

REPORT ON THE AREA REFERRED TO AS

BLOCK "B" PERMIT GROUP

(Permits Nos. 549 to 555, 561 to 568, 587 to 590 and 592)

CAMERON HILLS BLOCK, NORTHWEST TERRITORIES

BY

D. A. POUNDER

THE CALIFORNIA STANDARD COMPANY

July, 1954.

BLOCK "B" - CAMERON HILLS BLOCK, NORTHWEST TERRITORIES.

INTRODUCTION

This report is written in compliance with the regulations governing petroleum and natural gas rights in the Northwest Territories and the Yukon Territory. Section 25(2) and Section 30 of these regulations require a report on operations in connection with permits held under these regulations at the termination of eighteen months from the date of the permits.

Twenty-seven permits, totalling 1,646,840 acres, more or less, were issued to the following companies on December 29, 1952:

California Dominion Company	6 permits
California Canadian Company	5 permits
California Mackenzie Company	8 permits
The California Standard Company	8 permits

All permits were assigned to The California Standard Company on January 8, 1954.

The block of 27 permits is referred to for convenience as the Cameron Hills Block. Section 22 of the regulations allows grouping of permits for exploratory work and expenditures. The Cameron Hills Block has been divided into two permit groups as follows:

Block "A" - 7 permits

Permits Nos. 529, 530, 531, 532, 533, 534 and 591.

Block "B" - 20 permits

Permits Nos. 549 to 555, 561 to 568, 587 to 590 and 592.

This report concerns the group of 20 permits referred to as Block "B". The approximate location of these permits is shown on attached Map "B". The 7 permits referred to as Block "A" are discussed in a separate report. It is pointed out that the entire Cameron Hills Block of 27 permits has been explored as one unit and consequently much of the body of the two reports is similar.

The acreage included in Block "B" permit group is as follows:

Permit No. 549	61,440 acres
Permit No. 550	63,360 acres
Permit No. 551	63,360 acres
Permit No. 552	63,360 acres
Permit No. 553	63,360 acres
Permit No. 554	56,320 acres
Permit No. 555	63,360 acres
Permit No. 561	63,360 acres
Permit No. 562	63,360 acres
Permit No. 563	63,360 acres

Permit No. 564	63,360 acres
Permit No. 566	63,360 acres
Permit No. 567	63,360 acres
Permit No. 568	63,360 acres
Permit No. 587	63,360 acres
Permit No. 588	57,600 acres
Permit No. 589	45,056 acres
Permit No. 590	63,360 acres
Permit No. 592	56,320 acres

The total acreage of the permit group is approximately 1,227,136 acres.

TOPOGRAPHY, DRAINAGE AND TRANSPORTATION FACILITIES

Block "B" group of permits forms approximately the western three-quarters of the Cameron Hills Block. The permit group is about 80 miles long (east to west) and about 40 miles wide (north to south). The area can be divided roughly into two main topographic divisions. The area of high elevation includes about the southeast one-third which lies on the top of the Cameron Hills and their upper slopes. The lower lying north and west portions comprise about two-thirds of the area of Block "B".

The area on top of the Cameron Hills is flat to gently rolling. It is dotted with numerous muskegs and small to large lakes. Trees cover the greater part of the hills but fires in recent years have left large areas of deadfall. Two very prominent topographic features are notable in this division. The Cameron River and some of its tributaries have cut very deep gorges or valleys. It is estimated that at one locality the steep sided valley of the Cameron River is from four to five hundred feet deep. The other noteworthy feature is a large area east of the sixth meridian where an amazing southwest-northeast alignment of parallel gravel ridges is found. The ridges are from 40 to 50 feet high and are a product of glaciation. Drainage from the hills is in three directions but eventually all water drains into the Mackenzie River system. The eastern slopes of the hills are drained by numerous creeks to the Hay River. The northern slopes are drained by the Cameron River system and numerous unnamed creeks which flow either directly into Tathlina Lake or into the upper part of the Kakisa River which in turn flows into Tathlina Lake. A portion of the southern part of this division drains to the south and southwest and forms the headwaters of the Petitot River system.

The low-lying area at the foot of the hills forms the northern and western part of Block "B" permit group. The area around Tathlina Lake is one huge muskeg which is criss-crossed by the meandering channels of the creeks and rivers flowing from the hills to the open waters of the lake. The western part of the area is somewhat higher in elevation but it contains numerous small to large muskegs and uncounted small to large lakes. This western portion is excellent beaver country. Some good stands of timber are found in the western part of this permit group. Spruce and poplar are the dominant varieties but willow, tamarack and some birch are also found.

There were no man-made transportation facilities in this area, except for the tractor trail which was constructed during the survey of the 60th Parallel. The 6th Meridian has been cleared and surveyed and was of great assistance in establishing survey control for exploration work. The trails which have been bulldozed during exploratory operations can be traversed during months when the

ground is solidly frozen but require constant snowplowing to permit passage of wheeled vehicles.

HISTORY OF EXPLORATION AND METHODS OF INVESTIGATION

Exploration work in the Northwest Territories was commenced by The California Standard Company many years ago. The discussions which follow have been divided into three main sections:

- (a) Surface Geological Investigations
- (b) Subsurface Geological Investigations
- (c) Geophysical Investigations

(a) Surface Geological Investigations

During the past number of years, The California Standard Company has been carrying out a geological evaluation of various areas in the Northwest Territories. These studies have been done as a normal part of exploration and the results have been used in selecting lands on which further, more intensive exploration methods appear warranted.

The greater part of the vast area of the Northwest Territories which is underlain by sedimentary strata is covered by a mantle of glacial deposits, soil or muskeg. This limits the study of pre-glacial geology to areas where bedrock is exposed in river and creek valleys, along lake shores and on ridges. The Cameron Hills are a major topographic feature in the southern portion of the Northwest Territories under investigation. It was originally thought that these hills must have a bedrock core which would be exposed in places along the edge of the hills. However, no bedrock outcrops are known within the limits of Block "B" permit group. The deep valley of the Cameron River exposes about 400 to 500 feet of glacial boulder clay. It would appear that the hills are composed of a great pile of glacial deposits hundreds of feet thick.

During the summer of 1949, a geological party carried out the first mapping of surface geology in the Northwest Territories for The California Standard Company. The work in 1949 was restricted to a study of sections exposed along the Hay River valley and adjacent areas. The sections examined consisted of Cretaceous marine shales and Devonian marine shales and limestones. Middle Devonian strata were the oldest rocks seen in exposures by this field party. Upper Devonian limestones exposed at Alexandra and Louise Falls are of particular interest. These limestones, of organic origin, in part exhibit reefoid characteristics.

The field season of 1951 saw another geological field party carrying out studies of bedrock exposures along the Slave River, Little Buffalo River, Buffalo River, and the shores of Great Slave Lake. Sections studied ranged from Precambrian and early Paleozoic rocks along the Slave River to Upper Devonian limestones exposed at Lady Evelyn Falls on the lower part of the Kakisa River.

During the field season of 1952, a geological party conducted studies of surface sections along the Petitot River, Liard River and South Nahanni River. Stratigraphic information obtained was incorporated with data obtained previously in areas to the east.

An overall study of all regional data was completed and it was decided that further more detailed methods of investigation were warranted in the general region of the Cameron Hills.

In the Spring and summer of 1953, another geological field party studied sections along Kakisa River, Kakisa Lake, Horn River, Redknife River, Bouvier River and a portion of the Mackenzie River. The sections examined were exposures in the vicinity of the Cameron Hills Block which had not been previously studied. All of the exposures examined were Upper Devonian in age.

All of the data obtained from studies of surface geology have been integrated with information obtained from studies of available subsurface geology. These combined geological studies are the basic foundation of all other methods of investigation used in the exploration for oil or natural gas.

