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**GOLDBORO PROJECT**

**PRE-FEASIBILITY STUDY**

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Presented to EXPLORATION OREX INC.

**ST-MICHEL**

**GÉOCONSEIL INC.**

DUPLICATE AVAILABLE

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Date: July 27, 1989



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**AFFIDAVIT**

I, the undersigned, Gilbert Rousseau living at 96 Guay Street in Val d'Or, province of Quebec, have graduated in mining engineering from the Ecole Polytechnique of the University of Montreal in 1969.

I am a registered member of the Order of Quebec Engineers and the Canadian Institute of Mining and Metallurgy.

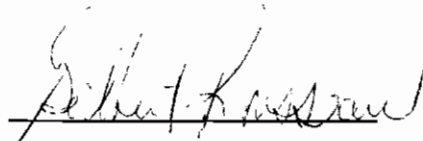
I have no direct nor indirect interest in the Goldboro property or in Exploration Orex Inc.

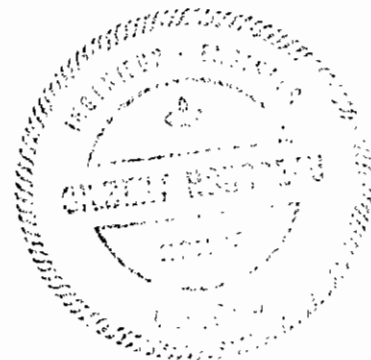
I exercise my profession since 1969. I live and work in Abitibi, Quebec since 1979.

The writing of this report, dated July 27, 1989 is based on the analysis of all reports available on the Goldboro property and on the experience of the undersigned.

I testify that the contents of this report is true and is at the best of my knowledge. Furthermore I hereby give my consent to the use of my name and the report.

Signed in Rouyn-Noranda, this 27th day of July, 1989.

  
Gilbert Rousseau, P. Eng.



## SUMMARY

St-Michel Géoconseil inc. has reviewed all the available information published so far on the Goldboro Project and is of the opinion that Orex should immediately take steps to bring the property into production.

With a capital investment of \$14.6 M and operation costs estimated at \$40.00 per metric ton (see table 1), a profit of \$40.00 per metric ton before taxes, capital cost reimbursement and other royalties, is anticipated from an ore grading 6 grams per metric ton.

Even if readily available ore reserves are presently estimated at only 1M metric tons, St-Michel Géoconseil inc. is confident that the property bears a potentiel at least ten times higher. Diamond drill holes made all along the fold axis of the Goldboro anticline, on Orex's property, have returned fair to high gold values.

## INTRODUCTION

Exploration Orex Inc. was incorporated in July 1987 and was registered for trade on the Montreal Stock Exchange in March 1988. The head office of the company is located at 67 Perreault Street East in Rouyn-Noranda. Exploration Orex Inc. is part of the Société de Gestion Morisco, whose main activities are centered on in the mining and real estate fields.

Exploration Orex Inc.'s activities consist in acquiring mining properties in order to explore and develop them and eventually bring them into production. The company has several properties in Quebec and Nova Scotia. Its most important project at present is the Goldboro Project, which is the subject of the following pre-feasibility study.

Events	Total investment	July 1989	August 1989	September 1989	October 1989	November 1989	December 1989	January 1990	February 1990	March 1990	April 1990	May 1990	June 1990	July 1990
General expenses (10%)	1 203 951\$	642\$	8 132\$	34 240\$	66 875\$	96 349\$	101 173\$	51 178\$	98 825\$	153 887\$	175 972\$	198 290\$	141 615\$	76 773\$
Engineering & supervision	787 631\$	420\$	5 320\$	22 400\$	43 750\$	63 032\$	66 188\$	33 481\$	64 652\$	100 674\$	115 122\$	129 722\$	92 645\$	50 225\$
Mill	8 943 000\$	6 000\$	76 000\$	320 000\$	625 000\$	750 000\$	795 000\$	270 000\$	570 000\$	1 170 000\$	1 510 000\$	1 485 000\$	986 000\$	380 000\$
Underground development	2 308 875\$	0\$	0\$	0\$	0\$	150 460\$	150 540\$	208 300\$	353 600\$	268 200\$	134 600\$	368 175\$	337 500\$	337 500\$
Sub total	13 243 457\$	7 062\$	89 452\$	376 640\$	735 625\$	1 059 841\$	1 112 901\$	562 959\$	1 087 077\$	1 692 761\$	1 935 694\$	2 181 187\$	1 557 760\$	844 498\$
Contingencies (10%)	1 324 346\$	706\$	8 945\$	37 664\$	73 563\$	105 984\$	111 290\$	56 296\$	108 708\$	169 276\$	193 569\$	218 119\$	155 776\$	84 450\$
<b>TOTAL</b>	<b>14 567 803\$</b>	<b>7 768\$</b>	<b>98 397\$</b>	<b>414 304\$</b>	<b>809 188\$</b>	<b>1 165 826\$</b>	<b>1 224 191\$</b>	<b>619 255\$</b>	<b>1 195 785\$</b>	<b>1 862 038\$</b>	<b>2 129 264\$</b>	<b>2 399 306\$</b>	<b>1 713 535\$</b>	<b>928 947\$</b>

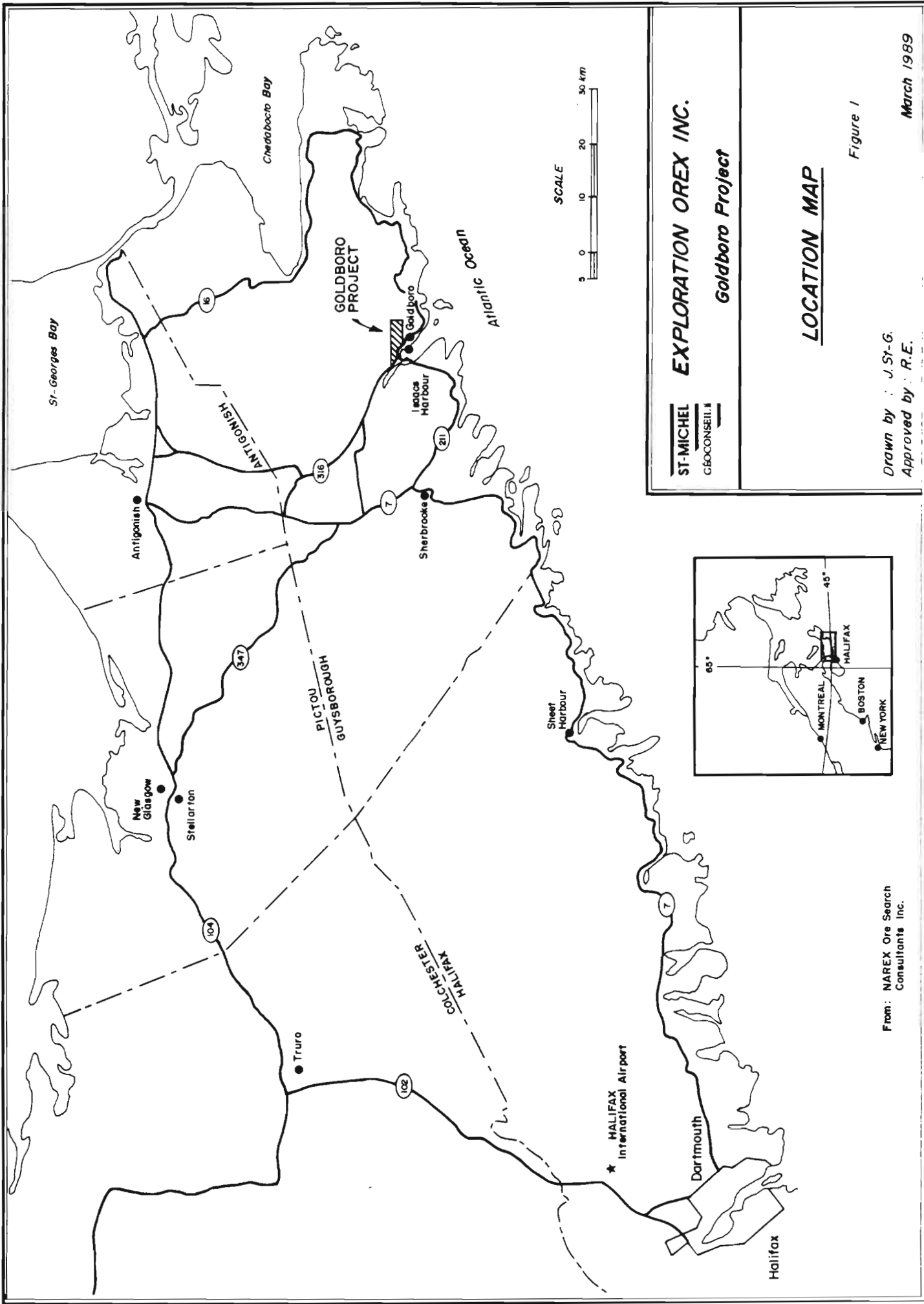
TABLE 1  
Goldboro Project - Pre-Production Costs

## 1. LOCATION AND ACCESS

The Goldboro property lies along on the eastern shore of Nova Scotia, Canada, along the Atlantic Ocean. It is 180 km northeast of Halifax, approximately 1.6 km north of the village of Goldboro on the eastern shore of the Isaac's Harbour, in Guysborough County.

The villages of Goldboro and Isaac's Harbour offer some essential services. All other services are readily available in the town of Sherbrooke, 50 km by road to the west (figure 1) or the town of Antigonish, 80 km to the north-north-east. The nearest commercial airport is the Halifax International Airport.

The Goldboro property consists of 37 contiguous claims covering a total area of 1,480 acres (600 ha). The surface rights belong to various private landowners and the Nova Scotia Department of Lands and Forests.



**ST-MICHEL**  
GEOCONSEIL II

**EXPLORATION OREX INC.**  
*Goldboro Project*

**LOCATION MAP**

Figure 1

Drawn by : J. St-G.  
Approved by : R.E.

March 1989

From : NAREX Ore Search  
Consultants Inc.

## 2. HISTORY OF THE PROPERTY AND WORK DONE BEFORE 1988

In 1861, gold was discovered in quartz veins in the Isaac's Harbour anticline. In 1892, Howard Richardson was the first to note gold occurrences in the slate belt (slate and quartz) that would later bear his name. During the same year, the Richardson Gold Mining Company started developing the belt.

In 1893, the Richardson Gold Mine went into operation; ore grade averaged 0.38 ounce of gold per short ton (11.82 g/mt) (50% to 60% gold recovery). In 1896, the mine operated at full capacity. In 1897, three shafts gave access to the ore at a depth of 195 feet (59.4 m). At the turn of the century, the main shaft was 530 feet (161.5 m) deep and selective mining methods were used. At this time two Wilfley concentrators were in operation. In 1901, two additional Wilfley tables were installed. A year later, the vertical shaft was sunk. In 1903, the Boston-Richardson Mining Co. took over the property and resumed the sinking of the vertical shaft to the 400 foot (122 m) level (1905). In 1906, a bromo-cyanide plant was built and gold recovery went up to 70%. The next year, the 700 foot (213 m) level station was reached. Operations were suspended on August 15, 1908, because of financial difficulties.

The New England Mining Company took over the mine in 1909. During that year, 41,425 short tons (37,282 mt) of ore were crushed and yielded 5,024 ounces (142 kg) of gold. In 1910, the company proceeded to a final clean-up resulting in the recovery of an additional 1,502 ounces (42.5 kg) of gold for a total recovery of gold from the Boston-Richardson Mine of 54,871 ounces (1,551 kg) from 414,887 short tons (377,170 mt) of ore, between 1893 and 1910.

The Dolliver Mountain Mine was most active between 1901 and 1905 when underground work was done. In 1902, the shaft was 190 feet (58 m) deep and three ore belts were

intersected, the most important of which measured 32 feet (10 m) (Partington belt). In 1903, the shaft was deepened to 265 feet (81 m) and intersected a 22 foot (7 m) ore belt (Forge belt).

In 1904, the shaft was extended to 488 feet (149 m). Stopping was done principally on two levels and 205 ounces (5,883 g) of gold were recovered from 8,059 short tons (7,326 mt) of ore. In 1905, a 500 foot (152 m) hole was drilled from the bottom of the shaft. Several bodies of quartz and slate were intersected but results were unsatisfactory. The mine has remained idle since that time.

In the West Gold Brook Mine, from 1909 to 1910, five ore belts were identified and a milling test was done on three of these belts. Results were unsatisfactory and the mine was abandoned.

