

895289

**Annual Reclamation Report for 1994**

**Centipede Resources Ltd.  
Ruth Vermont Mine (82K/15W)  
Golden Mining Division**

**Reclamation Permit M-89**

**31 March, 1995**

J.J. Morrow

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## 1. INTRODUCTION

### 1.1. Location and Access.

The Ruth Vermont Mine is located approximately 97 km southwest of the town of Golden, British Columbia. The mine is accessible by 37 km of paved highway to Parson, B.C., then 60 km of variable logging roads (Map 1).

The minesite sits on the south side of Vermont Creek at 1,678 m (5,500 feet) elevation near the headwaters of the creek. The workings extend into the south valley flank, with the main portal at 1,830 m (6,000 feet) elevation.

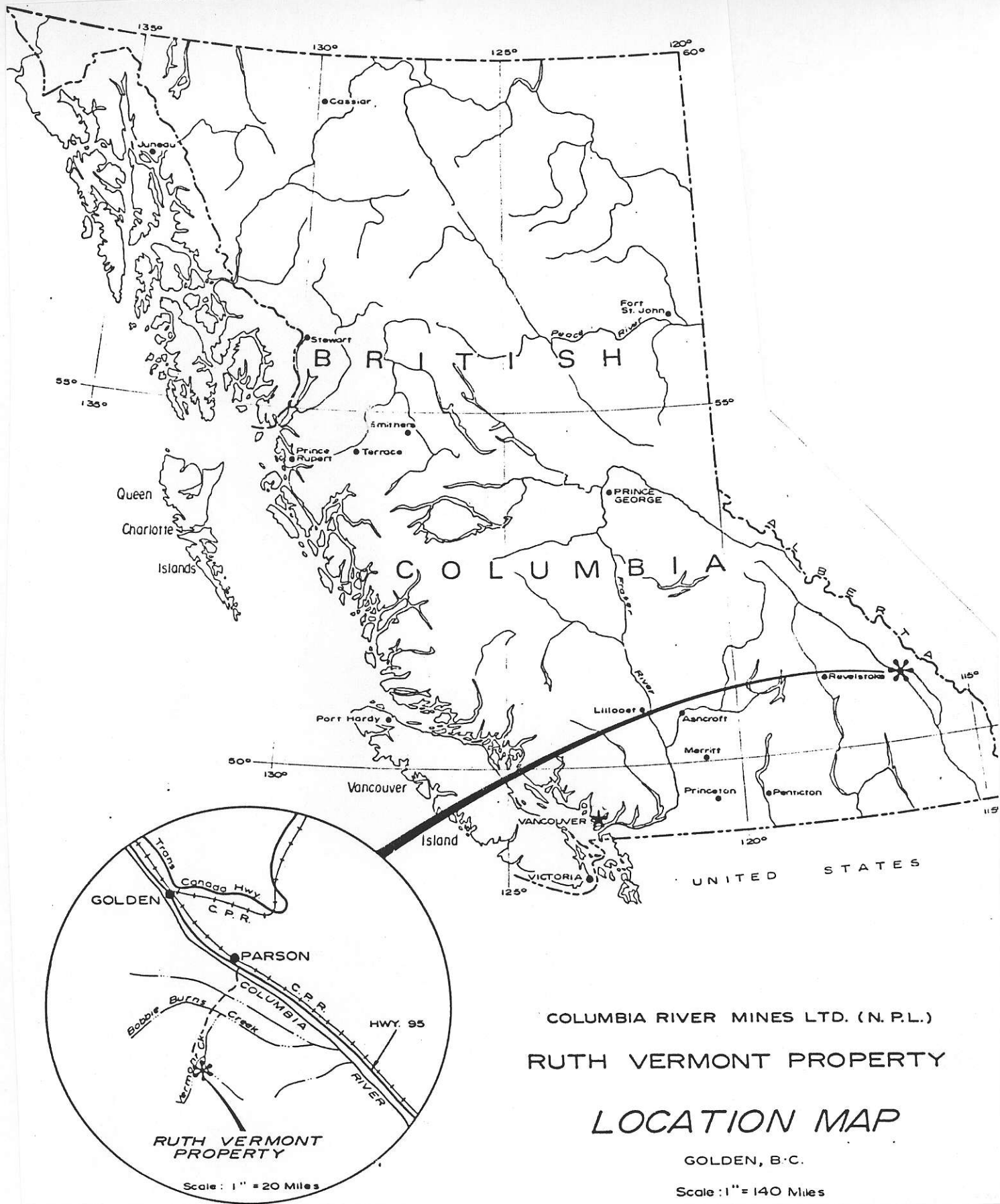
The valley walls rise steeply from the valley bottom. Avalanches scour both sides of the valley during winter. Over the history of the mine, considerable damage has been caused to the buildings and the site by these slides.

The site can be accessed by vehicle (four wheel drive) from late June through the end of September. Once the winter arrives, access is generally restricted to helicopter. Avalanche conditions can make winter access quite dangerous.

### 1.2. Background.

The Ruth Vermont Mine is characteristic of the many mines developed in the search for silver, lead and zinc in the Purcell Anticlinorium of eastern British Columbia. The mineralization occurs as vein deposits and associated replacements in the limestones of the Horsethief Creek Group of the Precambrian Windermere System and the mines are composed of underground workings following these vein systems. As was the case with many of the mines in this region, the Ruth Vermont enjoyed sporadic operation between the turn of the century and 1981, when it was closed and the company forced into receivership. The site lay abandoned until 1986 when Centipede Resources Limited, an Alberta partnership, purchased the buildings, equipment and the mineral tenures (It is worth noting that Ruth Vermont Mines Ltd. (NPL) still exists, and that Centipede did not purchase the assets of the company and cannot be considered successor in interest to it).

Centipede began to remove equipment, demolish structures and reclaim the site shortly thereafter. During the time the site lay unoccupied, avalanche damage, weathering and vandalism all contributed to its deterioration. Pursuant to requests made following ongoing site visits by the B.C. Ministry of Energy, Mines and Petroleum Resources Mines Inspection Branch and related government agencies a reclamation program was undertaken which would return the site to its



Map 1. Ruth Vermont Minesite Location Map.

pre-development conditions and which would be in keeping with the multiple use requirements of the area. This program encompassed:

1. Removal of equipment.
2. Demolition of all structures.
3. Stabilization and seeding of the tailings ponds.
4. Closing of all portals and underground access.
5. Removal of debris from Vermont Creek.
6. Grading of the site to the natural contours.

These goals were realized by the end of the 1994 field season, and the site is awaiting final inspection in 1995.

### 1.3. Land Use.

Although the area has had a long history of mining, declining metal prices have forced the closure of these small operations. Currently, the area is primarily used for recreation. In the next valley to the south on Bobbie Burns Creek, a successful heli-ski and hiking resort has operated for several years. Both the skiers and hikers have found their way into the Ruth Vermont minesite and the area has long been popular with "souvenir hunters".

