PRELIMINARY
BASIC ENVIRONMENTAL DATA

BIG SMITH CREEK BRIDGE

REFERENCE MILE 546 MACKENZIE HIGHWAY

DEPARTMENT OF PUBLIC WORKS
EDMONTON, CANADA

January , 1973

F. F. SLANEY & COMPANY LIMITED
Vancouver, Canada

PRELIMINARY

BASIC ENVIRONMENTAL DATA
BIG SMITH CREEK BRIDGE
REFERENCE MILE 546

MACKENZIE HIGHWAY
NORTHWEST TERRITORIES

DEPARTMENT OF PUBLIC WORKS
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F.F. SLANEY & COMPANY LIMITED
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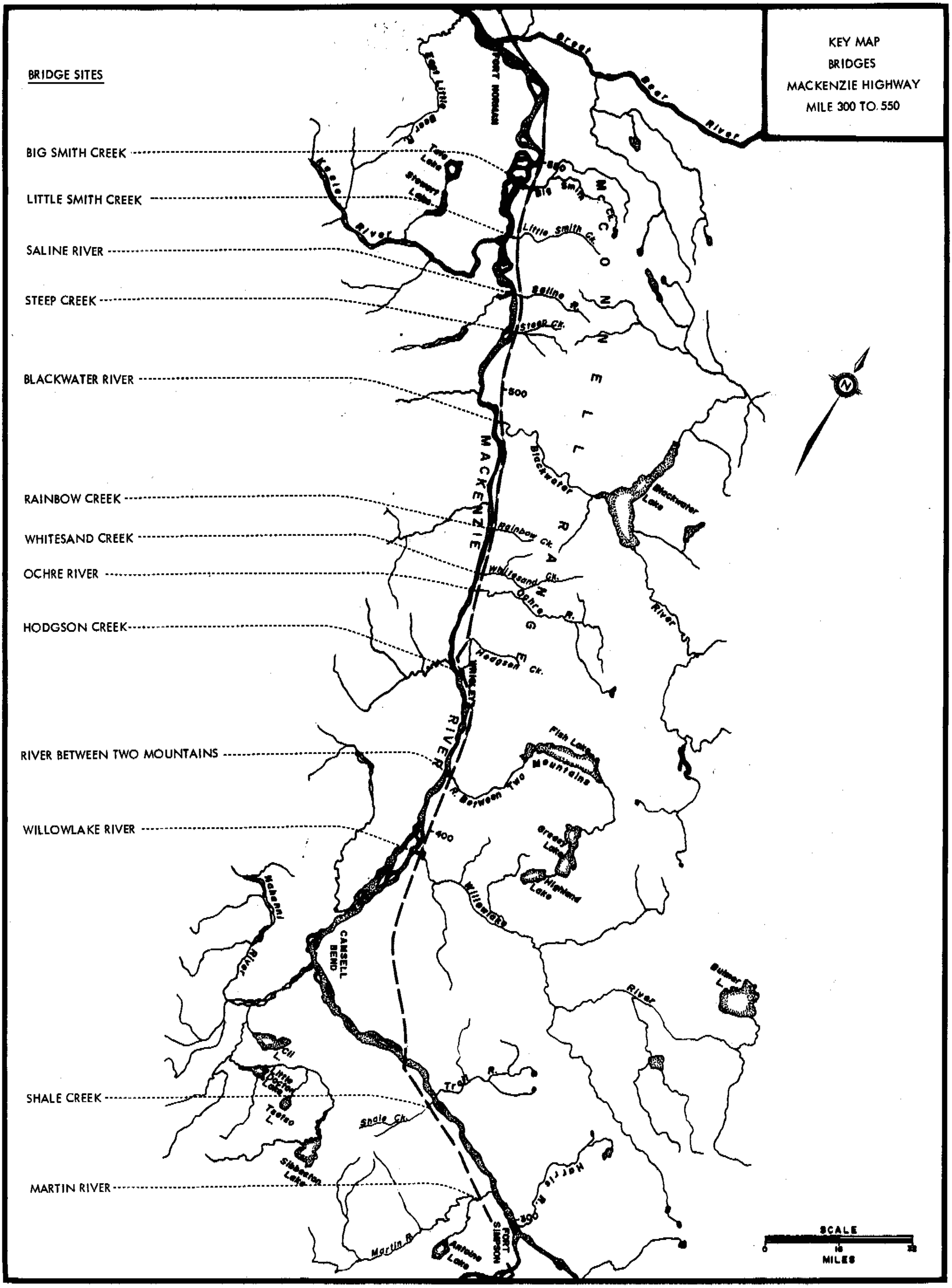