Between 1929 and 1931, Locarno Copper Mines Ltd. sank a shaft west of the previous one (West Gold Brook). In 1931, a metallurgical test recovered 1.61 ounce (46 g) of gold from 1.1 short ton (1 mt) of ore.

In 1956, Canso Mining Corporation dewatered the shaft and did some cross-cutting. Work was stopped because of the company's financial difficulties.

The East Gold Brook Mine started with the sinking of a shaft in 1907. In 1908, three ore belts were explored by drifting eastward around the apex (150 foot or 46 m level). Some rich ore was found in one of these ore belts, but no other work was done.

Between 1931 and 1934, Renada Mines Ltd. dewatered and sampled the old workings. Assaying gave results ranging from 0.052 to 0.137 ounce of gold per short ton (1.61 to 4.26 g/mt).



After almost 30 years without activity, some exploration work was done in 1981. The property was owned by Patino Mines Ltd., who did some geophysical survey during the summer of that year. In 1984, a 1,737 foot (529 m) diamond drill hole was executed down dip from the Boston-Richardson Mine. It reached the Boston-Richardson belt at an approximate depth of 1,180 feet (360 m) along the hole on the north limb of the fold.

In 1985, a program of five diamond drill holes was undertaken on the West Gold Brook Mine for a total of 1,279 feet (390 m). Each hole intersected many slate beds, but few samples were taken.

Early in 1987, Petromet Resources Ltd. and Greenstrike Gold Corporation completed an exploration program of another five diamond drill holes for a total of 6,314 feet (1,925 m). Later that year, Onitap Resources Inc. completed an additional 33 D.D.H., for a total of 38,917 feet (10,330 m). An IP survey was done in the central part of the claims and "Aerodat" Limited conducted an helicopter-borne magnetic and EM-16 surveys.

The aim of the first 1987 campaign was to establish the depth and lateral extension of the Boston-Richardson belt. The holes were located in the eastern part of the property. The subsequent D.D.H. campaign was directed not only on the Boston-Richardson belt but also on the East Gold Brook property and on exploration targets under the Boston-Richardson, where many auriferous ore belts were found. The 1987 D.D.H. campaign led to the detection of a minimum of four belts under the Boston-Richardson belt (New, Third, Fourth and Fifth) and many impressive gold values over the Boston-Richardson belt, in the East Gold Brook area. Visible gold was present in almost every hole.

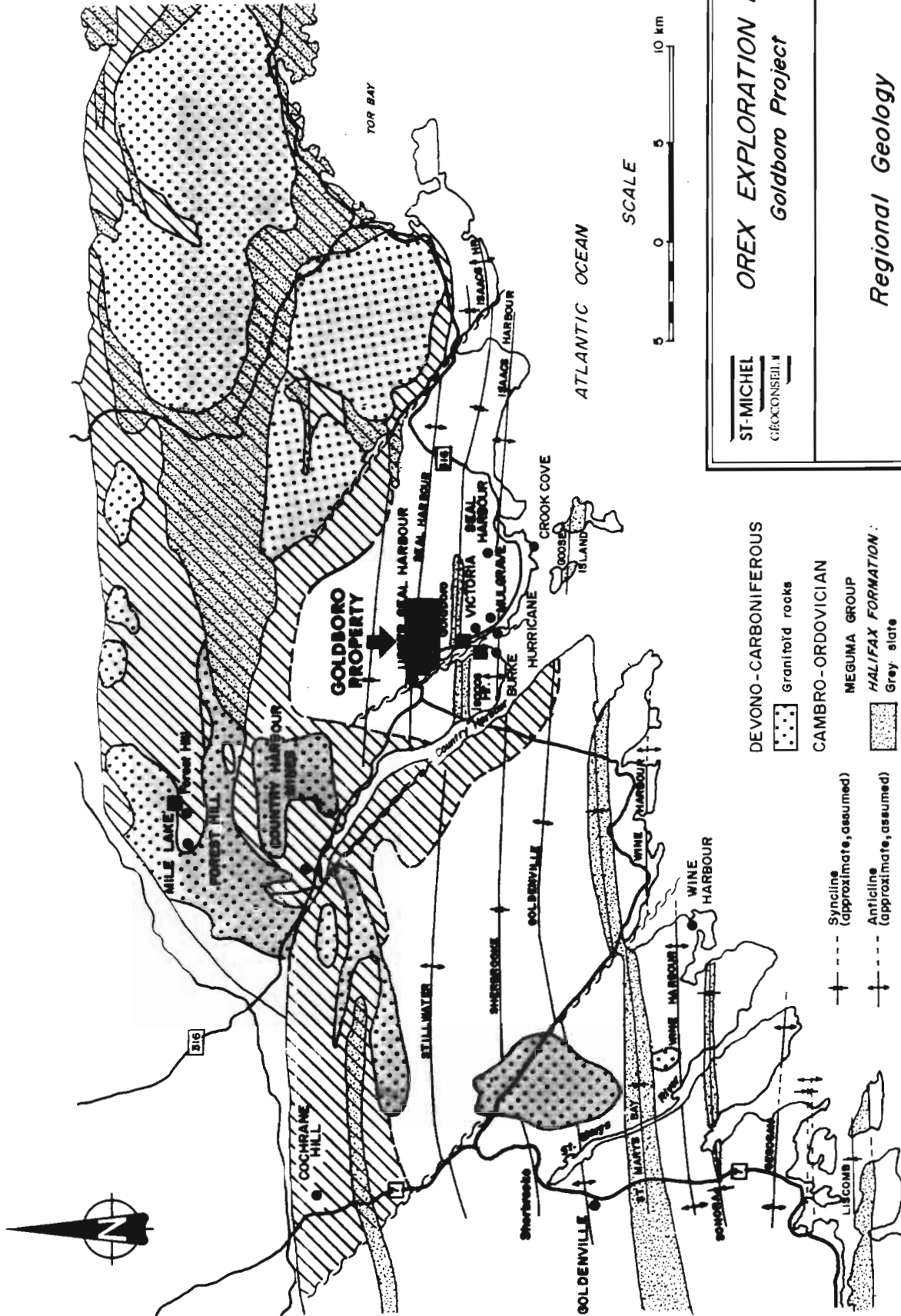
Exploration work done during the 1988-1989 campaign is described in chapters 6 and 7.

### 3. REGIONAL GEOLOGY

Nova Scotia, in terms of geology and metallogeny, can be divided into three domains: the Avalon and Meguma domains (Middle Devonian) overlaid by the Glooscap domain (Carboniferous and Triassic). Most of the gold produced in Nova Scotia came from deposits described as concordant groups of quartz veins in the oldest and most extensive metasedimentary unit.

The rocks underlying the property are of the Meguma group and are composed of a thick Cambro-Ordovician metasedimentary sequence (Meguma Group) intruded by Devonian granitoid plutons. The Meguma Group is divided, from the base to the top, into two formations, the Goldenville formation and the Halifax formation.

The Goldenville formation underlies the entire property (see figure 2). Amalgamated sandstone units and both partial and complete bouma sequences are present and indicate a turbiditic origin.



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GÉOCONSULTANTS

**OREX EXPLORATION INC.**  
Goldboro Project

**Regional Geology**

FIGURE 2

Drawn by : J.SY-G.  
Approved by : G.P.

- DEVONO-CARBONIFEROUS
    - Granitoid rocks
  - CAMBRO-ORDOVICIAN
    - MEGUMA GROUP
    - HALIFAX FORMATION : Grey slate
  - GOLDENVILLE FORMATION : Grey sandstone, minor slate
  - Amphibolite facies (after Kepple and Muecke, 1979)
- 
- Syncline (approximate, assumed)
  - Anticline (approximate, assumed)
  - Gold deposit
  - Geological boundary
  - Metamorphic boundary

#### **4. STRUCTURAL GEOLOGY**

The Meguma domain has been the site of at least four periods of superimposed deformations starting earlier than the Acadian deformation and ending with the Hercinian shear zones following the granitoid batholith intrusions.

The Upper Seal Harbour anticline, which is the host of the Goldboro auriferous mineralization, can be followed for 40 km west to east from the St. Marys River to New Harbour (figure 2). This major fold system is mainly from the Acadian Age (Guysborough deformation). Its direction is roughly 95° and its surface axial trace is slightly wavy.

## 5. ECONOMIC GEOLOGY

### 5.1 THE MEGUMA DOMAIN

The Meguma group contained most of the 35,130 kg of gold produced in Nova Scotia since the early 1860. Gold is found mostly in concordant groups of quartz-carbonate-arsenopyrite veins in the Cambro-Ordovician metapelites of the Meguma Group of southern Nova Scotia.

### 5.2 THE GOLDBORO GOLD MINERALIZATION

On the Goldboro property, one past producer (the Boston-Richardson Mine), three old shafts (Dolliver Mountain, West Gold Brook and East Gold Brook), one exploration ramp (Orex Exploration Inc.) and more than 86 drill holes have enabled St-Michel Géoconseil inc. to characterize gold occurrences in the Cambro-Ordovician turbiditic sequence. Information is distributed in the fold axis corridor over more than 3 km in length.

In the Boston-Richardson Mine, 100% of the ore material came from the only shale unit present between big piles of greywackes and arenites. Vein material occupies variable volume in the shale unit, from almost nothing to nearly 100%.

The information obtained during the last exploration campaign on pelitic units under the Boston-Richardson belt indicates the occurrence of a minimum of 14 pregnant auriferous shale beds moderately spaced by greywackes and arenite beds.

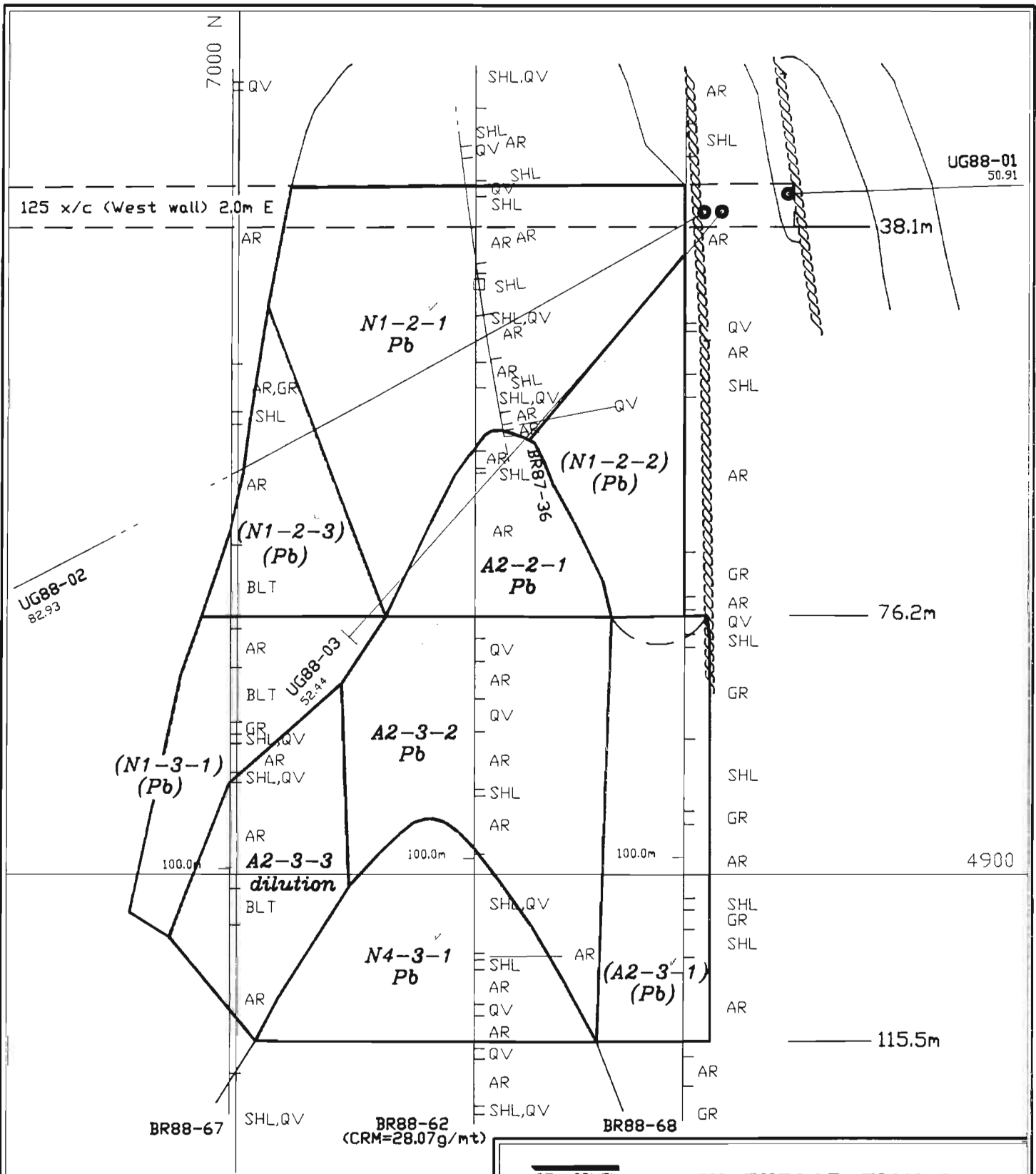
Gold occurs in association with ore minerals (arsenopyrite, pyrite) or in free state in quartz veins, or in the wall rock (shale units). Most of the belts contain visible gold.