Crestbrook Forest Products holds numerous timber leases in the immediate area and is actively logging many of them. Due to the steep nature of the Vermont Creek valley and the minimal quality of the timber there, it is unlikely that logging will progress into the valley.

Within the last few years, several mineral claims have been staked in the area, and future exploration is likely.

The area is host to several species of mammal, notably:

- |  |   |
|--|---|
| Black Bear ( <i>Ursus americanus</i> )                           | Grizzly Bear ( <i>Ursus arctos</i> )                |
| Elk ( <i>Cervus elaphus</i> )                                    | White-tailed Deer ( <i>Odocoileus virginianus</i> ) |
| Striped Skunk ( <i>Mephitis mephitis</i> )                       | Porcupine ( <i>Erithizon dorsatum</i> )             |
| Bushy-tailed Woodrat ( <i>Neotoma cinera</i> )                   |   |
| Beaver ( <i>Castor canadensis</i> )                              |   |
| Golden-mantled Ground Squirrel ( <i>Spermophilis lateralis</i> ) |   |
| Columbian Ground Squirrel ( <i>Spermophilis columbianus</i> )    |   |

Amphibians such as the Western Toad (*Bufo boreas*) and the Spotted Frog (*Rana pretiosa*) are common in the tailings area along Vermont Creek. Numerous species of birds have been noted at the site.

## 2. MINING PROGRAM

### 2.1 Development to Date.

The property dates back to 1893, and originally consisted of eleven Crown granted claims on which more than a dozen short adits were driven before 1930.

Rio Canadian Exploration Ltd. made an extensive survey of the property during 1956 and 1957 and did a small amount of drilling and soil sampling.

In 1964, the old grants, which had reverted to the Crown, were issued to Mel Pardek as a Mineral Lease. About forty claims were subsequently located around this lease. Copperline Mines Ltd. acquired the property in 1965, and began underground work in an old adit called "The Old Timers' Level". This was subsequently referred to as the "6000 Level". The property was worked from 1965 until 24 August, 1967. A shipment of sorted ore made in 1965 averaged 63 oz/ton silver, 31% lead, and 19% zinc.

The main activities in 1966 were directed to the development of the 6000 Level. The level was driven from the footwall to the hangingwall of a mineralized zone for 1,200 feet. Contact was maintained with the zone by frequent drilling, which amounted to 132 holes totalling 20,000 feet by year end. A new level was opened at the 5,750 foot elevation and extended 650 feet. The 5750 Level eventually became the main haulage level. Surface activities included the construction of an 88 x 20 foot powerhouse and machine shop near the portal of the lower level. A new 4.5 mile access road replacing the old access road was built, partly on the south side of Vermont Creek to avoid snowslides as much as possible, and to improve snow removal. Twenty men were employed the year round under the direction of T.E. Swanson, a consulting engineer. During 1967, the 6000 Level was advanced on several headings, and further drilling was carried out to test the mineralized zone on that horizon. The 5750 Level was extended and collared in wet, heavy overburden. A mill site was prepared near the 5750 Level adit, and an assay office was installed nearby. Excavation of the mill site had been completed prior to the stopping of operations.

In 1969-70, a diesel-electric generation plant with a capacity of 1,950 kva. and compressor capacity of 2,200 cfm. were installed. A 600 ton per day mill was completed, and a cyclone added. A three pond tailings impoundment was constructed.

Ventilation capacity of 30,000 cfm. was provided for the initial development on both the 5750 and 6000 Levels, with provision for 60,000 cfm. to be available for subsequent stripping operations.

A total of 1,773 feet of development was completed, which included the driving of the ore raise and the service raise from the 5750 Level to the 6000 Level. During the last three months of the year, the mill worked to capacity, with the ore being provided from the initial ramps being driven into the orebody above the 6000 Level. A trackless method was adopted to work the deposit, with rubber tired, diesel propelled, front end loaders and similarly propelled drilling rigs. The mined ore was transported out of the mine along the 5750 Level to the ore bins in small cars hauled by a diesel propelled locomotive. Concentrates from the mill were loaded and hauled by road to Kellog, Idaho for smelting.

The mine and mill operated for about eleven months until 24 June, 1971, when declining metal prices forced closure.

Consolidated Columbia River Mines Ltd. took over the property from Copperline Mines Ltd. and commenced work on the rehabilitation of the mine and mill in June of 1973. This work was completed until the end of September. The mine and mill were brought into production in October, with underground mining operations being performed by a mining contracting company. Production continued until 17 December, when a decision was made to stop production for the remaining winter months. Ore production was mainly from room and pillar stoping, with a minor amount derived from development which consisted of a total of 326 feet of advance. Total manpower for the operation was approximately 60 to 65. A total of 26,975 tons of concentrate was shipped to the Trail smelter.

There were no operations at the mine during 1974. The property suffered extensive damage from snow avalanches arising on both sides of the valley from 14 to 17 January. The avalanche from the south slope completely destroyed the powerhouse facility, most of the dry building, the mechanical maintenance shop, storage sheds, the tramway portion of the crushing house, and the southwest corner of the mill. The avalanches from the north slope extensively damaged the number 1 and number 2 bunkhouses, and also caused damage to the mine office building. A second attempt at production was tried for eight months in 1976, but proved unsuccessful.

In 1980, the mine was reopened by Ruth Vermont Mines Ltd. (NPL), and some \$800,000.00 expended.

In 1981, under a \$4,000,000.00 loan from the Royal Bank of Canada, the mill, mine, and camp were rehabilitated, and the property readied for production by 1 October, 1981.

Staff problems, mechanical failures, and difficulties with the supply of parts for the equipment created many setbacks, and the mine only reached 70% of its expected rate of production.



Mining was accomplished by jumbo and scooptram within the replacement orebodies, and conventional underground methods in the vein deposits. The underground operations could supply 300 tons daily which easily could be handled by the concentrator.

The mill was standard for a two product flotation operation, with coarse ore from the ore bin going first to a jaw crusher, then passing through a screen, with the fine ore going to the fine ore bin and the oversize ore returned to the cone crusher. The fine ore was fed through two ball mills, then through a cyclone to the lead and zinc circuits where it was thickened and filtered through leaf type filters.

A new 2,250 kva. powerhouse as well as three 750 cfm. electric driven compressors were added. Surface work was done by a D8 Caterpillar grader and an Allis Chalmers loader.

The mine operated until mid December, 1981, when the Royal Bank called the loan and placed the mine into receivership.

## **2.2. Development Within the Past Year and Future Development.**

The mine has not reopened and there has been no development on site since 1981. No future development is planned.

