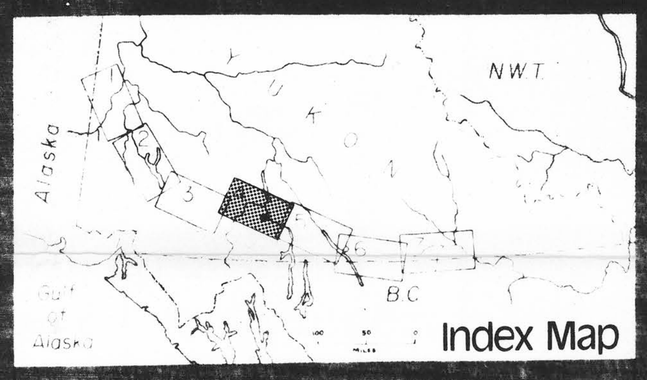
MAP 4
TERRAIN OVERVIEW
ALCAN PIPELINE
YUKON TERRITORY



Refer to Geologic Legend on Front Page.

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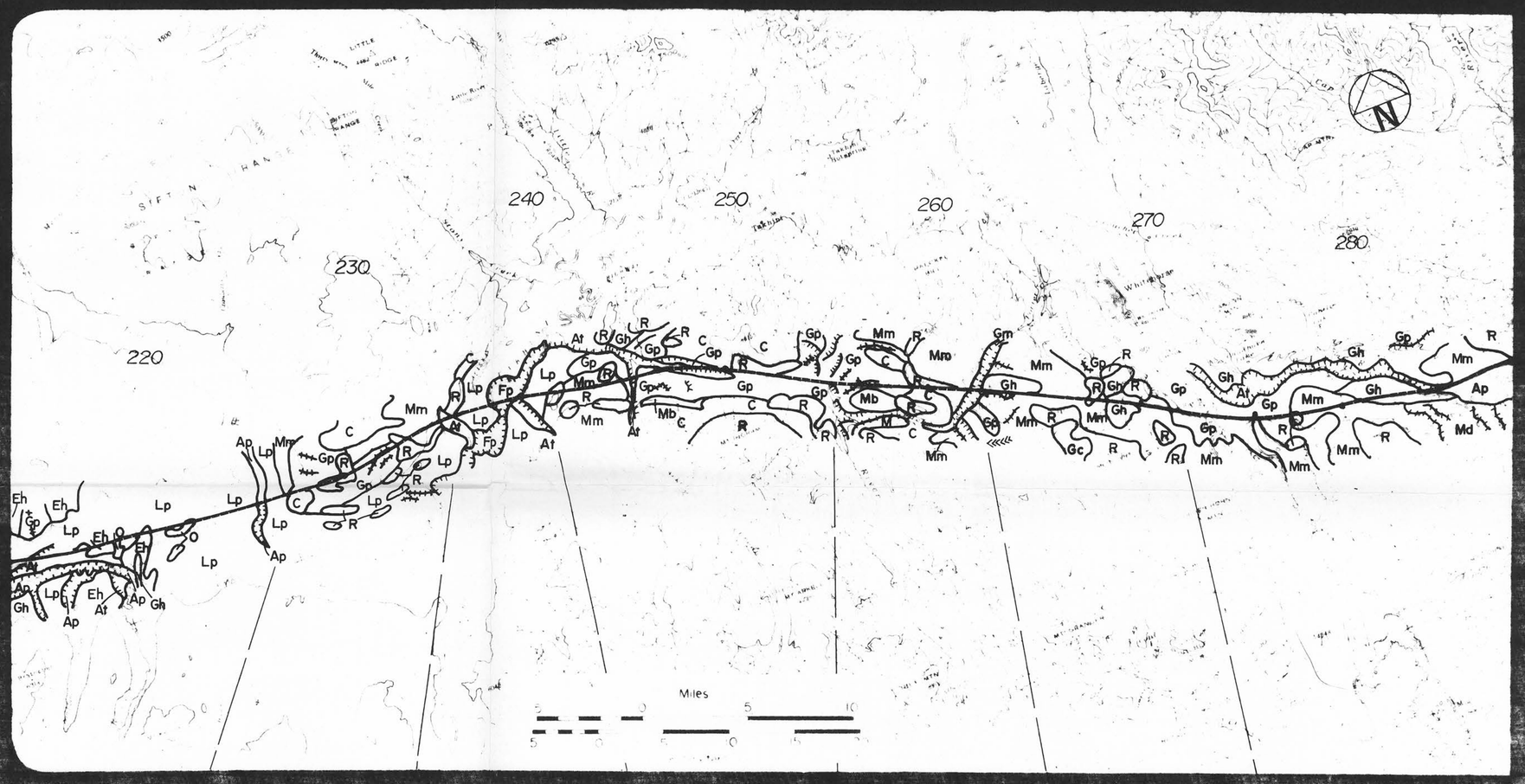

PHYSIOGRAPHIC UNITS	TAKHINI VALLEY	TAKHINI VALLEY/KLUANE PLATEAU	TAKHINI VALLEY (TAKHINI RIVER)	TAKHINI VALLEY/TESLIN PLATEAU	TESLIN PLATEAU	TESLIN PLATEAU	TESLIN PLATEAU LEWIS RIVER VALLEY
PHYSICAL ENVIRONMENT — TERRAIN TYPES	Flat glaciolacustrine plain underlain by varved clays and silts. Local sand dunes and bogs.	Complex of ground moraine, channeled kame terraces, slopes underlain by bedrock and colluvium. Moraine composed of stony till; outwash may be sand or gravel.	Flat glaciolacustrine plain underlain by varved clays and silts, and floodplain underlain by silt and sand.	Complex of ground moraine, valley train, and slopes underlain by rock. Moraine consists of stoney till; valley train of gravel.	Complex of channeled kame terraces and deltas, till and colluvium blanketed slopes. Outwash consists of gravel; till and colluvium presumably very stoney.	Rolling bedrock mantled by ground moraine and patches of hummocky outwash; moraine consists of stoney till; outwash mainly gravel.	Valley train, kame-and-kettle complex, and ground moraine. Outwash consists of sand and gravel; moraine of stony till.