St-Michel Géoconseil inc.'s interpretation suggests that many shale units are lensoid in form, but continue for impressive lateral distances along the same stratigraphic horizon (with variable thicknesses). This could be similar to the Cochrane Hill Mine where lensoid shale units have been recognized in the open pit. The great continuity of lateral shale units is exemplified by the well-known Boston-Richardson belt.

On the Goldboro property, where new belts have been defined below the Boston-Richardson, diamond drilling data suggest the distribution of black shale (with a variable percentage of quartz), centered on the apex zone along a maximum perpendicular distance of 50 meters on either side of the axial plane (figure 3). With a fold amplitude over 2 km wide, St-Michel Géoconseil inc. considers 100 meters to be the axial zone (5% of the fold amplitude).

The potential of this project lies mainly in the fact that the shale units as a whole can be considered auriferous and not only the quartz veins. The consequence is a high potential of large-volume low-grade orebody containing many shale beds.

Visible gold has often been observed intercalated in arenite units in cross-cutting quartz veins, in the fold axial zone.

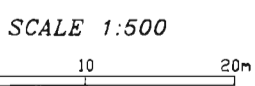


UG88-02  
82.93

UG88-01  
50.91

UG88-03  
52.44

BR88-62  
(CRM=28.07g/mt)



- LEGEND**
- Block limits
  - A2-3-3 Block number
  - Pb Probable reserves
  - ( ) Not included in the reserves

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OREX EXPLORATION INC.  
Goldboro Project

TYPICAL SECTION 8712.5 E  
OF THE BLOCK RESERVES AND GEOLOGY

FIGURE 3

Drawn by: J.St-G.  
Verify by: G.P.

July 1989

## **6. WORK PERFORMED IN 1988**

A total of \$8.2 M was spent on the 1988 surface and underground exploration program. This included the shaft rehabilitation (Boston-Richardson) and other related technical services. The program was financed by Exploration Orex Inc. The financing was obtained under an option agreement between Exploration Orex Inc., Onitap Resources Inc. and Narex Ore Search Consultants Inc.

### **6.1 SURFACE EXPLORATION DRILLING PROGRAM**

The 1988 surface exploration drilling program was done to cover the western part of the Boston-Richardson Mine area. Its aim was to drill the belts discovered previously under the Boston-Richardson belt. These are known as the New Belts. A total of 41 holes were drilled along the projected anticlinal of the Upper Seal Harbour fold axis. The 1988 drilling program covered a total of 34,463 feet, (10,504 m) including 10 holes (5,965 feet or 1,818 m) drilled in the former West Gold Brook Mine area. At the end of the campaign, three (3) supplementary holes (672 feet or 205 m) were drilled in the vicinity of the underground decline to check the continuity of belts near the surface.

### **6.2 UNDERGROUND EXPLORATION PROGRAM**

An access decline and two levels were developed during the 1988 exploration program. The decline measuring 16 ft X 13 ft (5m X 4m) was driven for a total length of 1,364 feet (416 m) from the surface to the 250 foot (76 m) level, with a slope of 15%. It gives access to two 13 ft X 10 ft (4 m X 3 m) cross-cuts, one at the 125 foot (38 m) level and another at the 250 foot (76 m) level. Underground exploration



confirmed the interpretation of drilling data and consequently substantiated the potential of the auriferous zones.

As the cross-cut and apex drifts were being done, a muck sampling procedure was developed. Mapping and chip sampling of each cross-cut walls were done. Coarse gold mineralization is contained in the quartz veins associated with the graphitic black shale and some is also present in the shale itself.

An underground drilling program was done at the 125 foot (38 m) level cross-cut. Four holes were drilled for a total length of 768 feet (234 m).

### 6.3 SHAFT REHABILITATION

It was decided to rehabilitate the Boston-Richardson vertical shaft to give direct access to the ore in the eastern part of the new belts. Dewatering started in May 1988. The shaft collar has been reinforced to withstand a new 90 foot (27.4 m) headframe. The shaft, which consists of three standard 6' X 6' (1.82 m X 1.82 m) compartments, is now completely rehabilitated down to the 400 foot (122 m) level.

## **7. EXPLORATION PROGRAM AS OF APRIL 30, 1989**

The 1988 exploration program convinced Exploration Orex Inc. to do more work on the property since it bears good potential for coarse gold in shale and quartz units.

A metallurgical test has been made on the muck samples taken from the 125 foot (38 m) and 250 foot (76 m) level cross-cuts and a new surface diamond drilling campaign was initiated. The preliminary metallurgical tests revealed a grade estimation problem by the conventional analytical method (atomic absorption and/or fire assay) because of the nugget effect. For this reason, it was decided to find a proper way to sample the drill cores before sending any more samples.

A milling test was done in February 1989 with the cores from holes BR-35A , BR-48 BR-60, BR-61, BR-62 and BR-85 to have an exact grade of the ore compared to the estimated grade given by assay analysis.

### **7.1 SURFACE EXPLORATION DRILLING PROGRAM**

At the end of April 1989, seventeen (17) holes were completed (figure 4) for a total length of 2,360 meters. The aim of this campaign was first to evaluate the potential of a series of new belts from the western extension defined in the previous program, west of Section 8600E, and secondly to define reserves in the working and drilling area of the West Gold Brook (1985-01 to 1985-04) where the new belts and auriferous quartz veins reach the surface. To date known (calculable)<sup>†</sup> reserves are estimated at approximately 1,050,000 metric tons grading 6.16 grams per ton between the 38 and 122 meter levels in the vertical plane and from section 8625E to 8762.5E in the longitudinal plane. The targets and major results obtained for each hole are shown in appendix 1.

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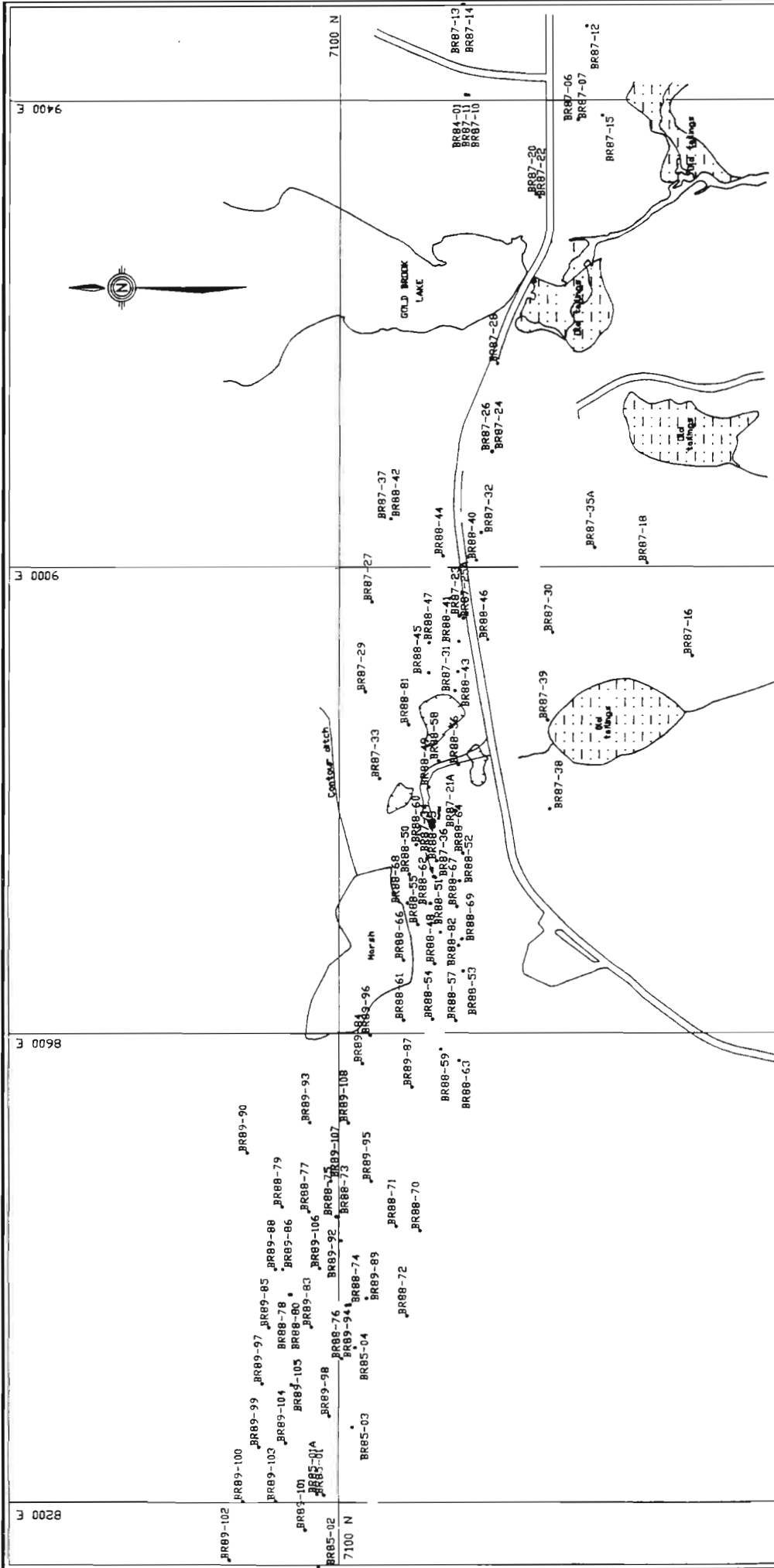
<sup>†</sup> Drilling results are too scarcely distributed along the anticlinal fold axis to calculate more ore reserves

## 7.2 ORE RESERVES

The ore reserves were calculated by St-Michel Géoconseil inc.'s chief geologist using all available information. Results from metallurgical tests on core and muck samples (when available) were used instead of their counterpart fire or atomic absorption assays.

The ore reserves estimate is also centered only in the area where underground development has been done permitting to confirm the geological interpretation. The rest of the property is too scarcely assayed to assess any reserves.

To date, approximately 1 M metric tons of ore grading 6.2 g/mt has been defined within an ore block measuring 137.5 meters laterally and 84 meters vertically. This tonnage includes all probable and a limited amount of possible reserves (24,600 mt) and takes also into account an internal dilution coming from the very low grade arenites.



**ST-MICHEL**  
**GEOCONSULT**

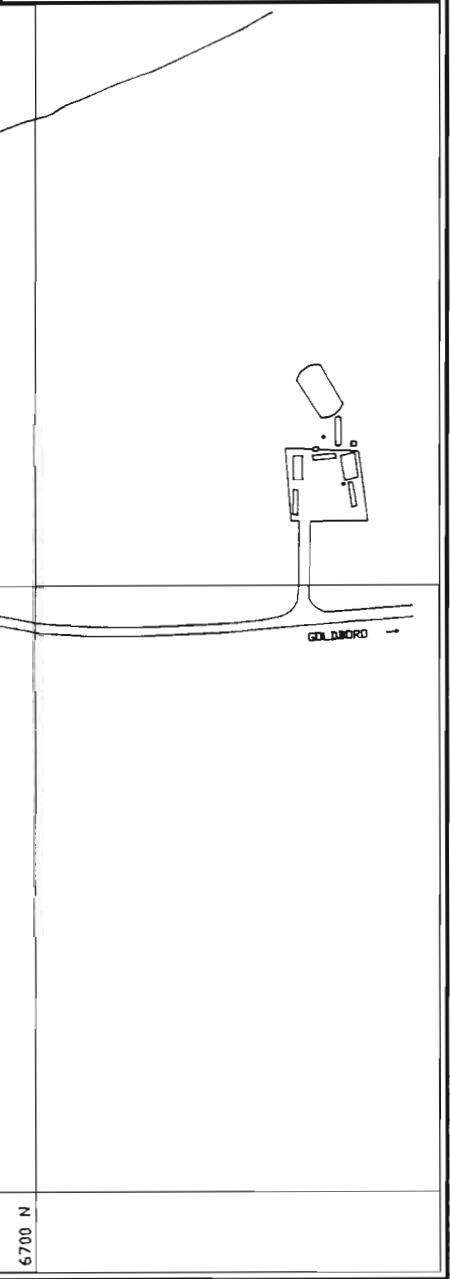
**DREX EXPLORATION INC.**  
 Goldboro Project

**DRILL HOLES LOCATION**

FIGURE 4

Scale: 1:5000  
 Date: June 1989

Drawn by: JST-G.  
 Verified by:



## 8. DESCRIPTION OF THE DEVELOPMENT SCENARIO

Based on all the information gathered so far on the Goldboro Project, St-Michel Géoconseil inc. is of the opinion that Orex should bring the property into production.