KEY MAP
BRIDGES
MACKENZIE HIGHWAY
MILE 300 TO 550
BRIDGE SITES
BIG SMITH CREEK
LITTLE SMITH CREEK
SALINE RIVER
STEEP CREEK
BLACKWATER RIVER
RAINBOW CREEK
WHITESAND CREEK
OCHRE RIVER
HODGSON CREEK
RIVER BETWEEN TWO MOUNTAINS
WILLOWLAKE RIVER
SHALE CREEK
MARTIN RIVER
FORT NORMAN
Great Bear River
Keele River
Little Smith Ck.
Saline R.
Steep Ck.
500
MACKENZIE
McCONNELL RANGE
Blackwater
Blackwater Lake
Rainbow Ck.
Whitesand Ck.
Ochre R.
Hodgson Ck.
WRIGLEY
RIVER
Fish Lake
R. Between Two Mountains
400
Highland Lake
Willowlake
Nahanni River
CAMSELL BEND
River
Trout R.
Shale Ck.
Martin R.
300
FORT SIMPSON
SCALE
0
16
32
MILES


MACKENZIE HIGHWAY
BIG SMITH CREEK BRIDGE
REFERENCE MILE 546
N
NORTH SHORE
CAMPSITE
RIPRAP REQUIRED

PART 1

BASIC ENVIRONMENTAL DATA

1.1 SURFICIAL GEOLOGY

The bridge site is on low alluvial terrace with near surface bedrock. Banks appear stable apart from normal fluvial erosion on outer curved part of thalweg.

1.2 SOILS

Soils are peaty gleysols on north approaches. Bedrock is shallow. No particular difficulties are apparent except that approach fill material should be selected to avoid introducing silt into the stream.

1.3 VEGETATION

Vegetation cover is an important feature of this site which is by far the most attractive stream in the section of highway from mile 300 to 550. Special precaution should be taken to avoid disturbance of the right-of-way. Construction camps should be set up as far as is practical from the crossing site to avoid disturbance to cover.

1.4 WILDLIFE

Disturbance of wildlife would be minimal in this locality.

1.5 FISH

Velocity of the stream is not important for fish at this location.

Particular attention should be focused on the prevention of runoff erosion and silt entering the stream. It is obvious that debris and such chemicals as diesel, motor oil and turbo fuel should be kept away from the stream at all times.

Big Smith is a clear, fast-flowing stream with coarse gravel substrate and frequent pools. In brief sampling in 1971, Fisheries Service crews captured no fish but found caddisfly larvae.

1.6 ARCHAEOLOGY

An archaeological site has been found within the southern approach to Big Smith Creek. This site is endangered by proposed road construction and should be evaluated. If necessary it should be excavated immediately to avoid conflict with the proposed bridge construction.

1.7 LANDSCAPE - RECREATION

Aesthetically a high bridge over the rock canyon below the falls would be most desirable to develop views into the falls from the bridge structure.

Potential recreation areas could include Big Smith falls and Cleaver Lake. Access should be developed to Cleaver Lake at mile 535 with campsite and trail access to Big Smith falls. A development plan should be prepared for this area.

Two campsites are envisaged at the creek, one a resting area adjacent to the crossing, and the other a more conventional but primitive site south of the river about two miles downstream from the highway.

1.8 AESTHETICS

The proposed cantilevered structure (Drawing No. 2) is the most aesthetically pleasing design submitted. The massive abutments and their sweeping span complement the thinly bedded limestone bedrock and vertical rock walls of the canyon. At least one bridge with some flair is desirable and this site lends itself to such a creation.

1.9 SOCIO-ECONOMIC

This site has obvious appeal. Provision should be made to accommodate foot traffic. The bridge will become a view point in any event.

The fact that these environmental investigations are limited to the section of highway from Mile 300 to 550 limits complete understanding of the site's significance in context with the entire road system. However, the population centres north of Big Smith Creek would probably find this site attractive and local visitation would be drawn from the north and the south.

1.10 CONSTRUCTION

This site is particularly sensitive to careless material handling on the part of contractors. Extra precaution should be built into the contract to ensure that the falls and rocky canyon walls below the bridge site are not festooned with 45 gallon drums and decking from temporary structures.

