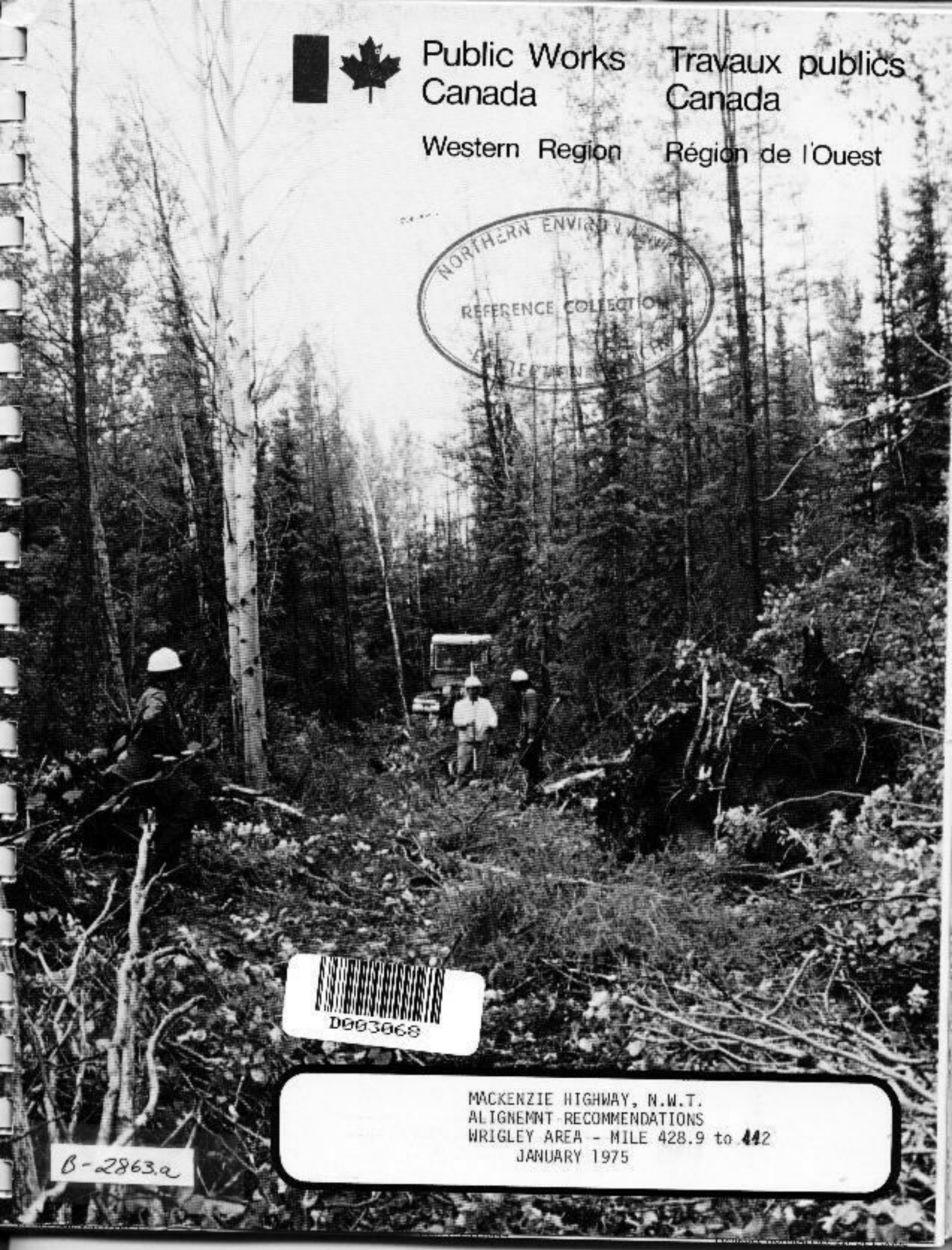

Public Works Canada
Travaux publics Canada

Western Region
Région de l'Ouest

MACKENZIE HIGHWAY, N.W.T.
ALIGNEMNT RECOMMENDATIONS
WRIGLEY AREA - MILE 428.9 to 442
JANUARY 1975

Government of Canada / Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

000003

SECURITY - CLASSIFICATION – *DE SÉCURITÉ*	
OUR FILE – *N/RÉFÉRENCE*	9305-52-300
YOUR FILE – *V/RÉFÉRENCE*	
DATE	January 23, 1975

TO / *À*
Mr. W.R. Binks
Program Manager
Implementation Directorate
Ottawa

FROM / *DE*
F.E. Kimball
Project Manager
Edmonton

SUBJECT / *OBJET* MACKENZIE HIGHWAY, N.W.T. - ALIGNMENT RECOMMENDATIONS
WRIGLEY AREA, MILE 428.9 TO 442

Enclosed are 24 copies of the above noted report which has been prepared to outline our alignment recommendations for the Wrigley area based on an agreement that was reached with the Wrigley Council on January 7, 1975.