LOCAL RELIEF AND DRAINAGE	Flat to gentle slopes with scarps at edge of Mendenhall River valley. Well drained except for local depressions.	Moderate slopes predominate Occassional steep slopes along some bedrock outcrops and eroded channels in outwash. Well drained, except for rare channel bottoms.	Flat to very gently sloping except for escarpment along edge of Takhini River floodplain. Well drained.	Gentle to flat slopes on valley train except for local hummocky areas. Moderate to steep slopes in bedrock and along numerous channel scarps cut in outwash. Well-drained; possibly high water table along narrow floodplain of Ibex River.	Slopes generally moderate. Some steep slopes on stream-cut escarpments. Well drained.	Slopes are gentle to moderate with rare minor steep scarps. Well drained.	Slopes are generally gentle to flat, but with numerous minor steep scarps in the valley train. Occasional steep slope in kame-and-kettle complex. Well drained.
GROUND ICE AND PERMAFROST	Sporadic permafrost may be present but probably rare. Rare lenses of ground ice may be present in glaciolacustrine sediments.	Sporadic permafrost may be present, but probably rare.	Sporadic permafrost may be present, but probably rare. Rare lenses of ground ice may be present in glaciolacustrine sediments.	Sporadic permafrost may be present. Coarse texture of most sediments negate possibility of ground ice.	Permafrost probably present at higher elevations, especially in colluvium and till. Ground ice in form of lenses and ice wedges possible in some units.	Sporadic permafrost probable. Ground ice probably negligible.	Permafrost probably absent except for scattered sporadic occurrences with thick active layers.
BEDROCK LITHOLOGY	Precambrian rocks of Yukon Group and Cretaceous intrusions, mainly granodiorite. (10)	Cretaceous intrusion, mainly granodiorite. (10)	Mainly Cretaceous intrusions and Metamorphosed Lewes River rocks. (8)	Intrusive Cretaceous rocks, Lewes River group metamorphosed rock and Laberge Group conglomerate Jurassic age. (8)	Laberge Group Conglomerate, Jurassic age. Upper Triaasic Lewes River Group and Cretaceous intrusions. (8)	Mainly coast intrusions, Cretaceous age - granite granodiorite. Some Laberge Group and Lewis River Group. (8)	Volcanics, Jurassic Laberge Group, greywacke arkose, quartzite, conglomerate, siltstones, hornfels in south; limestone and breccia Triassic in age; granodiorite, granite, monzonite, Cretaceous age, in east. (8)
HYDROLOGY	Takhini River Drainage Basin, Dezadeash River. Floods occur in June (snowmelt) or August (rapid glacier melt plus high precipitation).	Mendenhall	Takhini River northeast wide meandering river on slope 1.4 ft/mi; maximum ice thickness of 2.85 ft. in March; mean annual runoff 1.2 cfsm; maximum annual runoff 6.3 cfsm. Flow regulated by Kusawa Lake. (54,65 66)	Ibex River north; Arkell Creek, north flowing	Jackson Creek	McIntyre Creek, Johnson Lakes.	Yukon River Drainage Basin below. Yukon River north slope 6.9 ft/mi, regulated by dam at highway; maximum annual runoff 3.0 cfsm; mean annual runoff 1.1 cfsm. Ice thickness 4.00 ft. Mean annual precipitation 10.24 inches at Whitehorse. (52,54,65 66)
PROCESSES AND STABILTIY	Landscape stable except for small blowouts in sand dunes. Mendenhall River slowly shifting meandering channel.	Landscape generally stable.	Landscape including escarpment along Takhini River appears stable. Potential very slow lateral shifting of the meandering Takhini River and local erosion of escarpment.	Erosion and deposition on active braided floodplain and erosion of valley wall of Arkell Creek. Slow lateral shifting of meandering channel of Ibex River.	Solifluction probable at higher elevation; remainder of landscape stable.	Landscape generally stable.	Landscape generally stable. Lewes River may move some sediment, but with negligible shifting of channel. Potential erosion at river crossing.