(b) Subsurface Geological Investigations

The rapid advance of exploration for oil into frontier areas of the northern bush country began some four to five years ago. About this time, The California Standard company initiated an intensive study of the subsurface geology in these frontier areas. These studies entail an examination of drill samples, cores, electrologs and other logging devices, which become available from wells and core holes drilled by other subsurface investigators in the mining and oil industries.

The first work was carried out on wells drilled many years ago along the Mackenzie River system and the shores of Great Slave Lake. Most of this drilling was carried out during the emergency created by World War II. During the past few years, numerous wells and core holes have been drilled at Deep Bay, Big Island, Fort Providence, Mills Lake, Fort Simpson, Camell Bend, Pine Point, etc. These wells have greatly increased the quantity of data available for study and interpretation.

The structural and stratigraphic information obtained from subsurface geological studies is combined with similar data from studies of surface geology. All of these investigations are a continuing project and are an essential part of an oil company's evaluation of lands which are potentially oil productive.

No wells have been drilled in the area designated as Block "B" permit group of the Cameron Hills Block. The only subsurface information available to date is near-surface data obtained from shot holes drilled by a seismograph party. Normally, seismic shot holes are from 40 to 60 feet in depth, if drilling conditions permit, the small rigs to reach that depth. The shallow shot holes drilled in the area on top of the hills penetrated only glacial boulder clay. No flowing, water-bearing sands or gravels were noted. A larger truck-mounted drill was moved to the central portion of Block "B" permit group in March, 1954, to drill three deep shot holes. Bennett and Hurst Drilling Company contracted for these holes. The location of the holes is shown on attached Map B-2. The purpose of these holes was to determine if deeper drilling of shot holes would affect the quality of seismic records obtained. The most southerly of these deep shot holes drilled to a depth of 700 feet. It penetrated glacial sands, gravels, and boulders intermixed with clay down to a depth of about 400 feet. This hole was bottomed in Cretaceous marine shales. The other two shallower holes were drilled until Devonian limestones were reached. The shot holes drilled in this area indicate that glacial deposits are very thick on top of the hills and are very thin in some localities of the low-lying areas.

(c) Geophysical Investigations

Preliminary to conducting a geophysical survey of lands in un-mapped bush country, a great amount of preparatory work must be completed. The operations must be especially designed and planned to meet the conditions present in the particular areas to be explored. Establishing of such operations requires the efforts of every department and division of a large organization.

The first steps taken prior to the setting up of a plan of operations are to determine the exact conditions present in the area. This was done by close examination of aerial photographs purchased from government agencies, construction of aerial mosaics from the photographs, and scouting the area in company owned aircraft and on foot. Familiarity with the terrain is essential in planning best routes of access.

Communications and supply are the life line of all operations. A two-way radio network system was set up for direct continuous contact with a district base office. Three company owned and operated aircraft were used to supply operations in the field. The supply system requires a large investment and very careful planning and execution. The maintenance of geophysical survey parties in the field is entirely dependent on uninterrupted communications and supply.

The next step in planning seismograph operations in the Cameron Hills Block depended on technical considerations. Experience in other areas of northern bush and muskeg country had shown that it was necessary to "sample" an area to determine if data could be acquired, from seismic records obtained, which would permit a study of subsurface structure. With this in mind, it was decided to carry out a seismic record quality reconnaissance of the Cameron Hills Block. After this decision was made, actual ground work was commenced to prepare the area for the seismograph survey.

Early in December, 1952, bulldozer and contract survey teams moved to the Cameron Hills Block. Four bulldozers working in teams of two and two survey parties began cutting and surveying trails to be shot by the seismic party. The attached maps (Map No. A-1 and B-1) show the line bulldozed and surveyed in Block "B" permit group during the winter of 1952-1953. A total of 251.14 miles of line were cleared and surveyed. The preparatory bulldozing and surveying was suspended in mid-March, 1953, when spring break-up ground conditions prohibited any further work until the following winter freeze-up.

Plans were completed, during the summer of 1953, for a seismograph party to commence shooting of line in the Cameron Hills Block as soon as the ground was frozen solidly enough to permit the party to move about. A mobile fully equipped camp mounted on logging sleighs and pulled by bulldozers was made ready to house the crew and serve as a base of operations. It was decided that Geophysical Service International Party No. 408 would carry out the survey. This party had many years experience in bush operations for The California Standard Company.

The very late freeze-up and heavy snows last winter caused costly delays in the crew reaching the start of seismic operations. Finally, early in February, 1954, the crew commenced shooting of the record quality reconnaissance program in Block "B" permit group. The party was a fully equipped seismograph crew with all equipment mounted on vehicles called "all-tracks". These vehicles were especially designed to operate in bush and muskeg country. Five bulldozers were used during the winter of 1953-54. Two bulldozers were used almost exclusively in moving the sleigh-mounted camp.

The other three bulldozers snowplowed trails out during the previous winter and cleared new line for the seismic crew to shoot. In March, 1954, a larger drilling unit, belonging to Bennett and Hurst Drilling Company, was moved to the area to drill a few deep shot holes to determine if any significant change was evident on the seismic records obtained. Three deep shot holes were drilled in the central portion of Block "B" permit group. All of the planned program was completed by the seismic crew in mid-April, 1954.

Some pertinent data respecting seismic operations in Block "B" permit group of the Cameron Hills Block are as follows:

Number of miles of line shot	149.9
Number of shot holes drilled	598.
Total footage of shot holes	23,007.
Number of deep shot holes drilled	3.
Total footage of deep shot holes	1,353.

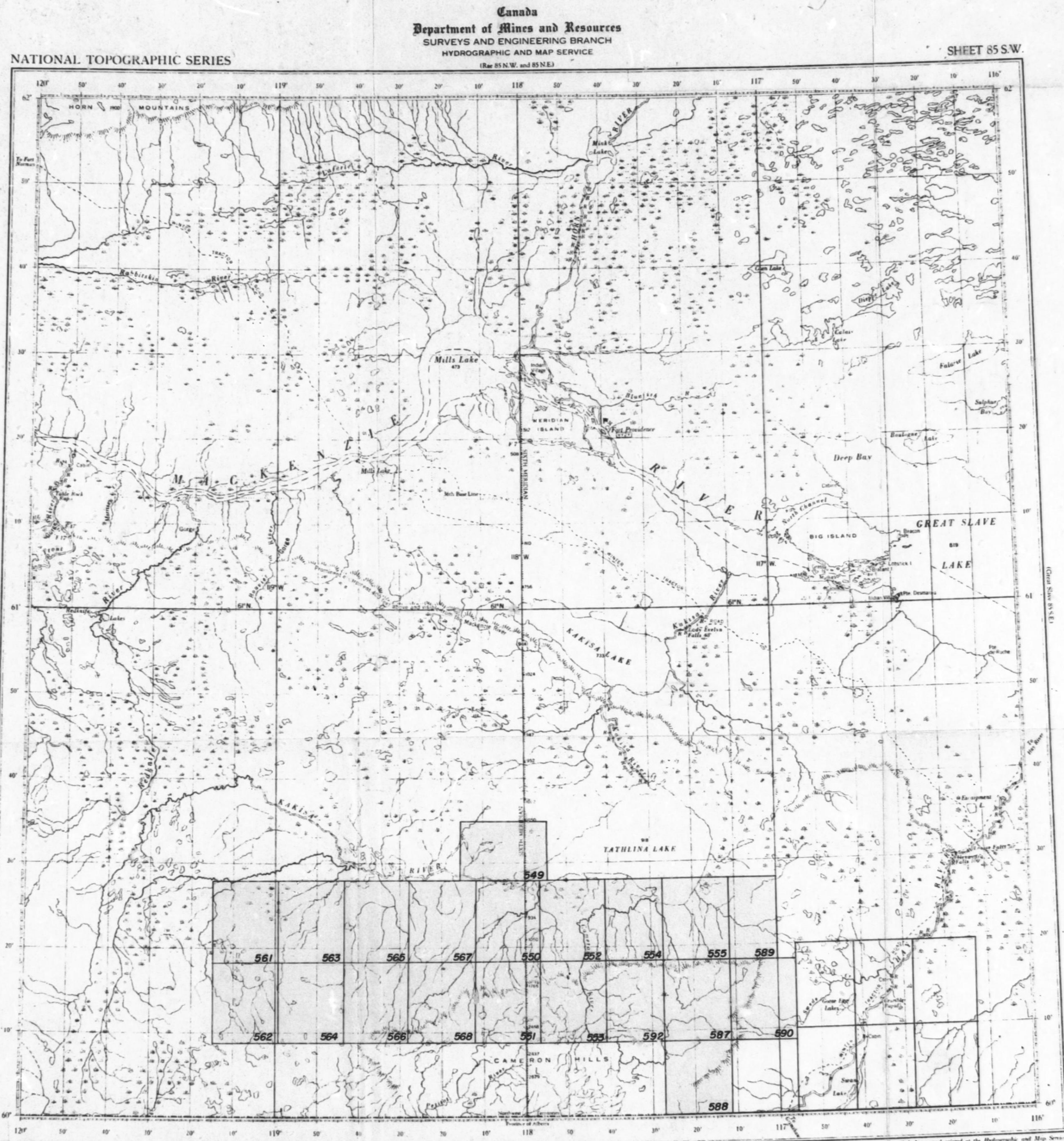
Map No. B-2 shows the location of each shot hole. The results of interpretation of the seismic data obtained are being studied and a final interpretation will not be completed by our own geophysical review staff for some months.