We have also distributed copies of this report as follows:

1. Five copies to DIAND in Yellowknife
2. Four copies to DIAND in Edmonton three of which are intended for furtherance to the NWT Government for possible review with the Wrigley Council
3. One copy to D.O.E. in Edmonton
4. One copy to D.O.E. in Winnipeg
5. One copy to EM & R in Calgary
6. One copy to both the environmental and hydrology consultants

F.E. Kimball
Project Manager
Edmonton

Encl.

MACKENZIE HIGHWAY N.W.T.

ALIGNMENT RECOMMENDATIONS

WRIGLEY AREA MILE 428.9 TO 442

DEPARTMENT OF PUBLIC WORKS

WESTERN REGION

EDMONTON, ALBERTA

JANUARY, 1975

CONTENTS

1. INTRODUCTION

The limits of the proposed Mackenzie Highway covered by this report, mile 428.9 to 442, were previously identified in the June 19, 1973 and September 1973 alignment reports for the mile 297 to 550 section as;

Revision Areas "B14" - Mile 428.9 to 430.7
"B15" - Mile 431.5 to 433.5
"B16" - Mile 434 to 438
"B17" - Mile 438.4 to 442

The revision areas were initiated by the Mackenzie Highway Environmental Working Group (MHEWG) by way of the comments and recommendations contained in their Consolidated Comments Numbers 1 and 3 covering the mile 415 to 443 section of highway. In both of the DPW alignment reports referred to above, no response was made to the revision recommendations of the MHEWG because of the controversy with the local residents regarding the presence of the highway in the general area. This controversy subsequently resulted in instructions from the Minister of the Dept of Indian and Northern Affairs that no further work or investigations were to be carried out for 10 miles on either side of Wrigley until further notice.

On January 7, 1975 a meeting involving representatives of the Territorial Government, Dept. of Indian and Northern Affairs and Wrigley Council as well as an observer from the Dept. of Public Works was held in Wrigley to review various alignment proposals and hopefully arrive at some mutually acceptable proposal

for the area. Agreement was reached between the representatives of the N.W.T. Govt and D.I.N.A. and the Wrigley Council on a route corridor to the east of the previous alignment from approximately mile 433.5 to approximately 439.7. The basic criteria in the agreement for the alignment in the general vicinity of the Wrigley Settlement is that it be a minimum of one mile from the main part of the settlement and that the highway provide access to the settlement by way of an access road generally following the south bank of Hodgson Creek and joining the community road system at its northern extremity.

A recommended alignment from mile 428.9 to 442 based on the above noted agreement has been projected from aerial photographs and is shown on the semi-controlled 1 inch to 1000 ft. airphoto mosaics and 1:50,000 topographic mapping included as appendices 'A' and 'B' of this report. The alignment is essentially unchanged from mile 428.9 to 433.5 and 439.7 to 442 with the major relocation occurring in the settlement area from mile 433.5 to 439.7. A more detailed description and evaluation of the alignment is presented in the following section of this report.

In connection with the recommended alignment, detailed geotechnical information is required in the mile 429 to 430 and 433.5 to 439.7 sections with some less concentrated work required from mile 439.7 to 442. It is proposed that this be obtained as part of the geotechnical work which will be starting northward from Ft. Simpson about January 20, 1975 and will be in the Wrigley area about February 6, 1975. The mile 429 to 430 section is now

accessible by geotechnical equipment by way of existing trails, however access to the other sections must still be established. The geotechnical operation has equipment with it to cut an access along the projected alignment but since the alignment has not been established by ground survey this operation would be restricted to day light hours only and would require a relatively lengthy period of time to complete under winter daylight conditions. To avoid any delays to the geotechnical operation, the line clearing should be undertaken as a separate operation and completed prior to arrival of the geotechnical operation in the Wrigley area. It is therefore critical that an alignment decision be obtained at a very early date as the geotechnical operation will bypass the Wrigley area if access is not available in order not to jeopardize a critical schedule to reach Ft. Good Hope before breakup.