### **3. RECLAMATION PROGRAM**

#### **3.1. Reclamation Facilities and Staff**

The work undertaken during 1994 represents the final year of a three year program, at the end of which the site will be ready for final inspection.

The program was supervised by Jeff Morrow, BSc, F.G.A.C., of Quadratrix Microsystems Inc., 201 - 20466 Fraser Hwy., Langley B.C., V3A 4G2.

All site work was undertaken through contract with Mason's Backhoe, Box 9, Parson, B.C.

Equipment used:

- 1 D8R CAT Bulldozer
- 1 D8 CAT Bulldozer
- 1 D7 CAT Bulldozer
- 1 Case 9020 Excavator

#### **3.2 1994 Reclamation Program.**

##### **3.2.1. Treatment of Structures and Equipment.**

Please refer to the Reclamation Area Map (in pocket) and figures as noted.

Prior to 1993, much of the smaller equipment and fixtures from the mill and associated buildings had been removed, as well as the generators, and compressors.

In 1993, the equipment and buildings were sold to Aerial Amsterdam Investments Ltd., represented by Gary Waters of Calgary, Alberta. During 1993 and the early part of 1994, Waters' crew had removed a quantity of the smaller equipment and fixtures from the mill and associated buildings, as well as the primary crusher. He had partially demolished the crusher building and dismantled and removed the "A" frame and engineering building at the 5750' level. Although the structures had been removed, there was considerable refuse and mess left at the sites (Figures 2 through 4). The Mines Inspector found the site condition at these demolition areas to be unacceptable, and noted this in his report (Appendix A). Additional costs were incurred by Centipede to remedy this condition.

Following Waters' retreat from the site, the ball mills and primary crusher were removed. There was not much mobile equipment left on site at the time of the closure, and most of this already had been removed. There was a large quantity of scrap steel and iron left from the mining operations. This material was buried on site.

The bunkhouses and kitchen facilities were composed of "ATCO" type trailers and were removed from the site. Some of the smaller buildings were demolished and a quantity of material salvaged and removed. All remaining buildings and structures including the ore bins were constructed of raw or treated timber. These structures were burned and buried. The foundation of the mill was backfilled and the fill surface graded to final contour.

There are now no buildings or equipment remaining at the site. Figures 10 through 12 show the final grading taking place. Note especially Figures 11 and 12, which clearly show the area where the mill buildings and ore bins stood. Figure 10 shows work in progress above the 5750' level where the bank and upper access road is being graded to finish grade and the old generators are being covered.

### 3.2.2. Reclamation of Tailings Impoundments.

During the past several years remedial work was undertaken on the tailings ponds. Notably, at the request of the Mines Inspector (A. Whale) a large drainage ditch was constructed in 1988 near the north edge of the Number 1 Pond. Material removed from this ditch was placed along its southern edge to form a berm. The purpose of this ditch is to channel the runoff from the north side of the valley and stop it from washing across the pond surface. As an additional measure, during 1993, the pond surface was regraded and a secondary berm constructed behind the original system in the Number 1 pond.

The spillway at the northern end of the berm between Pond Number 1 and Pond Number 2 was widened and more rip rap added to handle the increased flow during the spring runoff period (Figures 13 and 15).

During 1994, at the southeast corner of the Number 1 Pond, the pond surface was sloped along the berm to the drainage ditch running along the north side of the pond (Figure 14). This grading properly aligns the pond surface with the drainage ditch and reduces erosional potential in the southeast corner of Pond Number 1.

Water traversing the junction of Pond Number 1 and Pond Number 2 had started to cause erosion across the berm between the two ponds. To keep the erosion from spreading across the south pond system berm, a ditch was dug along the inner part of the southwest berm of the Number 2 pond (Figure 16). This will direct the water flow into the Number 2 pond and halt potential flooding of the pond system south berm.

To prevent a similar situation between Ponds 2 and 3, a spillway was constructed between the ponds near the southern end of the dividing berm. The spillway was filled with rip rap as shown in Figure 17.

### 3.2.3. Revegetation and Fertilizer Treatments.

Following the pondwork, the Number 1 and 2 ponds were seeded with a mixture of 60% creeping red fescue and 40% birdsfoot trefoil. Although both ponds were seeded, a heavier concentration was spread along the newer inner perimeter berm of pond Number 1 in an attempt to quickly start a root system to give the berm added strength. The original outer berm is covered with native vegetation and is stable.

### 3.2.4. Sealing of Underground Workings.

During 1993 the main portals at 5750' and 6000' were backfilled and drainpipe placed to allow dewatering. The ventilation shaft is still open to the west of the 6000' portal and might present a potential hazard. This portal was blasted and allowed to cave to prevent access.

To further discourage access, the road to the 6000' level has been removed below the first switchback, making entry to this part of the site very difficult without proper climbing gear.

### 3.2.5. Reclamation of Watercourses.

Vermont Creek, which flows from west to east, passes through the minesite, running along the north edge of the area developed for the processing facilities and then passing immediately south of the tailings area. To the east of the Number 3 Pond (the most easterly of the three ponds), a colony of beaver (*Castor canadensis*) have constructed a considerable dam across the creek.

Over the course of the mine operation, scrap metal and the remains of a pumphouse had collected in the creek. This debris has been removed and the creek cleared.

Where the creek passes alongside the toe of the south berm of the Number 2 Pond additional rip rap has been placed along the berm to check erosion.

### 3.2.6. Reclamation of Roads.

The mine access road consists of approximately 5 km of mostly 4-wheel access branching off the Crestbrook logging road along Vowell Creek. The road was cleared and graded during 1993 and 1994 to allow passage of the large trucks required for equipment removal.

Each year the road, which runs along the north edge of the valley bottom, suffers avalanche and mudslide debris. Given the speed of natural reclamation of the road, no attempt was made to manually reclaim it. In any event, site access is required for the 1995 inspections, and the road may be of use to hikers and forest personnel.

The bridge across Vermont Creek at the minesite was removed at the end of the 1994 season as part of the creek reclamation.

### 3.2.7. Environmental Monitoring

During an investigation and sampling of refuse burn areas by staff of MOELP, elevated levels of cyanide gas were detected (Appendix B). It is not clear what caused these elevated levels, since the areas sampled were remains of the ore bins, and were removed from any of the plant areas where cyanide had been used. There is some speculation that the readings may have been caused by burning treated timber.

In view of this anomaly, water samples were taken to establish a baseline at three points along Vermont Creek; one upstream of the site, one at the site and one below the pond system. The sample locations and results are shown in Appendices C-1 and C-2. Two samples were collected at each location. One of the pair of samples, collected in a sterile container, was used for analysis of all elements except cyanide. The second sample of the pair, which was used for the cyanide analysis, was collected in a sterilized container containing approximately 1 ml of a stabilizing solution of 6N NaOH.