EXPENDITURES

The various items of expenditure incurred in carrying out the exploratory investigations detailed in this report have previously been submitted to the Chief of the Lands Division under separate cover. Many items of expenditure are a general charge to the entire Cameron Hills Block. These items have been prorated to Block "A" and Block "B" permit groups. The itemized statement of the expenditures on Block "B" permit group has been prepared from company records by our accounting staff, and this statement has been supported by a Statutory Declaration.



D. A. POUNDER,
District Exploration supervisor,
Northern District,
The California Standard Company,
Peace River, Alberta.



THE DETERMINATION OF THE LENGTH OF THE MERIDIAN OF THE CANADIAN TERRITORIES

The determination of the length of the meridian of the Canadian territories is a task of great importance. It is a task which has been undertaken by the Survey of Canada since its inception in 1869. The Survey of Canada has been successful in determining the length of the meridian of the Canadian territories to within a few feet. This is a remarkable achievement, considering the vastness of the territories and the difficulties of the task.

PER CENITRE

Boundary (perennial)	—
Boundary (seasonal)	—
Track or ridge	—
Indication	—
Boundary (seasonal) with rail line	—
Boundary (seasonal) with road	—
Boundary (seasonal) with river	—
Boundary (seasonal) with lake	—
Boundary (seasonal) with swamp	—
Boundary (seasonal) with bog	—
Boundary (seasonal) with marsh	—
Boundary (seasonal) with tundra	—
Boundary (seasonal) with forest	—
Boundary (seasonal) with meadow	—
Boundary (seasonal) with pasture	—
Boundary (seasonal) with field	—
Boundary (seasonal) with garden	—
Boundary (seasonal) with orchard	—
Boundary (seasonal) with vineyard	—
Boundary (seasonal) with plantation	—
Boundary (seasonal) with park	—
Boundary (seasonal) with garden	—
Boundary (seasonal) with orchard	—
Boundary (seasonal) with vineyard	—
Boundary (seasonal) with plantation	—
Boundary (seasonal) with park	—

PROVIDENCE
NORTHWEST TERRITORIES
(DISTRICT OF WILKINSON)
(PRELIMINARY EDITION)

Scale 8 miles to 1 inch or 1:126,880

45-1-4-4
MAP No. "B"



PERMIT GROUP BLOCK "B"

