

GEOLOGICAL REPORT on Sayward Explorations Ltd.

(N.P.L.), BILLY CLAIMS GROUP, Sayward area,
Nanaimo M.D., Vancouver Island, B.C. (126°
10'W; 59° 22'N)

NAME OF CLAIMS: CATHY 1-36; BILLY 1-40; BERNA
1-4; MOGN 1-8. (88 claims)

AUTHOR: E. Percy Sheppard, P.Eng.
Consulting Geologist (N.P.L.)

HOLDER OF CLAIMS: Sayward Explorations Ltd.

WORK DATES: 1972:- July 1-3; 22-26; 29;
August 2; 9-15.

REPORT DATE: August 15, 1972

92L/8E

3795

3795

GEOLOGICAL REPORT

On the

BILLY CLAIMS GROUP

SAYWARD AREA, NANAIMO M. D.

VANCOUVER ISLAND, B.C.

OF

SAYWARD EXPLORATIONS LTD. (N. P. L.)

Location: $126^{\circ} 10' W$; $59^{\circ} 22' N$

NTS: 92 L / 8 E

E. Percy Sheppard, P.Eng.
Consulting Geologist

August 15, 1972
Vancouver, B. C.

Department of	
Mines and Petroleum Resources	
ASSESSMENT REPORT	
NO. 3795	MAP

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Claim & Geology Maps Nos. 1 & 2. Scale: 1" = 400'

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#10 " " (#2)

GEOLOGICAL REPORT

BILLY CLAIMS GROUP

Sayward Area, Vancouver Island, B.C.

SUMMARY

Sayward Explorations Ltd. (N.P.L.) is the owner, by long-term lease agreement, of a group of 34 mineral claims known as the "Billy Group", located near Rooney Lake, Sayward area, Nanaimo Mining Division, Vancouver Island, B. C. The property is a new copper discovery. The known showings were exposed when logging crews blasted rock-cuts during road construction.

Access is by a logging road which turns off Highway 19 at White River Bridge, Sayward, and follows the Adam River northwesterly for ten miles. The area is rugged with elevations ranging from 900 feet at the Adam River to a maximum of 2000 feet. The claims are covered with a heavy growth of cedar, hemlock, balsam and Douglas fir. Overburden is shallow, 1 ft. to 15 ft. on some slopes.

The area is underlain by an assemblage of volcanic rocks placed in the Upper Triassic or earlier age known as the Karmutsen group. It consists of basaltic and andesitic flows, medium to basic, highly amygdaloidal material, tuffs, agglomerates and breccias. Limestone, grey to dark grey, impure and recrystallized, lies beneath the basalts. The dark green, fine-grained basalts - dense rocks with scattered amygdules of quartz, epidote and calcite - carry magnetite and pyrite. A second type carries epidote, quartz and calcite constituting the common fillings. Chalcopyrite is present in minute grains and disseminations.

The volcanics strike E-W and dip 20° - 30° North. Limestones, possibly of Quatsino formation, are found lying below the volcanics. The intrusive contact runs southeast through the eastern part of the claims group. The intrusives appear to crosscut the volcanics and limestones and are considered to be the source of the mineral deposits of the region.

The Magnetometer survey showed little magnetic variation. A Geochemical profile gave numerous higher-than-background readings.

Diamond drill holes, put down mainly for assessment work in 1969, showed several widths of near-economic copper values.

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Billy Claims Group

CONCLUSIONS

Disseminated copper sulfides were observed, occurring in the Karmutsen basalts, throughout most of the N-S length of the Billy claims group. These occurrences warrant further investigation. Geochemical surveying is considered to be the most direct and economical exploration method for this group, as indicated by the test profile. If significant anomalous areas are outlined by the survey, a diamond drill program will be laid out.

RECOMMENDATIONS

It is recommended that the exploration program outlined in this report be carried out.

It is further recommended that Sayward Explorations Ltd. (N.P.L.) allocate the sum of \$10,000 to implement the program.

E. Percy Sheppard
E. Percy Sheppard, P.Eng.
Consulting Geologist



August 15, 1972
Vancouver, B.C.

GEOLOGICAL REPORT

BILLY CLAIMS GROUP

Sayward Area, Vancouver Island, B.C.

INTRODUCTION

The following report is prepared at the request of the Board of Directors of Sayward Explorations Ltd. (N.P.L.).

The report is compiled from data collected by the writer during July and August 1972, when geological mapping and sampling were carried out and new showings located. A magnetometer survey was conducted and results are plotted on the Geological Maps 1 & 2. Mr. W. Boyes assisted the writer in this work. A study was also made of previous work done in the area, as well as Company and Government reports.

PROPERTY

The Billy group consists of 84 staked mineral claims, as follows:

<u>Claim Name</u>	<u>Record No.</u>	<u>Expiry Date</u>
CATHY 1-36 incl.	27002-27037	Sept. 17, 1972
BILLY 1-36 "	26966-27001	" " "
BERNA 1-4 "	26962-26965	" " "
MOON 1-8 "	29430-29437	Aug. 22, 1972

The claims were inspected and found to be well staked, in accordance with the provisions of the Mineral Act.

OWNERSHIP

The claims are held by Sayward Explorations Ltd. (N.P.L.) under a long-term lease agreement.

