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# PETROGRAPHIC REPORT ON A GRAVEL SAMPLE FROM BOLGERS QUARRY

prepared for

## GUNNEDAH SHIRE COUNCIL GUNNEDAH, NSW

Purchase Order: 128863

Invoice Number: G2102555

Client Ref: Allison Riley

Issued by

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B.Sc. (Hons), MAppSc
22 March 2021

| | | | |
|---|---|---|---|
| **Sample Label**: | Bolgers Quarry | **Date Sampled**: | 21/01/2021 |
| **Sample Type**: | Prepared Road Base | **Date Received**: | 02/02/2021 |
| **Sampling Location**: | Stockpile | | |
| **Sampling Location**: | Bolgers Quarry | | |
| **Work Requested** | Petrographic analysis in relation to suitability for use as road base | | |
| **Methods** | Account taken of ASTM C295 Standard Guide for *Petrographic Assessment of Aggregates for Concrete,* the AS2758.1 – 2014 *Aggregates and rock for engineering purposes part 1; Concrete aggregates (Appendix B),* the AS1141 Standard Guide for the *Method for sampling and testing aggregates* | | |
| **Identification** | Partly ferricreted volcaniclastic sandstone | | |

The supplied sample consists of a light brown, moderately hard to hard, apparently robust, ferruginized fragments and fines. The gravel appears to consist of sub-angular fragments with associated crusher fines. The clast lithology is dominated by volcaniclastic sandstone. The clasts are partly ferruginized and appear to be still robust.


**Plate 1**: Photograph of submitted gravel sample for petrographic analysis.

A thin section was prepared to permit microscopic examination in transmitted polarised light of a random sub-sample. An average composition of the gravel, expressed in volume percent and based on a count of 100 points in the thin section is:

**Hard, durable minerals**

| | |
|---|---|
| 24% | microcrystalline feldspar and quartz |
| 15% | quartz as free grains |
| 31% | feldspar grains |
| 3% | secondary iron oxide |
| 4% | epidote |

**Moderately robust minerals**

| | |
|---|---|
| 4% | calcite and siderite |

**Weak &/soft components**

| | |
|---|---|
| 4% | chlorite |
| 8% | muscovite/sericite |
| 3% | earthy goethite/limonite |
| 3% | kaolinite |
| 1% | zeolite |

The sectioned rock fragments are seen to be labile, coarsely sandy to silty textured, quartzofeldspathic rock in lightly weathered condition. They are largely composed of quartz and feldspar grains along with intermediate and acid volcanic and/or tuffaceous detritus. Other, coarser grained rocks are less-sorted and could be described as greywacke, but they too consist of volcaniclastic detritus. In places, the matrix is partly ferruginized and argillized with variable amounts of sericite, chlorite, kaolinite, zeolite and earthy secondary iron oxides. Some carbonate (probably calcite and siderite) is observed in fine veins and as replacement of some feldspar.

Free grains of quartz and feldspar along with liberated clasts of acid and intermediate volcanics are also observed.

## Comments and Interpretations

The submitted gravel sample from Bolgers Quarry is interpreted to be partly ferricreted volcaniclastic sandstone. It is interpreted to have been generated by chemical weathering and ferruginous cementation of moderately sorted sandstone during a cycle of lateritization. It now consists almost largely of silica (in the form of quartz grains) and secondary iron oxide (in the form of hematite and goethite) but more recent weathering has converted some of the secondary iron to more earthy types.

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

- **volcaniclastic sandstone** (sedimentary rock type)
- slightly weathered

- carrying about 77% of robust mineral grains and lithic clasts and 4% moderately robust carbonate
- consists of 19% soft, weak clays and earthy secondary iron oxides
- **essentially hard**
- **essentially strong**

In essence, the rock is predicted to be **essentially durable**.

The rock of the type represented by the supplied sample is interpreted to be **suitable for use as road base**.