The samples were submitted on 21 October, 1995 for analysis by Norwest Labs, Langley, B.C. The samples were analysed using multi-element ICP methods. Cyanide content was determined by a procedure based on EPA method number 335.3 using automated distillation followed by a colorimetric reaction with chloramine-T as the reagent.

Other than moderate concentrations of Ca and Mg which are to be expected in this geologic environment, all elements analysed in the samples fall below the threshold values for Level B - Drinking Water and Level B - Discharge Stream guidelines as set out in the Criteria for Managing Contaminated Sites (MOELP).

Further sampling of the creek and evident seepage areas at the site will be undertaken during the 1995 freshet period.

### 3.2.8. Review of Reclamation Costs.

Actual costs for the 1994 field season were:

Pondwork	\$10,188.45
Building demolition	\$20,376.90
Site grading	\$30,565.36
Landscape materials (seed, fertilizer)	\$1,012.67
Sampling / Analyses	\$375.57
Food, miscellaneous	\$1,650.67
Management / Consulting	\$11,163.49
Casual Wages / Labor costs	<u>\$100.00</u>
<u>Total for the 1994 season</u>	<u>\$70,596.42</u>

Variance for the 1994 season \$13,596.42 (23.85%)

The following table summarises the reclamation costs for the three years of the program.

#### Cost Summary

Year	Initial Proposal	Yearly Budget	Actual Expenditure
1992	\$45,200.00	\$53,400.00	\$68,450.00
1993	\$82,850.00	\$40,000.00	\$23,303.96
1994	<u>\$27,650.00</u>	<u>\$57,000.00</u>	<u>\$70,596.42</u>
<u>Totals</u>	<u>\$155,700.00</u>	<u>\$150,400.00</u>	<u>\$162,350.38</u>

Total variance over the entire project: \$11,950.00 (7.9%)

#### 4. FUTURE RECLAMATION PROGRAMS

##### 4.1 1995 Reclamation Plans.

The only outstanding issue to be addressed from the 1994 program is the fertilization of the tailings pond area. Eleven hundred pounds (approx. 499 kg) of fertilizer (11-52-0) were to have been spread on the two ponds, but weather conditions did not permit it. The fertilizer will be spread in the early summer, as soon as the pond surfaces are dry enough to permit access.

The final government site inspection will occur in 1995 as well as a sampling of Vermont Creek by the Ministry of the Environment. If there are no recommendations for further work or monitoring, the reclamation bond should be returned and the site declared abandoned.

## Figures



**Figure 1.**

This picture shows the Mill Building during demolition in preparation for the removal of the Ball Mills.

**Figure 2.**

A view of the remains of the "A" Frame following removal of the structure by Gary Waters. Tony Milligan, the Mines Inspector is seen in the lower left of the photograph.



**Figure 3.**

The "A" Frame remains. Photo taken looking west.

**Figure 4.**

"A" Frame remains showing the debris left following Water's removal of the structure. The Mines Inspector was not pleased with the way the site had been left by Water's crew.



**Figure 5.**

Burning the Coarse Ore Bins. This photo shows the western Coarse Ore Bin being burned. The other bin had already been burned.

**Figure 6.**

Remains of the Coarse Ore Bins prior to burial. The wood was piled and burned, then the site covered.



**Figure 7.**

Coarse Ore Bins being burned.

**Figure 8.**

One of the Ball Mills being removed from the Mill Building.





**Figure 9.**

"No Trespassing" sign posted on the mine road. Five more of these signs were posted around the site in visible locations. Many of these signs have been posted over the years and have been found to make excellent targets for hunters.

**Figure 10.**

Grading at the 5750' level. Final grading of the site encompassed the removal of the mine road up to the workings. This picture shows the road being graded down to the 5750' level and the burial of the old powerhouse.



**Figure 11.**

This picture shows a view of the minesite from the 5750' level looking west. The barren area in the foreground of the photo is where the Ore Bins and Mill Building stood. The area was graded in a continuous slope from just above the 5750' level to the base of the site near the south edge of Vermont Creek.

**Figure 12.**

The same area as in Figure 11, but viewed looking north to the mine access road.



**Figure 13.**

Remedial work being done to the drainage ditch on the #1 Tailing Pond.

**Figure 14.**

The southeast corner of Pond #1 showing the regrading to allow water to drain toward the main drainage channel along the north edge of the Pond.



**Figure 15.**

The drainage spillway at the north end of the berm between Ponds 1 & 2. This spillway was enlarged and had more rip rap added to accommodate the increased discharge from the drainage channel.

**Figure 16.**

An erosional channel was beginning to form between Ponds #1 and #2 at the junction of the dividing berm and the south pond system berm. This picture shows the channel scooped out to prevent a channel forming across the south berm to Vermont Creek.





**Figure 17.**

This picture shows a new spillway constructed between Ponds #2 and #3 close to the south berm of the pond system. This spillway will relieve pressure on the south berm from erosion and will prevent crosscutting of the south berm to Vermont Creek.



**Figure 18.**

The site graded! This picture shows the minesite looking south from the mine access road. All structures and machinery are gone and the final grade has been established.



## **Appendicies**

## Appendix A

Province of British Columbia  
Ministry of Energy, Mines and Petroleum Resources

Report of Inspector of Mines  
(Issued pursuant to Section 15 of the Mines Act)

MINERAL

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Name of Mine: Ruth Vermont Mine	Manager: Mr. Jeff Morrow
Owner or Operator: Centipede Energy Ltd.	Address: Quadratix Microsystems Inc. 201-20466 Fraser Hwy. Langley, B.C. V3A 4G2
Management: Mr. Jeff Morrow, D. Campeau	

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General site clean up had progressed well since my inspection of August 6, 1994. Considerable amounts of scrap lumber had been burnt, loose metal scrap scattered around the site had been gathered into piles for disposal.

The performance of the previous salvage contractor was less than satisfactory and left the area in a state that will delay closure of this site. The new salvage contractor now on site, would appear to have the experience, the equipment, and determination to remove most of the mill equipment. If this can be done as is now planned it will significantly reduce the earth moving component of the reclamation plan.

Unfortunately, the tardy arrival on site of the earth moving equipment may jeopardize the planned drainage control and fall seeding program on the settling ponds. Application of seed immediately following ground disturbance will be the optimum time to ensure successful germination. The intent to apply the seed in late fall will also be advantageous at this elevation. The addition of fertilizer, will certainly encourage the long term establishment of a permanent cover on the tailings ponds. It is encouraging to see that the native vegetation is slowly invading the perimeters of the disturbances. Once a vegetative cover has been established on the surface of the ponds there is a high probability that it will provide suitable cover for continuing invasion by these native species. The required contouring of the ponds to ensure controlled drainage as well as restoration of adequate spillways will be done prior to seeding. Plans are required to be submitted showing all the reclamation work undertaken on the tailings pond area as referenced in the letter of February 14, 1994, to yourself from Mr. A. O'Bryan.