LOCATION & ACCESS

The claims group is located near Rooney Lake, west of Adam River, Sayward Area, Nanaimo Mining Division, Vancouver Island. Co-ordinates: 126° 10'W Long., 59° 22'N Lat.

Access is by a logging road which turns off Highway 19 at the White River bridge, Sayward, and follows the Adam River northwesterly for ten miles. The location line on the claims follows the logging road.

HISTORY

The property known as the "Billy Claims Group" is a new copper discovery in the Sayward area of Vancouver Island. The known showings were exposed when logging crews blasted rock-cuts during road construction. There has been no known production from the area. It has not been mapped by either the Geological Survey of Canada or the B.C. Department of Mines.

Diamond drilling was completed on the group in November 1969. Six holes were put down for a total footage of 1748 feet.

TOPOGRAPHY & CLIMATE

The area is fairly rugged with elevations of 900 feet beginning at the Adam River and rising to a maximum of 2000 feet. The claims area is covered with a heavy growth of cedar, hemlock, balsam and Douglas fir. Overburden is relatively shallow, from 1 ft. to over 15 ft. on some slopes.

The climate is generally mild, with a rainfall of over 50 inches per year and a snowfall of approximately 3 feet. Logging operations continue with a minimum of difficulty throughout the winter months.

GENERAL GEOLOGY

The area is underlain by an assemblage of volcanic rocks placed tentatively in the Upper Triassic or earlier age known as the Karmutsen group. It consists of basaltic and andesitic flows composed of medium to basic, highly amygdaloidal material, tuffs, agglomerates and breccias. Limestone, gray to dark grey, impure and recrystallized, lies beneath the basalts. Island intrusives of Middle Jurassic age intrude the basalts and limestones.

In the area under consideration the basalts vary considerably in texture and appearance. Some are dark green, fine-grained, dense rocks with scattered amygdules of quartz, epidote and calcite. Magnetite, occasionally associated with a little pyrrhotite, may form up to 5% of the rock.

A second type of basalt, finer grained than the above and black or very dark green in color, may occur near the top or bottom of a flow. It is decidedly amygdaloidal with epidote, quartz and chlorite constituting the most common fillings. These rocks contain a small amount of chalcopryrite in minute grains and disseminations. No observations were possible to place a concentration of chalcopryrite and other copper minerals in the tops or bottoms of the flows.

The volcanics strike E-W and have a dip of 20°-30° N.

Dark grey to nearly white, impure, recrystallized limestone was observed lying below the volcanics described above. It is not known whether this makes the base of the Karmutsen group or the top of the Quatsinc formation in faulted.

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Island intrusives, placed tentatively in the Middle Jurassic age, were observed to intrude the basalts and limestones. They form part of the Coast intrusions which now occupy much of the Coast Range area of British Columbia. They are holocrystalline, igneous rocks that range in color from pink to grey and dark greenish grey, and in composition from basic to acidic with rocks of granitic types predominating. Where observed, the intrusives appeared to be in the form of a long, narrow, northwesterly-trending belt in contact with basalts and limestones. The contacts coincide roughly with the course of the Adam River. They are considered to be of great economic significance in that most of the mineral deposits of the region are believed to be genetically related to them.

DETAILED GEOLOGY

Detailed geological mapping was carried out along the network of logging roads which crisscross the area. Distances were measured along each roadside and trips were made to locate outcrops at a distance from each road. The geology was plotted on two 400-scale maps, Nos. 1 and 2 of this report.

The volcanic rocks on the claims group consist of dense fine to medium-grained crystalline basalts which are amygdaloidal in part. Although flow tops were not defined, it is surmised that the amygdaloidal basalts represent the tops of the flows. Amygdules are typically made up of white and pink feldspars which show minor alteration to kaolinite, epidote and chlorite, occasionally calcite and quartz. Corona structures are abundant - a rim of calcite encircling a center of epidote or chlorite. These are typically mineralized with chalcopryrite in the central area. Some bornite and malachite were also noted.

In general the mineralization is sparse and somewhat sporadic; that is, small blebs and smears of chalcopryrite were seen within the rocks. However, the amygdaloidal basalts seemed to be more consistently mineralized than the denser more homogeneous rocks.

In the northern part of the map-area the intrusive-basalt contact is sharply defined, whereas in the southeastern portion the basalts grade into the intrusives and the contact is less distinct. Inclusions of coarse-grained basalts or fine-grained gabbro, up to several feet in diameter, were observed within the granitic rocks.

East-west trending, almost vertical shears show epidote alteration but no mineralization was evident. Megascopic examination of the granitic rocks would tentatively place them in the granodiorite clan. They are medium to coarse-grained rocks with numerous pink feldspar segregations in patches and flow lines. Veins of epidote and chlorite are also abundant. Copper mineralization in these granodiorites is not common, although several blebs of chalcopryrite were noted.

The limestones in the area are microcrystalline to fine-grained, blue-grey and banded, in part. Where outcrops were evident they were observed to be overlain by the basalts. These strike in a N-S direction

...cont.

and probably dip 60° - 80° E. No mineralization was noted.

The intrusive contact was traced southeasterly through MOON 2, 4, 6, 8; BILLY 36, 34, 32, 30, 28, 26, 24, 22; through CATHY 36, 34, 32, 30, 28, 6, 3 & 1.