On the airphoto mosaics in Appendix A and the topographic map in Appendix B, the alignment shown as a solid line is the recommended alignment consisting of the original alignment to remain unchanged or, where applicable, the recommended alignment revisions. The original alignment now recommended for abandonment is represented by a dashed line. There is one exception to this at about mile 434 where a dashed line is also used to indicate an alternate revision however this exception is specifically identified on the mosaics.

2 ALIGNMENT REVIEW

(a) Mile 428.9 to 430.7

This section has been identified in previous alignment reports as Revision Area 'B14'. The reason for considering alternate alignments in this area results from a large slump area on the south bank of the Smith Creek Crossing.

Although it appears that there has been no recent movement of the slump area, there is strong potential for some movement if construction takes place in the area particularly if large cuts and/or fills are involved. In spite of the relatively serious terrain conditions on the south bank of Smith Creek. The north bank in the general vicinity of the projected crossing consists of extensive granular materials with no indicated stability problems or restrictions to highway construction.

Studies of the crossing and surrounding area to date have consisted primarily of the analysis of geotechnical information obtained by Acres during the winter of 1972-73, additional geotechnical information obtained with helicopter support in 1973, air photo interpretation and air and ground reconnaissance. In addition to a proposed crossing in the area of the originally established alignment, projected crossings at various locations to the east have been considered particularly with regard to the indication that it may be necessary to follow a more easterly location through the Wrigley area because of the controversies with the settlement.

Invariably it was found for each projected crossing to the east that the terrain conditions for the south approach did not significantly improve, the stream valley tended to have steep relatively deep banks with doubtful stability, and probably most important would be relatively poor conditions that would be encountered along the north approach to the crossing. Associated with this would be a scarcity of good quality granular materials. It has therefore been concluded that considering all aspects of a crossing and approach conditions, the optimum location for a crossing would be situated somewhere along about a 2500 ft. length of Smith Creek in the general vicinity of the originally established location.

The latest evaluation of available information for the area of the originally projected Smith Creek Crossing shows that the terrain on the south approach becomes less stable upstream from the original alignment and that the best potential for improved ground conditions would be downstream from the original alignment. This is applicable to both the terrain on the south bank as well as the conditions at the stream bed itself. There is however a limitation in the distance that the alignment can be moved downstream when considering the optimum of all circumstances, with the critical factors being the skew angle for the Smith Creek Crossing and proximity to the back water and ice jamming effects of the Mackenzie River. Taking into account these various factors the projected alignment shown on the mosaics and topographic map is recommended as the optimum alignment for the crossing. The

detailed geotechnical work to be carried out in this area early in February 1975 will be used to confirm or modify this projection as required. In any event, any modifications that might be made to this projection would not affect the original alignment any further south than mile 429 or further north than approximately mile 430.8.

(b) Mile 430.7 to 433.2

This section of the recommended alignment is exactly the same as originally established and for which surveys and geotechnical investigations are now complete.

The alignment in this area was identified for possible relocation in the MHEWG Consolidated Comment No. 1 for miles 415 to 443 in order to provide a 500 ft. buffer between the alignment and the adjacent lake. It can be assumed that the information available to the MHEWG at that time did not accurately show the distances from the lake as these are greater than 500 ft. at all points. The alignment is also controlled against any westward relocation by the Ministry of Transport V.O.R. site adjacent to mile 431. In view of the limited amount of overland flow that will result on the terrain between the lake and the Mackenzie River and the granular nature of the soil throughout the entire area, the possibility of any siltation into the lake is essentially nonexistant. In considering the environmental sensitivity of the lake, it must be noted that it is used as the Wrigley float plane base.

(c) Mile 433.2 to 439.7

This section of projected alignment represents the major revision resulting from the agreement reached with the Wrigley Council on January 7, 1975. This revision removes the alignment from the areas of concern expressed by the MHEWG referred to in the previous alignment reports as Revision Area 'B16' and the southern portion of Revision Area 'B17'.

