

### Geological Survey Branch Assessment Report Indexing System



[ARIS11A]

#### ARIS Summary Report

Regional Geologist, Nanaimo

Date Approved:

2005.07.11

Off Confidential:

2005.12.13

**ASSESSMENT REPORT: 27670** 

Mining Division(s):

Nanaimo

**Property Name:** 

Tsitika Granite

Latitude: 50 16 48

Longitude: Longitude: 126 20 41 126 20 46 UTM:

09 5572917 689182 09 5573102 689078

NAD 83 NTS:

**NAD 27** 

**Latitude:** 50 16 47

BCGS:

092L08W

092L029

Camp:

Location:

Claim(s):

Southern 1, Sea Green 1, Worthington 1

Operator(s):

Tarmac Management Ltd.

Author(s):

Henneberry, R. Tim

Report Year:

2005

No. of Pages:

27 Pages

Commodities

Searched For:

Granite

**GEOL** 

General

Work Categories:

Work Done:

Geological

GEOL Geological

(100.0 ha;)

Keywords:

Jurassic, Island Plutonic Suite, Granodiorites, Building stone, Dimension stone

Statement Nos.:

3221717

MINFILE Nos.:

092L 345

Related Reports:

23891, 24251

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GEOLOGICAL REPORT
TSITIKA GRANITE PROPERTY

Nanaimo Mining Division

FOR

Tarmac Management Ltd. 1250 West Hastings Street Vancouver, B.C. V6E 2M4

By; R.Tim Henneberry, P.Geo. March 2, 2005 The Tsitika property consists of 4 contiguous, two-post mineral claims in the Nanaimo Mining Division of Vancouver Island. The property is road accessible, 17 kilometres northeast of Woss. The entire property is underlain by the Vernon batholith of the Jurassic Island Intrusions, near its northeast contact with the Karmutsen volcanics of the Triassic Vancouver Group.

The present Tsitika property was originally identified and staked as part of the regional exploration and assessment program of the north Island plutons in the early 1990's. In the period 1994 to 1996, 125 tons of 4 inch split face and 1376 tons of 5 ton block were quarried and supplied into the Vancouver Island and Lower Mainland market places. *Tsitika Grey* was used in both residential and commercial operations.

The project halted in late 1996 due to insufficient funding. The project required significant influx of capital to build a road into the projected quarry site. Renewed interest in the project has been sparked by the recent availability of capital to build an access road and establish a proper quarry bench.

The first aim of the program will be to rehabilitate 600 metres of a recently deactivated logging road to allow the construction of 450 metres of new road to reach the proposed quarry site. An landing area of 50 square metres will also be constructed to make a working area for the quarrying operation. Cost of the road building phase is estimated at \$85,750.

The second aim of the program is to quarry 2,500 tons of granite in a bulk test. The stone will be split into 5 ton blocks in preparation of later shipment into the Lower Mainland and Vancouver Island markets. This quarrying should entail the of mining sixteen 150 ton master blocks. It is anticipated that the quarrying and subsequent splitting of each master block will take three days. The total cost of the quarrying phase of the program is estimated at \$112,510.

The budget also includes a contingency fund and sufficient capital to document the results of the program and undertake a preliminary feasibility study in preparation for production.

Road Building	\$ 85,750
Bulk Sampling	\$ 112,510
Documentation	\$ 3,750
Contingency	\$ 25,000
Preliminary Feasibility	\$ 50,000
Development, equipment	\$ 250,000

#### TOTAL 2005 BUDGET

\$ 527,010

The cost of the 2004 evaluation program was \$1175.

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#### - 4-INTRODUCTION

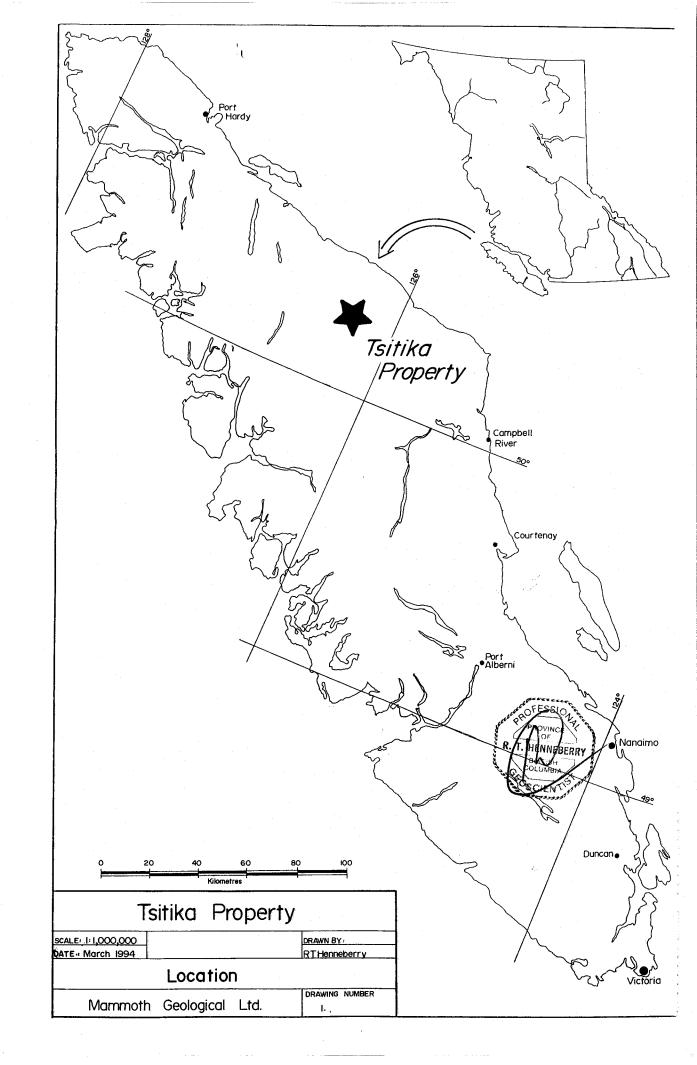
The purpose of this report is to update the status of the Tsitika Granite Property. During the mid 1990's approximately 1500 tons of *Tsitika Grey* granite was quarried from both boulders and an initial quarry test site. The stone was utilized on both commercial and residential projects in the Lower Mainland and Whistler and on Vancouver Island.