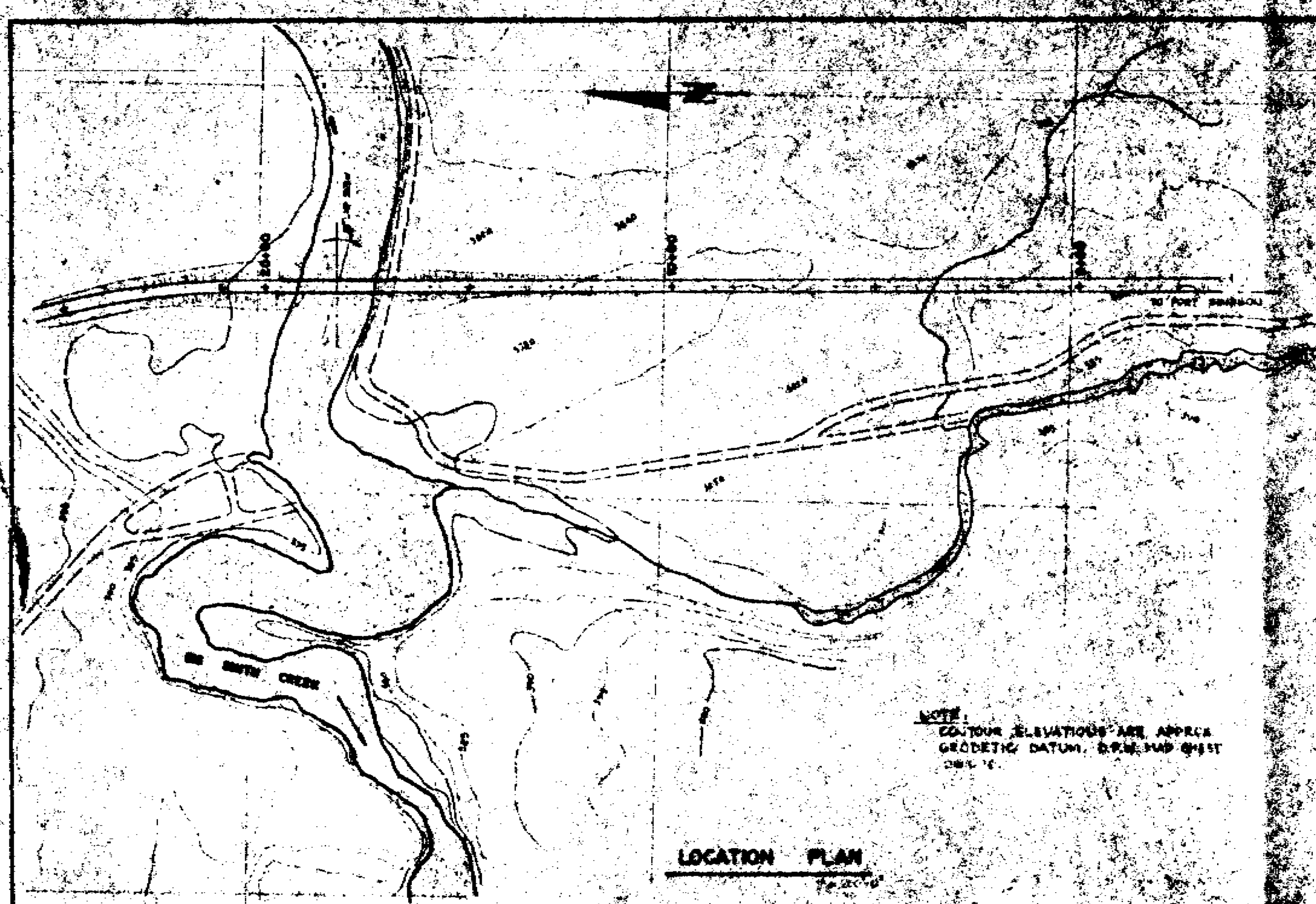
PART 2

ASSESSMENT

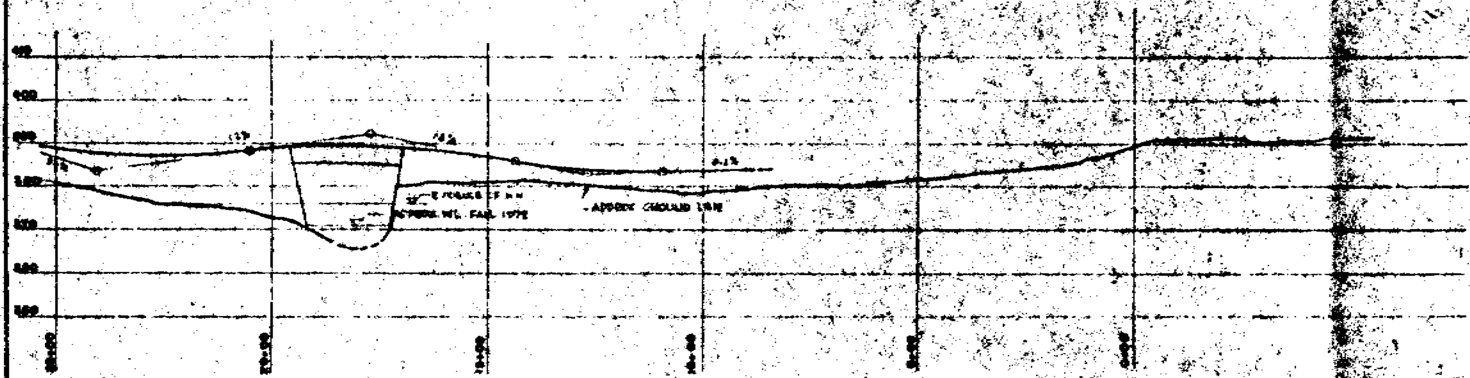
This is a most attractive site and visitors with an appreciation of aesthetic values will be the primary beneficiaries. It becomes the bridge designers to produce a structure with its own appeal.

29.10.72. Big Smith Creek looking north. Road centerline is located at the extreme right of the photo. Banks appear stable; single span bridge appears suitable. Erosion on bends of thalwegs can be expected.

24.10.72. Looking easterly up Big Smith Creek. Waterfall is on lower edge of photo. CNT landline and winter road are across the center. The highway is located adjacent to and upstream of CNT landline. The crossing appears stable but may have flood hazard; will have low impact on fish is siltation prevented.