The only portal that is still open is the remaining ventilation portal. This must be closed, however, considering the continual rock falls from above this face it is advisable to minimize the exposure of workers at this location. The option of blasting is acceptable providing the entrance is totally blocked and safety of the employees is addressed.

Your co-operation in completing this project is appreciated and I could understand your disappointment upon seeing the apparent lack of progress since our last visit. Weather permitting I would certainly agree to a further site visit with you this fall and assess the progress at that time.

---

*J. Milligan* Date: 13<sup>th</sup> Oct. 94  
Inspector: Tony Milligan, P.Ag.  
Reclamation Inspector of Mines

Manager: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix B





Province of  
British Columbia

BC  
Environment

MINISTRY OF  
ENVIRONMENT,  
LANDS AND PARKS

Environmental Protection  
205 Industrial Road G  
Cranbrook, British Columbia  
V1C 6H3  
Telephone: (604) 489-8510  
Fax: (604) 489-8506

File: PE 448

November 22, 1994

Quadratix Microsystems Inc.  
201 - 20466 Fraser Highway  
Langley, British Columbia  
V3A 4G2

Attention: Mr. Jeff Morrow

Dear Sir:

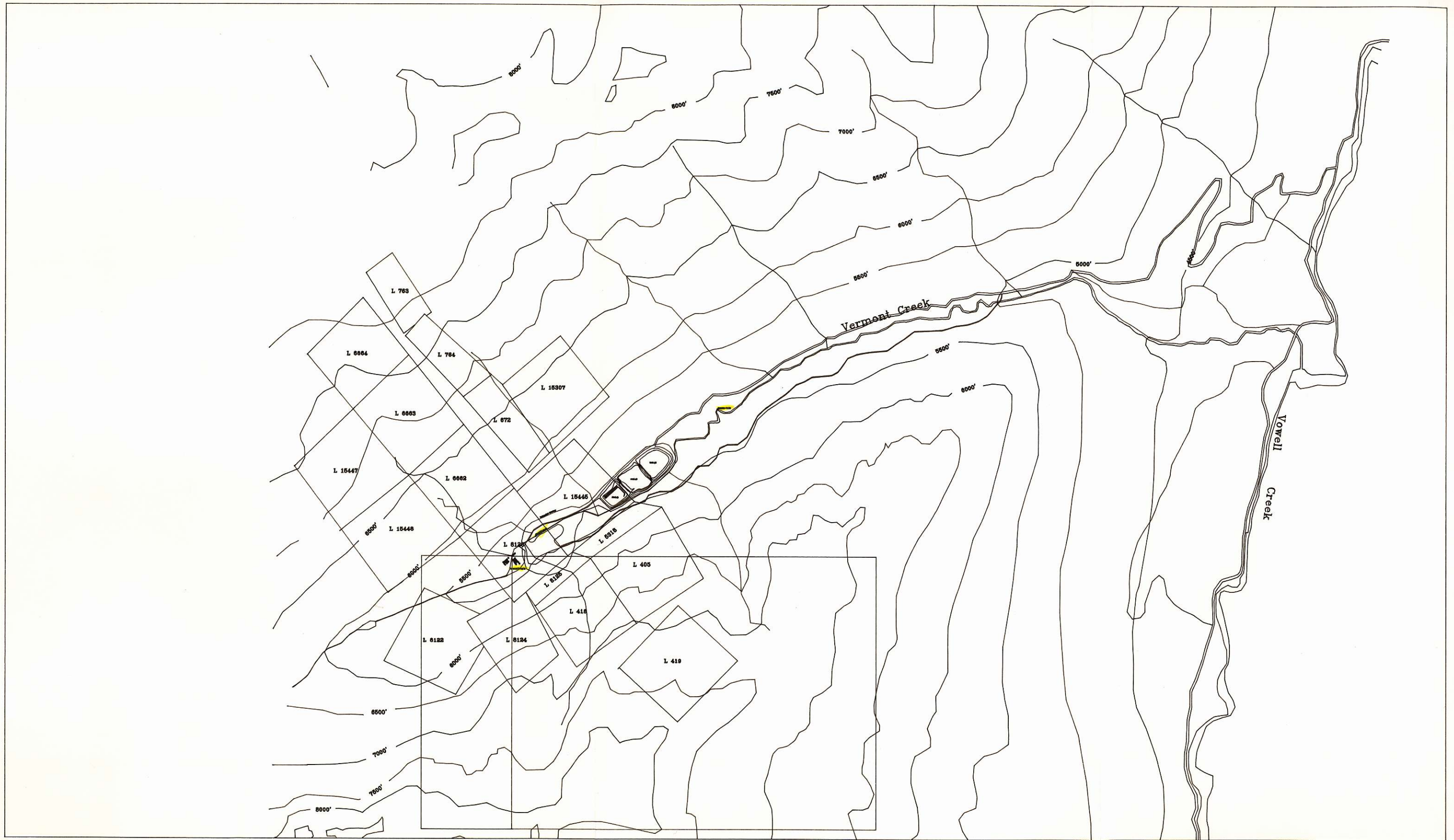
**Re: Ruth Vermont Mine Abandonment**

Further to our telephone conversations regarding the demolition/abandonment work conducted at the Ruth Vermont mine site, this is to confirm that an investigation of the former plant site area was conducted by this office on October 12, 1994. Tests for the presence of hydrogen cyanide gas were conducted at the plant area and at several locations in the plant site area, elevated hydrogen cyanide gas levels were detected using Drager Hydrocyanic Acid gas detection tubes. Readings exceeding 150 parts per million were indicated. The presence of elevated cyanide gas levels at the site, the known use of sodium cyanide reagent at the site and the close proximity of Vermont Creek has raised the concern of possible cyanide contamination of the site. In order to address this concern, this is to confirm that further investigation of the site is required to assess the issue of possible cyanide contamination of the site. Since the plant site has now been completely covered as part of the abandonment work required at the site, sampling of Vermont Creek to test for cyanide contamination, during the 1995 freshet period is required, as an initial assessment of the site. You are requested to co-ordinate the sampling of Vermont Creek with the undersigned, prior to taking samples, to ensure that the required assessment objectives are met.