The production ceased in 1996 when it became clear an access road was required to reach the logical starting point of a quarry bench. Tsitika Stone Industries was unable to secure the necessary financing to build the road.

The 8 claims comprising the property lapsed in the 2000 / 2001 period. The key claims have just recently been acquired and are now under option to Tarmac Management Ltd.

This report was commissioned by Ms. Joan Purdy, president of Tarmac Management Ltd.

The author was intimately involved in the Tsitika project since its inception. An examination of the property was made on June 9 to check the quarry faces and to try to site in an access road to reach the face of the quarry knob to allow quarrying up slope as opposed to down slope.



#### -6-LOCATION, ACCESS

The area of interest is the northern section of Vancouver Island, between latitudes 49° 45' and 50° 45' and longitudes 126° 30' and 127° 55'. Topography ranges from Sea Level to 1050 metres, with valleys generally less than 300 metres. There are numerous lakes, creeks and streams where water for diamond drilling is readily obtainable. Heavy-duty equipment for trenching and road building will be accessible locally, in either Port Hardy, Port McNeill or Sayward.

The climate on the north island is relatively mild. The summers are warm and generally dry, while the winters are cool and wet. Snow will accumulate on the higher peaks, but generally the valley bottoms and lower hills are clear for year round work.

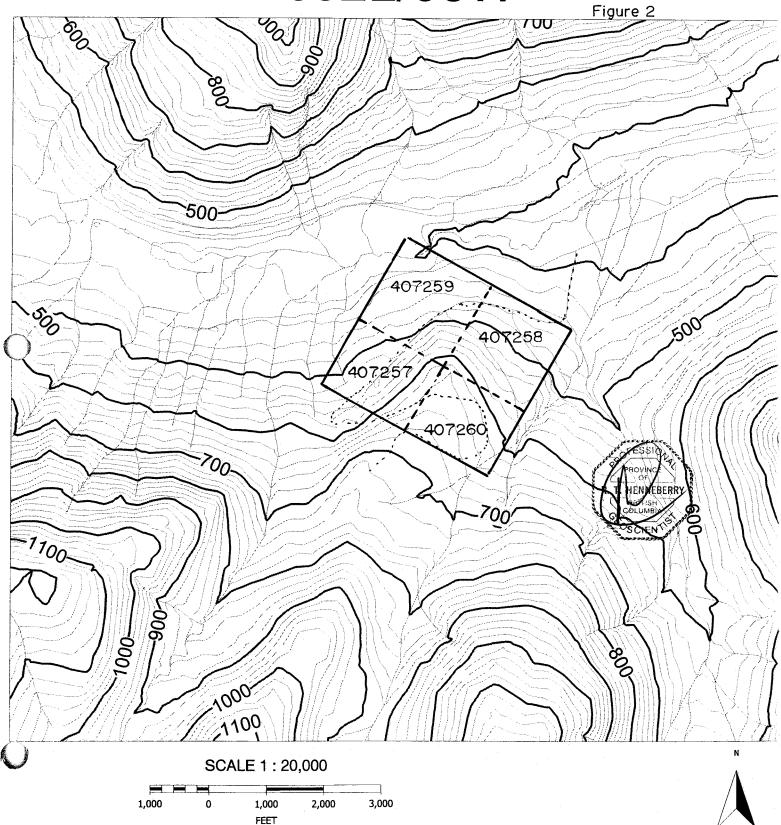
There are several towns and lesser communities in the map area where accommodation and lodging can be readily obtained, including Port Hardy, Port McNeill and Sayward. The Island Highway cuts through much of the map area. The numerous logging roads of Canadian Forest Products, TimberWest Forest and Canadian Pacific Forest Products provide access to different claim groups.

The Tsitika property lies at latitude 50° 16′ 48″ and longitude 126° 20′ 41″ on NTS Sheet 92L/08W, 17 kilometres northeast of Woss. The claims cover a prominent ridge of granite on the north facing slope of the pass between the headwaters of Eve River and the Tsitika River valley.

Access is provided from the Island Highway at the S90 logging road. S90 leaves the Island Highway 18 kilometres east of Woss.

The status of the property is logged and naturally reforested. This property is at the highest point on the Island Highway and can be susceptible to snowfall accumulations from mid-October to mid-February.

# Tsitika Granite Property Claim Location 092L/08W



Saturday, December 20, 2003 11:08 AM

http://webmap.em.gov.bc.ca/mapplace/maps/minpot/mtitles.mwf

The Tsitika property originally consisted of 8 contiguous two-post mineral claims encompassing an area 4 kilometre by 0.5 kilometre, covering the lower slopes of the pass between the Tsitika and Eve River valleys. The largest part of these holdings covered an area of large granite boulders, quarried as phase I of the exploration, development and marketing program.

These eight claims lapsed through 2000/2001. The S90 quarry site has just been reacquired with four units as listed below. These four units cover an area 1 kilometre by 900 metres (90 hectares):

Claim	Record Number	Anniversary Date
Southern #1	407257	December 13, 2006*
Sea Green #1	407258	December 13, 2006*
Worthington	#1 407259	December 13, 2006*
Prefco #1	407260	December 13, 2006*

<sup>\*</sup> pending approval of 2004 assessment credits.

