

HARDROCK



GEOTECHNICAL  
CONSULTING GEOTECHNICAL ENGINEERS

## Geotechnical Review

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**RE:** Proposed Stockyard Hill Substation at:

**Stockyard Hills Wind Farm.**

**Client:** Wind Power Pty Ltd  
Attention: Mr. Vaughan Hulme  
No. 765 Glenferrie Road  
Hawthorn  
Vic. 3123

**Distribution:** - Wind Power Pty Ltd

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## **Introduction:**

A “desk-top” study was undertaken to provide an initial geotechnical assessment of the proposed substation at the Stockyard Hills Wind Farm site. Relevant geological maps were examined with the purpose of providing feasibility foundation advice for the proposed structures and pavements associated with the substation.

## **Scope of the Study:**

The study is limited to a desk top review only.

The scope of this report is to provide comments on the anticipated foundation systems and pavement options, based on experience in the region and its geology, as interpreted from appropriate maps.

Site investigation work will be required to confirm the assumptions made in this report and for any design purpose.

## **Site Description:**

The proposed substation site is located approximately 10.5km south east of Lismore and approximately 36km north east of Camperdown. The site is currently used for predominantly agricultural purposes. The precise layout of the substation was not known at the time of this geotechnical review.

## **Subsurface Conditions:**

### ***Regional geology***

The area of the proposed substation development lies within the ‘Geological Survey of Victoria’ Colac Sheet (1:250,000). The geology of the substation site identified on the geological map comprises:

- Quaternary “Newer Volcanics” – comprising ‘Olivine basalt’ and ‘Blochy vesicular basalt flows: Stockyard Hill area’ in the central, south and east areas of the site, and is close to;
- the Tertiary “Hanson Plain Sands” – comprising ‘quartz sand, clayey sand, gravel, minor calcareous clay and limonite pisolites; surface may be lateritised’

## **Discussion:**

### ***Anticipated subsurface conditions***

The major geological provinces are common throughout the Melbourne area and south west Victoria.

The engineering properties of the ‘Hanson Plain Sands’ are expected to be similar to the Tertiary ‘Brighton Group’. The engineering properties of the Quaternary “Newer Volcanics”, and Tertiary ‘Brighton Group’ and their associated residual soil profiles are well documented. These geological materials have been widely used and adapted for engineering structures ranging from large multistorey buildings, roads, bridges and other significant civil infrastructure, as well as smaller scale structures which have resulted in a thorough understanding of their properties and characteristics.

The subsurface profile is expected to comprise surface residual silts and sands, underlain by moderately to highly reactive clay soils which grade to variably weathered rock or clayey sand with depth.

The depth to bedrock may be variable and shallow in the case of basalt (“Newer Volcanics”). Numerous discreet floaters and closely packed boulders may be present above the basalt and granitic rock interface.

The subsurface geology will need to be confirmed through direct sampling methods. The regional groundwater regime would be investigated during a detailed geotechnical investigation as necessary.



The geological setting is favourable in terms of interaction between the soil and rock mass and groundwater regime. Unstable underground features (such as caverns) present in limestone 'karst' regions found in NSW are not present in this region.

Foundations will have no impact on underground water bodies, and/or groundwater.

Waste water is expected to be treated on-site using a small on-site treatment plant and similarly will have minimal impact on underground water bodies, and/or groundwater. Larger volumes of waste water may be produced during construction which should be contained in portable storage and removed from site upon project completion.

### ***Foundation options***

It is assumed that loading conditions are relatively light for substation structures and that conventional foundations can be incorporated into the design. It is expected foundation design will need to commensurate a CLASS H where in the 'Newer Volcanics' and a CLASS M where in the 'Hanson Plain Sands' in accordance with AS2870-1996. It is expected the natural topsoils or clay soils should readily accommodate such loads depending on the foundation system adopted.

It is expected that conventional strip and (mass) pad footings and/or slab on ground will provide the most practicable foundation type for the structures.

Piled foundations would provide further alternatives to a conventional pad type footing, however the final foundation design will be based on economics with all alternatives providing a stable foundation.

At this stage, it is expected that no unusual difficulties will be associated with the construction of the substation foundations.

### ***Pavements***

It is expected that access roads will be required for the construction of the substation and future maintenance.

Subgrade properties within the region may range from poor to good. Some form of subgrade improvement may be required in the "Newer Volcanics". This could include in situ lime/cement stabilisation upon which the pavement is constructed or placement of a geo-fabric on the stripped surface upon which the pavement is constructed. This is common practice and foresee no difficulties in pavement construction.

### ***Report notes***

This report contains information for the feasibility stage of the proposed development. Detailed geotechnical site investigation and reporting will be required for design purposes.

During the construction period, land may be disturbed and exposed to erosion. Erosion and sediment runoff can be minimised/controlled by adopting good construction practices referenced below (4), (5) and (6).

Further information regarding geotechnical site investigation reports is referenced below (8).

Should there be any further queries please do not hesitate to contact this office for further advice.

Yours Faithfully,  
**HardRock Geotechnical Pty Ltd**

Harold McIntosh. B.E. (Civil)Hons.  
(Geotechnical Engineer)



## References

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- (7) Geological Survey of Victoria. 1997. 1:250,000 Geological Map Series Queenscliff. Department of Natural Resources and Environment.
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