It would appear that the basalts strike in a nearly E-W direction and dip 20° - 30° NE. The limestones appear to be contorted, and in BILLY 22, CATHY 36 & 34, they strike N 40° W, and dip 60° - 80° E. In the south part of the CATHY claims, a flat, drift-covered area separated intrusive outcrops from the limestones and basalts.

SURFACE SAMPLING

Sampling consisted of chip samples taken along the logging road passing through claims BERNA 2 and BILLY 19 & 20. Disseminated chalcopyrite constituted the predominant copper mineral, with occasional blebs and stringers of chalcocite and bornite.

<u>Sample No.</u>	<u>Length</u>	<u>%Cu</u>
S-1	40'	0.02
S-2	20'	0.12
S-3	30'	0.02
S-4	50'	0.07

MAGNETOMETER SURVEY

A magnetometer survey was run across the claims concurrently with the geological mapping. Readings were taken at regular stations along each road traverse. Results are plotted in gamma on the 400-scale Geology map.

There was very little magnetic relief, and it is felt that no further magnetometer work is warranted.

GEOCHEMICAL SURVEY

Soil samples were taken along the location line between BILLY 11 & 12 to BILLY 19 & 20, a distance of approximately 7500 feet. These samples gave numerous higher-than-background readings.

This one profile of high readings gives sufficient evidence to warrant a complete geochemical survey on a grid pattern over the covered portions of the claims group.

DIAMOND DRILLING

Six diamond drill holes, totalling 1748 feet and varying in depth from 175 ft. to 460 ft., were drilled AX, giving a core diameter of 1 3/16". This work was carried out during the 1969 field season.

Hole No.1: Located in BILLY 19. Drilled to explore at depth a showing of disseminated chalcopryite in a rock cut beside a logging road. Bearing N 30°E, dip -45°, length 175 ft.

Cut metavolcanics of the Karmutsen group, composed of dark grey, medium-grained, massive, altered, epidote-bearing amygdaloidal basalt. Weak mineralization was encountered in the hole from 44.5' to 61.0' and 71.0' to 73.0'. Assays are shown on Plate No. 1.

Hole No.2: Same location as No. 1. Bearing N 60°E, dip -45°, length 226'. Drilled through basalts similar to No. 1.

Encountered disseminated copper mineralization from 56.0' to 61.0'; assayed 0.41% Cu. Plate 2.

Hole No.3: Located in BILLY 17, 400' south of holes 1 & 2; bearing S 60°E, dip -40°; length 350'.

Drilled through metavolcanics, dark grey, medium-grained, massive, epidote blebs and fillings in amygdules. Encountered copper mineralization from 10' to 117'. Plate 3.

Hole No.4: Located in BILLY 17, 300' SW of No. 3; bearing S 75°W, dip -40°; length 230'.

Drilled through volcanics similar to Hole 3. Encountered copper mineralization from 57' to 74', and 83' to 92'. Plate 4.

Hole No.5: Located in BILLY 19, 370' N of Holes 1 & 2; bearing N, dip -55°; length 307'.

Drilled through volcanics and amygdaloidal basalt, dark grey, massive, medium-grained, containing epidote in eyes and blebs; local disseminations of chalcopryite and pyrite with magnetite. Core was split and assayed from 50' to 120'; remainder was logged but not split. Plate 5.

Hole No.6: Located in BILLY 11, 4000' S 55°E of Holes 1 & 2; bearing S 45°E, dip -40°; length 460'.

Drilled through Karmutsen volcanics, dark grey in appearance, massive, stringers of epidote, changes to chalcopryite mineralization from 162' to 174', 250' to 255', 279' to 285'; sphalerite in 14" stringer from 451' to 460', with occasional chalcopryite and pyrite. Plate 6.

EXPLORATION PROGRAM

A Geochemical survey should be run from BERNA 1 south through the BILLY claims, and the CATHY claims as far south as alteration in the volcanics occurs. The grid should extend east to the Intrusive contact and west to the edge of the claims. This would cover most of the claims group.

Surface sampling of the showings located during the geological mapping should be carried out.

ESTIMATED COST OF EXPLORATION PROGRAM

Geochemical samples, 2500 @ \$3	\$7,500
Geological mapping, 10 days	1,500
Surface sample assaying	500
Travel & Living Expenses	<u>500</u>
	\$10,000

E. P. Sheppard
E. Percy Sheppard, P.Eng.
Consulting Geologist

August 15, 1972



C E R T I F I C A T E

I, E. PERCY SHEPPARD, of the City of Vancouver, in the Province of British Columbia, hereby certify THAT:

I am a Consulting Geologist with offices at 314-402 West Pender Street, Vancouver, B. C.;

I am a graduate of Dalhousie University, with a B.Sc. in Geology, and have been active in mining exploration and geophysics for over thirty years;

This report is compiled from data collected on numerous visits to the Billy Claims Group during July and August 1972, and a study of previous work done, as well as Company and Government reports;

I have no direct or indirect interest in the properties or securities of Sayward Explorations Ltd. (N.P.L.), and do not expect to receive any such interest as a result of writing this report;

I am a member of the Professional Engineers Association of British Columbia, the American Institute of Mining Engineers, the Society of Exploration Geophysicists, and a Fellow in the Geological Association of Canada.

DATED AT VANCOUVER, B.C., this 15th day of August, 1972.

E. P. Sheppard
E. Percy Sheppard, P.Eng.



d

E. P. SHEPPARD & ASSOCIATES LTD.

CONSULTING GEOLOGISTS

314-402 WEST PENDER STREET,
VANCOUVER 3, B.C.

