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SITE INSPECTION AT KLEMS HILL AREA, EFATE

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Brief Summary

On the 25th of May 2022, the Geology and Mines Unit team (GMU) conducted a site inspection at Klems Hill area, on the North West part of Efate. The assessment was undertaken following a request from the Department of Climate Change regarding the geotechnical formation of their area of interest .See map below.



Figure 1: Location map of study area (in red)

This brief report will outline the findings of the assessment.

Brief Geology of Efate

The following geological description is extracted from the Regional Report of the New Hebrides Condominium Geological Survey (Ash, 1978):

“Efate is roughly circular in outline, with prominent embayment in the southwest caused by subsidence along mainly northeasterly-trending normal faults. The island was built up by two major phases of volcanic activity followed by late but very extensive reef limestone development.

The oldest rocks belong to the Efate Pumice Formation of central Efate, a Plio-Pleistocene series of submarine tuffs and breccias unique in the New Hebrides on account of their highly differentiated potash-rich rhyodacitic and rhyolitic composition. These are overlain in

north Efate by the Pleistocene Basalt Volcanoes Formation comprising submarine brecciate lava flows of olivine-basalt composition.

Overlying these two older formations is a really extensive series of limestone terraces, including the present-day fringing reef, which makes up the Late Pleistocene to Recent Reef Limestone Formation.

Postdating the Older raised reef of this formation in the Port Havannah area is a small pocket of superficial tuffs. These subaerial deposits were probably derived from Late Pleistocene or Recent basaltic eruptions on the Offshore Islands and are accordingly equated with the Basalt Volcanoes Formation of these islands.

Holocene deposits, apart from the younger reef limestones, encompass loosely consolidated alluvium and beach sands and occasional outcrops of beach rock.”

Material/Equipment Used

1. GPS
2. Field book book/pen
3. Geological map
4. Spade
5. Bush knife
6. Camera

Methodology

Below is a summary of the method/techniques use to carry out the assessment. These methods were used to confirm whether or not the geological features in the current geological map collaborate with the features being observed on site. That is taking into consideration the geological process/activities such as weathering, tectonic, soil leaching, uplifting, erosion, and earthquakes which might alter the geological formation of the area over time.

1. Observed any features such as creeks, swamps, and erosion within the interested area and record them in the field book.
2. A pit was dug to check the soil profile



Figure 2a: Garden Area;



(2b) Vegetation cover at entrance to site



Figure 3a: Pit buried after checking soil profile;



(3b) Pit

Findings

During the site inspection, the following were observed and assessed;

- a. There are no major geological features within the interested site that will require further and detailed assessment.
- b. During heavy rainfall, the area is subjected to flooding as it is within a slope terrain.
- c. The pit revealed that there is a thick topsoil layer before reaching the underlying limestone layer. Furthermore, we observed the occurrence of clay soils in some areas on the surface of the area of interest.
- d. The area of interest is within the Limestone formation.

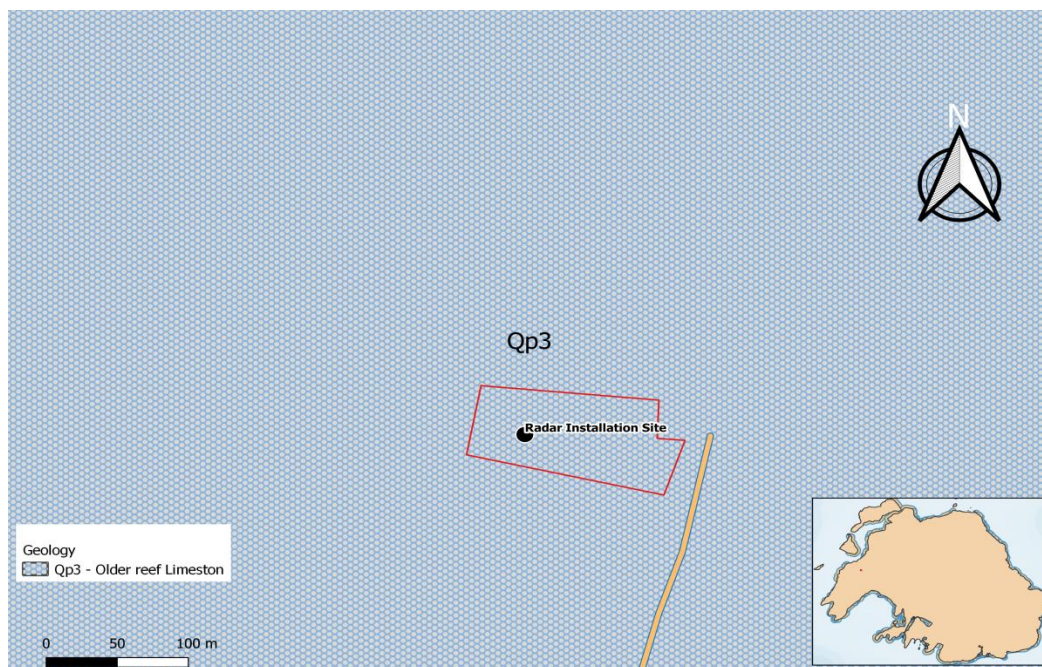


Figure 4: Geological location of study area

Conclusion/Recommendation

To conclude, the proposed area of interest is within the limestone formation and it correlates with the geology map that was use during the assessment. Generally, it can be concluded that the limestone formation at its natural state is considered stable, unless there is any underlying geological process that may affect the stability and strength. However, for detail analysis of the strength and stability of the rock formation within the area of interest, it is recommended that a detail drilling core of a much deeper depth be conducted and laboratory analysis to be undertaken.