The registered owner is R. Tim Henneberry of Mill Bay, B.C.

#### -9-PREVIOUS EXPLORATION

The Tsitika property was originally acquired in 1994 to assess the granite dimension stone potential of the northeast corner of the Vernon batholith. The first focus of the program was to test a number of the large (100 to 800 ton) boulders of granite lying along the existing logging roads. Three distinct boulders were quarried in 1994 and 1995 with the stone delivered to suppliers for preliminary market tests:

315-1	43 tons into 4 inch	66 tons into 5 ton block
M315-3		331 tons into 5 ton block
S90-1	10 tons into 4 inch	600 tons into 5 ton block
S90-2	52 tons into 4 inch	200 tons into 5 ton block

This 4 inch stone was primarily used on residential projects on Vancouver Island. The blocks went to Mahovlich Stone in Vancouver and were used on numerous commercial projects in the Lower Mainland and Whistler.

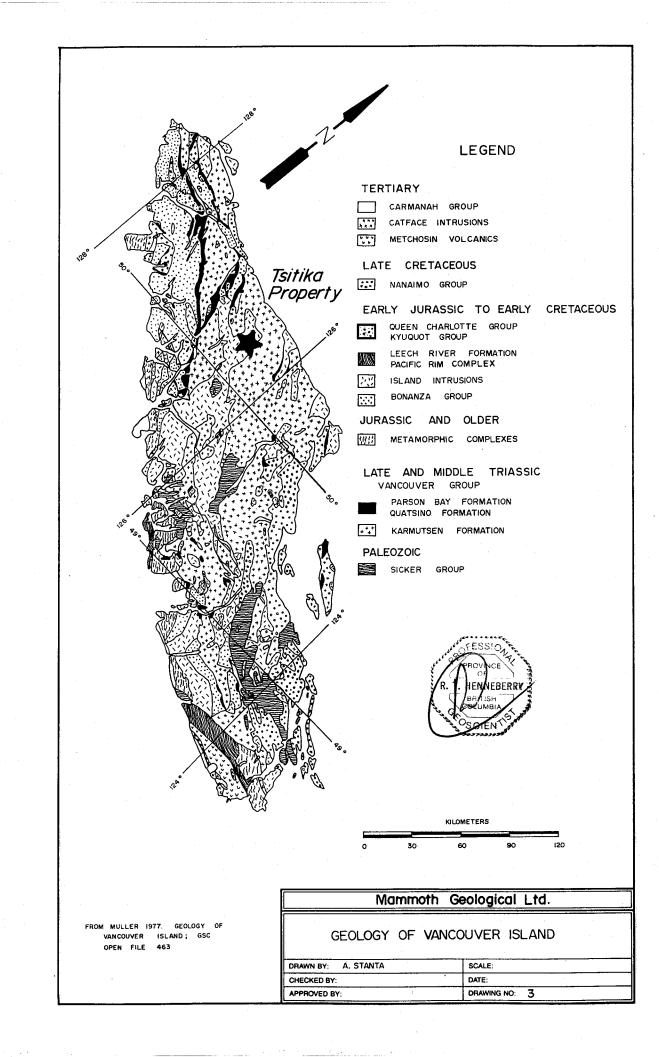
A small quarry was opened on the S90-2 claim in 1996. The limited funds available for the projected forced the initial face to be opened on the up dip instead of the down dip side of the granite. Considerable effort was expended trying to fight the sill fracture dip, causing portions of the master blocks to be lost. Despite the problems, a number of blocks were removed:

S90-2 20 tons into 4 inch 179 tons into 5 ton block

The project ceased when Tsitika Stone Industries was unable to secure the funding required to construct an access road to the down dip end of the granite out cropping, the logical quarry starting point.

The marketing phase of the exploration program was successful. The stone was readily accepted into the island and Lower Mainland markets being used on a number of prominent projects including:

- The new library at the University of British Columbia
- Sears Metrotown Mall
- Townhouse complexes in Richmond and West Vancouver
- Ambleside at Lon Lake Nanaimo
- Private residences in Victoria, Duncan and Port Hardy



#### -11-GEOLOGY

Regional Geology

The geology of the north end of Vancouver Island has been described by Muller et al (1974) and Muller et al (1980). The area lies in the Insular Belt of the Canadian Cordillera. The map area is chiefly underlain by the middle to upper Triassic Vancouver Group, overlain by the lower Jurassic Bonanza Group. The Vancouver Group is intruded by large and small bodies of middle Jurassic Island Intrusions and the related (?) Westcoast Complex, and overlain unconformably by remnants of a lower Cretaceous clastic wedge on the southwest side and similar upper Cretaceous beds on the northwest side of Vancouver Island. There are some small early Tertiary (Catface) intrusions also mapped. The region may be divided into several great structural blocks, separated mainly by important near-vertical faults and themselves fractured into many small fault segments.

The Vancouver Group is comprised of the lower Karmutsen Formation, middle Quatsino Formation and upper Parson Bay Formation. The Karmutsen Formation, the thickest and most widespread of the Vancouver Group formations, consists of basaltic pillow lavas, pillow breccias and lava flows with minor interbedded limestones, primarily in the upper part of the formation. Karmutsen rocks outcrop throughout the north part of Vancouver Island, primarily on the east side.