OFFICE: 685-2301
RESIDENCE: 681-9903

STATEMENT OF EXPENDITURES ON BEHALF OF SAYWARD EXPLORATIONS LTD. (NPL)

BILLY CLAIMS GROUP, Sayward Area, Vancouver Island, B. C.:-

1972

July 1, 2, 3, 22, 23, 24, 25, 26, 29

August 2, 9, 10, 11, 12, 13, 14, 15

July - E. P. Sheppard - 72 hrs @ \$35	\$2,520.00
William Boyes Sr., - 72 hrs @ \$10	720.00
W. H. Boyes Jr. (Magnetometer survey)	
60 hrs @ \$10	600.00
Survey work	250.00
Travel (automobile) 1000 mi. @ 15¢	150.00
Living Expenses (10x20x2)	400.00
	<u>\$4,640.00</u>
Aug.- E.P.Sheppard - 72 hrs @ \$35.....	2,520.00
W. Boyes Sr. - 64 hrs @ \$10	640.00
(Magnetometer survey)	
Travel, 1500 mi. @ 15¢	225.00
Living Expenses (6x20x2)	240.00
Ferry (July & August)	54.00
Preparing Geological Report	<u>600.00</u>
TOTAL	\$8,919.00

August 17, 1972

Declared before me at the
of **VANCOUVER, B. C.**
Province of British Columbia, this
day of **AUG 17 1972**

in the

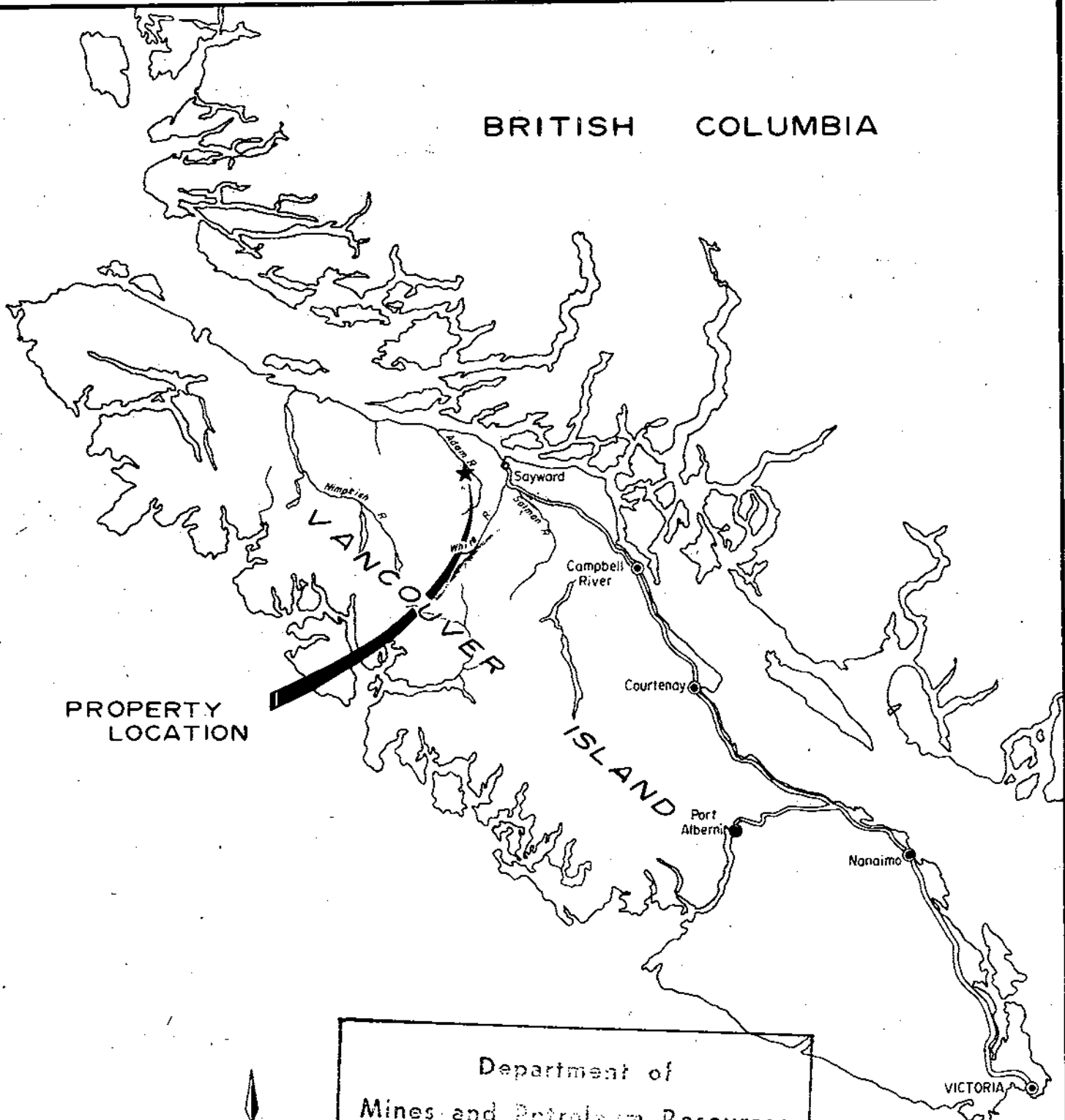
, A.D.