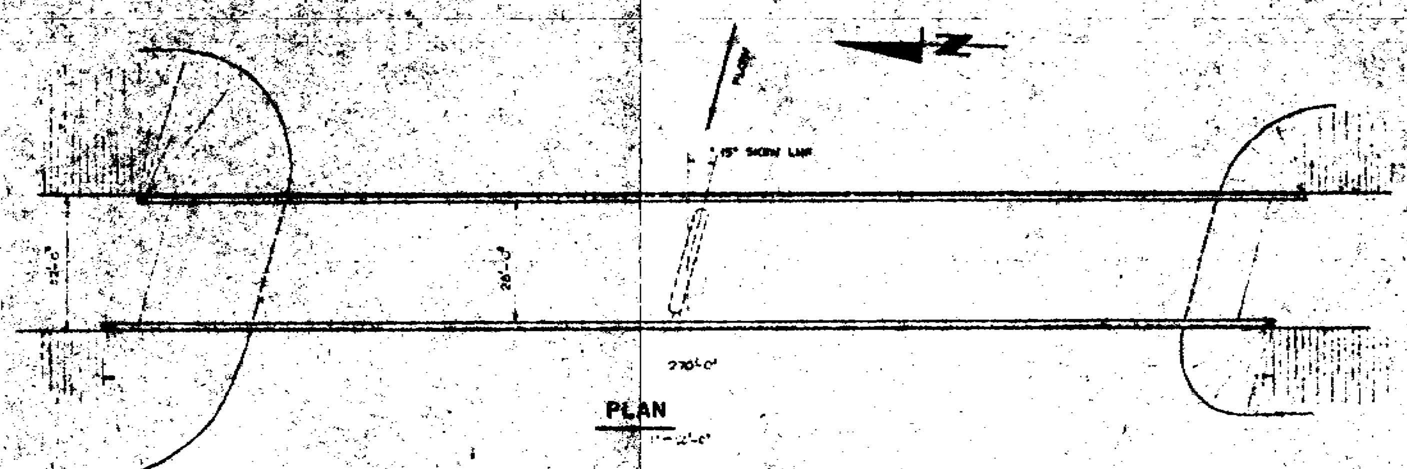


LOCATION PLAN

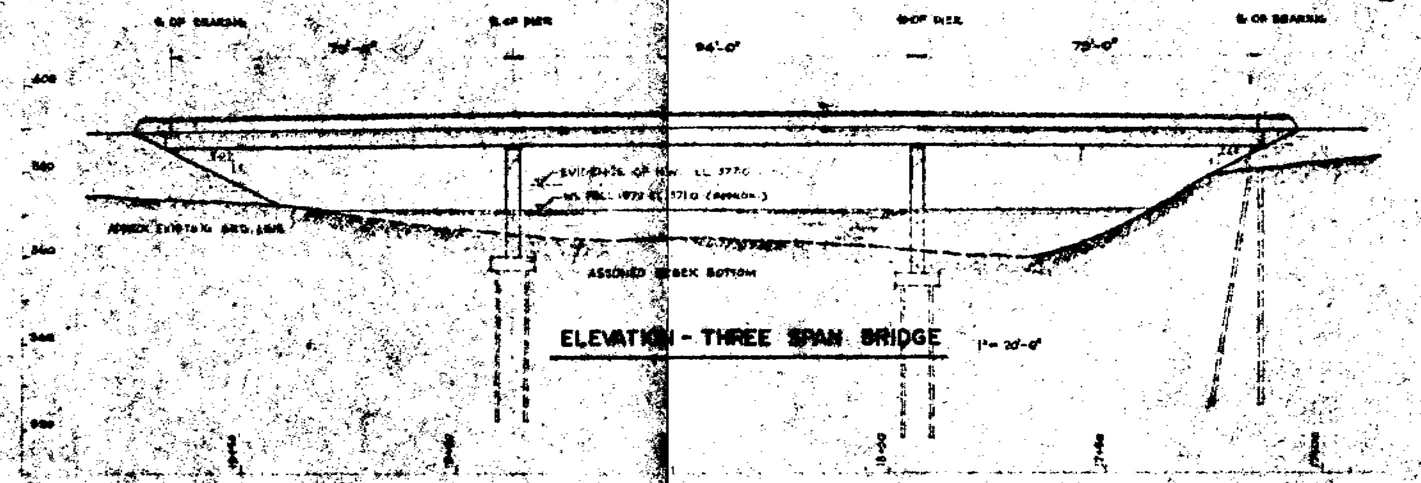


PROFILE

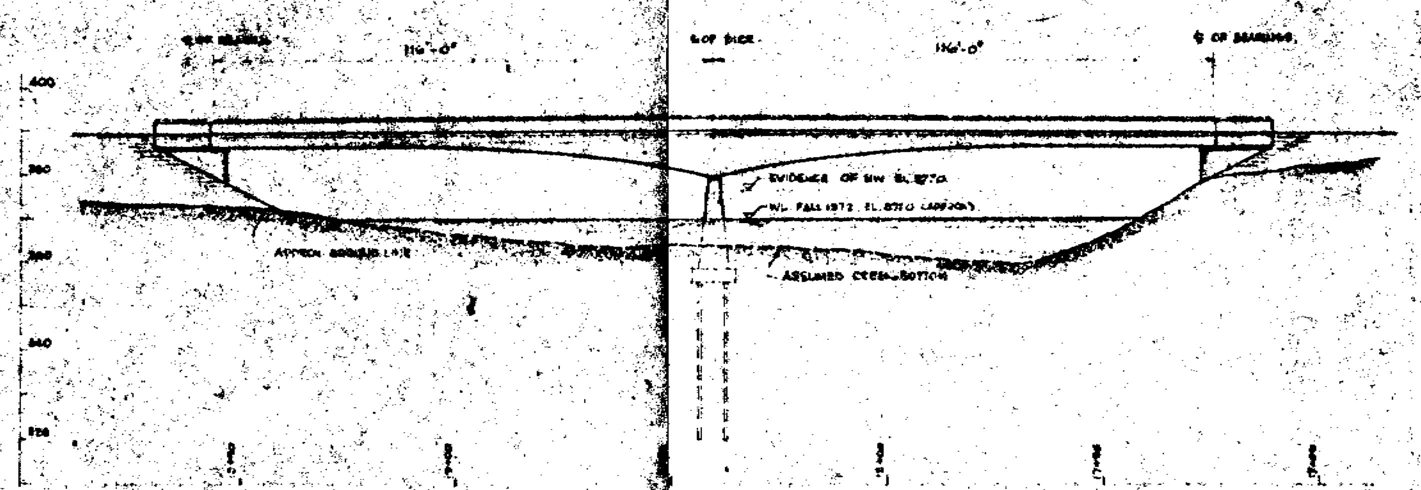
NOTE:
PROFILE ELEVATIONS ARE APPROXIMATE AND HAVE BEEN SCALED FROM THE ABOVE PLAN



PLAN



ELEVATION - THREE SPAN BRIDGE



ELEVATION - TWO SPAN BRIDGE

GENERAL NOTES.