**Free Silica Content**

Estimated to be about 23% of the rock 8% as finely microcrystalline quartz <0.01 mm, and 15% as coarser common quartz).

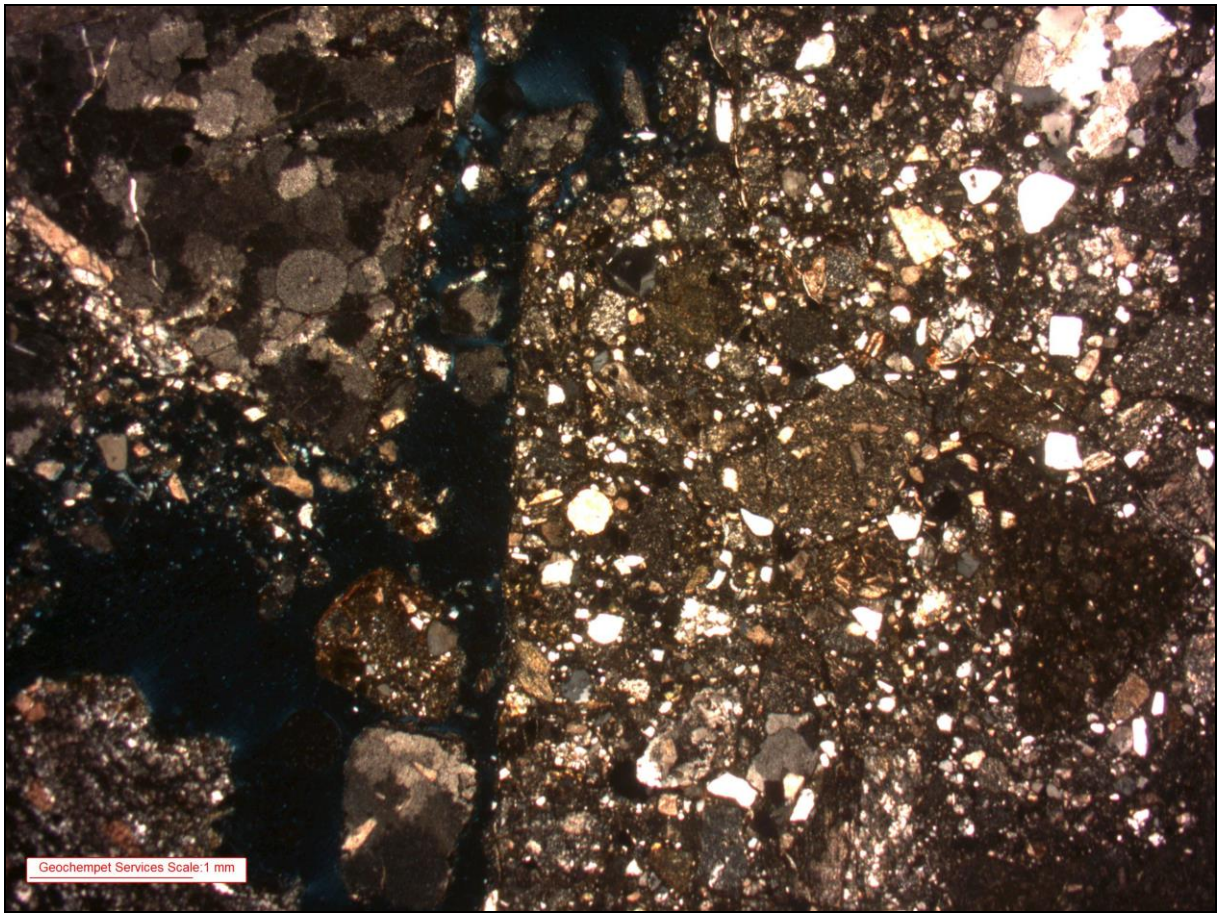


**Plate 2:** Micrograph taken at low magnification, in transmitted cross polarised transmitted light, showing partly ferricreted volcaniclastic sandstone fragments with murky matrix.