Lands Geological Survey Division
GEOLOGICAL LABORATORY SERVICES SECTION
(PETROLAB)

REPORT OF LABORATORY ANALYSIS

Client	**MGB-CO / HARLEY A. LACBAWAN**
Project / Company	Quadrangle Mapping Project
Mailing Address	MGB, North Ave., Quezon City
Telephone No.	667-6700 LOC. 177
Request No.	1818.019
Date of Request	February 23, 2018
Amount Payable	₱7,750.00
OR No. / Date	NON-PAYING
Type of Analysis	Petrography
No. of Sample	5
Type of Sample	Rock
Sample Preparation	☑ Thin section ☐ Polished section ☐ Polished-thin section
Other Procedures	☐ Staining test for K-feldspar ☐ Photomicrography
Result of Analysis	Please see attached result of analysis comprising 3 pages.

Analysts: **HARLEY A. LACBAWAN**

Date: November 12, 2018

Recommending Approval:

MA. LOURDES STEPHANIE V. LEIDO
OIC, X-Ray and Petrography Units

JOCELYN C. VILLANUEVA
OIC, Geological Laboratory Services Section

Approved by the Authority of the Director
of Mines and Geosciences Bureau:

ANTONIO N. APOSTOL JR.
OIC, Lands Geological Survey Division

Lands Geological Survey Division

RESULT OF PETROGRAPHIC ANALYSIS

Client	MGB - CENTRAL OFFICE / HARLEY A. LACBAWAN
Request No.	1818.019

Sample No./ Lab. No.	Rock Name	Description	Composition	%age
CAT-BAR-HW01A PM18-146	ALTERED PORPHYRITIC ANDESITE Locality: Baras, Catanduanes	The porphyritic sample is intensely altered with subhedral phenocrysts of relic plagioclase laths + altered mafics set in a fine-grained groundmass of plagioclase microlites + chlorite + acicular and granular epidote + brown clay + anhedral secondary opaques. Sizes range from 0.11 to 0.52mm for phenocrysts and 0.01 to 0.06mm for groundmass grains, respectively. The plagioclase laths are partially to completely replaced by quartz + epidote + calcite. Chlorite completely replaced other grains, presumably mafic minerals. Crisscrossing veinlets composed of epidote + quartz + calcite + goethite randomly cut across the rock and consequently crushed some crystals into smaller grains.	Primary Minerals: Phenocrysts: Plagioclase (An<50) Groundmass: Plagioclase (An<50) Secondary Minerals: Chlorite Epidote Clay Calcite Quartz Opaque Goethite	 5% 25% 25% 18% 10% 6% 6% 5% trace
CAT-BAR-KE2 PM18-147	LITHIC TUFF (after Schmid, 1981) Locality: Baras, Catanduanes	Fragmental texture is observed in the sample, which is composed of sub-angular to sub-rounded clasts of volcanic rock fragments + augite + plagioclase in a matrix of glass + chlorite. The sample is clast-supported and moderately sorted (after Compton, 1962). The average size of the clasts is 0.14mm. The rock fragments are of volcanic origin as exhibited by the presence of felty plagioclase laths which are mostly altered into epidote. Some plagioclase crystals exhibit sieve texture. The augite crystals are relatively fresh with slight alteration to chlorite. The twinned plagioclases partially alter to calcite + epidote + clinozoisite + illite + sericite. The augite crystals are partially replaced by calcite + chlorite + opaque. Parallel-oriented veins composed of calcite + quartz + chlorite + goethite cut through the rock. A left-lateral displacement of some veins is also observed. The width of the veins ranges from 0.02mm to 0.1mm.	Clasts: Volcanic rock fragments Plagioclase Augite Matrix: Glass Chlorite Opaque Others (Veins): Calcite Quartz Goethite	 45% 20% 18% 10% 1% 1% 3% 2% trace

CAT-BAT-KE5 PORPHYRITIC DIORITE
PM18-148

Locality:
Bato, Catanduanes

Porphyritic texture is exhibited by coarse-grained, twinned, and zoned plagioclase laths + relic rectangular mafics (possibly hornblende) + muscovite set in a groundmass of secondary quartz + titanite + apatite + secondary opaques. Size ranges from 0.4mm to 1.21mm for phenocrysts and 0.02mm to 0.09mm for the groundmass grains, respectively.

The plagioclase laths are partially to completely altered to epidote + chlorite + calcite + sericite. The rectangular relic mafic grains (possibly hornblende) are pseudo-morphed by chlorite + epidote.

Crisscrossing veinlets (with width of 0.02mm) composed of calcite + epidote cut through the rock.

Primary Minerals:	
Phenocrysts:	
Plagioclase (An<50)	45%
Hornblende	8%
Muscovite	5%
Groundmass:	
Plagioclase (An<50)	3%
Titanite	trace
Apatite	trace
Secondary Minerals:	
Quartz	12%
Epidote	10%
Chlorite	6%
Opaque	5%
Calcite	2%
Clinozoisite	2%
Sericite	2%

CAT-BAT-KE8 PORPHYRITIC BASALT
PM18-149

Locality:
Bato, Catanduanes

The sample exhibits glomeroporphyritic texture with subhedral phenocrysts of twinned plagioclase + augite + relic mafics set in a felty groundmass of plagioclase microlites + augite + epidote + clinozoisite + intersertal chlorite + opaque + clay + goethite. Size ranges from 0.4mm to >2mm for phenocrysts and 0.006mm to 0.09mm, respectively.

Coarse-sieve texture is observed in coarser plagioclase phenocrysts as exhibited by anhedral glass inclusions. Plagioclase crystals are slightly to completely altered to epidote + calcite + clinozoisite + opaque + illite. Epidote + goethite + opaque take the form of relic mafics. Augite crystals are slightly to completely altered to calcite + chlorite + goethite + opaque.

Discontinuous, crisscrossing veinlets (with average width of 0.04mm), which are composed of calcite + secondary quartz + epidote, cut through the sample.

Primary Minerals:	
Phenocrysts:	
Plagioclase (An>50)	45%
Augite	5%
Groundmass:	
Plagioclase (An>50)	30%
Augite	trace
Secondary Minerals:	
Epidote	8%
Calcite	4%
Clay	4%
Opaque	4%
Clinozoisite	trace
Chlorite	trace
Quartz	trace
Goethite	trace

CAT-SANM-KE7
PM18-150

ALTERED PORPHYRITIC BASALT

Locality:
San Miguel, Catanduanes

Intense fracturing and multiple veinlet intrusions fragmented most of the section. However, porphyritic texture is still observed with phenocrysts of twinned plagioclase laths + subhedral augite in a felty groundmass of plagioclase microlites + augite + brown clay + opaque + epidote + chlorite. Size ranges from 0.025 mm to >2mm for the phenocrysts and 0.006mm to 0.02mm for the groundmass grains, respectively.

The plagioclase laths are slightly altered to epidote + chlorite + clinozoisite + opaque + illite. The augite phenocrysts are slightly to completely altered to actinolite + chlorite + opaque.

Intrusion of microcrystalline quartz veinlets fragmented most of the section.

Primary Minerals:	
Phenocrysts:	
Plagioclase (An>50)	15%
Augite	2%
Groundmass:	
Clay	40%
Plagioclase (An>50)	5%
Augite	1%
Epidote	1%
Chlorite	trace
Secondary Minerals:	
Quartz	25%
Actinolite	10%
Opaque	1%
Epidote	trace
Chlorite	trace
Clinozoisite	trace
Illite	trace