1. LOCATION OF CROSSING & BASIC DESIGN DATA AS PER WALTER PARISH TRIMBLE DRAWING NO. 116-4-72
2. DESIGN STANDARDS:-
   a). LOADING.
      DEAD LOAD : INCLUDES 30 PSF FOR FUTURE WEARING SURFACE.
      LIVE LOAD : 1. CSA HS20-S16 LOADING PLUS IMPACT.
         2. SINGLE CSA H40-S16 TRUCK APPLIED TO CENTER OF ROADWAY; ALLOWING 25% OVERSTRESS AND NO IMPACT.
   b). CODES AND SPECIFICATIONS.
      CSA S6-1966 HIGHWAY BRIDGE SPECIFICATION
      AASHO 1969 HIGHWAY BRIDGE SPECIFICATION, 1970, 71, 72 INTERIM SPECIFICATIONS.

DEC. 1 1972

Stanley Associates Engineering Ltd.
CONSULTING ENGINEERS

CANADA DEPARTMENT OF PUBLIC WORKS
WESTERN REGION

MACKENZIE HIGHWAY

BIG SMITH CREEK - MILE 546

PROPOSED BRIDGE CROSSING -

SHEET NO. 3 OF 5

DRAWING NO. 650-7-1-P3

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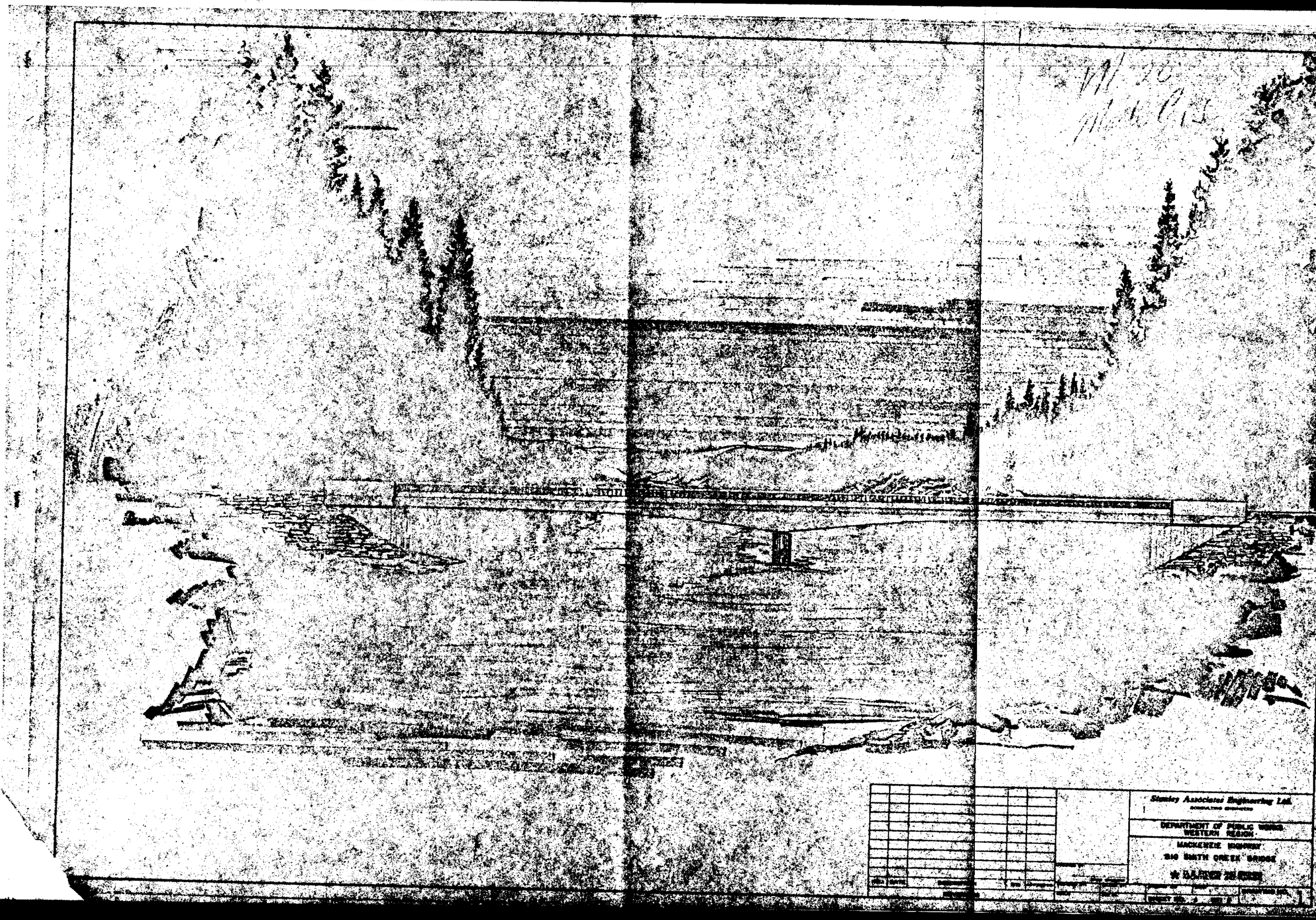
Dec 1st 72