Because of the extreme difficulty for junior mining companies to finance even the very best of projects through public offerings, the capital investment must be kept to a very strict minimum. To do so, St-Michel Géoconseil inc. recommends the following scenario: for at least the first two years of operation or until Orex's cash flow becomes favourable, underground development, mining and crushing would be subcontracted whereas Orex would operate the mill.

The mining and crushing equipment would be supplied by subcontractors while the mill and related milling facilities would be built by Orex.

## 9. TECHNICAL PRE-FEASIBILITY OF THE PROJECT

### 9.1 ENVIRONMENTAL PERMIT

Ideally, Orex should first ask for an environmental permit and wait for it before proceeding any further with the Goldboro Project. However, because of the time it takes to get such permits (3 to 5 months), plus the time it takes to find milling equipment and build the mill, St-Michel Géoconseil inc. is of the opinion that Orex should not wait and should initiate both activities as soon as possible.

### 9.2 UNDERGROUND DEVELOPMENT

Even with the limited amount of information on hand (in relation to the size of the orebody), St-Michel Géoconseil inc.'s approach is to bulk mine the whole orebody. The dilution generated by the rather sterile arenite beds would be more than offset by the benefits of low cost, large tonnage mining.

Bearing this in mind and also remembering the thickness and width of the orebody, it is recommended that a modified sub-level retreat mining method be used.

The orebody has been divided into four blocks which will eventually be stopes 2-1, 3-1, 2-3 and 3-3. Except for remote control scoop tramming, very standard mining equipment will be used (jumbos, scooptrams, underground trucks, long hole drilling machines, etc.).

Each block will be developed in such a way that practically nowhere will

thickness of ore exceeding 50 feet (15.2 m) be drilled, thus making the drilling pattern easier and reducing the formation of big non-blasted ore blocks.

An underground definition diamond drilling program will be done to define the limits and final size of the ore body . The results of this program will also help to determine the exact grade and the final location of the different drifts, sub-drifts, sills and raises.

Mining will then be done in sequences starting with stope 2-1. Subsequent development costs of stope 2-3, 3-1 and 3-3 will be included as part of the mining costs (see table 2).

### 9.3 CRUSHING

The crushing will be subcontracted and the crushing equipment will be of the mobile type. Ideally the unit will consist of a hopper equipped with an apron feeder, a jaw crusher big enough to take 1,500 mt per day of 12" ore, followed by a 5 1/2' short head cone crusher capable of reducing the ore to -3/8". Because the crushing will be subcontracted, no capital costs will be required. However, a crushing cost of \$5.50 was obtained from a Rouyn-Noranda subcontractor.

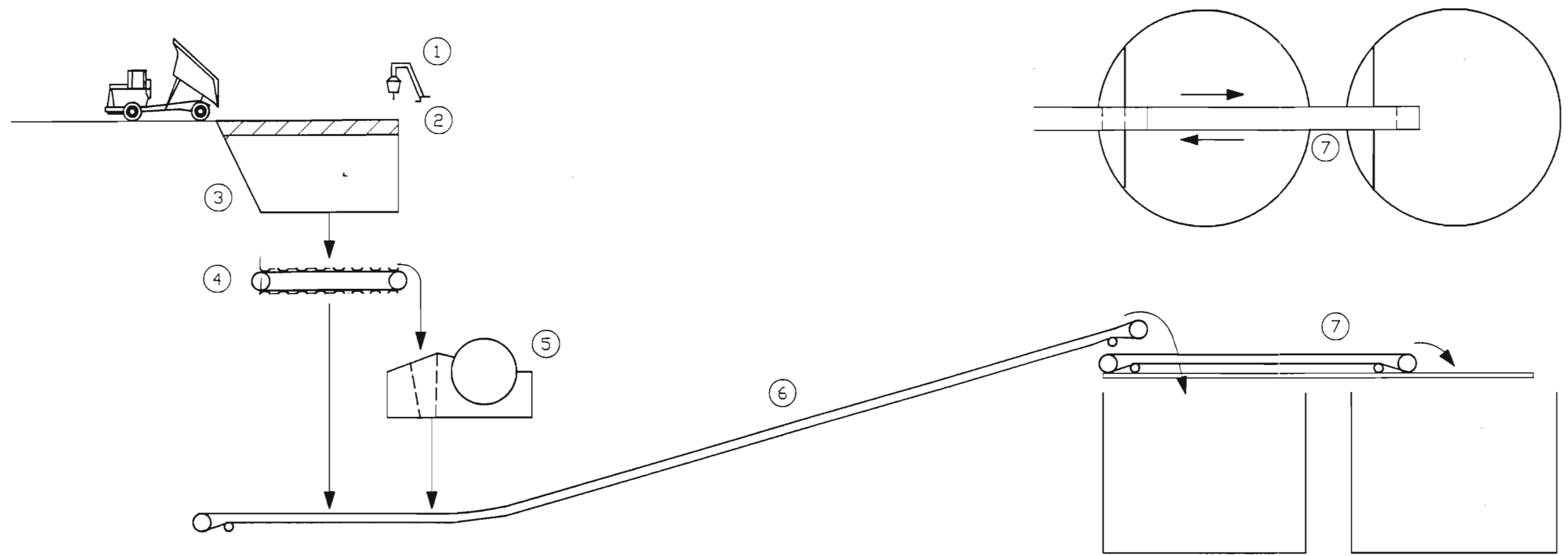
### 9.4 MILLING

Because of the limited amount of mill tests done on the Goldboro ore, St-Michel Géoconseil inc. proposes at this time a very conventional mill flow sheet (see figures 5 and 6). Grinding to -65 mesh, gravity concentration, flotation of the sulphides followed by cyanidation of the concentrate will be the heart of the milling process.

The tailings pond will have to be built at the same time as the mill. St-Michel Géoconseil inc. recommends a standard tailings pond for the flotation tailings while the cyanidation rejects would be pumped into the old Boston Richardson mine.

Equipment, installation and construction costs for the mill and milling facilities have been estimated at \$8.94 million using second-hand equipment.

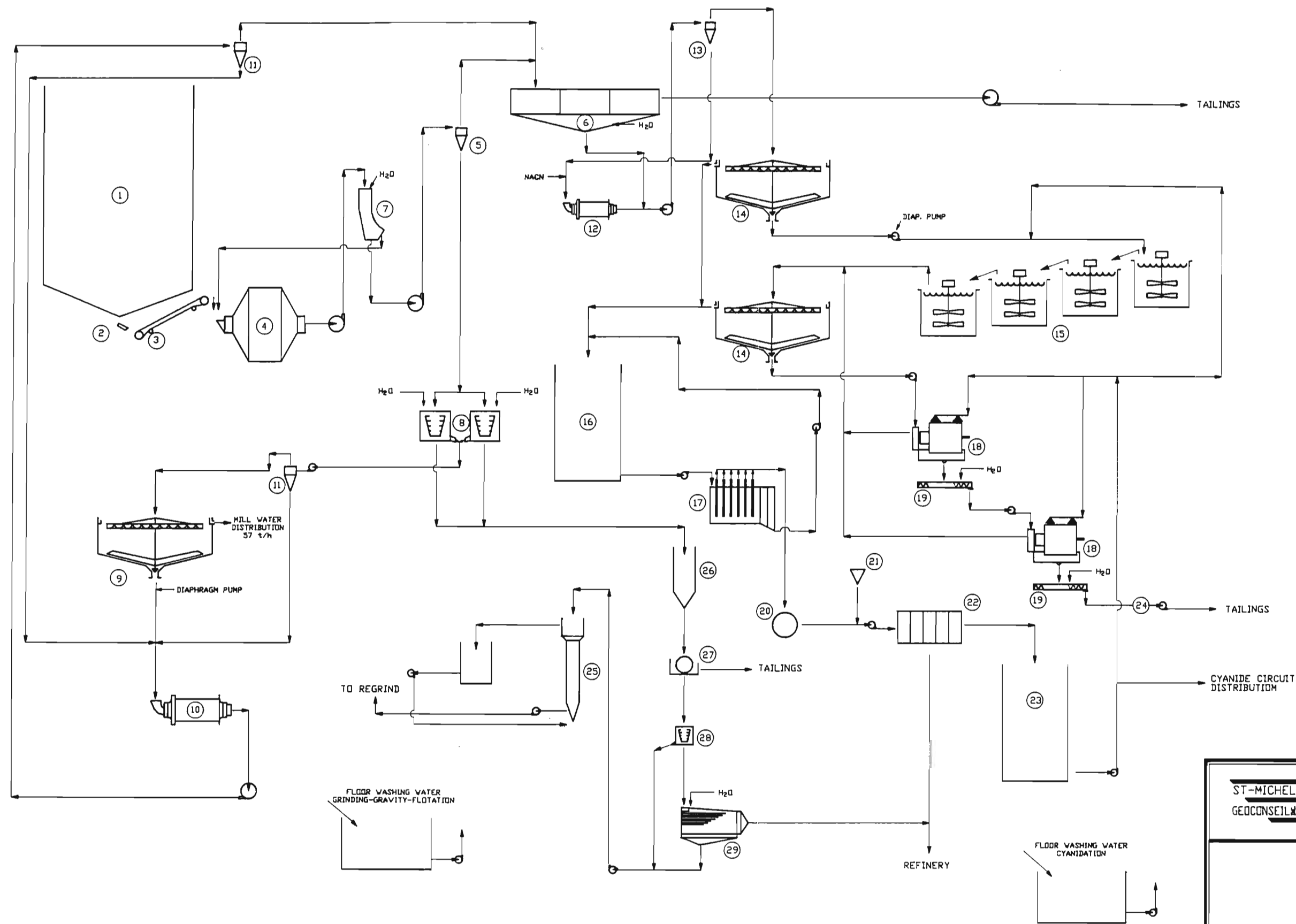




- 1 ROCK BREAKER
- 2 GRIZZLY BARS (8' spacing)
- 3 HOPPER (70 tons capacity)
- 4 APRON FEEDER (36")
- 5 JAW CRUSHER (36'x25')
- 6 CONVEYOR (to fine ore bin)
- 7 SHUTTLE BELT

PRELIMINARY

<b>ST-MICHEL</b> <b>GEOCONSEIL</b>	<b>OREX EXPLORATION INC.</b> <i>Goldboro Project</i>
<b>CRUSHING PLANT</b> <b>FLWSHEET</b>	
<b>FIGURE 5A</b>	
<small>Drawn by: J.St-G.          Verified by: C.R.</small>	
<small>October 1989</small>	



PRELIMINARY

- 1 ORE BINS (2)
- 2 FEEDERS (2)
- 3 CONVEYORS (3)
- 4 SAG MILL
- 5 CYCLONES (2)
- 6 FLOTATION CELLS (1)
- 7 DSM SCREEN
- 8 KNELSON CONCENTRATORS (3)
- 9 THICKENER
- 10 BALL MILL
- 11 CYCLONES
- 12 REGRIND MILL
- 13 CYCLONES
- 14 THICKENERS (2)
- 15 AGITATORS (4)
- 16 PREGNANT TANK (1)
- 17 CLARIFIER (1)
- 18 DRUM FILTERS (2)
- 19 REPULPERS
- 20 CROVE TANK (1)
- 21 ZINC FEEDER (1)
- 22 GOLD PRESSES (2)
- 23 BARREN TANK (1)
- 24 CN. DESTRUCTION PLANT (if required)
- 25 CYANIDATION COLUMN (3)
- 26 BIN
- 27 MAGNETIC SEPARATOR (1)
- 28 KNELSON SEPARATOR (12po)
- 29 WIFLEY TABLE (1)