E. P. Sheppard

Sub-Mining Recorder

BRITISH COLUMBIA



PROPERTY
LOCATION



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **3795** MAP **#1**

SAYWARD EXPLORATIONS LTD. (N.P.L.)

LOCATION MAP

ROONEY LAKE AREA, SAYWARD
BRITISH COLUMBIA

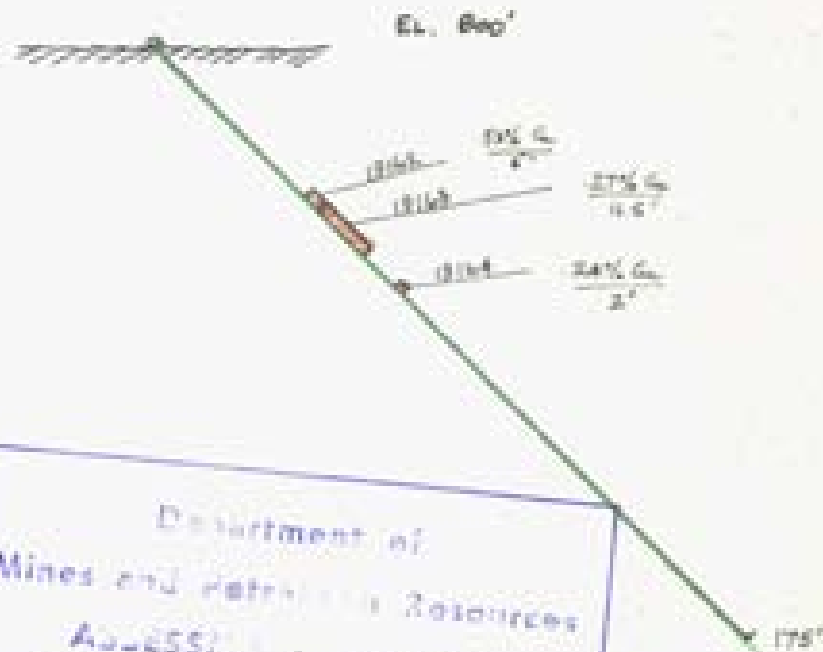
E. P. SHEPPARD & ASSOCIATES LTD.
VANCOUVER B.C.



JAN. 1970

5 30' W

N 30' E



Department of
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ASSESSMENT REPORT
NO. 3795 MAP # 2



PLATE No 1

SAYWARD EXPLORATIONS LTD. (NPL)

DD Hole No. 1

SCALE 1" = 40' Incl. 0.70.

E. P. SHEPPARD & ASSOC. LTD.

← S 60° W

→ N 60° E



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3795 No. #3



PLATE NO 2

SAYWARD EXPLORATIONS LTD. (INC.)

DD HOLE No. 2

SCALE 1" = 40'

JAN. 1970.

E. F. SHEPPARD & ASSOC. LTD.

560' E

N 60' W



Department of
 Mines and Technical Surveys
 ASSOCIATION
 NO. 3795 M.P. #4



PLATE No 3

SAYWARD EXPLORATIONS LTD. (NPL)

DD HOLE No. 3

SCALE 1" = 40' JAN 1970

E. P. SHEPPARD & Assoc. LTD.

S 76° W

N 76° E



Requisition of
 Mines and Geology Resources
 ACCESSORY REPORT
 NO. 3795 M.P. # 5



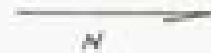
PLATE No 4

SAYWARD EXPLORATIONS LTD. (NPL)

DD HOLE No. 4

SCALE 1" = 40' JAN. 1970

E.P. SHEPARD & ASSOC. LTD.