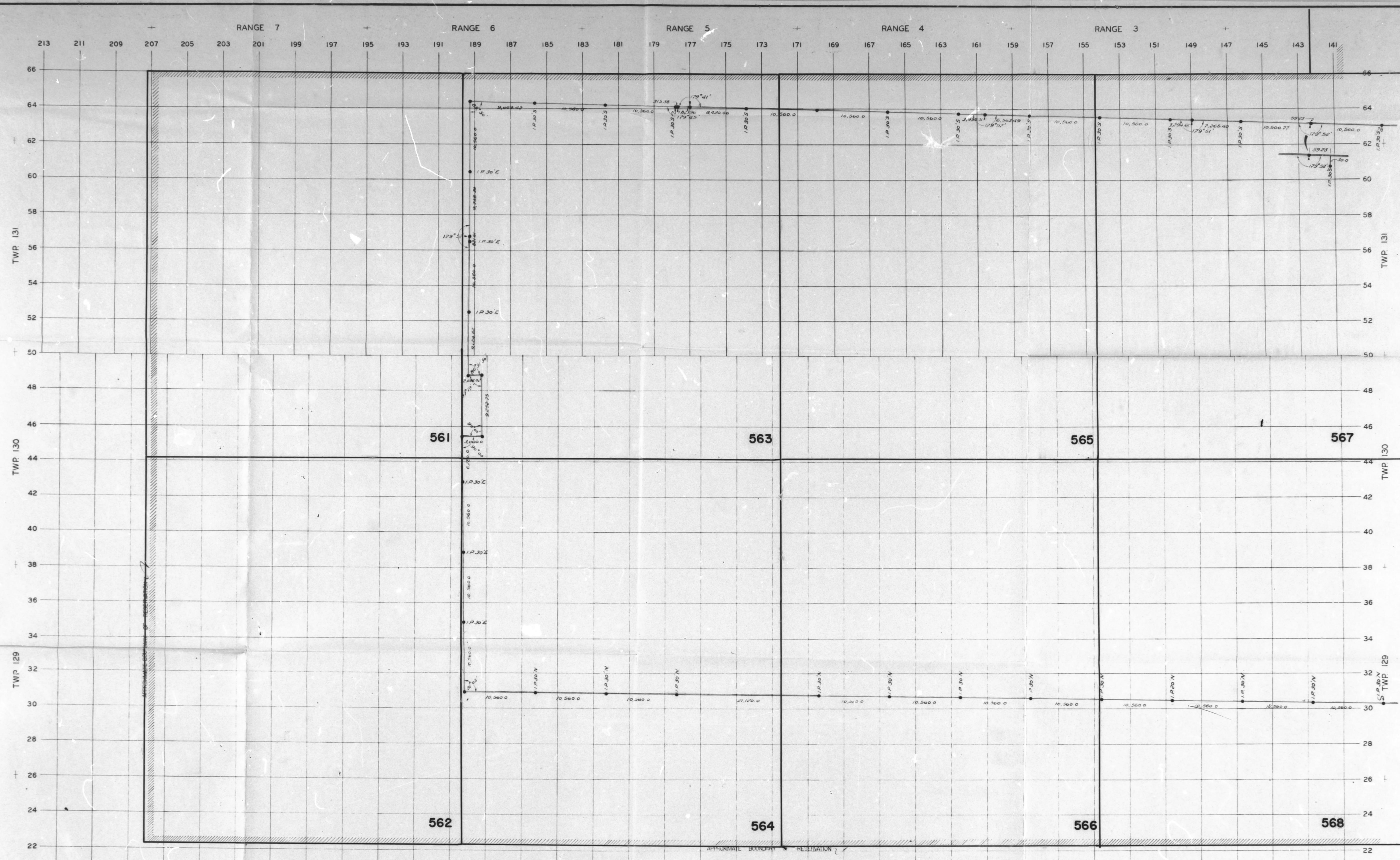
MAP No. B

67

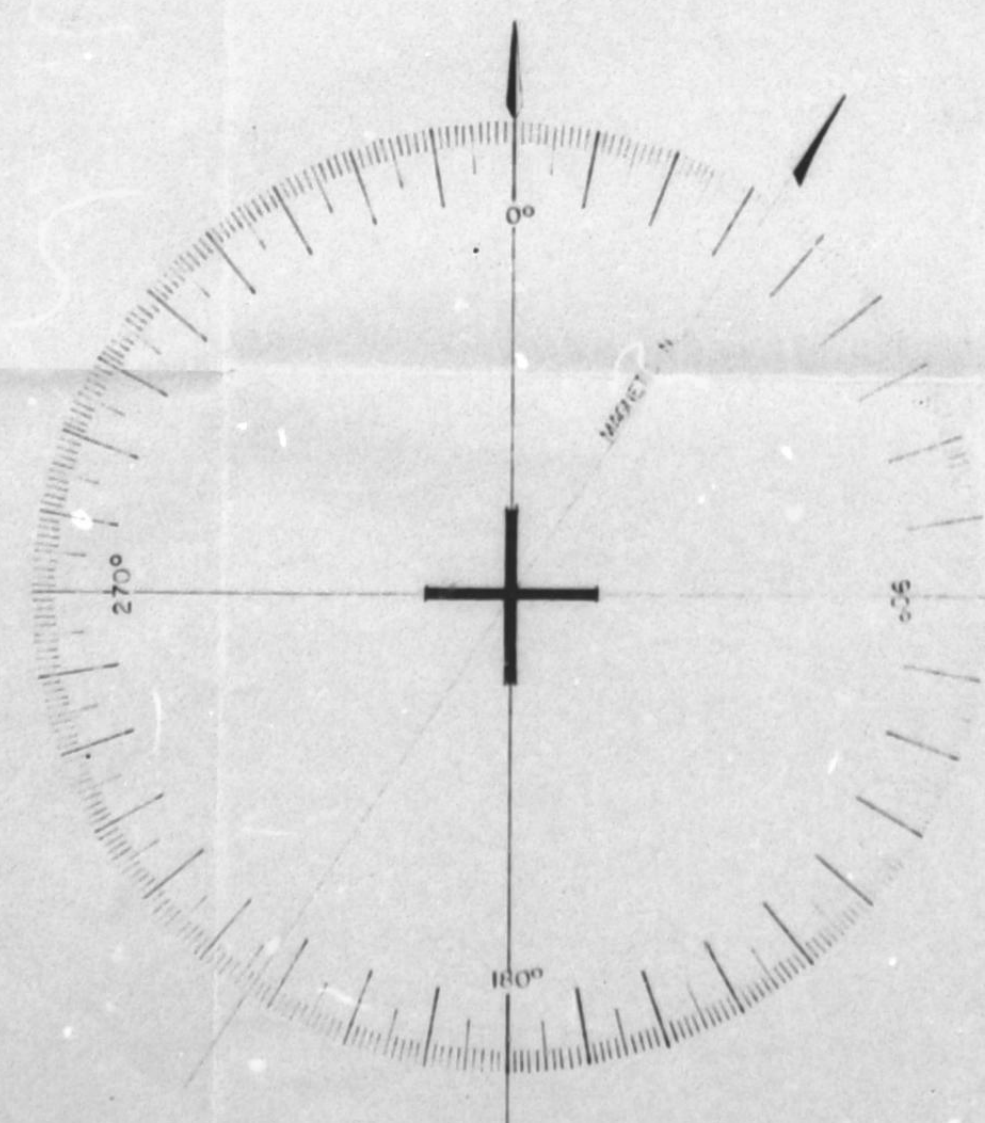


30x

West Canadian Graphic Industries Ltd.

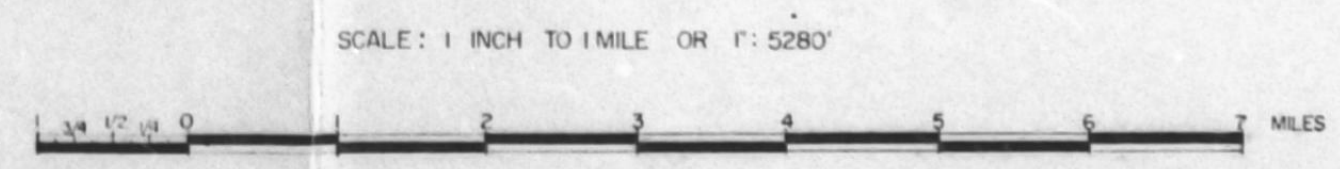


THE CALIFORNIA STANDARD CO.
CAMERON HILLS RESERVATION PLAN OF
SURVEY DATA

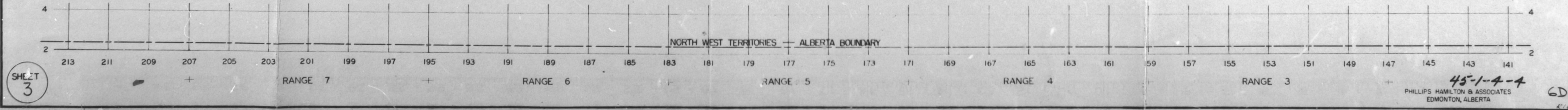


LEGEND
IRON SURVEY POSTS SHOWN THIS
DRIFT PINS 1/2" x 1/4" LONG SHOWN THIS
DEFLECTION POINTS SHOWN AS THIS
GRID LINES SHOWN THIS
LINES COMPLETED SHOWN THIS
DISTANCES SHOWN IN FEET AND DECIMALS OF A FOOT