**ST-MICHEL**  
GEOCONSULT

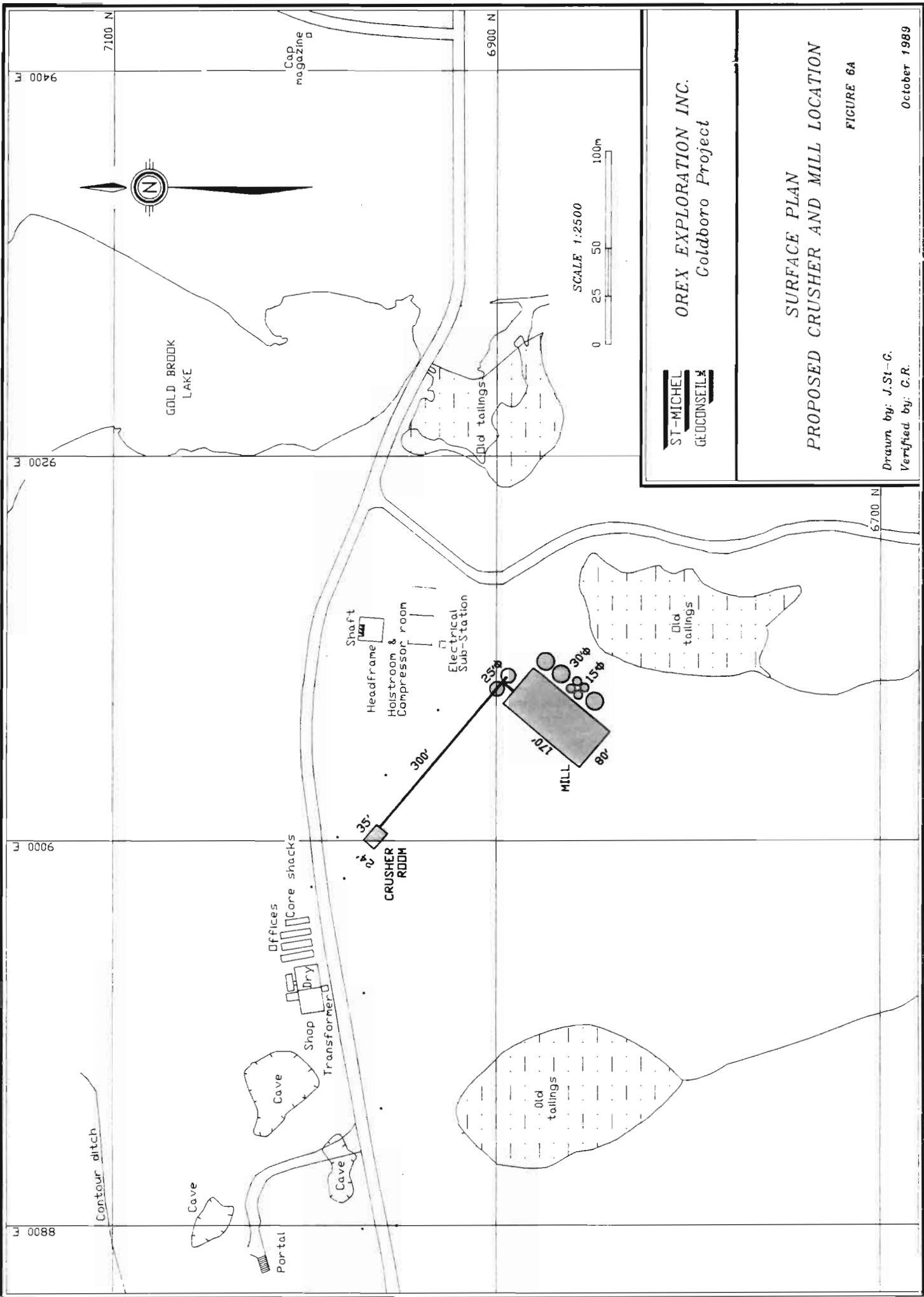
**OREX EXPLORATION INC.**  
Goldboro Project

**MILL FLOW SHEET**

FIGURE 5B

Drawn by: J.St-G.  
Verified by: C.R.

October 1989



**ST-MICHEL**  
**GEOCONSEIL**

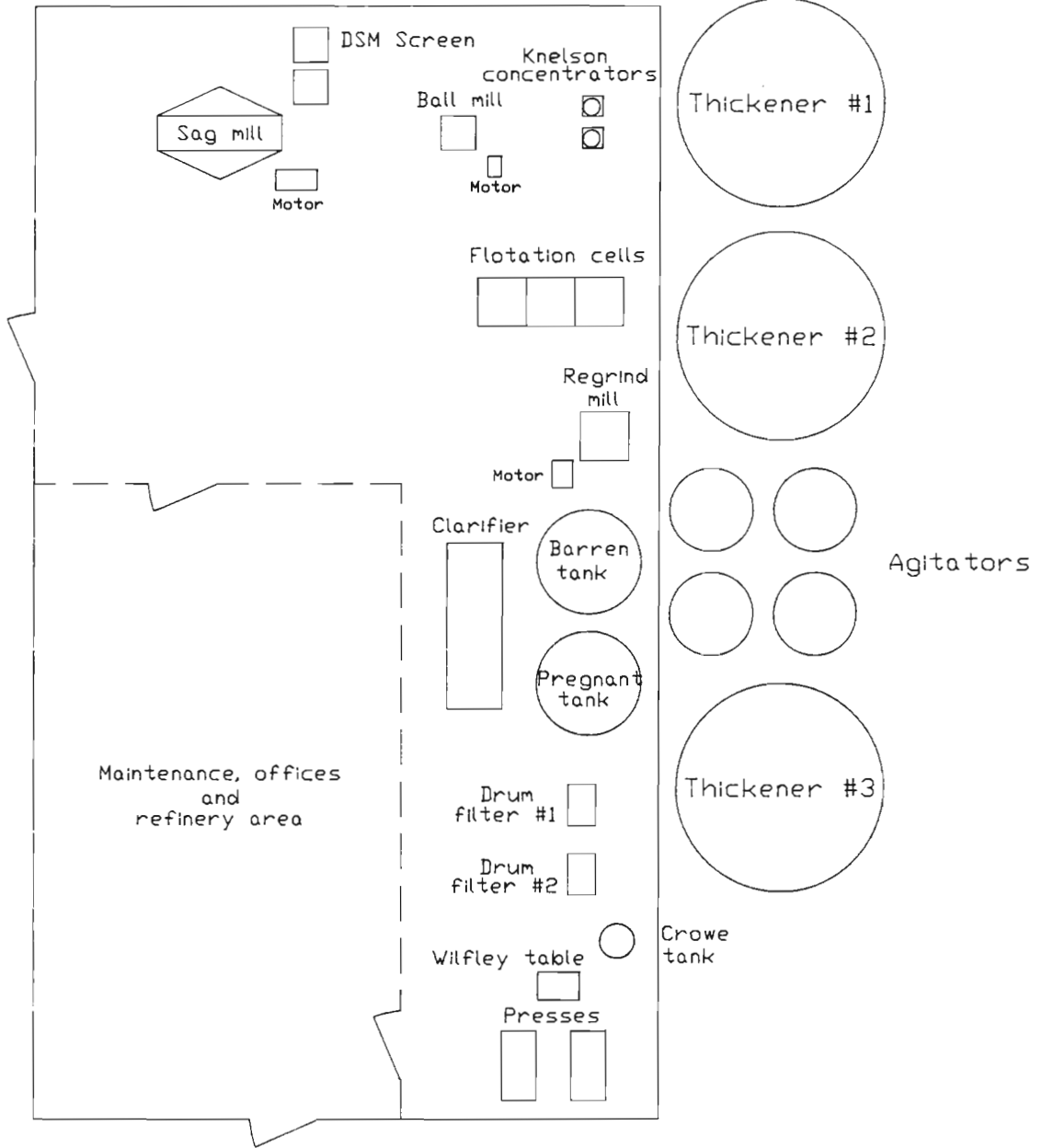
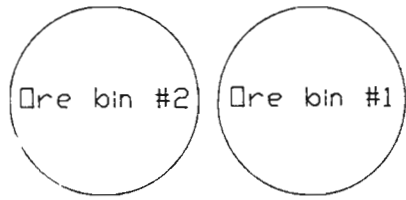
**OREX EXPLORATION INC.**  
 Goldboro Project

**SURFACE PLAN**  
**PROPOSED CRUSHER AND MILL LOCATION**

FIGURE 6A

Drawn by: J.St-C.  
 Verified by: C.R.

October 1989



PRELIMINARY

ST-MICHEL  
GEOCONSEIL

OREX EXPLORATION INC.  
Goldboro Project

PROPOSED MILL LAY OUT

FIGURE 6B

Drawn by: J.St-G.  
Verified by: C.R.

October 1989

## 10. INCOME GENERATED BY THE PROJECT

Income generated by the selected scenario was calculated using a conservative mill recovery of 92% for the first year, improving to 94% by the third year of mill operation. This recovery is based on results of limited tests done at the Centre de recherches minérales du Québec and Lakefield Research Laboratory over the past months and also on visits made to gold mills in Nova Scotia which process ore similar to that of the Goldboro property.

Following are the calculation parameters used for estimating the yearly gross income and profit.

TABLE 2  
Income Generated by the Goldboro Project

Variables	Year		
	1990-91	1991-92	1992-93
Tons milled	350,000	350,000	350,000
Grade (g/mt)	7.72	3.97	6.43
Price of gold <sup>2</sup>	\$450	\$460	\$487
Mill recovery <sup>3</sup>	92%	93%	94%
Income	\$36,000,000	\$19,400,000	\$33,100,000
Cost/mt			
mill	\$12.33		
mining	\$22.50		
administration	<u>\$5.17</u>		
	\$40.00	\$ 41.60	\$ 43.30
Cost/year <sup>3</sup>	\$14,000,000	\$14,560,000	\$15,160,000
Gross profit	\$22,000,000	\$ 4,840,000	\$17,940,000

<sup>2</sup> A 4% increase per year was taken into account to adjust to inflation

<sup>3</sup> Mill should be more performant over the years

## 11. MINING AND MILLING PREPARATION AND CONSTRUCTION COSTS

### 11.1 UNDERGROUND DEVELOPMENT

The underground development costs are based solely on the 1988 factual costs for similar types of work and the rest on budget estimates.

<u>Event</u>	<u>Size (m)</u>	<u>Cost/m</u>
Drifts	4 X 5	\$1,663/m
Drifts	3 X 4	\$1,307/m
Draw points	3 X 3	\$1,310/m
Drifts	2.4 X 2.4	\$ 987/m
Raises	2.4 X 2.4	\$1,258/m
Raises	1.5 X 2.2	\$1,000/m
Underground drilling	BQ	\$ 35/m

The cost of surface excavation was set at \$4.00/m<sup>3</sup>, whereas the cost of equipment and other related facilities not furnished by subcontractors and which will have to be supported by Orex, has been estimated from a similar installation in the Val d'Or area.

Finally a provision of nearly \$1,000,000 was allotted for the start-up of mining operation.