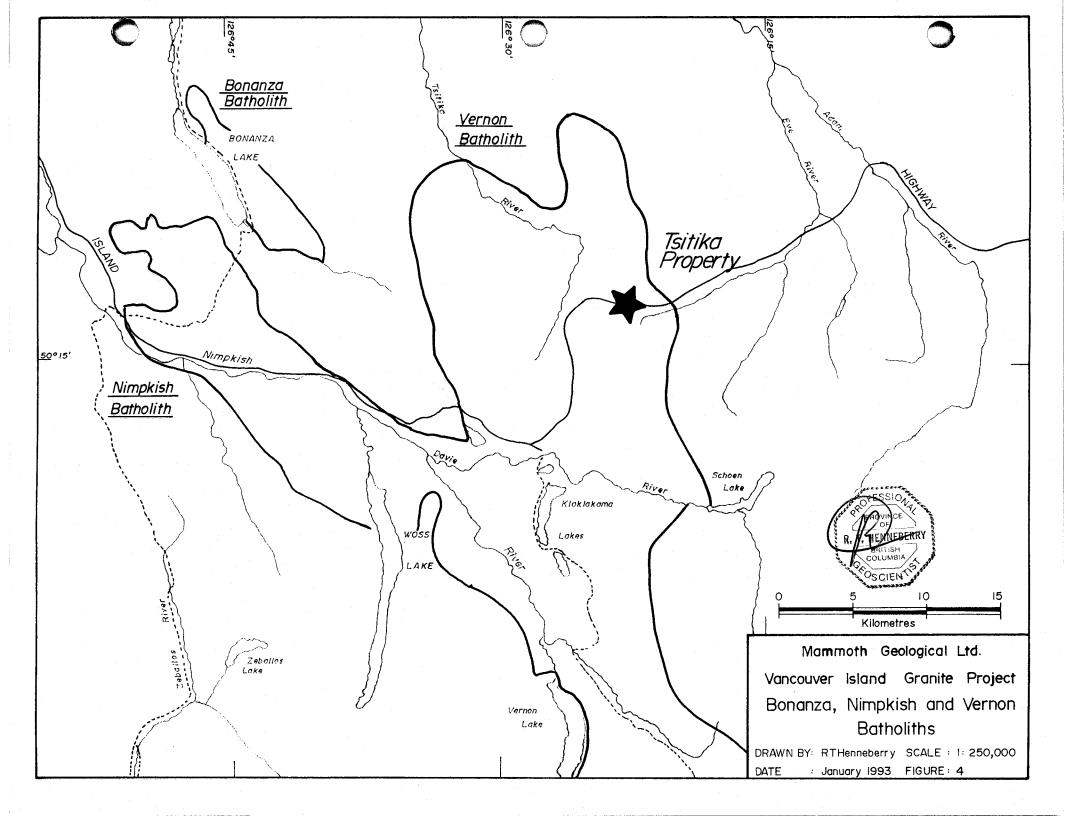
The Quatsino Formation overlies the basalts. The lower part of the Quatsino Formation consists of thick bedded to massive, brown-grey to light grey, grey to white weathering, fine to microcrystalline, commonly stylolithic limestone. The upper part is thin to thick bedded, darker brown and grey limestone, with fairly common layers of shell debris. The formation is in gradational contact with the overlying Parson Bay Formation by an increase in layers of calcareous pelites. Quatsino limestone outcrops as three narrow belts on the north part of Vancouver Island.

The Parson Bay Formation consists of a series of interbedded silty limestones and calcareous shales and sandstones, and occasional beds of pure limestone. Parson Bay rocks outcrop sporadically overlying the Quatsino limestone.

The Bonanza Group overlies the Vancouver Group. Bonanza Group rocks are primarily a Jurassic assemblage of interbedded lava, breccia and tuff with compositions ranging from basalt through andesite and dacite to rhyolite, deposited in a volcanic island arc environment. The Bonanza Group outcrop primarily on the west side of northern Vancouver Island.

The Westcoast Complex is a heterogeneous assemblage of amphibolite and basic migmatite with minor metasedimentary and metavolcanic rocks of greenschist metamorphic grade. The Westcoast Complex outcrops in a loosely defined belt on the west coast of Vancouver Island.

Granitoid batholiths and stocks of the Island Intrusions underlie large parts of Vancouver Island. These intrusions range in composition from quartz diorite and tonalite to granodiorite and granite. Island Intrusions outcrop in a belt through the central section of Vancouver Island.



The Cretaceous clastic wedge includes the Queen Charlotte and Nanaimo Groups. These groups consist of cyclical successions of sandstone, conglomerate and shale, with interbedded coal in the Nanaimo Group. These rocks outcrop around Quatsino Sound.

Small intrusive stocks of early Tertiary age and of general quartz dioritic composition are known in many parts of Vancouver Island. These rocks are generally massive, light colored, fine to medium grained equigranular to locally porphyritic granitoid rocks. They are commonly regularly and closely jointed.

The network of faults displayed on the north end of Vancouver Island appears to be the super position of two or more fracture patterns, each with a characteristic directions and of different age and origin.

#### **Island Intrusions**

The intrusive rocks of the Island Intrusions at the north end of Vancouver Island have received little attention as a source of dimension stone in the past. These "granites" have dimension stone potential as both polished stone (tiles and slabs) and structural stone. A literature compilation, combined with a preliminary prospecting program (Henneberry, 1994; 1995) identified several target areas within these intrusions. Systematic evaluation lead to the staking of a number of claims, including the original Tsitika group in 1994.