REVISIONS & ADDITIONS	
DATE	ITEM



MAP No. B-1

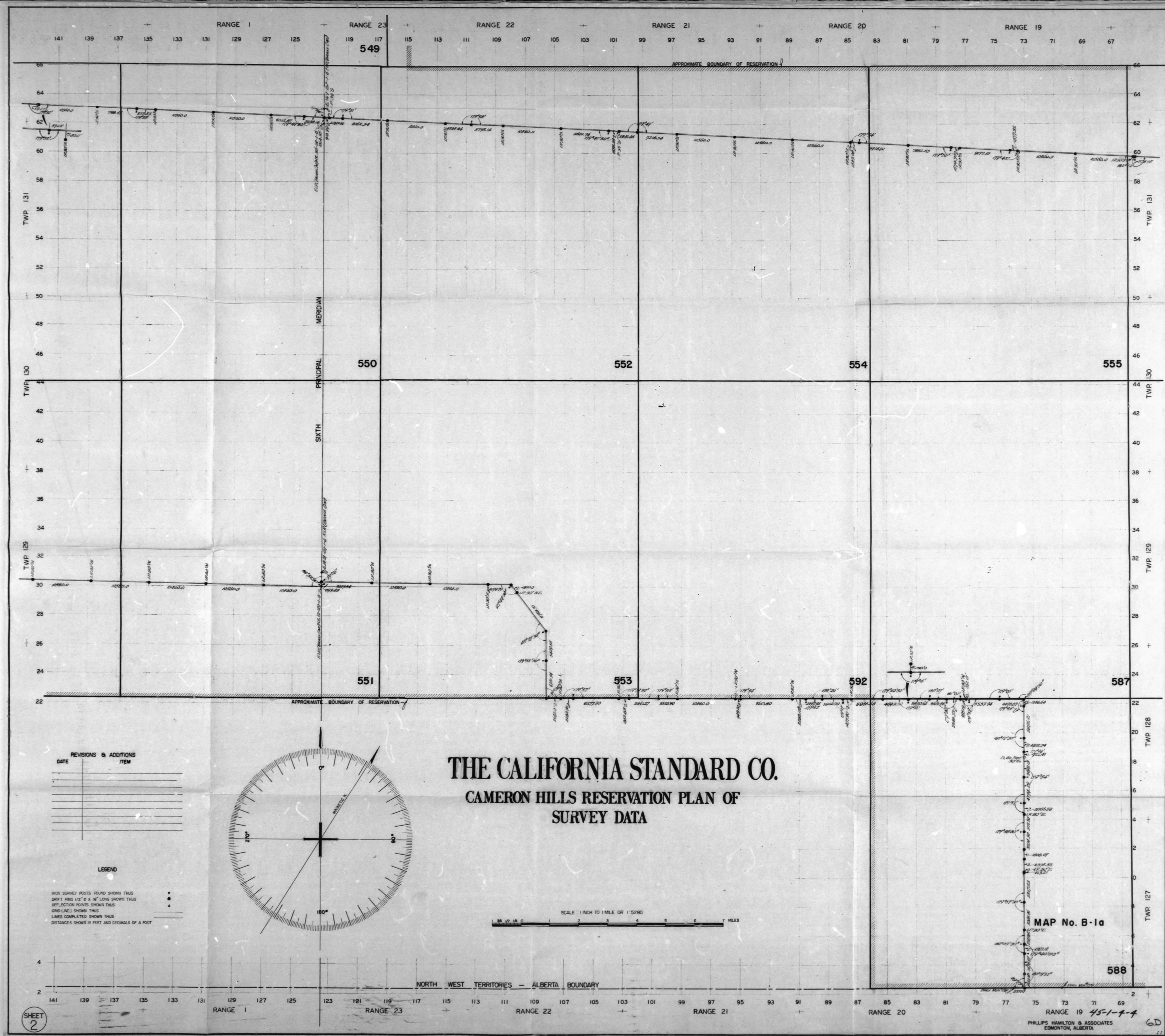


30x

West Canadian Graphic Industries Ltd.

PHILLIPS HAMILTON & ASSOCIATES
EDMONTON, ALBERTA

6D

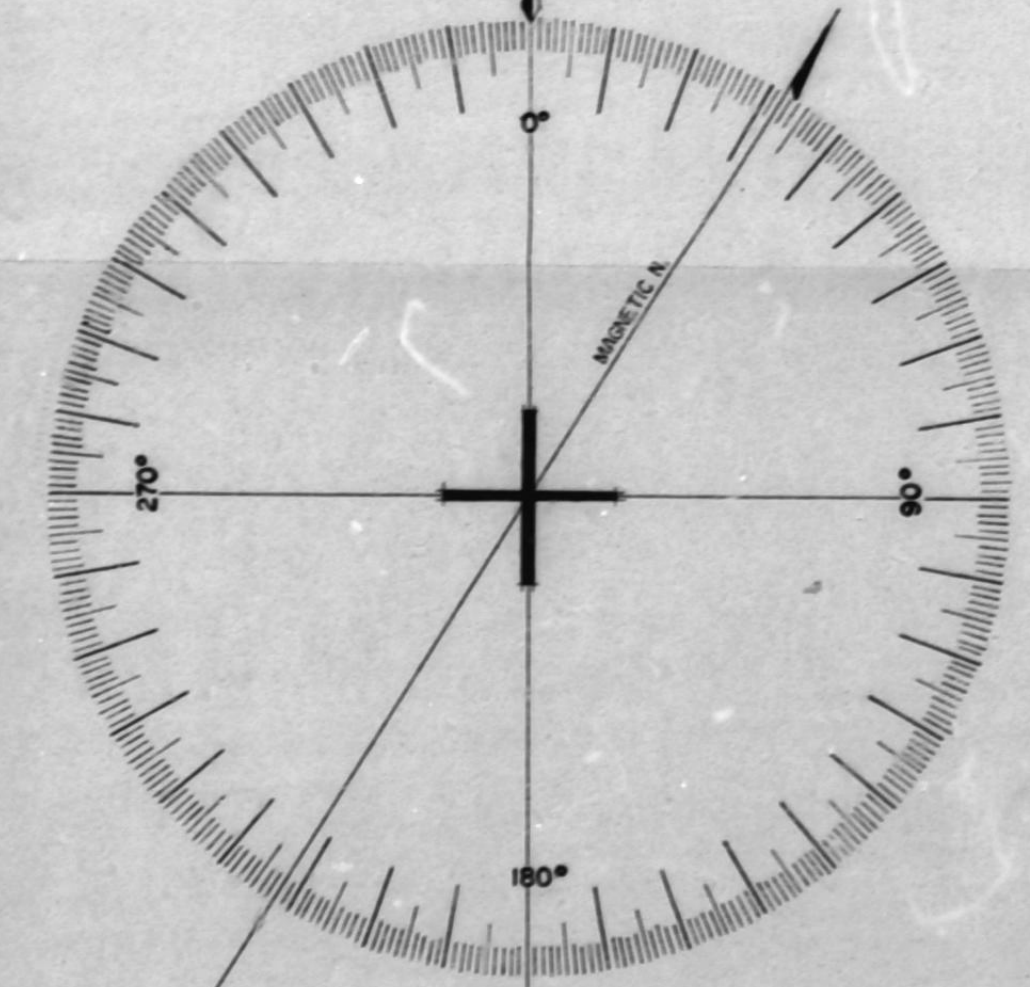


THE CALIFORNIA STANDARD CO.
CAMERON HILLS RESERVATION PLAN OF
SURVEY DATA

REVISIONS & ADDITIONS	DATE	ITEM

LEGEND

IRON SURVEY POINTS SHOWN THUS
DRIFT PINS 1/2" x 1/4" LONG SHOWN THUS
DEFLECTION POINTS SHOWN THUS
GRID LINE SHOWN THUS
LINES COMPLETED SHOWN THUS
DISTANCES SHOWN IN FEET AND DECIMALS OF A FOOT



SCALE: 1 INCH TO 1 MILE OR 1:5280

MAP No. B-1a

SHEET 2

30x

West Canadian Graphic Industries Ltd.

PHILLIPS HAMILTON & ASSOCIATES
EDMONTON, ALBERTA

45-1-7-4

THE CALIFORNIA STANDARD CO.