Yours truly,

James A. Jensen  
Environmental Protection Officer  
Kootenay Region, Cranbrook

## Appendix C



SCALE 1:20000

Water sample locations marked in YELLOW

Appendix C-1

# Norwest Labs



"We Solve Problems"

203 - 20771 Langley By-Pass  
 Langley, B.C. V3A 5E8  
 Phone (604) 530-4344  
 Fax: (604) 534-9996

WO (Lang.) : #10060  
 WO (Other) :  
 PO # :  
 Date Rec'd. : 21-Oct-94  
 Date Comp. : 31-Oct-94

Client

Received From

<p>Name : <b>Quadratix Microsystem</b>                  Address : <b>201-20466 Fraser Hwy.,                  Langley, B.C.                  CANADA V3A 4G2</b>                  Phone : <b>(604)534-8766</b>                  Fax : <b>(604) 5348766</b>                  Attention : <b>Jeff</b></p>	<p>Name :                  Address :                  Phone :                  Fax :                  Attention :</p>
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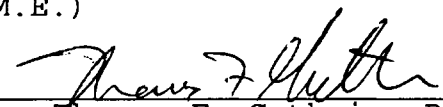
## Water Analysis Report

Lab # : 10060-1      10060-2      10060-3      Level B.Guidelines\*  
 Sample Id : RV941019      1A and 1B      2A and 2B      3A and 3B      (Drinking Water)

### Total Metals (mg/L)

Element	Symbol	10060-1 1A and 1B	10060-2 2A and 2B	10060-3 3A and 3B	Level B.Guidelines* (Drinking Water)
Aluminum	(Al)	<0.06	0.07	0.17	-
Arsenic	(As)	0.0003	0.0006	0.0022	0.050
Barium	(Ba)	0.005	0.005	<0.004	1.00
Beryllium	(Be)	<0.001	<0.001	<0.001	-
Boron	(B)	<0.01	0.01	<0.01	-
Cadmium	(Cd)	<0.005	<0.005	<0.005	0.005
Calcium	(Ca)	25.3	25.0	23.0	-
Chromium	(Cr)	<0.01	<0.01	<0.01	0.050
Cobalt	(Co)	<0.01	<0.01	<0.01	-
Copper	(Cu)	<0.01	<0.01	<0.01	1.00
Iron	(Fe)	<0.02	<0.02	0.17	-
Lead	(Pb)	<0.04	<0.04	<0.04	0.05
Magnesium	(Mg)	7.82	7.92	10.1	-
Manganese	(Mn)	0.006	0.005	0.022	-
Mercury	(Hg)	<0.0001	<0.0001	<0.0001	0.001
Molybdenum	(Mo)	<0.02	<0.02	<0.02	-
Nickel	(Ni)	<0.02	<0.02	<0.02	-
Phosphorus	(P)	<0.01	<0.01	<0.01	-
Potassium	(K)	<1	<1	<1	-
Silver	(Ag)	<0.05	<0.05	<0.05	0.05
Selenium	(Se)	<0.0002	<0.0002	<0.0002	0.010
Silicon	(Si)	1.04	1.51	1.50	-
Sodium	(Na)	2	2	2	-
Titanium	(Ti)	<0.003	<0.003	<0.003	-
Thallium	(Tl)	<0.1	<0.1	<0.1	-
Vanadium	(V)	<0.003	<0.003	<0.003	-
Zinc	(Zn)	<0.002	<0.002	<0.002	5.000
Cyanide	(Cn)	<0.001	<0.001	<0.001	0.200

> Criteria for Managing Contaminated sites (B.C.M.E.)

Approved By   
 Dr. Thomas F. Guthrie, P.Ag.  
 General Manager

## Appendix D

**NOTES:**

1.

By the time Centipede undertook work on the property, most of the records had been lost or destroyed. Therefore, it is only possible to give a rough estimate of the tonnages present in the tailings ponds based on their capacities.

In a report titled **Inspection of Tailings Facilities, Ruth Vermont Mines**, dated February, 1981. by Golder Associates, the ponds are listed as having the following capacities:

Pond # 1	36,000. cu. yd.
Pond # 2	42,300. cu. yd.
Pond # 3	24,400. cu. yd.

By all appearances, Pond Number 1 was overfilled during production. If we estimate (generously) that approximately 40,000 cu. yd of material were placed in the pond, and assume that the tails are consistent with Golder's evaluation of

"... medium to fine sands with minor silt lenses..." (p3, para 1)

having an estimated specific gravity of 2.3, then Pond Number 1 may presently contain about 70,000 tonnes of material.

Making yet another assumption, we could speculate that Pond Number 2, which was used briefly in the final period of operation, may contain about 30,000 tonnes of material.

Again, be cautioned that these figures are very rough estimates and no reasonable degree of certainty can be attached to them.

**QUANTITIES OF WASTE ROCK, TAILINGS  
AND LOW GRADE ORE FOR  
RECLAMATION PERMIT # M-89  
AS OF DECEMBER 31, 1994**

Use the space below to enter information for each waste dump, tailings pond or low grade ore pile. All quantities should be given in tonnes.

Name of Waste Pile or Pond	Acid Generating Waste		Potentially Acid Generating Waste		Non-Acid Generating Waste	
	1994	Total	1994	Total	1994	Total
<b>Waste Dumps:</b>						
1)						
2)						
3)						
4)						
5)						
<b>Total</b>						
<b>Tailings Ponds:</b>						
1) POND # 1					70,000	
2) POND # 2					30,000	
3)						
4)						
5)						
<b>Total</b>						
<b>Low Grade Ore:</b>						
1)						
2)						
3)						
4)						
5)						
<b>Total</b>						

\* SEE NOTE 1.

SUMMARY OF AREAS DISTURBED AND RECLAIMED TO DECEMBER 31, 1994

COMPANY CENTIPED RESOURCES LTD PERMIT NO. M-89

DISTURBANCE	MINING		RECLAMATION							
	AREA DISTURBED (Ha)		AREA RECONTOURED (Ha)		AREA SEEDED/PLANTED (Ha)		AREA FERTILIZED (Ha)		AREA* RECLAIMED (Ha)	LAND USE** OBJECTIVE
	1994	Total***	1994	Total***	1994	Total***	1994	Total***	Total***	
ROADS										
ADMINISTRATION										
PLANT SITE			3.5	3.5	0.5	0.5				WILDLIFE HABITAT
PIT AREA										
WASTE DUMPS										
TAILINGS PONDS			0.25	1.25	2.5	2.5				WILDLIFE HABITAT
STOCKPILES										
LINEAR (pipelines, powerlines, etc.)										
OTHER										
TOTAL			3.75	4.75	3.0	3.0				