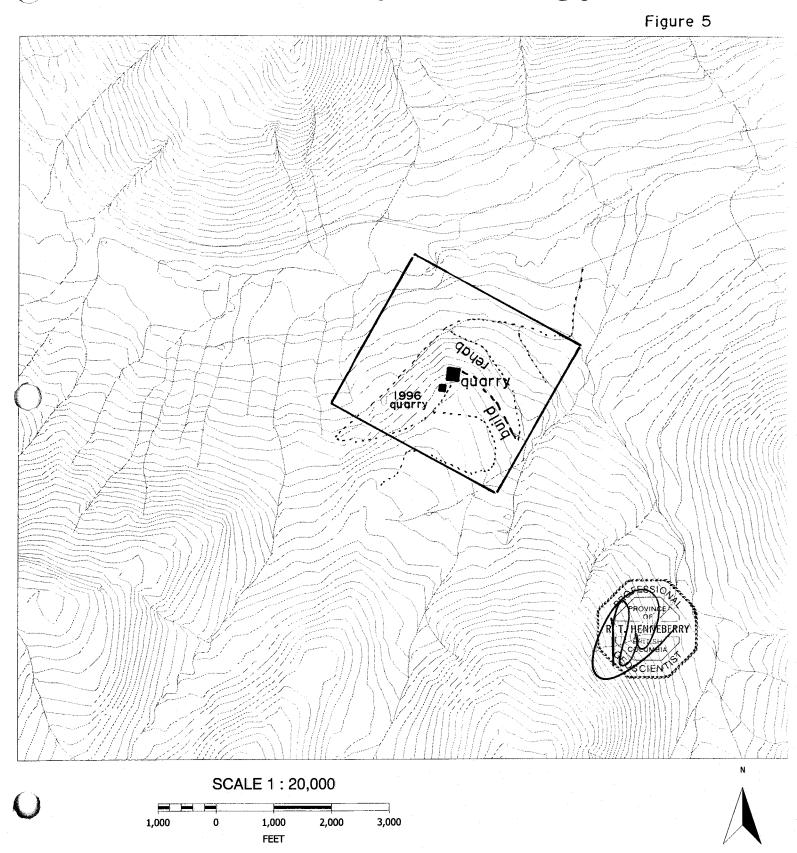
The Jurassic Island Intrusions underlie much of the central core of Vancouver Island. The Island Intrusions have invaded all Vancouver Group rocks and are elongated in a northwesterly direction. (Muller, 1977). The Intrusions vary in composition from leuco-quartz monzonite to gabbro, but the majority are granodiorite and quartz diorite. Small high-level bodies and cores of the larger bodies contain leuco-granodiorite and quartz monzonite, and deeper and marginal parts contain diorite and gabbro. Muller et al (1974) and Muller et al (1981) have divided the Island Intrusions of northern Vancouver Island into several distinct zones, based on location and composition.

The zones of interest for dimension stone are the lighter colored monzonites and associated leuco-granodiorite, and the dark to black gabbros. The lighter rocks are pink to red or white and contain less than 5% mafics, while the darker rocks are black and contain 30%-50% mafics. The Vernon batholith is the largest intrusion on the North Island and was the first one prospected..

#### Vernon Batholith

The Vernon Batholith of the Jurassic Island Intrusions is the main focus of the granite exploration. The Vernon baholith is a large rather homogeneous body of medium- to coarse-grained plutonic rocks ranging from biotite-hornblende quartz diorite to leuco-quartz monzonite. It is elongate in an approximate north-south direction, is up to about 10 miles wide and occupies much of the upper Nimpkish Valley with northward extension in the head water area of Tsitika River. To the south it connects with the Nootka and Bedwell batholiths. It is entirely enclosed by Karmutsen volcanics.

## Tsitika Granite Property Property Geology



The rocks are readily divisible into two distinct petrographic groups. Light-pink colored leuco-granodiorite and leuco-quartz monzonite are exposed in an elongate central core marked by Klaklakama Lakes in its middle part, and a poorly defined area east of Vernon Lake, but most of the batholith consists of dark-grey biotite-hornblende quartz diorite and granodiorite.

Except for the on-going exploration programs of the north Island dimension stone project undertaken by the author, there has been no exploration undertaken for dimension stone within the Vernon Batholith.

**Property Geology** 

The present Tsitika property lies near the northeast contact of the Vernon Batholith, covering the lower slopes of the headwaters of Eve River. Prominent ridges of granite were mapped on the ridges from Eve River headwaters through the pass to the headwaters of the Tsitika River. Numerous boulders ranging in size from 50 to 2000 tons were found adjacent to logging roads throughout the area.

The stone of interest is a medium-grained, equigranular, grey-white, hornblende-biotite granodiorite. The constituents are: 20-25% anhedral (5-7mm) cream K-feldspar, 40-45% anhedral (5-7mm) white plagioclase, 20% anhedral, grey (5-10mm) quartz and 10-15% black (5-10mm) mafics with hornblende over biotite.

This stone has a fresh, clean appearance on newly exposed surfaces, with little sign of alteration. The stone weathers well, as little rusting or other deleterious substances were noted on the natural bench faces. No sulfides were noted in any of the samples, or on the weathered surfaces. The stone is peppered with xenoliths, typical of the Island Intrusions. They can range from 0-5% of the granodiorite, ranging in size from 2-10 centimetres, though an occasional 30 cm xenolith has been observed. They generally show a rounded character, and give the stone "a character" for structural purposes.

Three prospective quarry sites were investigated during the mid 1990's program. The first, on the Tsitika River side was along a deactivated logging road. The stone is massive to fractured in outcrop with one section of heavily fractured granodiorite lying between two massive sections. The topography is terraced or benched on this property, with a deactivated logging road along the front edge of a solid bench of granite. The fracture pattern appears to be spaced close enough to allow extraction of master blocks in the order of 50 to 150 tons.

The second site straddles the pass itself, a long ridge approximately 50 metres above the logging road. The ridge appears massive and would be accessible from either end. Master blocks in the range of 50-200 tons should be attainable from this site. Unfortunately, this area is heavily treed with mature timber and would entail considerable expenses to provide access and establish a quarry site. (This area was subsequently logged off in the late 1990's. The problem with this site is the proximity to the Island Highway as the ridge is directly above the highway).

The third site, on the S90-1 claim, was actually opened. The stone is massive in outcrop and lies in a series of gently dipping benches progressing up the hill toward a solid knob at the top. The nature of this exposure will facilitate significantly easier quarrying, as drilling will be minimized. The fracture pattern as evidenced in the series of benches is spaced close enough that master blocks in the order of 500 to 1000 tons can be easily produced. Logging road S90 provides access to the top of the upper knob.