CAMERON HILLS RESERVATION PLAN OF SURVEY DATA

LEGEND

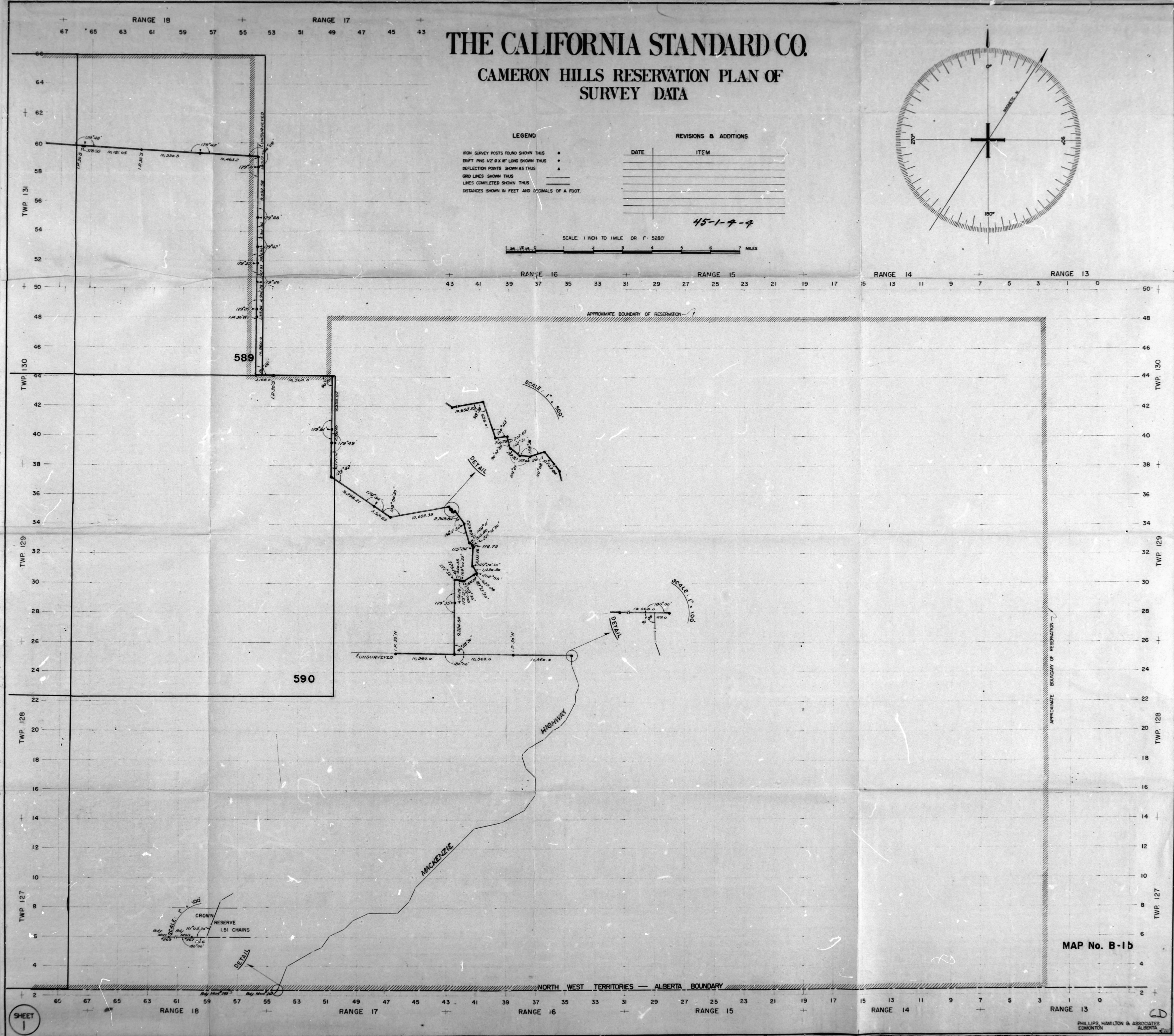
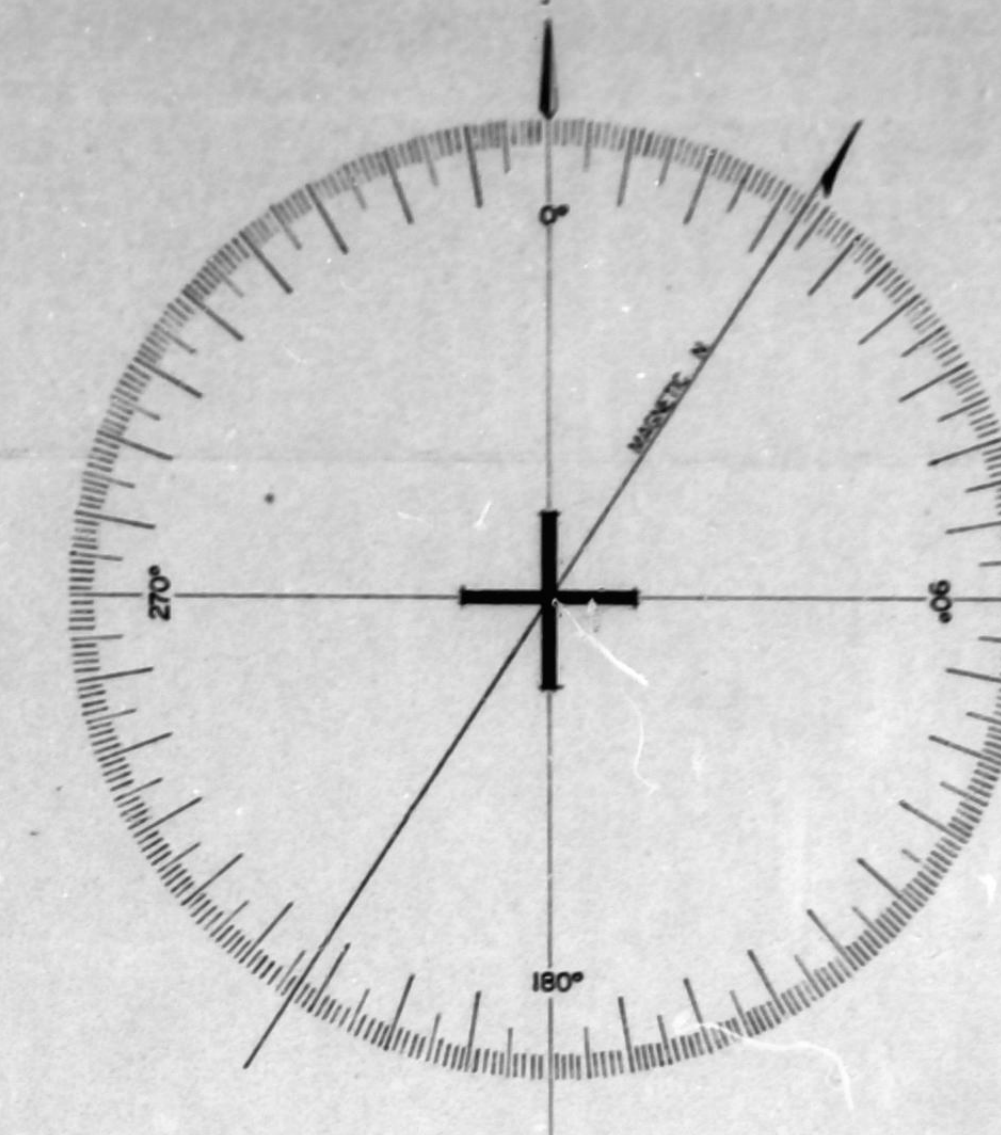
IRON SURVEY POSTS FOUND SHOWN THUS +
 DRIFT PINS 1/2" X 1/8" LONG SHOWN THUS *
 DEFLECTION POINTS SHOWN AS THUS Δ
 GRID LINES SHOWN THUS ———
 LINES COMPLETED SHOWN THUS ———
 DISTANCES SHOWN IN FEET AND DECIMALS OF A FOOT.