From mile 433.2 to 434.2 two possible alternate projections are shown on the airphoto mosaics. The solid line represents the recommended alignment conforming to that included as part of the January 7, 1975 agreement. It must be recognized however that with this alignment, or any other alignment that might be projected for this area, problems are anticipated as a result of the crossing with the access road to the float plane base that would occur at approximately mile 433.4. This access road would enter the highway on the inside of a relatively sharp curve in what would appear to be unavoidably a cut area. Either condition in itself is undesirable however when occurring together a serious safety hazard will result. To avoid or at least significantly minimize this safety hazard an alternate alignment further to the north has been projected as shown by a dashed line on the mosaics. The terrain conditions along both alternates at this time appear comparable however the more northern route would permit much more superior safety conditions in that the access road would join the highway well clear of the curve at a point where it could be arranged to have the cut

non-existant or very small. While this more northern alternate is recommended for reasons of highway safety, it is recognized that there are political implications governing the alignment in this area.

From mile 434.2 to approximately 436.5 the projected location is basically controlled by the agreed to criteria of keeping the alignment at least one mile away from the CNT land line location through the settlement of Wrigley. There is generally little room for lateral shift of the alignment in this area as the one mile limit is very close to the west and to the east the terrain quickly changes to steep side hill with deeply incised streams and gullies. The projected access road leaves the highway alignment at approximately mile 435.9 and has been located along optimum ground conditions generally following the south bank of Hodgson Creek. The access road has been brought into the northern extremity of the settlement road system and has been kept as far north as possible without encroachment onto the river banks so as to permit any potential community expansion in this direction.

The projected alignment from about mile 436.5 to its return to the original alignment at mile 439.7 is basically controlled by the crossing of Hodgson Creek. Beyond the one mile limit from the community, the stream banks are quite abrupt and high for some distance upstream. The crossing shown on the map and mosaics is considered the only feasible crossing area upstream from the one mile limit. Any proposals

further upstream would significantly increase road length in poor terrain areas and would be into an area with more potential for icing problems.

Available soils information for the general area indicates a good potential for granular materials in the vicinity of the projected stream crossing.

(d) Mile 439.7 to 442

With the exception of a localized shift of the alignment to the east, the alignment corridor is essentially the same as the original location.

MHEWG Consolidated Comments No. 1 and 3 for miles 415 to 443 suggested consideration be given to a relocation in this area because of the proximity of the alignment to a series of lakes and the presence of organic terrain (referred to as Revision Area 'B17' in previous alignment reports). The alignment shift projected to the east of the original alignment has been selected to minimize conflict with the lakes and encroachment onto organic terrain while maintaining acceptable geometries and availability of building materials.

APPENDIX 'A'

1 inch = 100 ft.

Semicontrolled Mosaics

(4 sheets)

APPENDIX 'B'

1:50,000

Topographic Mapping

(1 sheet)

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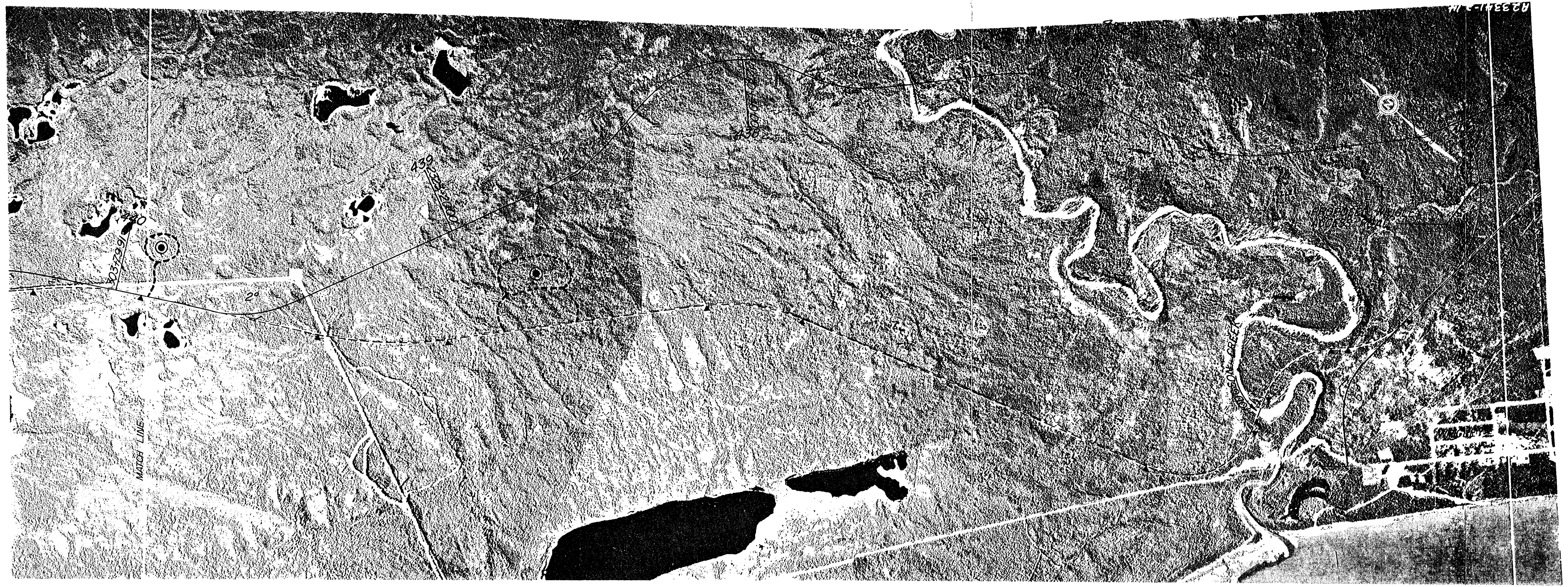