An area approximately 15m by 25m was stripped to bedrock. Three sub-parallel fractures were mapped (037/80N, 030/80NW, 040/80NW). The fractures were spaced at intervals ranging from 1.5m to 4.5m. One cross-cutting fracture was mapped at 177/80W. This fracture pattern resulted in master blocks of horizontal dimensions of 1.4m to 4.5m by indeterminate lengths (the lengths are determined by the size of the blocks required, usually 2m to 3m).

A horizontal fracture (135/25NE) provides a sill at approximately 4 metres depth. This is also the grain plain.

The outermost section was opened with 2m slices, drilled to a depth of 14 feet (4.3m). This yielded master blocks of dimensions 4.5m by 2m by 4.3m. These master blocks were liberated by blasting with primacord, pushed over and split into 5 ton blocks. The dip of the sill yielded a thickness of over 16 feet (4.5m) for the second slice, causing it to jam against the sill.

Two slices were also taken from the third section in. These slices were 3m by 2m, drilled to a depth of 10 feet (3m). Again the dip of the sill, this time in combination with cross cutting factures, caused the blocks to pinch and jam.

While the blocks finally split out are sound, considerable effort was expended fighting the sill fracture dip. This problem caused portions of the master blocks to be lost.

The quarry bench will need to be established at a location on the other side of the knob, necessitation some road building. The quarry can then advance up the dip of the sill as opposed to down the dip.

#### 2004 Program

The 2004 program consisted of examining the existing quarry face and walking the property to find the best route for a road to the lower end of the quarry face. One option appears to be continuing off the existing S90 road just past the turnoff to the quarry and progressing down slope to the north to the quarry face. The distance of required road is 250 metres, over some pretty tough terrain

The second option is to come in from below off an existing spur road. This would require rehabbing 700 metres of deactivated road and the building of 500 metres of new road. Though the road is longer the terrain appears to be much more conducive to road building. (Figure 5).

#### -17-MARKETING

The marketing program is essentially complete for the Tsitika property. The stone has been used and readily accepted on a number of job sites. The remaining aspect of the marketing program is identical to the remaining aspect of the quarrying program, open a quarry bench to ensure a continuing supply of stone will be available.

The other key aspect to be completed is to establish firm numbers for transportation. In the case of the north Island plutons the options are water (utilizing a barge) or truck (utilizing a Super "B" train).

A barge can move in the order of 1000 to 3000 tons at a cost of \$10,000 to \$15,000 to the lower Mainland. At full utilization of 3000 tons, costs would be  $\pm$ \$5 per ton. Additional costs include moving the stone from the quarry site to the barge, loading the barge and unloading the barge to the delivery site. Costs for a super "B" train are  $\pm$ \$85 per hour and could require a 3-5 hour round trip to tidewater, including loading and unloading and a  $\pm$ 2 hour trip unloading on the other end. A "B" train capacity is 45 tons, meaning an additional cost of  $\pm$ \$13 per ton.

Option	Volume	Loading	Transporting	Total
Barge Barge	3,000 1,000	\$13 \$13	\$5 \$15	\$18 \$28
"B" train	45	Ψ10	\$25	\$25

Direct utilization of the "B" train: loading at site, trucking to the lower Mainland and unloading at job site results in a cost of \$1055 to \$1200 per load, or  $\pm$ \$25 per ton.

In the case of a large order in excess of 1500 tons, a barge is the most economical method of transport. Orders are more likely to be in the range of 50-200 tons, leaving trucking as the best option.

#### -18-DISCUSSION

The Tsitika property was the first granite property to be assessed for dimension stone on northern Vancouver Island. The exploration and development program completed in the mid 1990's was successful in introducing *Tsitika Grey* into the Vancouver Island and Lower Mainland market places.

The program was halted in 1996 due to an inability to raise sufficient capital to build an access road to open up the S90 quarry from the down dip side.

The first objective of the planned development of the Tsitika project is to establish the quarry at the down dip end of the outcropping at the S90 site. This will require the rehabilitation of 600 metres of deactivated spur road followed by the construction of approximately 450 metres of new road to reach the proposed quarry site.

Once the road is completed and a working area has been cleared, a 2,500 ton bulk sample should be quarried to establish the quarry, test the stone to depth and provide sufficient material to begin bidding on contracts.

Marketing of Tsitika Grey should be ongoing throughout this process.

A successful conclusion to the development program will require a feasibility study in preparation of full sale development.

#### -19-CONCLUSIONS AND RECOMMENDATIONS

The present Tsitika property was originally identified and staked as part of the regional exploration and assessment program of the north Island plutons in the early 1990's. In the period 1994 to 1996, 125 tons of 4 inch split face and 1376 tons of 5 ton block were quarried and supplied into the Vancouver Island and Lower Mainland market places. *Tsitika Grey* was used in both residential and commercial operations.

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The budget also includes a contingency fund and sufficient capital to document the results of the program and undertake a preliminary feasibility study in preparation for production.

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Bulk Sampling	\$	112,510
Documentation	\$	3,750
Contingency	\$	25,000
Preliminary Feasibility	\$	50,000
Development, equipment	\$	250,000
TOTAL 2005 BUDGET	\$	527,010

The cost of the 2004 evaluation program was \$1175.

#### -20-REFERENCES

Henneberry, R.T. (1992). Marble Potential of the North End of Vancouver Island. Private Report 42p.

Henneberry, R.T. (1994). Final Compilation Report, 1993 Exploration and Prospecting Program for the Northern Vancouver Island Dimension Stone Project. Private Report 107p.

Henneberry, R.T. (1995). Final Compilation Report, 1994 Exploration and Prospecting Program for the Northern Vancouver Island Dimension Stone Project. Private Report 97p.