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3795 MAP # 6



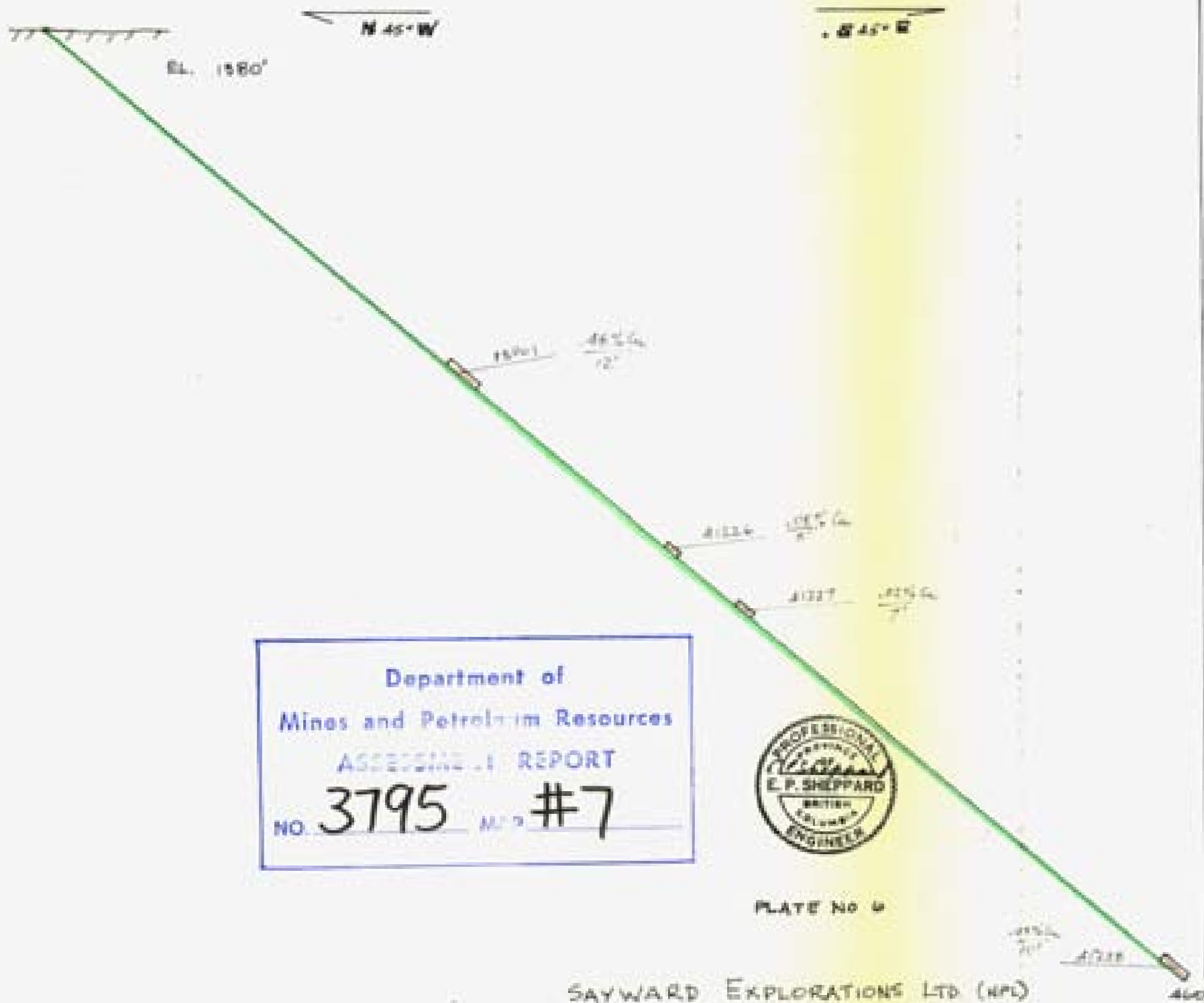
PLATE No 5

SAYWARD EXPLORATIONS LTD. (INC)

DD HOLE No. 6

SCALE 1" = 40' JAN. 1970.

E.P. SHEPPARD & ASSOC. LTD.

