

GEOCHEMPET SERVICES, BRISBANE

Geochempet Services

ABN 980 6945 3445

PETROLOGICAL and GEOCHEMICAL CONSULTANTS

Principals: K.E. Spring B.Sc.(Hons), MAppSc and H.M. Spring B.Sc.

5/14 Redcliffe Gardens Drive
Clontarf, QLD 4019

Telephone: (07) 3284 0020

Fax: (07) 3284 0018

Email: info@geochempet.com
www.geochempet.com

PETROGRAPHIC REPORT ON A HAND SPECIMEN (3A/3B) FROM GLENDON QUARRY

prepared for

GLENDON QUARRY EMERALD

Purchase Order:

Invoice Number: 00005335

Client Ref: John Osborne

Issued By:



L.P. Evans, B.Sc
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Sample Label: 3A/3B **Date Received:** 13/08/13

Sample Type: Hand Specimen

Sample Source: Glendon Quarry

Work Requested Petrographic analysis in relation to suitability for use as a source for road base, concrete aggregate, asphaltic/sealing aggregate, rip-rap, marine armour rock and rail ballast; petrographic assessment of potential for alkali-silica reactivity

Methods Account taken of ASTM C 295 Standard Guide for *Petrographic Assessment of Aggregates for Concrete*, the AS2758.1 – 1998 *Aggregates and rock for engineering purposes part 1; Concrete aggregates (Appendix B)*, the AS1141 Standard Guide for the *Method for sampling and testing aggregates*, of the content of the 1996 joint publication of the Cement and Concrete Association of Australia and Standards Australia, (HB 79-1996) entitled *Alkali Aggregate Reaction - Guidelines on Minimising the Risk of Damage to Concrete Structures in Australia*, and in accordance with ASTM C 294 Standard Guide for *Petrographic Assessment of Railway Ballast* and to the content of the 1996 publication of Standards Australia (AS 2758.7 – Appendix B), entitled *Aggregates and Rock for Engineering Purposes- Part 7: Railway Ballast*, and in accordance with ASTM D4992-07 Standard Guide for *Evaluation of Rock to be used for Erosion Control*

Identification Olivine basalt

Description

The sample consisted of two large block-shaped hand specimens of essentially unweathered, hard, robust, sparsely amygdaloidal, dark grey basalt. Joint surfaces are partly coated by a dark greenish clay but are otherwise fresh surfaces. The amygdules are spherical and up to about 2-12 mm in diameter. The rock can only be lightly scratched by a steel tool.

A thin section was prepared to permit microscopic examination of the specimen. An average composition of the rock, expressed in volume percent and based on a brief count of 100 widely spaced observation points falling within the thin section, is:

Primary Components

41%	plagioclase feldspar
17%	clinopyroxene
9%	opaque oxide (magnetite and/or ilmenite)
9%	remnant olivine
9%	mesostasis of blackish-brown glass darkened by microlites of pyroxene and opaque oxide
1%	apatite

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Secondary Minerals

14% brownish-green clay of smectite style (nontronite)

Microscopically, the rock is seen to consist of porphyritic, mildly to moderately flow-aligned, sub-ophitic to ophitic, finely crystalline textures of basaltic style. The phenocrysts are about 0.4 to 1.5 mm in size. The groundmass is dominated by mildly flow aligned feldspar laths in a cellular pattern (about 0.1 to 0.3 mm long), along with other smaller mineral grains.

Plagioclase phenocrysts and large pyroxene xenocrysts (with reaction coronas) are fresh. Olivine occurs as phenocrysts: the largest of which most commonly show slight alteration to greenish-brown clay of smectite style. Minor additional clay occurs filling irregular groundmass interstices, some of which have replaced late, green glass. Plagioclase occurs as multiply twinned, fresh groundmass laths. Other fresh groundmass minerals are complexly-shaped aggregates of pyroxene, equant to minor platy opaque oxides (magnetite and/or ilmenite) and acicular, fine apatite. A sparse mesostasis consisting of opaque oxide and pyroxene microlites in blackish-brown glass is present interstitially in the rock.

Comments and Interpretations

This supplied hand specimens (labelled 3A/3B) from the Glendon Quarry, Emerald is considered to consist of olivine basalt, a basic volcanic rock which crystallized probably along the periphery of a lava flow.

For engineering purposes, the supplied rock sample may be summarised as:

- **olivine basalt**, a basic volcanic rock
- finely crystalline
- essentially unweathered
- lightly to moderately altered
- having an average **secondary mineral content of about 14%** (comprising brownish-green smectite clay)
- **hard**
- **strong**

The rock is predicted to be **durable**.

The basalt lacks free silica and is, therefore, predicted to be **innocuous in relation to alkali-silica reactivity in concrete**. It contains glass of a common brown basaltic type which is interpreted to be undersaturated in silica and, thus, innocuous in relation to the alkalis in concrete.

Basalt essentially equivalent to that represented in the supplied sample is predicted to be **suitable for use as a source rock for road base, concrete aggregate, asphaltic/sealing aggregate and rail ballast**.

Rock represented by the supplied hand specimens is considered to be **suitable as a source for rip rap and marine armour rock**. This assessment is conditional, provided that large enough blocks can be exhumed from the quarry, that are free of jointing or fractures.

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Free Silica Content

Apparently nil.