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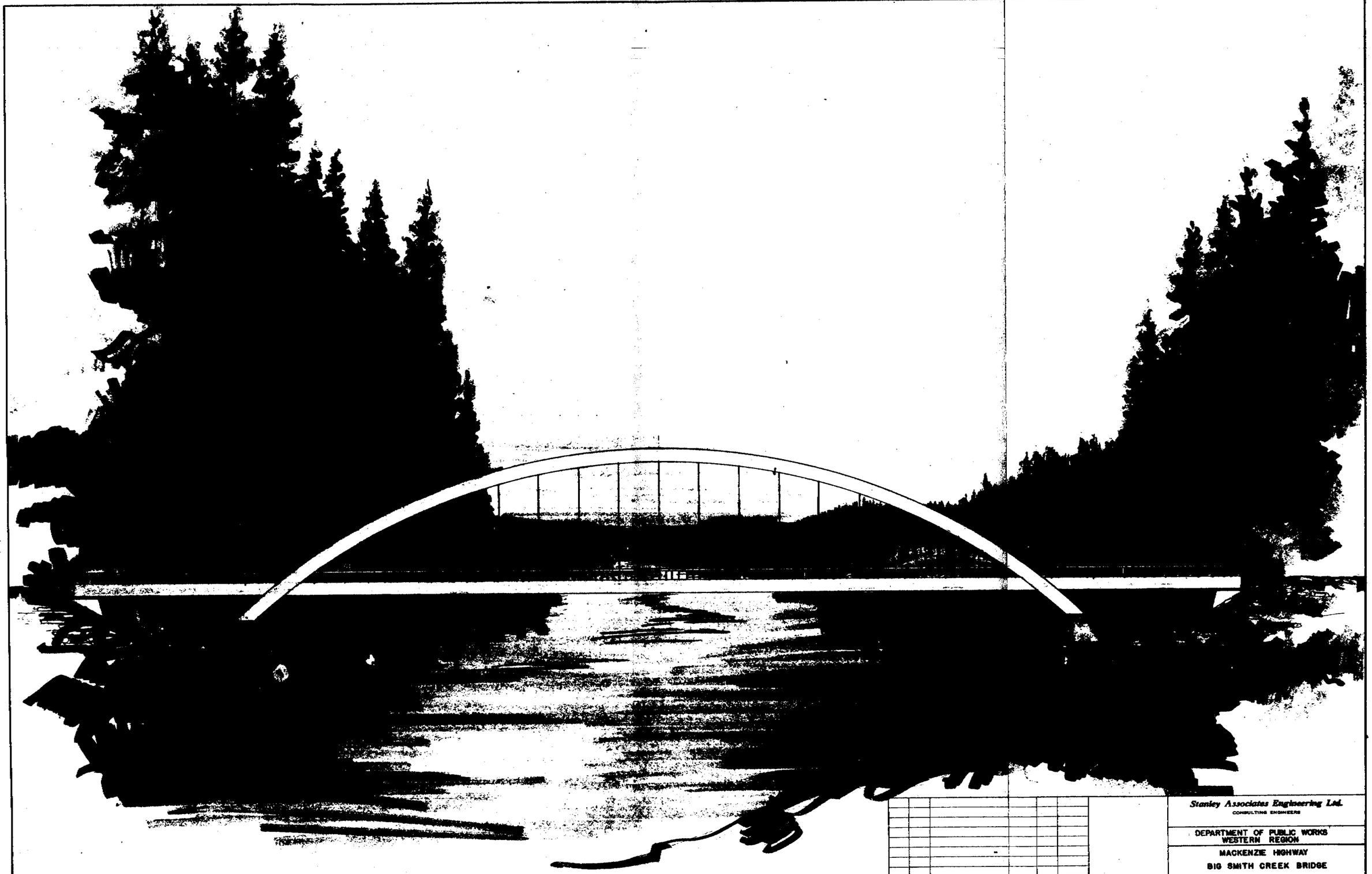
MACKENZIE HIGHWAY

240 SMITH CREEK BRIDGE



NO.	DATE	DESCRIPTION	BY:	APPROVED
		REVISIONS		

APPROVED BY:
CHIEF ENGINEER

DESIGNED BY: | DRAWN BY: | CHECKED BY: | DATE:
SCALE: | JOB No.