11.1.1 Second level to sub-level (slope 2-1)

<u>Event</u>	<u>Size (m)</u>	<u>Length (m)</u>	<u>Cost (\$)</u>
Haulage drift #1	3 X4	88	\$115,000
Haulage drift #2	3 X4	92	\$120,000
Cross cut #2	4 X5	49	\$ 81,000
Cross cut #1	3 X4	45	\$ 59,000
Draw points (10)	3 X3	100	\$131,000
Sill #1	4 X5	39	\$ 64,000
Sill #2	3 X4	60	\$ 79,000
Raise #2	1.5 X 2.2	21	\$ 21,000
Raise #1	1.5 X 2.2	21	\$ 21,000
Ventilation raise	2.4 X 2.4	21	\$ 26,000
Underground drilling accesses	2.4 X 2.4	12	\$ 15,000
Underground definition drilling		1,452	\$ 51,000
Subtotal			<hr/> \$783,000

11.1.2 Sub-level to first level (slope 2-1)

<u>Event</u>	<u>Size (m)</u>	<u>Length (m)</u>	<u>Cost (\$)</u>
Sub drift #1	2.4 X 2.4	77	\$ 76,000
Sub drift #2	2.4 X 2.4	77	\$ 76,000
Cross cut #1	2.4 X 2.4	40	\$ 39,000
Cross cut #2	2.4 X 2.4	10	\$ 10,000
Ventilation raise	2.4 X 2.4	21	\$ 26,000
Raise	1.5 X 2.2	21	\$ 21,000
Subtotal			<hr/> \$248,000

11.1.3 First level to surface

<u>Event</u>	<u>Size (m)</u>	<u>Length (m)</u>	<u>Cost (\$)</u>
Access drift	4 X 5	50	\$112,000
Sill	4 X 5	70	\$115,000
Cross cut	3 X 3	16	\$ 20,000
Ventilation raise	2.4 X 2.4	33	\$ 41,000
Ventilation excavation (surface)	1220 m3		\$ 5,000
Subtotal			<u>\$293,000</u>

11.1.4 Mining equipment (not supplied by subcontractors)

Main ventilation unit (fully equipped with heating system)	\$200,000
Orex's office, dry, clothing, lamps, office equipment, etc.	\$200,000
Subtotal	<u>\$400,000</u>
Mining (ore preparation)	<u>\$984,875</u>
<b>TOTAL</b>	<b>\$2,708,875</b>



## 11.2 MILL AND MILLING FACILITIES CONSTRUCTION COSTS

### 11.2.1 Buildings, equipment and inventory

The cost of milling equipment is based on second-hand machinery and on prices received from used equipment dealers. The installation cost comes from mill operators' experience whereas the cost of installing used equipment is equal to its purchasing cost. Building, power and piping costs were estimated from a fair figure of \$150 per square foot of mill floor.

As for the tailings pond, even if an amount of \$2,000,000 will probably be required for its final construction. St-Michel Géoconseil inc. considers that Ores should budget only \$1,500,000 for the time being. When the time comes, Ores could always raise the retaining dams to increase the pond capacity for the rest of the expected life of the mine.

An allowance of \$380,000 was budgeted to take into account the first month of mill operation where very little, if any, profit is usually made (start-up).

<u>Event</u>	<u>Cost (\$)</u>
Equipment	\$2,007,000
Installation	\$2,000,000
Building, piping, power, etc.	\$1,846,000
Engineering , assaying and metallurgical testing	\$ 450,000
Geotechnical study	\$ 100,000
Start up ( cost 1 month )	<u>\$ 380,000</u>
Subtotal	\$6,783,000
Assay office	\$ 150,000
Tailings pond	\$1,500,000
Cyanide destruction plant	\$ 100,000
Warehouse	\$ 50,000
Inventory	<u>\$ 360,000</u>
<b>TOTAL</b>	<b>\$ 8,943,000</b>

12. OPERATING COSTS

12.1 MINING COSTS

Mining costs are estimated at \$22.50 per metric ton and are based on costs of similar operations here in Quebec.

Drilling and blasting	\$5.50/mt
Mucking and hauling	\$8.00/mt
Supervision	\$3.00/mt
Development (\$1,200,000 / 200,000 mt)	\$6.00/mt

12.2 MILLING COSTS

Milling costs are estimated at \$12.33 per metric ton and are based on the following parameters:

<u>Operation - manpower</u>	<u>Cost/per year</u>	<u>Cost/mt</u>
1 mill superintendent	\$ 87,500	
4 leaders	\$170,000	
4 operators	\$150,000	
1 dryman	\$ 32,500	
4 laborers	\$130,000	
4 assayers	\$150,000	
3 mechanical men	\$120,000	
2 refinery men	\$ 85,000	
0.5 electrician	\$ 20,000	
Total	<hr/> \$945,000	\$2.70

Power <sup>4</sup> (10,000,000 kwh/yr @ \$ 0.07)	\$ 700,000	\$ 2.00
Grinding media and other reagents:		
Balls: 2,000 lb/day @ \$0.25	\$175,000	
Mill liners: 100 lbs/day @ \$0.60	\$ 21,000	
Flotation and cyanidation	\$200,000	
Others (spare parts)	\$350,000	
	<hr/>	
	\$746,000	\$ 2.13
Crushing <sup>5</sup>		\$ 5.50
		<hr/>
<b>TOTAL</b>		<b>\$ 12.33</b>

<sup>4</sup> If 50% of power must be supplied by diesel power units, \$1.00/mt must be added.

<sup>5</sup> Bid from subcontractor (budget)

**13. SCHEDULE**

**13.1 MILL AND MILL FACILITIES CONSTRUCTION**

St-Michel Géoconseil inc. is of the opinion that if Orex starts the engineering and other metallurgical testing early in August of this year, the mill should be in full operation by August 1, 1990 (see table 3).

**13.2 UNDERGROUND DEVELOPMENT**

Based on advances of 16 feet or 4.8 meters per day for drifts, draw points, cross cuts and sills, 8 feet or 2.4 meters per day for raises in ore, 16 feet or 4.8 meters per day for the ventilation raise and 60 meters per day for underground diamond drilling, the mine should be in production by June 1990 if underground development starts early in November of this year (see table 4).

<b>Events</b>
<b>Equipment purchase</b>
<b>Installation</b>
<b>Building, piping power, etc.</b>
<b>Engineering &amp; metallurgical testing</b>
<b>Geotechnical study</b>
<b>Start up (one month cost)</b>
<b>Assay office</b>
<b>Tailings pond</b>
<b>Cyanide destruction plant</b>
<b>Warehouse</b>
<b>Inventory</b>
<b>TOTAL</b>

**TABLE 3**  
**Goldboro Project - Calender of Mill Construction**

TABLE 4  
Goldboro Project - Calendar of Underground Development

Events	Total investment	October 1989	November 1989	December 1989	January 1990	February 1990	March 1990	April 1990	May 1990	June 1990	July 1990
Mobilization	05	** **									
Sill, 2nd level	64 000\$		64 000\$ ***								
Drilling accesses, 2nd level	15 000\$		15 000\$ **								
Drilling & interpretation, 2nd level	51 000\$		18 360\$	32 640\$							
Cross cut #1, 2nd level	59 000\$		53 100\$ ***	5 900\$ **							
Access drift, 1st level	112 000\$			112 000\$ *****							
Cross cut #2, 2nd level	81 000\$				81 000\$ *****						
Ventilation raise, 2nd level to surface	93 000\$				80 600\$ ****	12 400\$ **					
Surface excavation for ventilation fan	5 000\$				5 000\$ **						
Raise #2, 2nd level to sub-level	21 000\$				6 300\$ **	14 700\$ ***					
Haulage drift #1, 2nd level	115 000\$				17 250\$ **	97 750\$ *****					
Raise #1, 2nd level to sub-level	21 000\$					21 000\$ ***					
Sub-drift #1	76 000\$					55 800\$ *****	20 200\$ **				
Sub-drift #2, sub-level	76 000\$					13 400\$ **	62 600\$ *****				
Cross cut #1, sub-drift	39 000\$					11 700\$ **	27 300\$ *****				
Cross cut #2, sub-drift	10 000\$						10 000\$ **				
Haulage drift #2, 2nd level	120 000\$				18 150\$ **	101 850\$ *****					
Draw points (10), 2nd level	131 000\$					18 700\$ **	112 300\$ *****				
Sill #2, 2nd level	79 000\$						21 100\$ **	57 900\$ *****			
Raise, sub-drift to 1st level	21 000\$					6 300\$ **	14 700\$ ***				
Sill, 1st level	115 000\$						76 700\$ ****	38 300\$ **			
Cross cut 1st level	20 000\$							20 000\$ **			
Production drilling	309 875\$								309 875\$ *****		
Blasting, hauling	675 000\$									337 500\$ *****	337 500\$ *****
<b>TOTAL</b>	<b>2 308 875\$</b>	<b>05</b>	<b>150 460\$</b>	<b>150 540\$</b>	<b>208 300\$</b>	<b>353 600\$</b>	<b>268 200\$</b>	<b>134 600\$</b>	<b>368 175\$</b>	<b>337 500\$</b>	<b>337 500\$</b>

**14. ORE DEVELOPED AND MINED OUT AT END OF DEVELOPMENT PERIOD**

At the end of the underground development period an estimated amount of 32,000 metric tons of ore should be stockpiled at the surface and ready to be milled. This ore will come from the development work (17,000 mt) and from 15 days of mining production (15,000 mt).

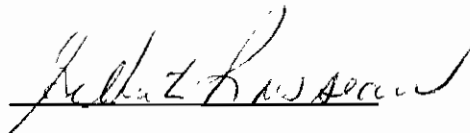


## CONCLUSION

Based on all the information gathered so far on the Goldboro project, St-Michel Géoconseil inc. is quite confident that the property bears a potential of at least 1 M metric tons of ore grading 6.0 g/mt.

Moreover, the huge potential of the property suggests that Exploration Orex Inc. should take step to bring the Goldboro property into production starting with belt no. 1 which is included in stope 2-1 of the proposed mining lay out.

For St-Michel Géoconseil inc.



Gilbert Rousseau  
Gilbert Rousseau, P. Eng.

REFERENCES

NAREX ORE SEARCH CONSULTANTS INC., Review of the Exploration Program Performed by Onitap Resources Inc. in the Goldboro Area - Guysborough County, non-public report.

PARENT, G., Progress Report Covering the 1989 Exploration Program up to the 30th April, 1989 - Goldboro Property, Rouyn-Noranda, St-Michel Géoconseil inc., 1989.

PARENT, G. & ÉTHIER, R., Final Report on the 1988 Exploration Program and Ore Reserve Calculations - Goldboro Property, Rouyn-Noranda, St-Michel Géoconseil inc., 1989, 51 pages.