Henneberry, R.T. (1995a). Boulder Testing Program on the M315 Property. Nanaimo Mining Division, Vancouver Island, B.C. British Columbia Ministry of Energy, Mines and Petroleum Resources Assessment Report 23892. 21p.

Henneberry, R.T. (1995b). Boulder Testing Program on the S90 Property. Nanaimo Mining Division, Vancouver Island, B.C. British Columbia Ministry of Energy, Mines and Petroleum Resources Assessment Report 23891. 21p.

Henneberry, R.T. (1997). 1996 Exploration and Development Program on the Tsitika Property. British Columbia Ministry of Energy and Mines Assessment Report 24876. 21p.

Hora, Z.D. and Hancock, K.D. (1997). Some new dimension stone properties in British Columbia, Part III. In: Geological Fieldwork 1996. British Columbia Ministry of Energy and Mines Paper 1997-1. pp.301-306.

Muller, J.E. (1977). Geology of Vancouver Island. Geological Survey of Canada Open File 463.

Muller, J.E., K.E.Northcote and D.Carlisle (1974). Geology and Mineral Deposits of Alert - Cape Scott Map-Area (92L-102I) Vancouver Island, British Columbia. Geological Survey of Canada Paper 74-8. 77p.

Muller, J.E., B.E.B.Cameron and K.E.Northcote (1981). Geology and Mineral Deposits of Nootka Sound Map-Area, Vancouver Island, British Columbia. Geological Survey of Canada Paper 80-16. 53p.

#### -21-CERTIFICATE OF QUALIFIED PERSON

I, R.Tim Henneberry, P.Geo. do hereby certify that:

I am the Qualified Person of:

Tarmac Management Ltd. 1250 West Hastings Street Vancouver, B.C. V6E 2M4

I earned a Bachelor of Science Degree majoring in geology from Dalhousie University, graduating in May 1980.

I am registered with the Association of Professional Engineers and Geoscientists in the Province of British Columbia as a Professional Geoscientist.

I have practiced my profession continuously for 23 years since graduation.

I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

I am responsible for the preparation of the technical report titled "Geological Report Tsitika Granite Property" and dated March 2, 2005, relating to the Tsitika Granite Property. I visited the Tsitika Granite property on December 13, 2003 and June 9, 2004 for one day each time.

I am the registered owner of the property that is the subject of the Technical Report.

I am not aware of any material fact or material change with respect to the subject matter of the Technical report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.

I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.

I have read NI 43-101 and Form 43-101F, and the Technical Report has been prepared in compliance with that instrument and form.

I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible to the public, of the Technical report.

Dated this 2nd day of March, 2005.

Mammoth Geological Ltd.

R.Tim Henneberry P.Geo

Tsitika Granite Property

-23-COST ESTIMATES

#### **Road Building**

Rehabilitate 600 metres of existing deactivated road - 20 hours Construct 450 metres of new road to quarry site - 100 hours Establish 50 metre square landing for work area - 30 hours

Geologist	10 days	@	\$ 300	/day	\$ 3,000
Engineer	5 days	@	\$ 500	/day	\$ 2,500
Equipment mob					\$ 5,000
Cat dozer	150 hours	@	\$ 200	/hour	\$ 30,000
Excavator	100 hours	@	\$ 200	/hour	\$ 20,000
Airtrack	30 hours	@	\$ <b>400</b>	/hour	\$ 12,000
Dump truck	100 hours	@	\$ 100	/hour	\$ 10,000
Room & Board	10 days	@	\$ 125	/day	\$ 1,250
Vehicle + Fuel	10 days	@	\$ 100	/day	\$ 1,000
Vehicle + Fuel	5 days	@	\$ 100	/day	\$ 500
Sundries					\$ 500

**Road Building Total** 

\$ 85,750

#### **Bulk Quarry Test**

Strip working area to bedrock Quarry 2,500 tons of granite (16 - 150 ton master blocks) Split into 5 and 10 ton blocks

Budget to quarry one ma	ster block a	nd sp	olit	to 5 to	on blocks	
Driller	3 days	@	\$	250	/day	\$ <i>7</i> 50
Assistant	3 days	@	\$	150	/day	\$ 450
Room & Board	6 days	@	\$	125	/day	\$ 750
Cat dozer	2 hours	@	\$	200	/hour	\$ 400
Excavator	8 hours	@	\$	200	/hour	\$ 1,600
Airtrack	8 hours	@	\$	100	/hour	\$ 800
Compressor	3 days	@	\$	100	/day	\$ 300
Fuel	3 days	@	\$	20	/day	\$ 60
Hand drills	3 days	@	\$	100	/day	\$ 300
Dump truck	8 hours	@	\$	100	/hour	\$ 800
Vehicle + Fuel	1 days	@	\$	100	/day	\$ 100
Vehicle + Fuel	3 days	@	\$	100	/day	\$ 300
1 master block total						\$ 6,610
16 master blocks						\$ 105,760
Powder						\$ 500
Wedges, prybars, paint						\$ 1,000
Geologist	10 days	@	\$	300	/day	\$ 3,000
Vehicle + Fuel	10 days	@	\$	100	/day	\$ 1,000
Room & Board	10 days	@	\$	125	/day	\$ 1,250
<b>Bulk Quarry Test Total</b>						\$ 112,510
· · ·						
Documentation	10 days	@	\$	300	/day	\$ 3,000
Reproduction						\$ 750

#### -25-APPENDIX I PRELIMINARY QUARRY PROFORMA

A preliminary proforma income statement has been prepared for the Tsitika Granite Property. These figures are based on the experience of the author, who quarried most of the 1500 tons of production from the original Tsitika property.