PLAN
ALIGNMENT
TOPOGR. NOTES
DRAINAGE
BORROW AREAS
STRUCT. REL. NOTED

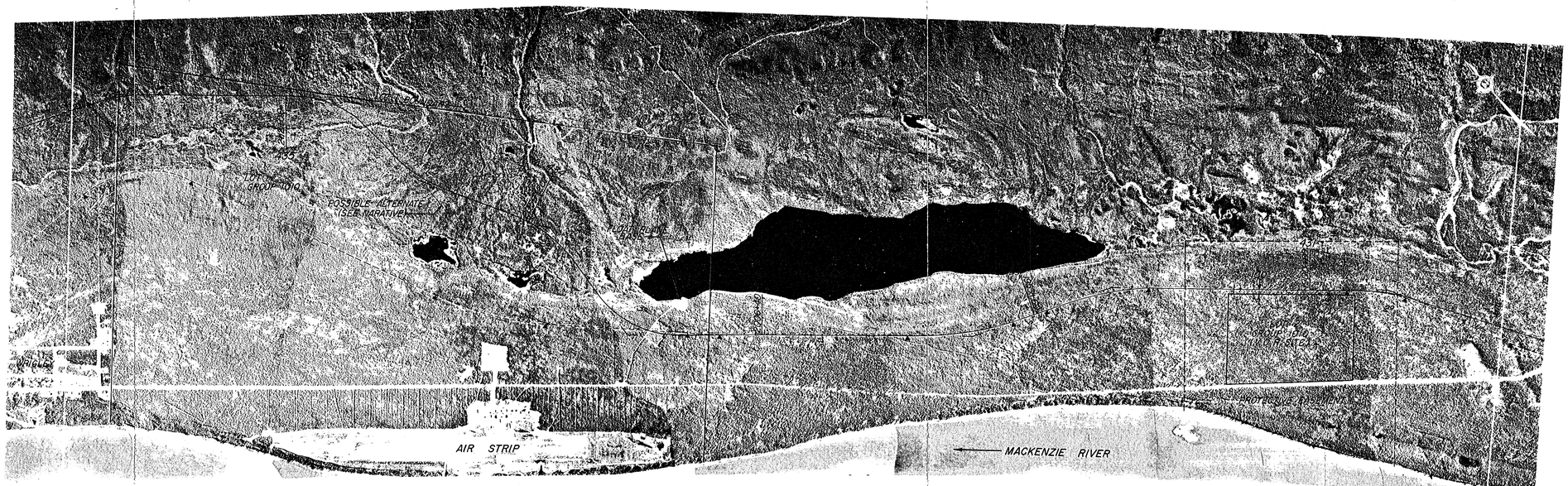
SURVEYED | DATE | PLOTTED | DATE | CHECKED | DATE