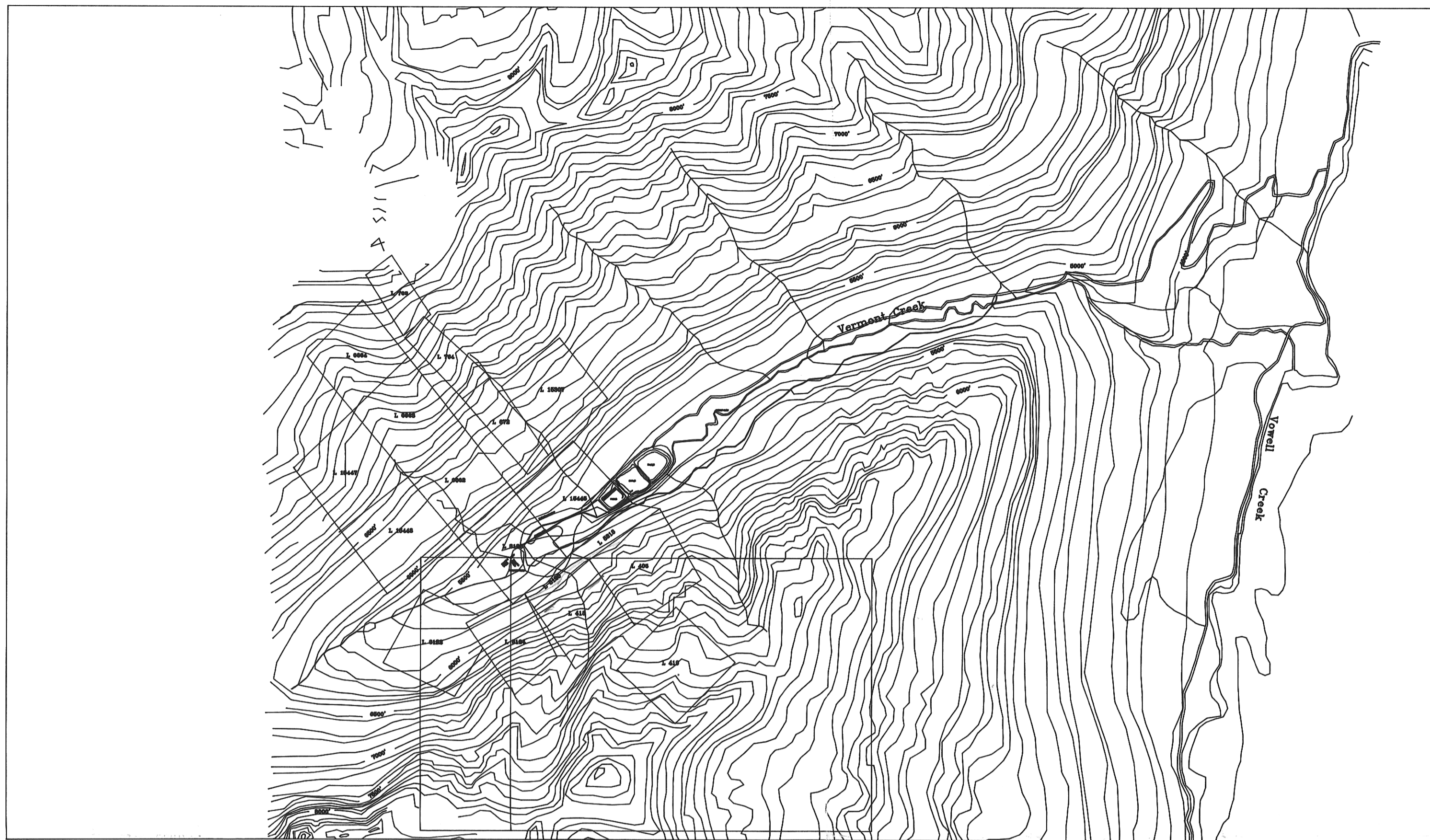
- \* In order for an area to be recorded as "reclaimed" it must have supported vegetation that will lead to the designated land use objective for at least one year.
- \*\* Specify land use. Options include: forestry, grazing, wildlife habitat, recreation, agricultural, industrial, residential, and other.
- \*\*\* Total up to December 31, 1994.



