN: Topsoil, 15 cm ($\frac{1}{2}$ ft.)

DEPTH OF ACTIVE LAYER: 90 cm (3 ft.)+

RESERVES: Proven 25,000 cu.m (30,000 cu.yd.)
Probable 250,000 cu.m (300,000 cu.yd.)
Possible 700,000 cu.m (900,000 cu.yd.)

MINIMUM HAUL DISTANCE

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: Low alluvial terrace along the south shoreline
of Smith Creek, located approximately 10 km
(6 mi.) southeast of Wrigley.

Vegetation: clustered growths of spruce, birch
and poplar.

Drainage: good into stream channel.

Thickness: 3 m (10 ft.)
Area: 230,000 sq m (2,400,000 sq ft.)
Perimeter: 2,300 m (7,500 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 483,100E 7,005,800N

SITE INVESTIGATION: 1 drill hole, 1 test pit.

ASSESSMENT: Suitable for development. The source is located
adjacent to the western border of the 28 km (17.5
mi.) pipeline corridor. Existing winter access
is along a road flanking the CNT pole line.
Access to the pipeline is across flat to gently
rolling terrain.

SITE BD12-63(2)

REFERENCE: Site W1, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PENCAN
Services "72", 1973.

MATERIAL QUALITY: Clas 2, Good quality material suitable for
embankment fill, base and surface course
aggregates.

MATERIAL DESCRIPTION: Gravel, coarse, some sand (GW);
Maximum size greater than 20 cm (8 in.);
Low moisture content.

OVERBURDEN: Topsoil 0 to 90 Cm (3 ft.)

DEPTH OF ACTIVE LAYER: 120 cm (4 ft.)+

RESERVES: Proven 400,000 cu.m (550,000 cu.yd.)
Probable 1,500,000 cu.m (2,000,000 cu.yd.)
Possible 5,500,000 cu.m (7,500,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze. Surficial waste materials should
not drain into the active Smith Creek or Mackenz-
ie River channels. Development should commence
farthest from the water course. A vegetation
buffer zone of adequate height and breadth should
be maintained between the stream and the final
limits of the borrow pit.

SITE DESCRIPTION: Partly eroded terraced on the east bank of the
Mackenzie River at the confluence of Smith Creek
located approximately 9 km (5 mi.) southeast
of Wrigley.

Vegetation: dense growths of spruce, poplar,
birch and occasional pine, ranging from 6 m
(20 ft) to 15 m (50 ft) in height.

Drainage: good to the south

Thickness: 12 m (40 ft.)
Area: 470,000 sq m (5,000,000 sq ft.)
Perimeter: 4,000 m (13,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 482,800E 7,004,600N

SITE BD12-63(2)

SITE INVESTIGATION:

3 drill holes, 3 test pits.

ASSESSMENT:

Suitable for development as a source of quality surface course and concrete aggregate material. However, a screening, crushing and washing operation will be required to produce concrete aggregates. Additional laboratory tests to evaluate specific properties of the granular materials is recommended, if the material from this source is considered for the production of concrete aggregates.

The source is located adjacent to the western border of the 28 km (17.5 mi.) pipeline corridor. Existing winter access is presently along a road flanking the CNT pole line. Access to the pipeline is by truck in the winter across flat terrain. Access along the adjacent Mackenzie River is possible by barge in the summer and possibly by truck in the winter.

SITE BD12-64(4)

REFERENCE: Site W20, Wrigley Community Study Area, Stage I
DIAND Granular Materials Inventory; PEMCAN
Services "72", 1973.

MATERIAL QUALITY: Class 4, Poor quality material suitable only
for marginal fills.

MATERIAL DESCRIPTION: Gravel, sand, silt (GM-ML);
Maximum size greater than 20 cm (8 in.)

OVERBURDEN: Topsoil; 30 cm (1 ft.)

DEPTH OF ACTIVE LAYER: Not determined

RESERVES: Possible 750,000 cu.m (1,000,000 cu.yd.)

MINIMUM HAUL DISTANCE:

METHOD OF EXTRACTION: Rip and doze.

SITE DESCRIPTION: River terrace on the west bank of the Mackenzie
River, located approximately 8 km (5 mi.) south
west of Wrigley.

Vegetation: willows and small brush

Drainage: good to the north.

Thickness: 3 m (10 ft.)
Area: 240,000 sq m (2,600,000 sq ft.)
Perimeter: 2,700 m (9,000 ft.)

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 480,800E 7,004,300N

SITE INVESTIGATION: None

ASSESSMENT: May be suitable for development.

The source lies outside the 28 km (17.5 mi.)
pipeline corridor. Access involves crossing the
Mackenzie River either by truck in the winter
or by barge in the summer. Seasonal land access
may require stockpiling if a barging operation
is employed.

SITE BD12-65(NG)

REFERENCE: Site 167X, Wrigley to Fort Norman Intercommunity Study Area, Book I, Stage I DIAND Granular Materials Inventory; PEMCAN Services "72", 1973.

MATERIAL QUALITY: Class NG, Non-granular materials not suitable for construction purposes.

MATERIAL DESCRIPTION: Silt, some clay and sand (ML-MH).

DEPTH OF ACTIVE LAYER: Not determined.

SITE DESCRIPTION: Crescent shaped terrace located immediately adjacent to the north bank of the Ochre River.

Vegetation: dense growths of spruce to 9 m (30 ft.) high.

Drainage: good to the west.

Map Reference: NTS 95-0, Wrigley.

UTM Reference: Zone 10; 469,000E 7,040,700N

SITE INVESTIGATION: 4 drill holes.

ASSESSMENT: Material is not suitable for construction purposes.

SITE BD12-66(3)

REFERENCE: Borrow Area GM119 Main Canadian Route, CAGSL Pipeline Related Borrow Studies; Northern Engineering Services Co. Ltd., 1974.

MATERIAL QUALITY: Class 3, Fair quality material suitable for general fill.

MATERIAL DESCRIPTION: Sand and gravel;
Low to medium moisture content.

OVERBURDEN: Topsoil and silt; 0 to 300 cm (10 ft.)

RESERVES: Possible 75,000,000 cu.m +(100,000,000 cu.yd.+)

MINIMUM HAUL DISTANCE:

SITE DESCRIPTION: Plateau located approximately 13 km (8 mi.) WNW of the confluence of the Johnson and Mackenzie Rivers.

Drainage: fair to good downslope

Thickness: 15 m+ (50 ft.+)
Area: 5,000,000 sq m+(55,000,000 sq ft+)
Perimeter: Not determined

Map Reference: NTS 95N, Dahadinni River

UTM Reference: Zone 10; 444,000E 7,072,000N

SITE INVESTIGATION: None

ASSESSMENT: Suitable for development as a source of general fill.

The source is located outside the 28 km (17.5 mi.) pipeline corridor. Access is by truck in the winter across flat, thermokarst terrain. Access includes crossing of the Mackenzie River by either truck in the winter or by barge in the summer. A barging operation may require stockpiling because of seasonal land access.

Selected by CAGSL as a primary source of material for construction of a facility.