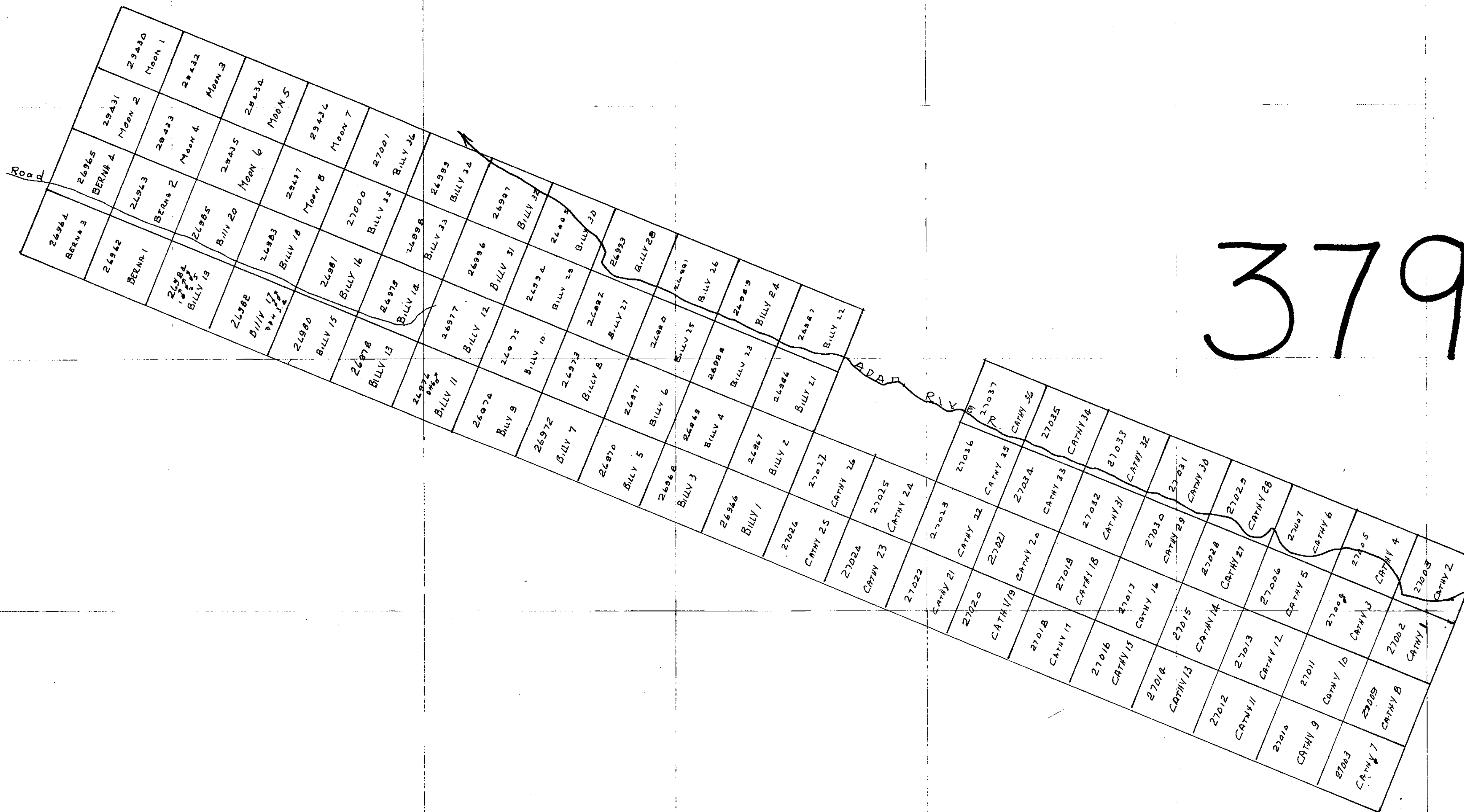


Department of
 Mines and Petroleum Resources
 ASSESSING REPORT
 NO. 3795 # 7



PLATE NO. 6

SAYWARD EXPLORATIONS LTD (NPD)
 DD HOLE NO. 6
 SCALE 1" = 40' JAN. 1970.
 E. P. SHEPPARD & ASSOC. LTD.



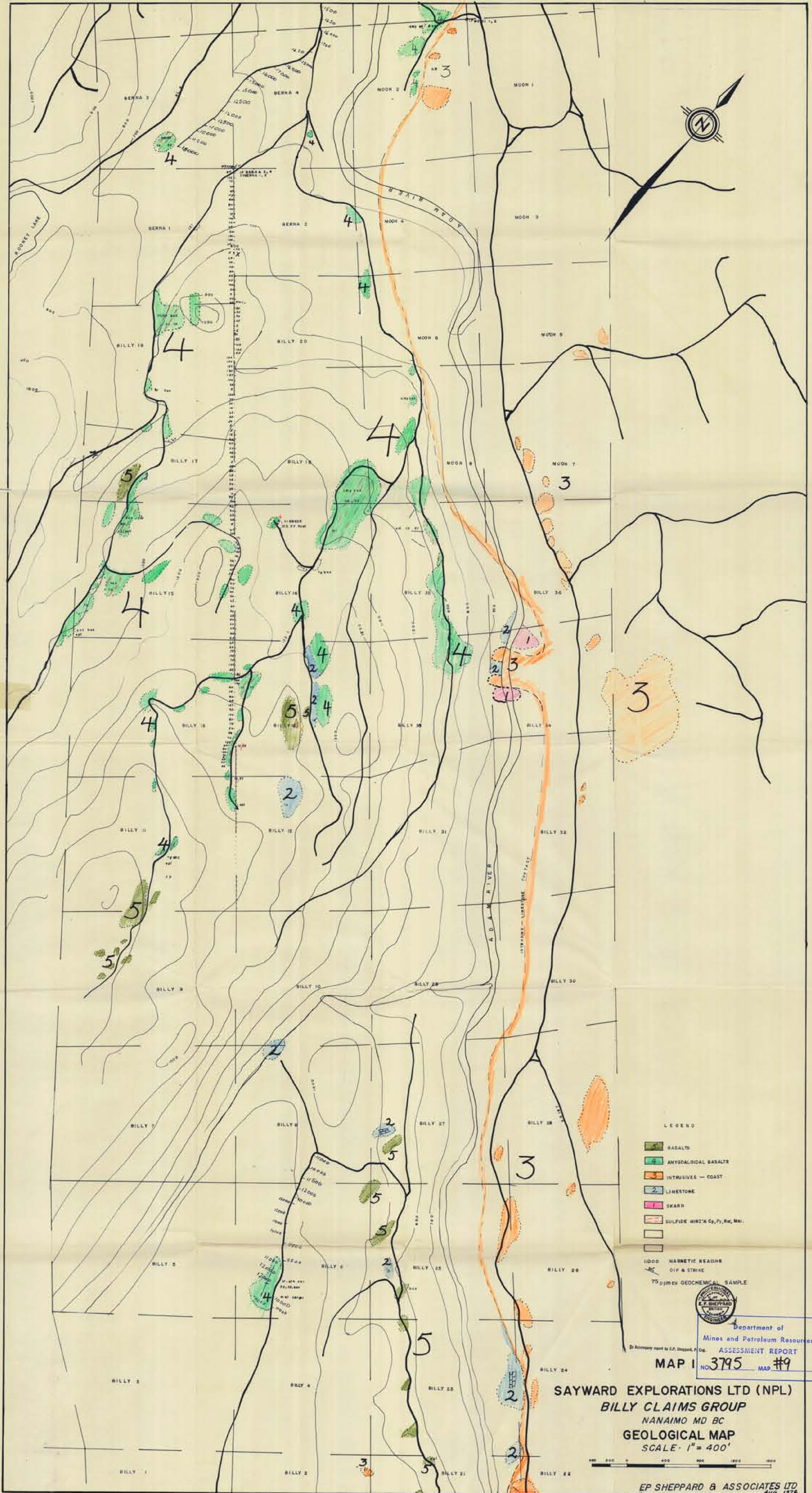
3795 M-8

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
3795 MAP #8



To Accompany report by E.P. Sheppard, P. Eng.