APPENDIX 1

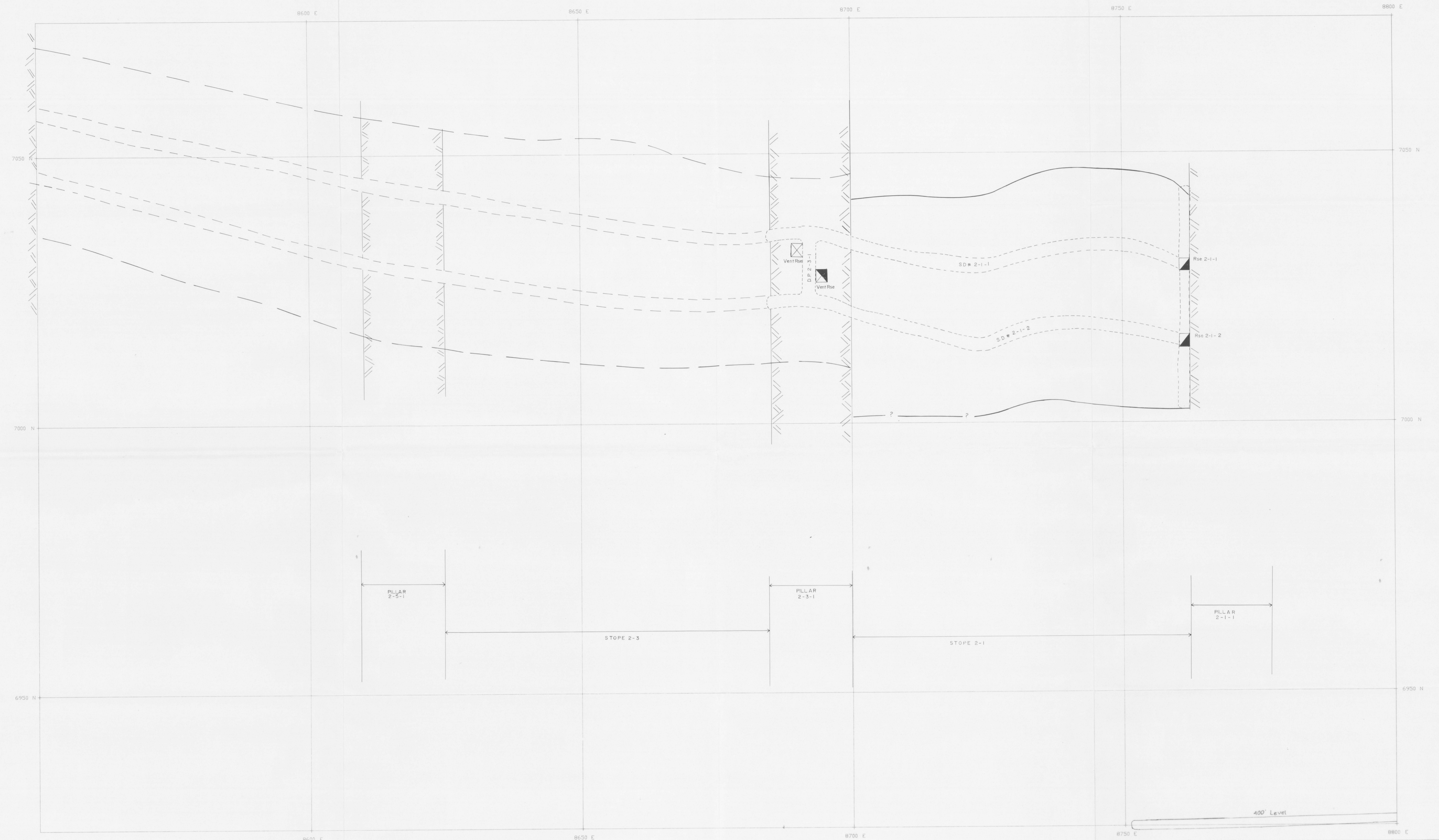
Drill Holes Description

- BR89-83: This reconnaissance drilling , near West Gold Brook, has established that the axial plane of the fold was located more to the north. A few shale horizons were crossed, one of which contained visible gold.
- BR89-85: This hole, which is located north of the above one, has crossed the axial plane of the fold together with four to five shale horizons on each side of it. Numerous quartz veins are present in the axial plane area and visible gold was seen in five places (Four of them in belts and one in a quartz vein located in arenite). This probing was most encouraging in the pursuit of the exploration of the West Gold Brook area.
- BR89-84: This hole was drilled in the western part of the Boston-Richardson area, in order to locate the N1 as well as the other belts on the north flank of the fold. A major belt was crossed as well as minor ones; the mineralized zone seems to become larger. The location of the axial plane in this area indicates the possibility of a fault somewhat to the west, since it is more to the north in the West Gold Brook area.
- BR89-86: This hole is located east of the West Gold Brook in the north flank of the fold. It has crossed numerous belts and visible gold was seen in three horizons (one is a shale and the two others are quartz veins in arenite). The axial plane was crossed near the end of the hole.
- BR89-88: This hole, which is north of the preceeding one, was aimed at establishing the extension of the belts in the north flank of the fold. Only a few belts were crossed.

- BR89-87: This hole was aimed at locating the axial plane between the western part of the Boston-Richardson area and the eastern part of West Gold Brook. It followed a fault zone for a distance of more than 60 m. This is a north-south occurrence which may be related to the displacement of the axial plane in the area.
- BR89-89: This hole, located in a section already crossed by four holes in 1988, was aimed at determining more accurately the location of the axial plane and for verifying the continuity of interesting intersections obtained on each side in holes BR89-85 and BR89-86. The axial plane area contains interesting shale horizons, but without visible gold.
- BR89-90: This hole, located far away on the north flank, was drilled in order to evaluate its potential as well as to locate more precisely the axial plane. Many belts containing quartz veins were crossed, but the axial plane was not reached.
- BR89-91: This hole, which was drilled south of the preceding one in order to cross the axial plane of the fold, curved significantly toward the north. Nevertheless, many belts were crossed and there were four intersections with visible gold (two in the shales near surface, one in a quartz vein in arenite, and one relatively far from the axial plane in a shale horizon containing quartz).
- BR89-92: This hole, which was drilled in order to evaluate the south flank, has probably crossed the axial plane in its lower part. Visible gold was seen in a graphitic shale horizon near the axial plane.

- BR89-93: With this hole, it was possible to get a more precise location of the axial plane of the fold in an area between the West Gold Brook and the Boston-Richardson. Numerous belts and quartz veins have been crossed, with visible gold in two places, this confirming the enlargement of the mineralized zone noticed in the BR89-84 hole.
- BR89-94: This hole, aimed at locating the axial plane of the fold, has probably crossed an old drift of the West Gold Brook. The axial plane was crossed as well as a few belts on each side, and some visible gold was seen in a small quartz vein in arenite.
- BR89-95: With this hole, it was possible to locate the axial plane of the fold in the area between West Gold Brook and Boston-Richardson. Numerous shale horizons were crossed, two of which contained visible gold.
- BR89-96: This hole, drilled in the western part of Boston-Richardson, confirmed the extension of the large mineralized sector crossed by the BR89-84 hole, with quite a few belts and quartz veins, and with visible gold in four places BR89-97, BR89-98, BR89-99: These three holes were aimed at determining more precisely the location of the axial plane of the fold and of the nugget belt in the West Gold Brook area.





- |   |   |
|---|---|
| <p><b>PHASE I</b></p> <p>— LIMIT OF MINERALIZATION</p> <p>- - - PROPOSED DEVELOPMENT</p> <p>/// RAMP, DRIFTS OR CROSS CUTS ALREADY DONE</p> | <p><b>PHASE II</b></p> <p>— LIMIT OF MINERALIZATION</p> <p>- - - PROPOSED DEVELOPMENT</p> |
|---|---|

DRAWN BY		DATE	ST - MICHEL GEOCONSEIL INC.
D.C		JULY 1989	
REVISED BY		DATE	EXPLORATION OREX INC.
G.R.		26 / 7 / 89	
SCALE 1: 250			GOLDBORO PROJECT Sub Level I (4947m)
DWG			