ENGINEERING IMPLICATIONS AND CONSTRUCTION MATERIALS	Area completely underlain by fine-grained sediments. Gravel only locally abundant in ridge east of Champagne.	Occasional shallow bedrock. Granular materials locally abundant.	Takhini River crossing; stability of west bank. Gravel in nearby glaciofluvial and alluvial deposits and glaciofluvial beaches.	Scour and erosion of west bank of Arkell Creek. Minor crossings of Ibex River. Abundant granular materials.	Frozen possibly ice-rich sediments on moderate slopes may be unstable. Steep scarps in outwash. Granular material locally abundant.	Local shallow bedrock. Granular material locally abundant.	Bed scour of Lewes River. Steep banks adjacent Lewes River crossing. Abundant granular materials available.
LIVING ENVIRONMENT — VEGETATION	White spruce/aspen forest with scattered grassy meadows; occasional burnt areas characterized by shrubs and lodge pole pine seedlings, saplings.	Mainly white spruce/aspen forest with scattered areas of lodgepole pine; grassy meadows on south-facing xeric slopes.	Complex of white spruce, lodgepole pine, and aspen forest.	Complex of lodgepole pine/ white spruce forest with scattered aspen and grassy meadows on river valleys.	Open white spruce forest near tree line; shrub and sedge tundra above tree line; white spruce and lodgepole pine at lower elevations.	Mainly lodgepole pine forest with scattered areas of white spruce and aspen.	Mainly lodgepole pine; scattered spruce and pine.
FISHERIES	Mendenhall river supports arctic grayling population which is sport fished.		Takhini River: chinook salmon migrate up the river to spawn upstream of the route at the outlet of the Kasawa Lake towards the end of August. Downstream juvenile migrations from April to June.		Ibex River: chinook salmon spawning area. (47)		Yukon River: chinook and chum salmon migration route. Wolf Creek: Chinook salmon spawn in the creek at the outlet of Coal Lake. (36) (68)
MAMMALS AND BIRDS	Waterfowl staging and breeding area in Marsh eastwards of Champagne along the Mendenhall River. (46)	Waterfowl staging and breeding areas southeast of Champagne along the Mendenhall River. Area between the Mendenhall River and Takhini River: elk introduced range. (46)	Area between the Mendenhall River and Takhini River is range for population of introduced elk.	Dall sheep year round range to south of route. (46)	Ibex Creek area: dall sheep habitat, Ibec valley significant summer moose range, animals move to highground in fall.		
RESEARCH PRIORITIES	Thermal condition of lacustrine sediments.	Depth to bedrock.	Depth of scour of Takhini River. Thermal condition of lacustrine sediments. Fisheries survey Takhini River with special reference to salmon migrations and spawning areas.	Scour depth of Arkell Creek. Location of favourable approach to west bank of Arkell Creek valley.	Permafrost and ice contents of sediments at high elevations. Slope stabilities during and following construction.	Location of shallow bedrock.	Scour depth of Lewes River. Bank stability of Lewes River.
NOTES	* No permafrost reported along Alaska highway. (50)	* No permafrost reported along Alaska highway. (50)	* No permafrost reported along Alaska highway. (50) * Local glaciolacustrine gravel beaches at various levels on valley walls. (25) * Permafrost reported at depth of 25 feet in bridge construction. Pitted areas in glaciolacustrine deposits may be due to melting of ground ice. (8)	* Glaciofluvial deposits locally hummocky. * Polygonal ground on upper slopes indicates presence of ice wedges.	* Highest elevation along right-of-way west of Whitehorse. * Fisheries survey of Takhini river with special reference to salmon spawning and overwintering of fry upstream and downstream of crossing.	* Small areas of rock and outwash not mapped separately. * Open pit mine. * Few occurrences of permafrost reported at Whitehorse. (50)	* Local shallow rock may be present. * Outwash underlain by thick glaciolacustrine varved silt and clay; outwash varies from 2 to more than 20 feet thick.

* The rivers of the upper Yukon drainage that are crossed by the proposed route include the Mendenhall, Takhini, Yukon and many smaller tributaries all draining north, northeast across the route. Further information on the hydrological characteristics and the environmental significance of these rivers and creeks is required.