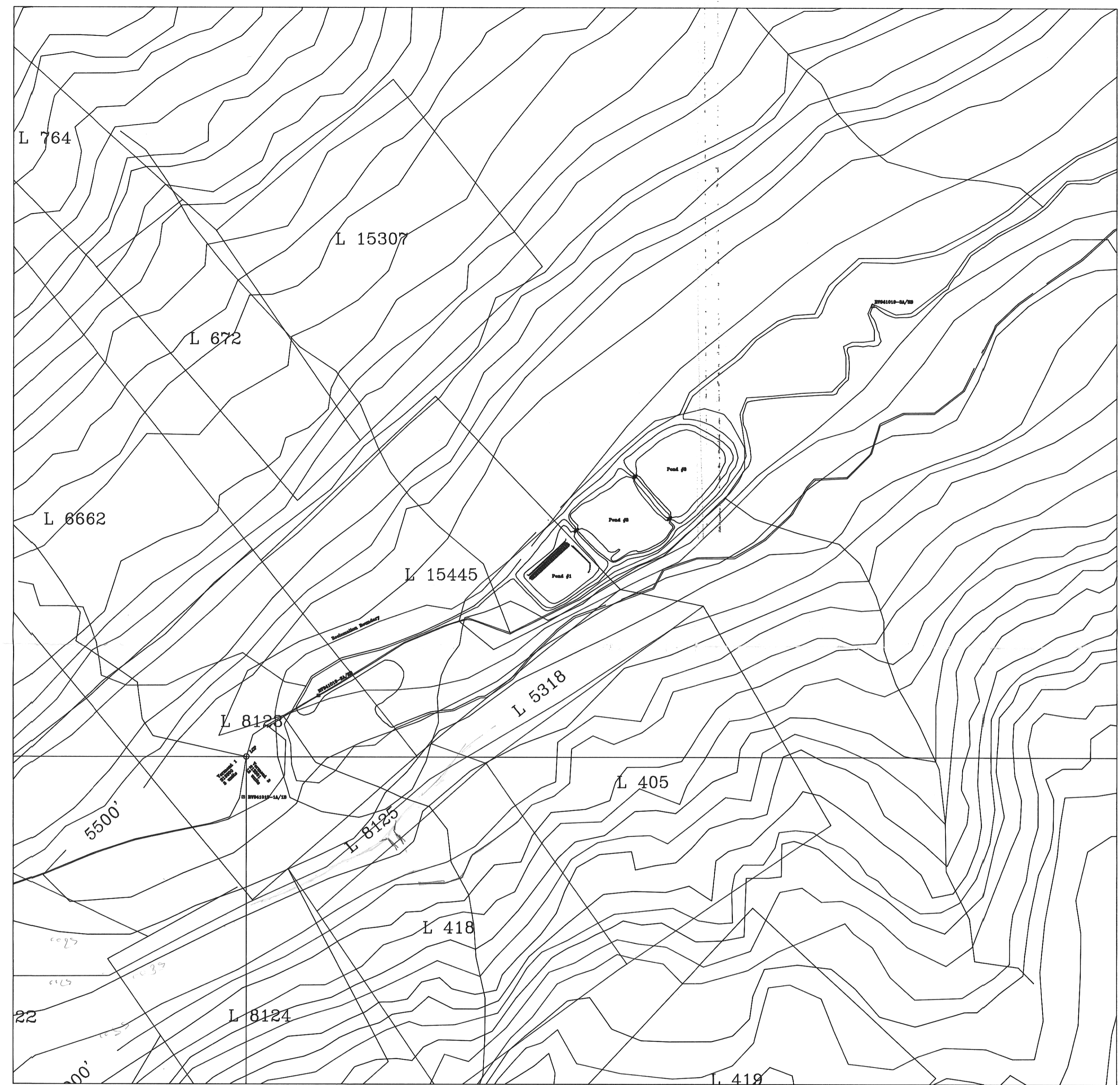
FIVE YEAR PROJECTION OF ANTICIPATED MINING AND RECLAMATION

COMPANY CENTRE-DE RESOURCES PERMIT NO. M-89

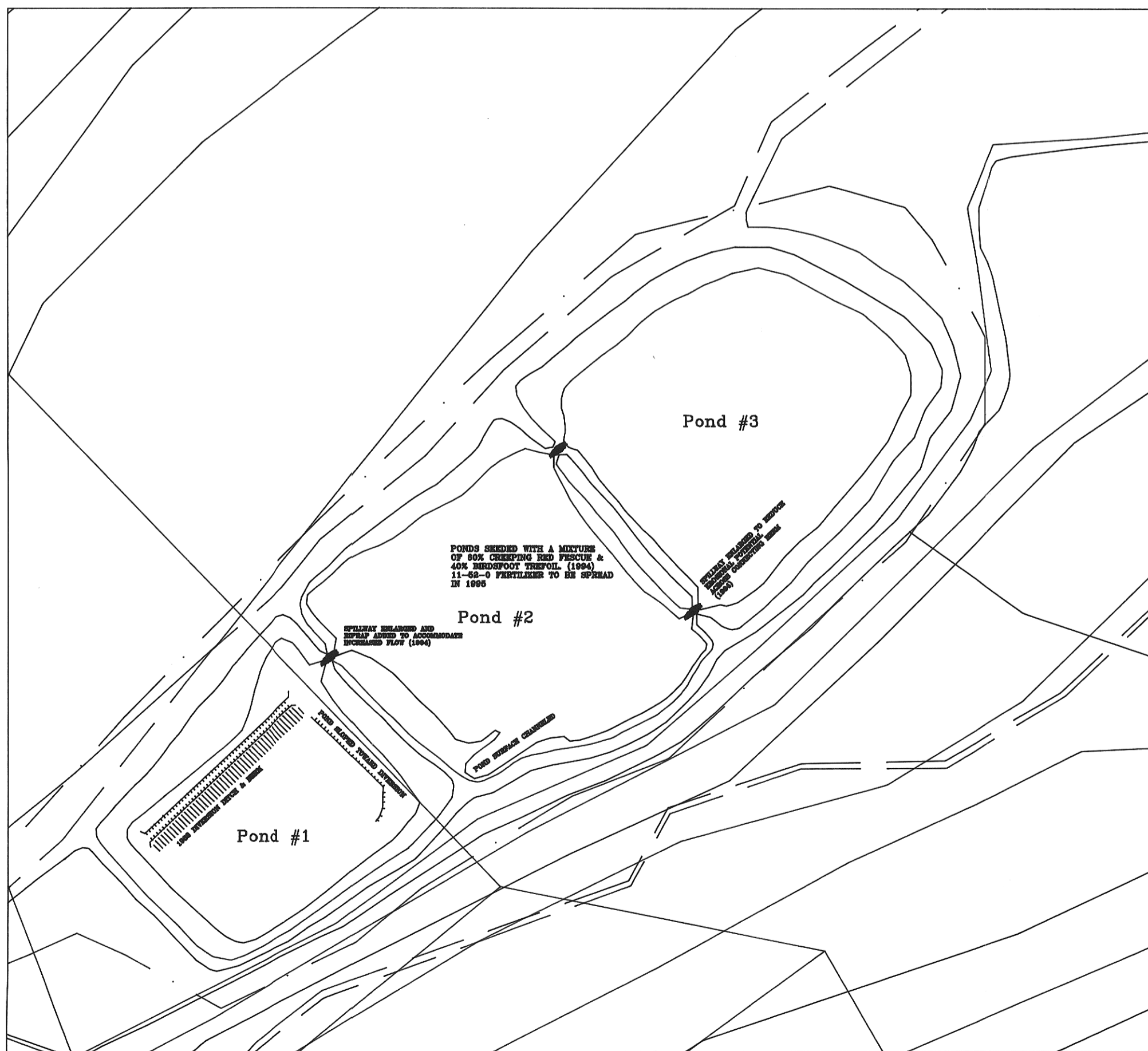
	MINING						RECLAMATION																		
	AREA DISTURBED (ha)						AREA RECONTOURED (ha)						AREA SEEDED/PLANTED (ha)						AREA FERTILIZED (ha)						
YEAR	95	96	97	98	99	TOTAL	95	96	97	98	99	TOTAL	95	96	97	98	99	TOTAL	95	96	97	98	99	TOTAL	
ROADS																									
ADMINISTRATION																									
PLANT SITE																									
PIT AREA																									
WASTE DUMPS																									
TAILINGS PONDS																									2.5
STOCKPILES																									
LINEAR (power/ pipelines)																									
OTHER																									
TOTAL																									2.5



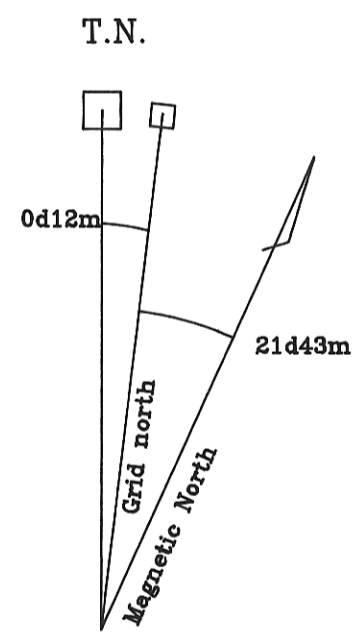
SCALE 1:20000



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SCALE 1:2000



Use diagram only to obtain numerical values. Approximate mean declination 1978 for centre of map. Annual change decreasing 5.2'.

Topography digitized from NTS Map 82K/15 (Bugaboo Creek) from aerial photography dated 1978. Base topographic information current as of 1977.

<h1>Centipede Resources Ltd.</h1> <h2>Ruth Vermont Minesite</h2>	
<p>1994 Reclamation Program Areas</p>	<p>Quadratix Microsystems Inc. May, 1995</p>
<p>Map 2/2</p>	<p>Revision 1.1</p>