#### **Production**

A production rate of 50 tons a day is quite attainable and is probably on the conservative side. Once the quarry bench is established production will probably be closer to 75 to 100 tons per day (with the same personnel and equipment) A proforma case for both 50 tons and 75 tons is presented but 50 tons a day should be considered the base case for start up. The proforma is based on a single shift, but a second shift could be added as marketing dictates.

The crew will consist of the master driller with the blasting ticket, a helper and a equipment operator/helper.

The quarrying process involves the drilling and crack blasting (with low velocity powder) of a block in the order of 150 tons. This master block is repeatedly split down until the resulting blocks are 5 tons in size. This splitting is done with drills, plugs and feathers. The only blasting undertaken is the liberation of the master block.

The biggest impediment to the production rate is the blocks themselves. As they are split they must be moved to the storage area or else working room quickly disappears. This is accomplished by a loader with forks or an excavator (shown as a loader in the proforma). The machine will be used only 2-4 hours per day, just as it is required.

The access road being built will be to the specifications to allow a "B" train to drive right to the quarry site itself and load the blocks, so a truck will not be required to haul the blocks to the bottom of the hill.

#### Marketing

A salesman has been budget for two weeks a month to meet with architects and end users. This role may be expanded as required.

#### **Mineral Resource Estimate**

The Tsitika granite property lies over a massive outcrop of blocky granite, ideal for quarrying. Each of the four claims are 500m by 500m entirely underlain by granite. Assuming that only 50 percent of the granite is suitable for quarrying, yields a potential volume of:

250 m by 500m by 4 claims = 500,000 cubic metres of granite for each metre of depth.

1 cubic metre of granite weighs about 2.6 metric tons so the Tsitika property could hold 1.3 million tonnes of granite per metre of depth. The underlying geology, combined with the topography, suggest the depth of granite could be 300 metres or more.

These are potential resources and need to be verified by drilling and bulk testing.

Mammoth Geological Ltd.

Tsitika Granite Property

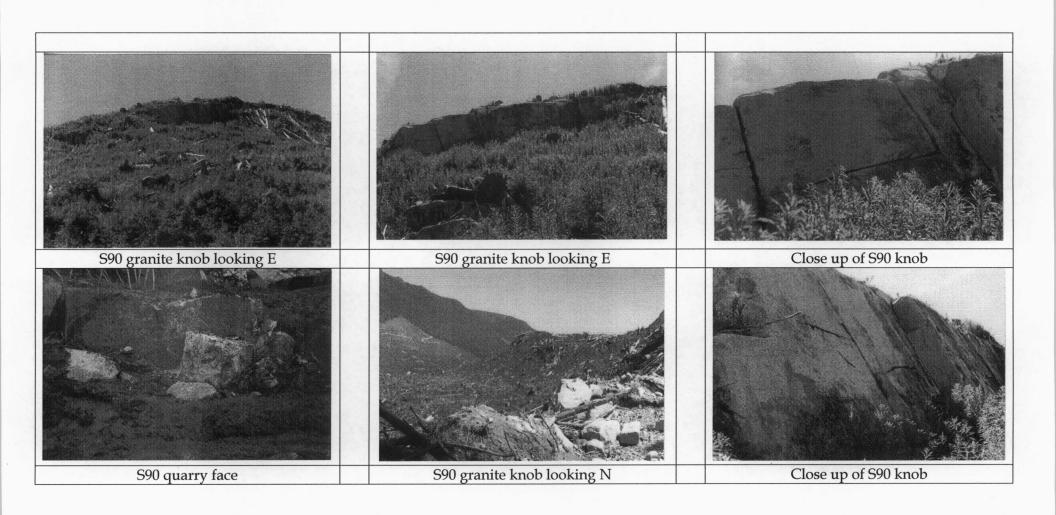
#### -26-TSITIKA GRANITE QUARRY PRELIMINARY PROFORMA

PRODUCTION (in tons)	per r	nonth		per month
Granite Block	(50 tons per day)	1100	(75 tons per day)	1650
COSTS				
Quarrying	days 22		day	s 22
Personnel				
Driller	\$250 / day	\$5,500	\$250 / day	\$5,500
Helper	\$125 / day	\$2,750	\$125 / day	\$2,750
Operator	\$150 / day	\$3,300	\$150 / day	\$3,300
Vehicle	\$50 / day	\$1,100	\$50 / day	\$1,100
Equipment			•	
Compressor	\$210 / week	\$840	\$210 / week	\$840
Hose	\$16 / week	\$64	\$16/week	\$64
Fuel	\$10 / week	\$40	\$10/week	\$40
Drills	\$50 / week	\$200	\$50 / week	\$200
Loader			·	
Mob	:			
4 hours/day	\$200 / hour	\$17,600	\$200 /hour	\$17,600
Fuel	\$300 / month	\$300	\$300 / month	\$300
Oil	\$125 / month	\$125	\$125 / month	\$125
Sundries			•	
Powder	\$50 / week	\$200	\$50 /week	\$200
Wedges	\$50 / week	\$200	\$50 /week	\$200
Steel	\$100 / week	\$400	\$100 / week	\$400
Other	\$25 / week	\$100	\$25 / week	\$100
Marketing / Sales	days 10		day	s 10
Salesman	\$200 / day	\$2,000	\$200 / day	\$2,000
Vehicle	\$50 / day	\$500	\$50 / day	\$500
Travel		\$500	•	\$500
Literature		\$200		\$200
Telephone		\$200		\$200
Revenue				
Granite blocks	\$75 / ton	\$82,500	\$75 / ton	\$123,750
Costs				
Quarrying		\$32,719		\$32,719
Marketing		\$3,400		\$3,400
Income		\$46,381		\$87,631

Mammoth Geological Ltd.

**Tsitika Granite Property** 

#### Tsitika Granite Project



#### Tsitika Granite Project