**PR89-015**

0 5.0 10.0 m

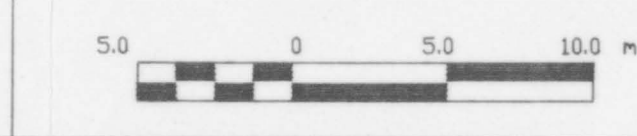
DATE 7 / 25 / 1989 TIME 10:58





**PHASE I**  
 ——— LIMIT OF MINERALIZATION  
 - - - PROPOSED DEVELOPMENT  
 ~~~ RAMP, DRIFTS OR CROSS CUTS ALREADY DONE

**PHASE II**  
 - - - LIMIT OF MINERALIZATION  
 - - - PROPOSED DEVELOPMENT



|            |             |
|------------|-------------|
| DRAWN BY   | DATE        |
| D.C.       | JULY 1989   |
| REVISED BY | DATE        |
| G.R.       | 26 / 7 / 89 |

PR89-015  
**ST - MICHEL GEOCONSEIL INC.**  
**OREX EXPLORATION INC.**  
 GOLDBORO PROJECT  
 250' Level(4923.8m)

DATE: 7/4/89 TIME: 10:23  
 SHEET: 05/25

6900 N

6950 N

7000 N

7050 N

7100 N

5000

5000

4950

4950

4900

4900

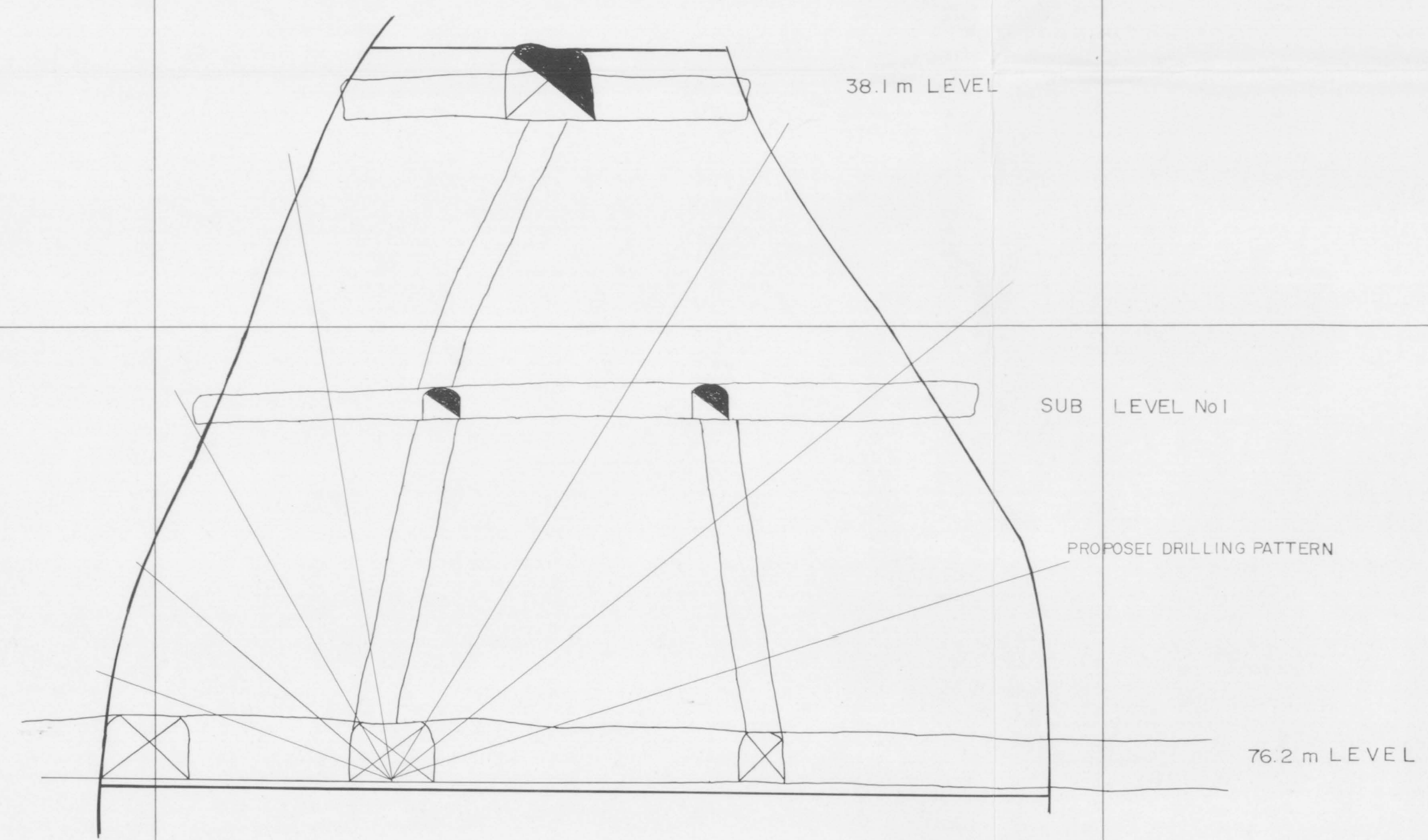
6900 N

6950 N

7000 N

7050 N

7100 N

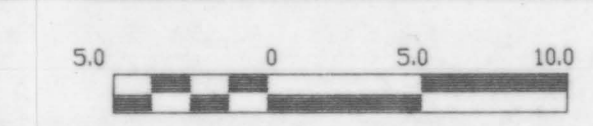


PR89-015

|            |         |
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| DRAWN BY   | DATE    |
| D.C        | 18/7/89 |
| REVISED BY | DATE    |
| G.R        | 26/7/89 |

ST MICHEL GEOCONSEIL INC.

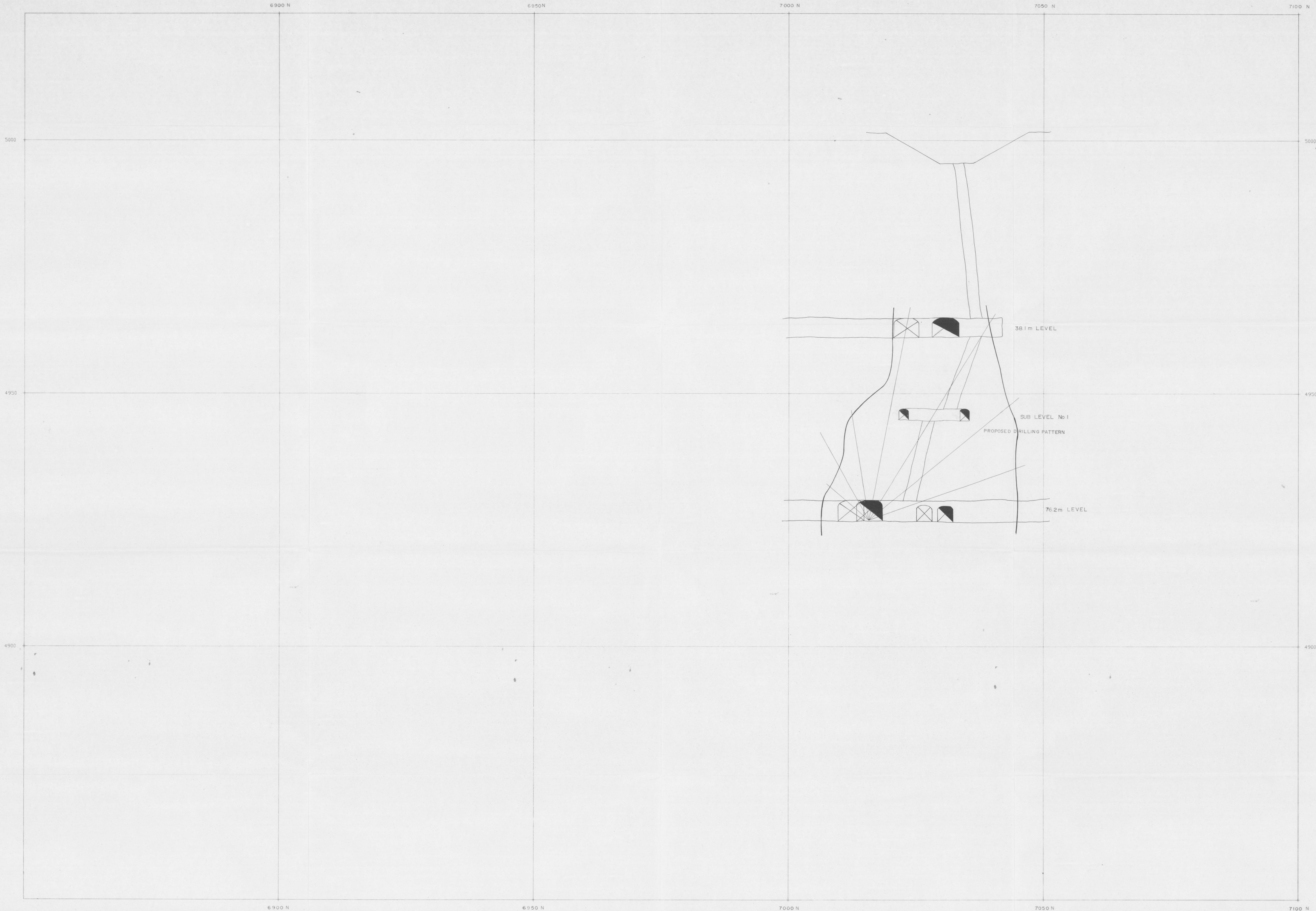
DREX EXPLORATION INC.



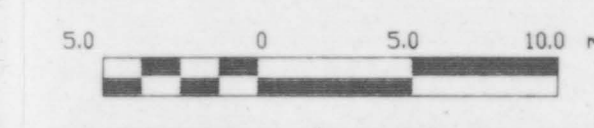
SCALE 1:250  
DWG

GOLDBORO PROJECT  
Section 8762.5 Est

DATE: 6/11/89 TIME: 9:14



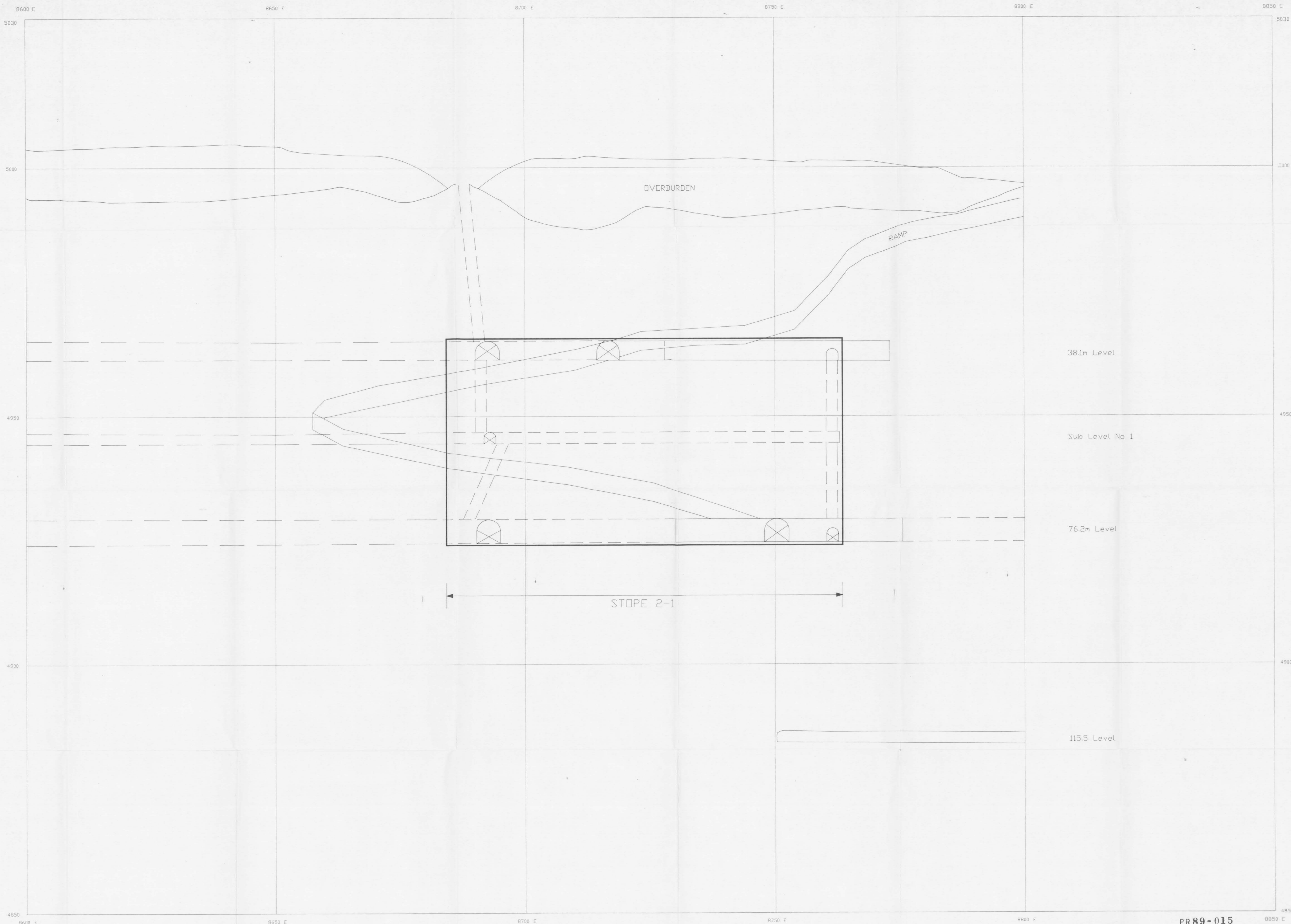
PR89-015



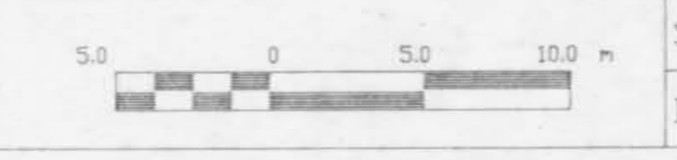
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| DRAWN BY     | DATE    |
| D.C.         | 18/7/89 |
| REVISED BY   | DATE    |
| G.R.         | 26/7/89 |
| SCALE 1: 250 |         |
| DWG          |         |

ST MICHEL GEOCONSEIL INC.  
OREX EXPLORATION INC.

GOLDBORO PROJECT  
Section 86875 Est

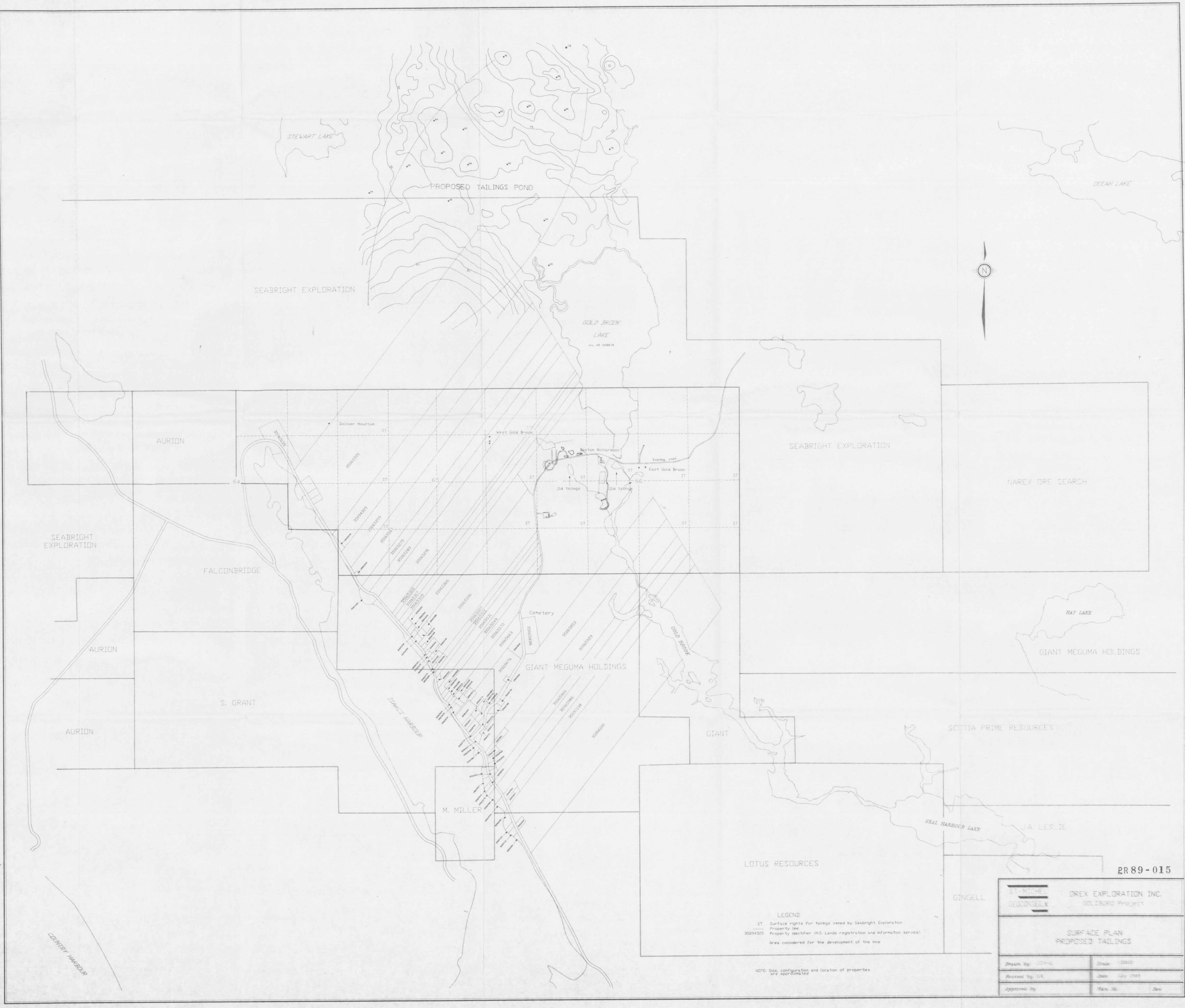


——— Former work  
 ——— Proposed development (PHASE 1)  
 - - - Proposed development (PHASE 2)



|              |          |
|--------------|----------|
| DRAWN BY     | DATE     |
| D.C.         | 25/07/89 |
| REVISED BY   | DATE     |
|              |          |
| SCALE 1: 250 |          |
| DWG          |          |

**PR89-015**  
 ST-MICHEL GEOCONSEIL INC.  
 OREX EXPLORATION INC.  
 GOLDBORO PROJECT  
 Idealized longitudinal section  
 Stope 2-1



PR89-015

|                                                 |                |                                                   |                 |
|-------------------------------------------------|----------------|---------------------------------------------------|-----------------|
|                                                 |                | <b>OREX EXPLORATION INC.</b><br>GOLDSBURY Project |                 |
| <b>SURFACE PLAN</b><br><b>PROPOSED TAILINGS</b> |                |                                                   |                 |
| Drawn by: JSH-G                                 | Scale: 1:10000 | Reviewed by: G.R.                                 | Date: July 1989 |
| Approved by:                                    | Plan No.       | Sheet                                             |                 |

**LEGEND**  
 ST Surface rights for tailings owned by Seabright Exploration  
 — Property line  
 35594325 Property Identifier (N.S. Lands registration and information service)  
 Area considered for the development of the mine

NOTE: Size, configuration and location of properties are approximated