REVISIONS & ADDITIONS

DATE	ITEM

45-1-7-7

SCALE: 1 INCH TO 1 MILE OR 1" = 5280'

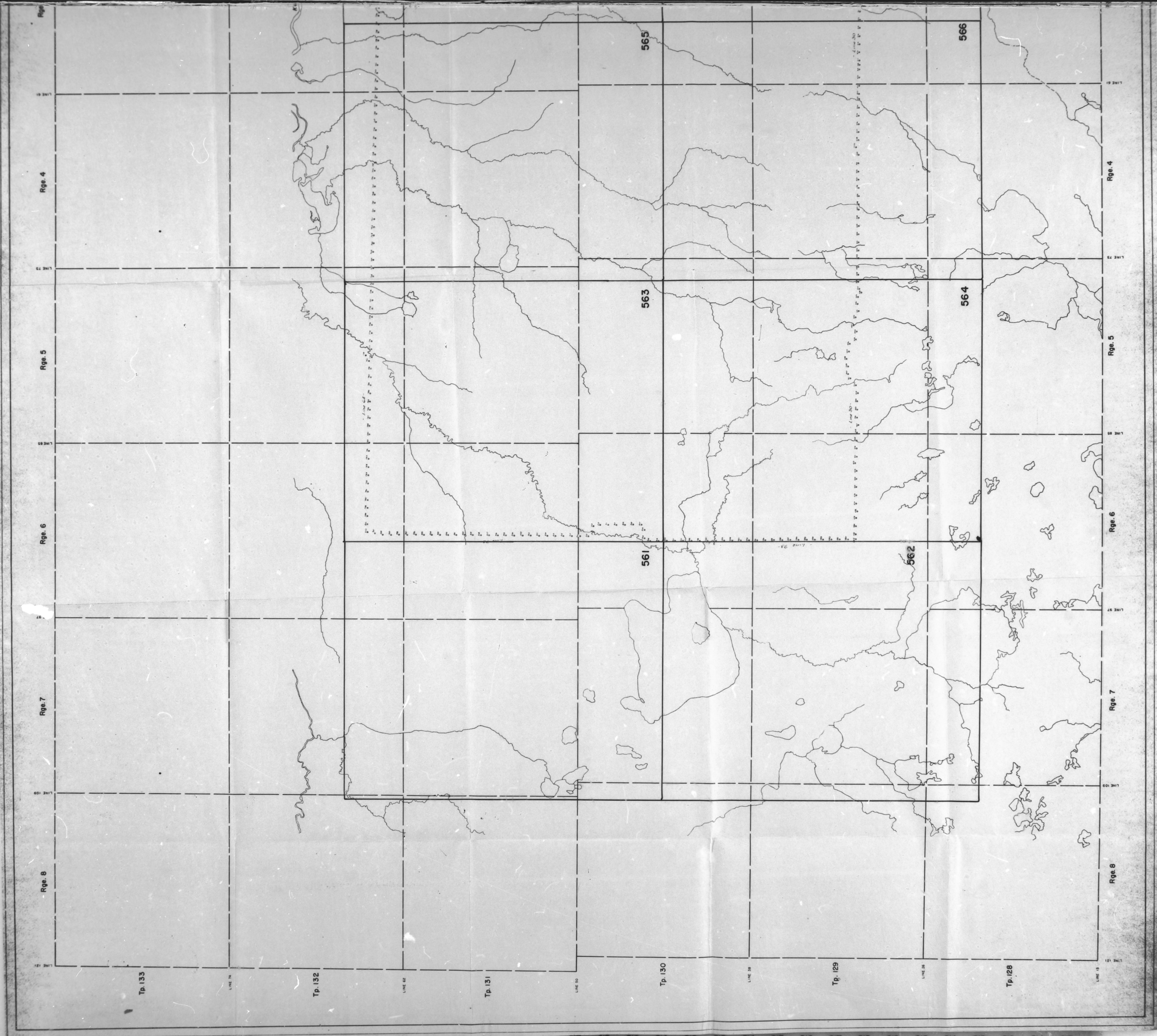


MAP No. B-15

PHILLIPS, HAMILTON & ASSOCIATES
 EDMONTON, ALBERTA

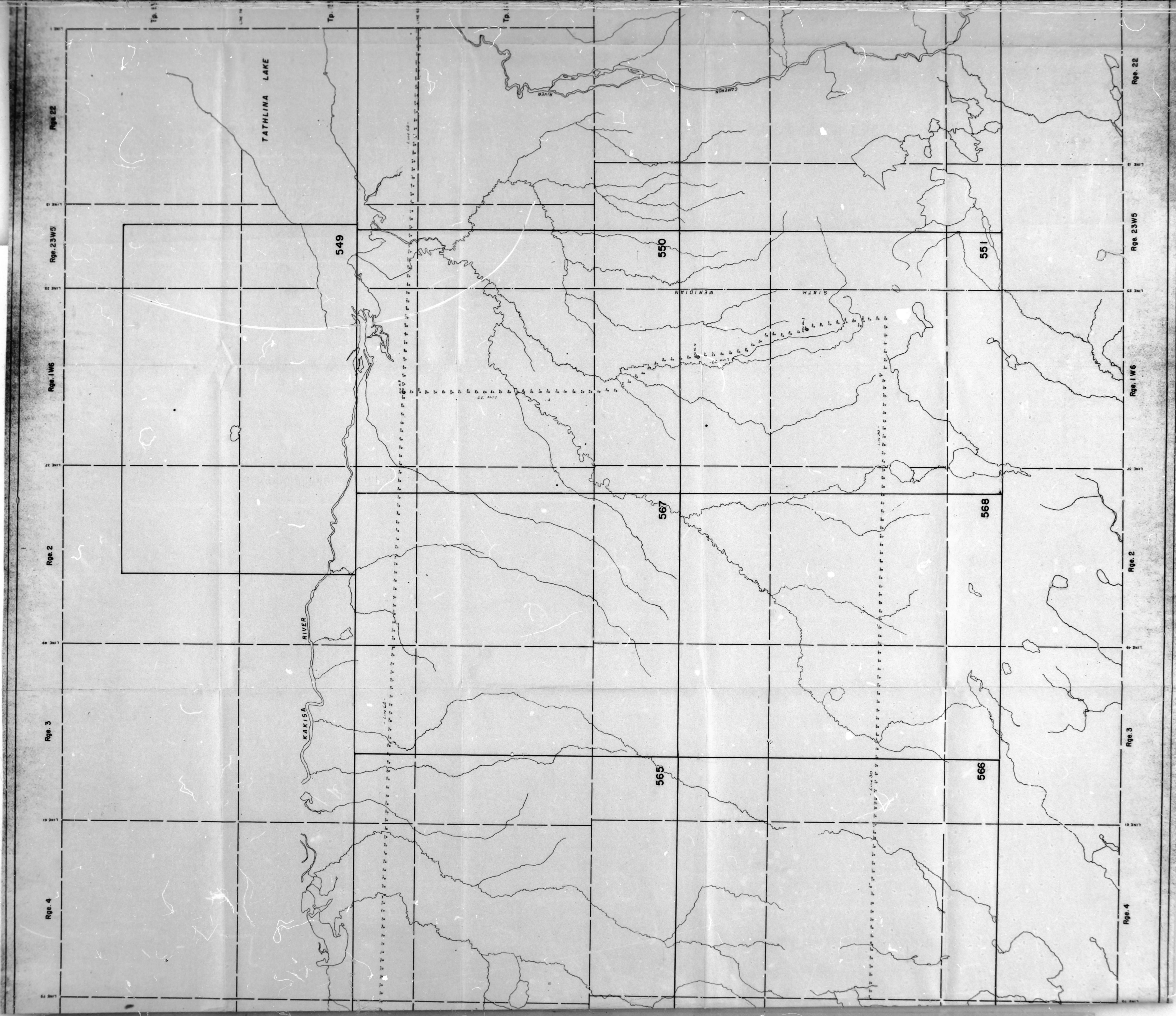
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West Canadian Graphic Industries Ltd.



