Geochempet Services

ABN 980 6945 3445
PETROLOGICAL and GEOCHEMICAL CONSULTANTS
Principals: K.E. Spring B.Sc.(Hons), MAppSc and H.M. Spring B.Sc.

19 Centenary Drive
MALENY Q 4552

Telephone: (07) 5494 2055
Fax: (07) 5494 3288

Email: geochempet@bigpond.com

PETROGRAPHIC REPORT ON A STONE CONSTRUCTION BLOCK FROM EIDSVOLD SILTSTONE QUARRY

prepared for

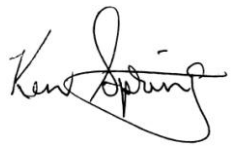
EIDSVOLD SILTSTONE PTY LTD

Order Number:

Invoice Number:

Client Ref: Michael Whitty

Issued by



K. E. Spring B.Sc.(Hons), MAppSc
28 July 2010

Sample Source : Eidsvold Siltstone **Date Received** : 03/07/10

Product Type : Stone Construction Block

Work Requested Petrographic analysis in relation to use as white decorative concrete aggregate and dimension stone

Methods Account taken of ASTM C295 Standard Guide for *Petrographic Assessment of Aggregates for Concrete* and to the content of the 1996 joint publication of the Cement and Concrete Association of Australia and Standards Australia**,** entitled *Alkali Aggregate Reaction - Guidelines on Minimising the Risk of Damage to Concrete Structures in Australia*

Identification Volcaniclastic siltstone

Description

The sample consisted of a dimension stone block (300x150x150mm) of light grey, apparently robust, indurated, essentially hard and robust, fine-grained sandy siltstone. Patchy secondary iron oxide is apparent on the exposed surfaces of the block. The two sawn surface are coated by a fine white dust but the remaining broken surfaces appear to be clean.

A thin section was prepared to permit detailed microscopic examination in transmitted polarised light of 8 random fragments. An approximate composition of the aggregate, expressed in volume percent and based on a brief count of 100 widely spaced points in thin section, is:

18%	quartz silt grains
13%	remnant feldspar silt grains
3%	sphene/leucoxene
trace	tourmaline and zircon
42%	lithic clasts of acid volcanic/tuffaceous rock
5%	lithic clasts of intermediate volcanic rock
8%	clay of kaolinitic/illitic appearance after labile silt clasts
5%	chlorite
4%	sericitized clasts
2%	detrital micas

In thin section, the rock is seen to massively bedded but thinly laminated in places, moderately to well sorted, densely packed and tightly cemented mineral grains and rock fragments (variously about 0.05 to 0.3 mm size) derived from acid volcanic/tuffaceous and rarer intermediate volcanic source rocks. Thin silty laminations are irregularly distributed and are about 1 to 3 mm wide but thinner discontinuous lenses are also present.

More specifically they contain mineral grains of feldspar and subordinate quartz, along with lithic and formerly vitric clasts of acid volcanic/tuffaceous derivation and

rarer lithic clasts of intermediate volcanic rock. The mostly angular quartz and feldspar grains (probably derived from phenocrysts/phenoclasts) with numerous volcanic fragments are scattered through a matrix of finely quartzofeldspathic material and chloritized clasts along with patches of mixed low birefringent clay (inferred kaolinite and illite). Trace amounts of tourmaline and zircon are also observed. Clasts are cemented by quartz and feldspar overgrowths in the sandy siltstone, and sericite and kaolinite/illite mixed layer type of clay mineral in the finer siltstone laminations.

Comments and Interpretations

The supplied aggregate sample is interpreted to have originated as volcaniclastic siltstone. The indurated sub-labile siltstone may have been originally vitroclastic (probably derived by reworking of tuffaceous detritus), but diagenetic or incipient metamorphic processes have devitrified and finely recrystallized the formerly glassy fragments.

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

- **volcaniclastic siltstone**, an indurated sub-labile sedimentary rock type
- fine-grained
- essentially unweathered
- contains 19% soft, weak minerals (comprising 8% clay, and 5% chlorite, 4% sericite and 2% detrital micas)
- **hard**
- **apparently strong**

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

The siltstone is interpreted to have a **mild potential for deleterious alkali silica reactivity** in concrete because it contains an average of about 14% of finely microcrystalline quartz.

Thus, rock of the type represented by the supplied sample is predicted have **good potential for use concrete, only provided that appropriate precautions are taken in mix and engineering design to take account of a perceived potential for deleterious alkali silica reactivity**. Given the scarcity of white decorative concrete it has the potential to provide a source of this type of material but selective quarrying for the more indurated siltstone is advised for this type of use.

Guidance on appropriate precautions can be obtained from the 1996 joint publication of the *Cement and Concrete Association of Australia* and *Standards Australia*, entitled *Alkali Aggregate Reaction - Guidelines on Minimising the Risk of Damage to Concrete Structures in Australia*.

Rock equivalent to the supplied sample is predicted to be **suitable for use as dimension stone**.

Free Silica Content About 32%.