SHEET NO. 8 OF: 8

DRAWING NO. 3

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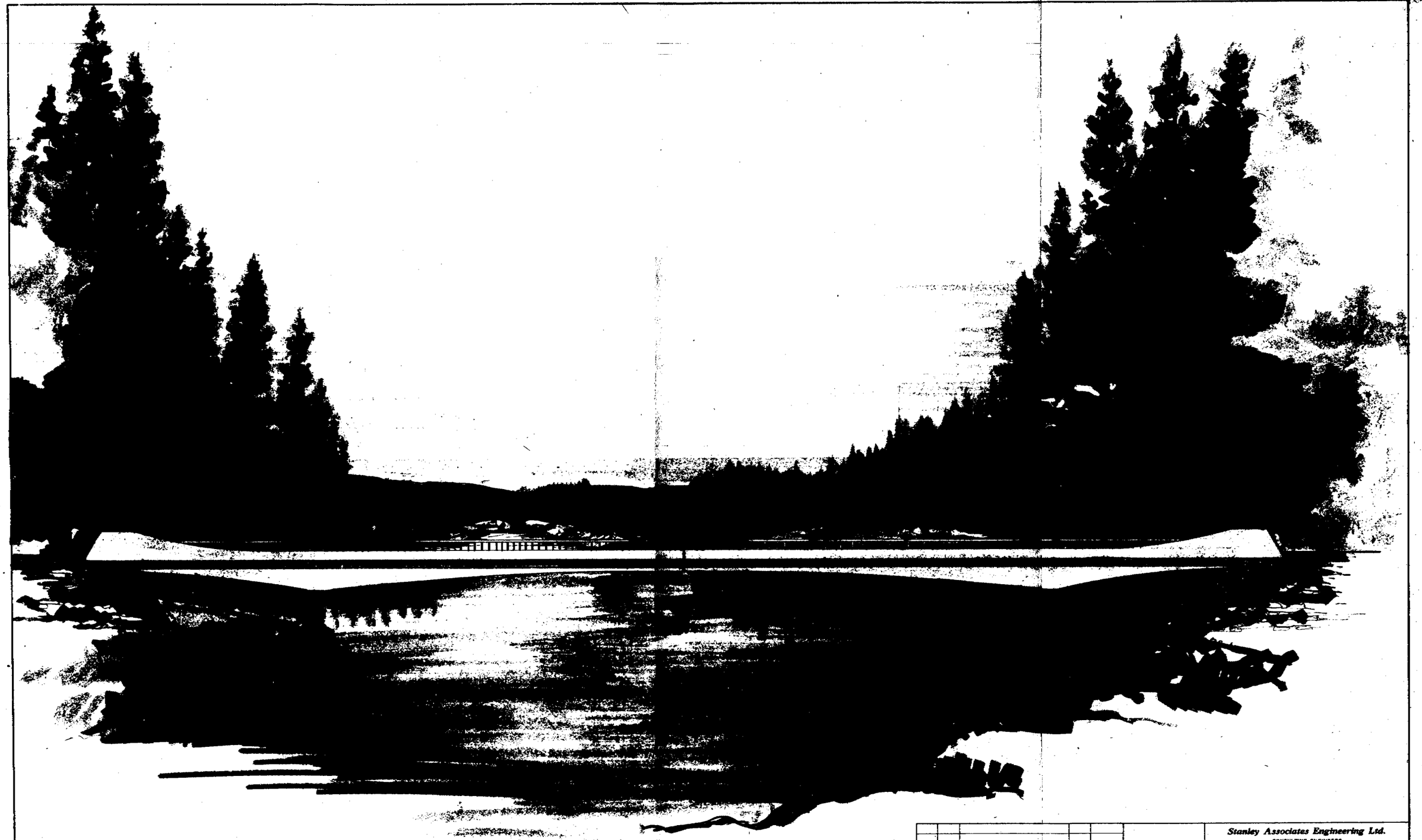
WESTERN REGION

MACKENZIE HIGHWAY

BIG SMITH CREEK BRIDGE

D. S. STEVENS AND PARTNERS
ARCHITECTURE AND PLANNING



NO.:	DATE	DESCRIPTION	BY:	APPROVED
		REVISIONS		

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DESIGNED BY: | DRAWN BY: | CHECKED BY: | DATE:
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DEPARTMENT OF PUBLIC WORKS
WESTERN REGION

MACKENZIE HIGHWAY
BIG SMITH CREEK BRIDGE

D. S. STEVENS AND PARTNERS
ARCHITECTURE AND PLANNING

SHEET NO. 7 OF: 8 | DRAWING NO. 2