SAYWARD EXPLORATIONS LTD (NPL)
BILLY CLAIMS GROUP
 ROONEY LAKE, SAYWARD AREA
 NANAIMO M-D, BC
 SCALE · 1" = 1500'



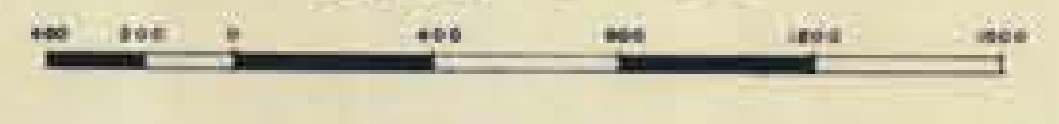
LEGEND

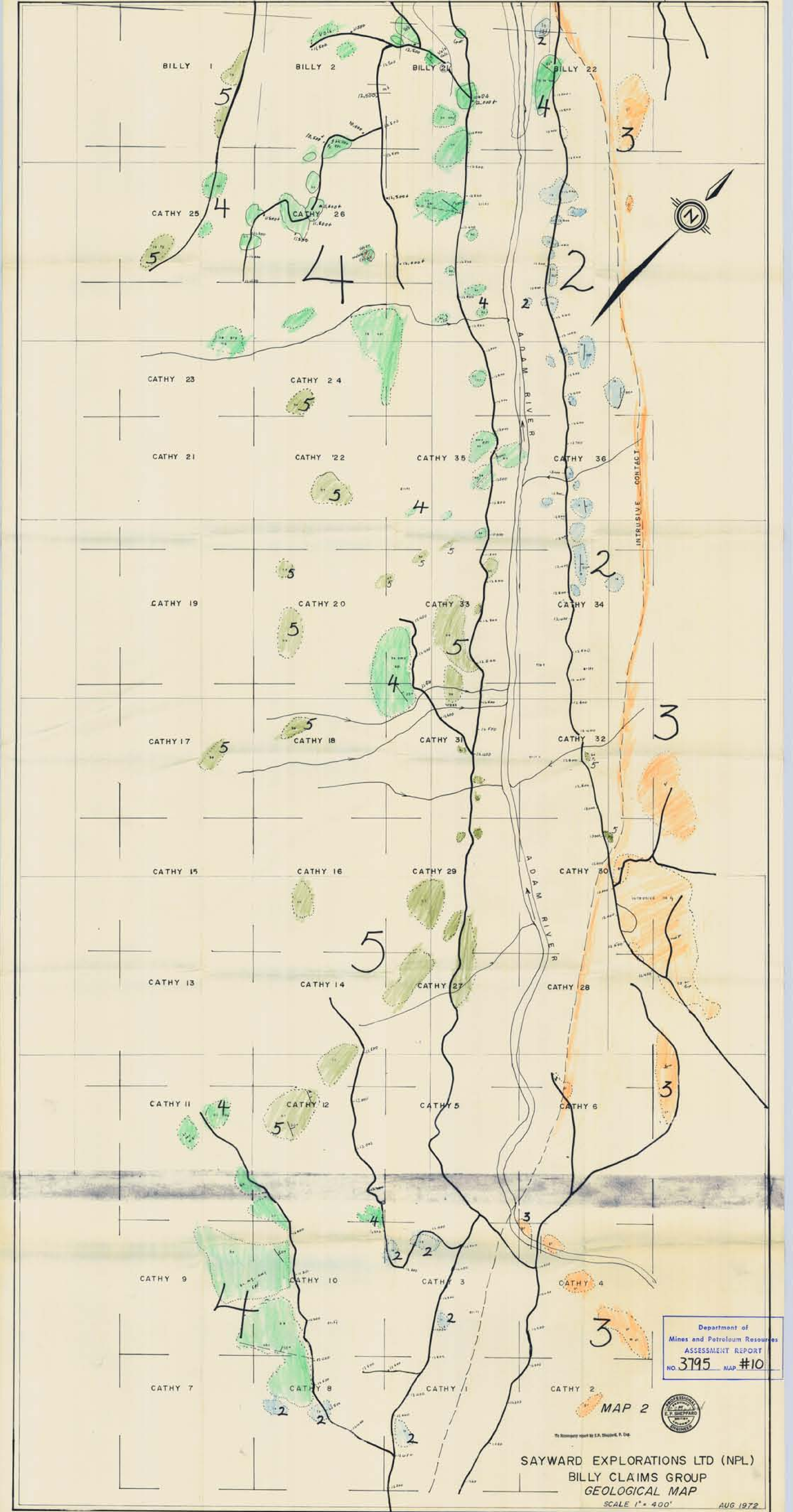
- BASALTS
- AMYGDALOIDAL BASALTS
- INTRUSIVES - COAST
- LIMESTONE
- SKARN
- SULFIDE MIN'G Co, Py, Bn, Mal.
- 1000 MAGNETIC READINGS
- DIF & STRIKE
- 75 ppm Cu GEOCHEMICAL SAMPLE



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
MAP I NO. 3795 MAP #9

SAYWARD EXPLORATIONS LTD (NPL)
BILLY CLAIMS GROUP
NANAIMO MD BC
GEOLOGICAL MAP
SCALE: 1" = 400'





Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3795 MAP #10



MAP 2

SAYWARD EXPLORATIONS LTD (NPL)
BILLY CLAIMS GROUP
GEOLOGICAL MAP
SCALE 1" = 400'

AUG 1972