BY | DATE

3

DRAWING No. SHEET No. TOTAL SHEETS

PLAN
ALIGNMENT
TOPOGR NOTES
DRAINAGE
BORROW AREAS
STRUCTURES NOTES



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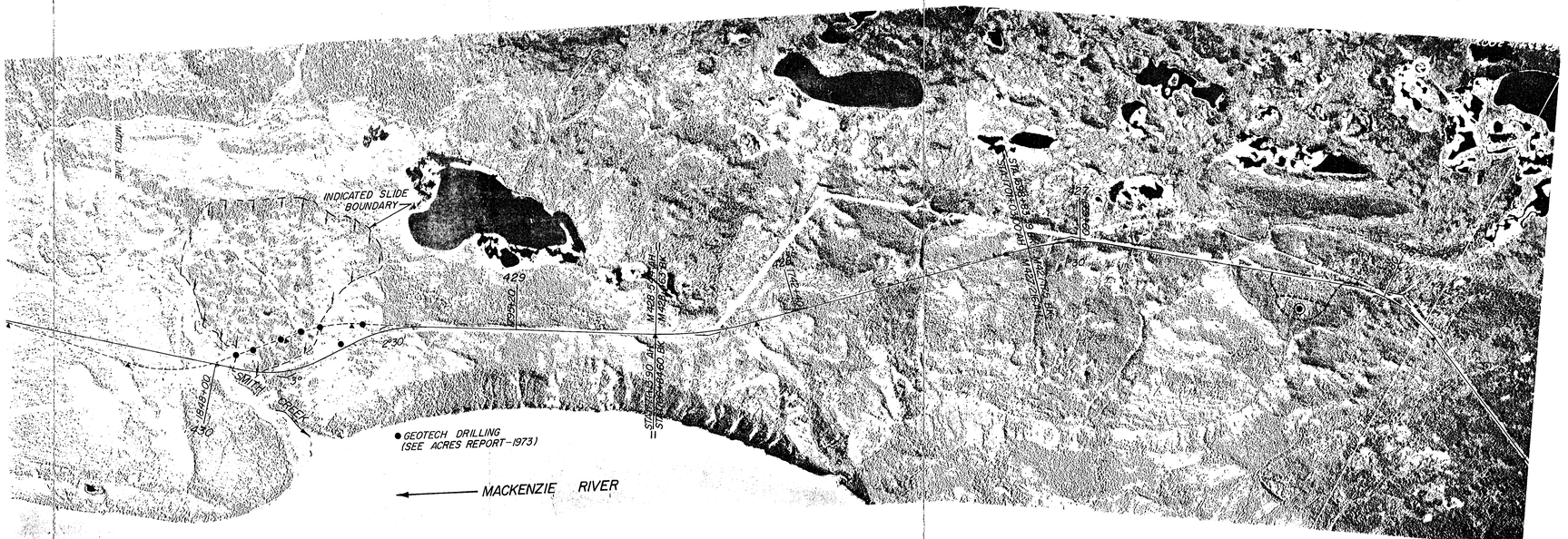
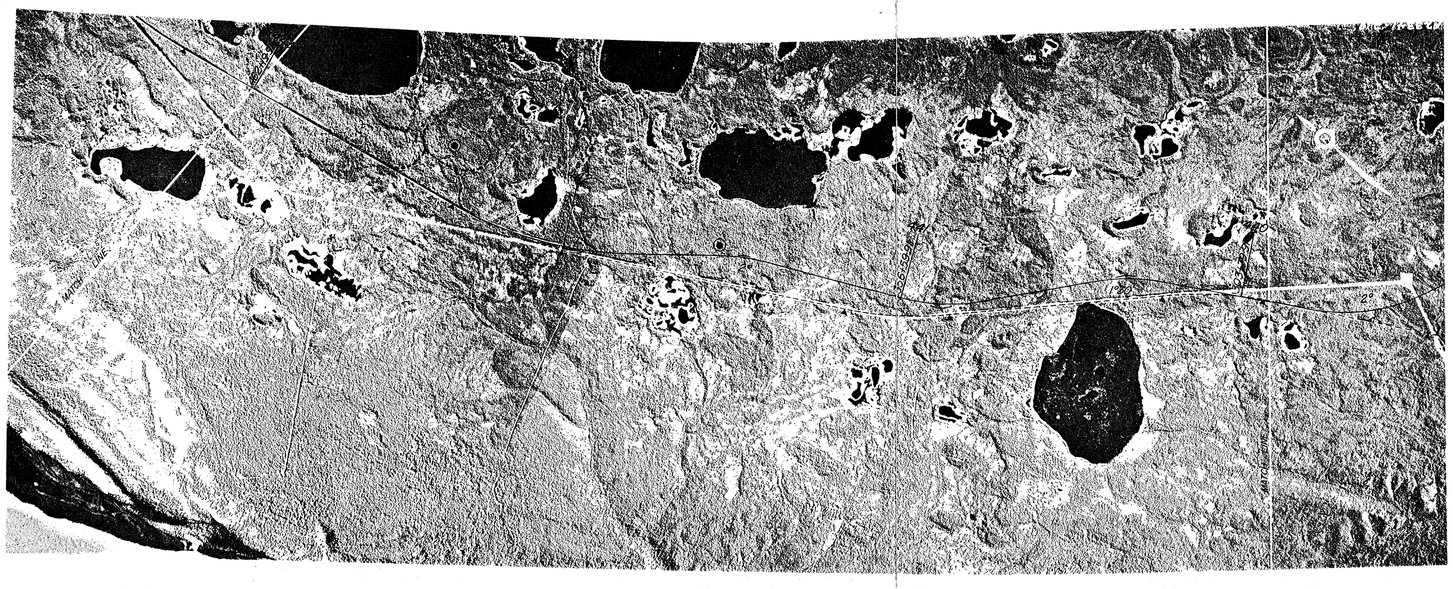
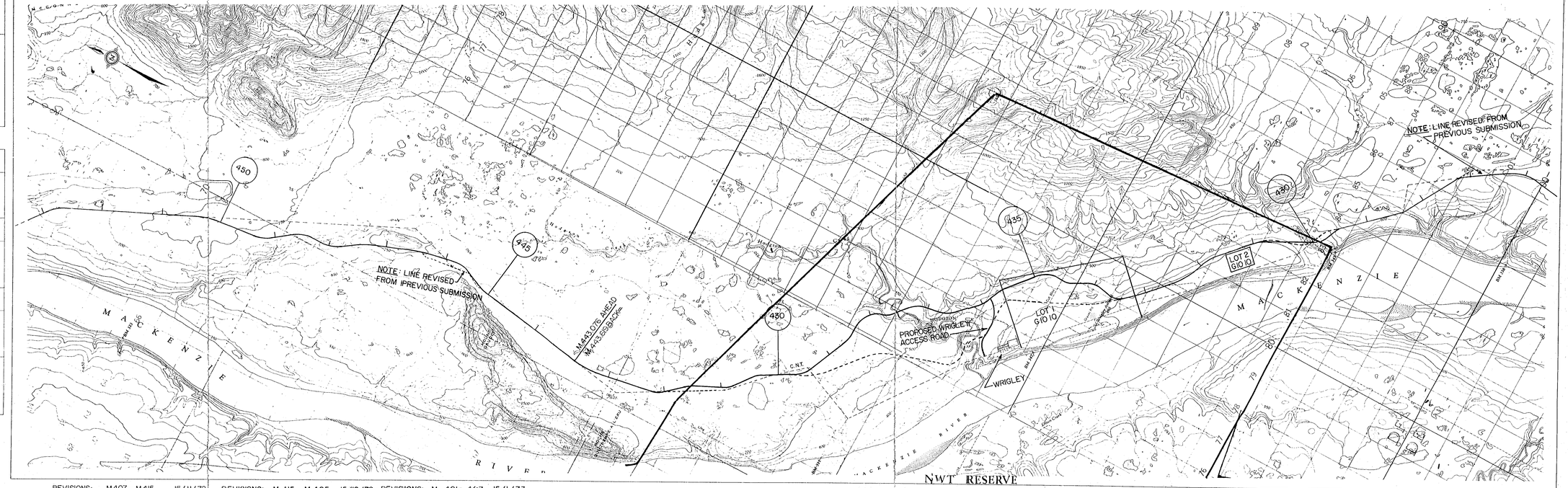

INDICATED SLIDE BOUNDARY
429
430
SOUTH CREEK
GEOTECH DRILLING (SEE ACRES REPORT-1973)
MACKENZIE RIVER

DRAWING No SHEET No TOTAL SHEETS

PLAN





MOSAIC

FLIGHT No.
PHOTO No.
ORIGINAL SCALE

FLOWN
PHOTOGRAPHERTON
ZONE LOCATED IN F.

PROFILE

℄ PROFILE
SOILS
CROSS FALL GRADELINE
DRAINAGE
STRUCTURES NOTED

	SURVEYED	DATE	PLOTTED	DATE	CHECKED	DATE

REVISIONS: M407—M415 15/11/72 REVISIONS: M.415—M.425 15/12/72 REVISIONS: M· 401- 407 15/1/73