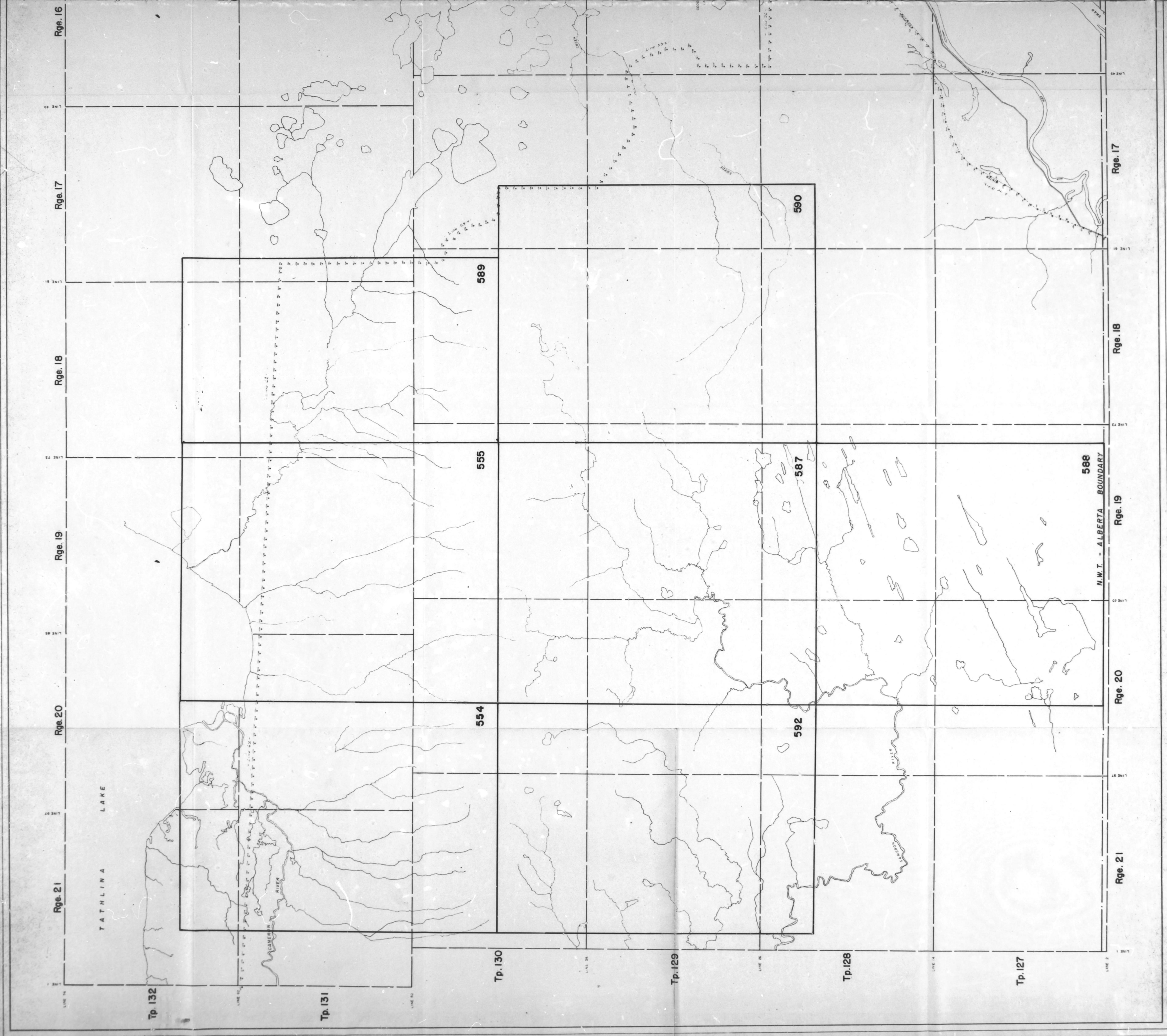
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West Canadian Graphic Industries Ltd.

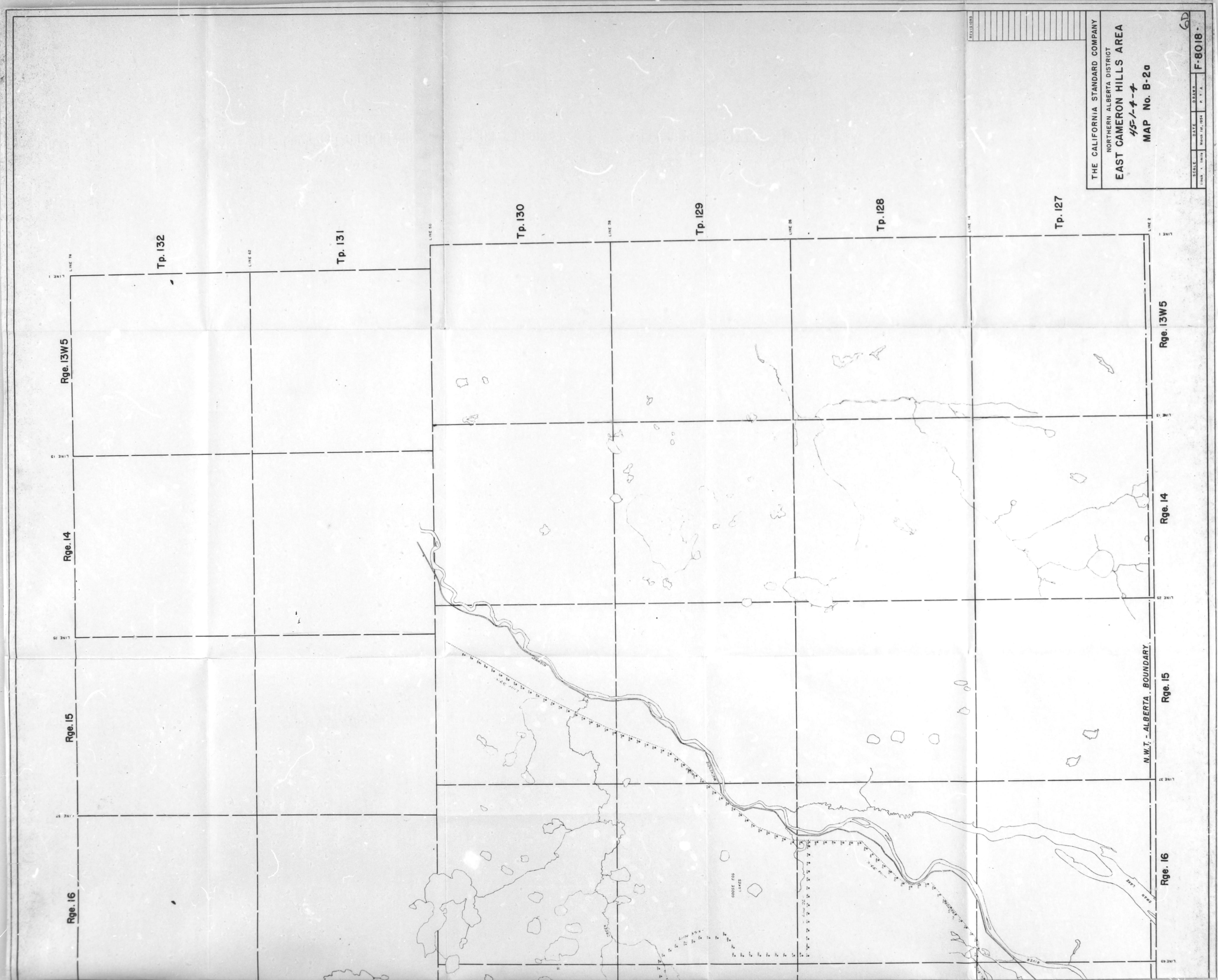


30x

West Canadian Graphic Industries Ltd.



30x



THE CALIFORNIA STANDARD COMPANY
NORTHERN ALBERTA DISTRICT
EAST CAMERON HILLS AREA
45-1-4-4
MAP No. B-2a

SCALE 1" = 1 MILE
DATE MAY 1954
P. T. A.
F-8018