

INTRAX JOB NUMBER : 61924

25 November 2014

David Norman Design and Construction
PO Box 321
MOUNT MARTHA VICTORIA 3934

Dear Mr Norman

RE: Peer Review of Civiltest Pty Ltd Landslide Stability Assessment (Report No:1140220A dated 15 September 2014)

– 14-16 View Point Road McCrae

As required by the Mornington Peninsula Shires Planning Scheme and the Erosion Management Overlay 1 (EMO1) a peer review is required for all landslide risk assessments carried out in the area defined under the planning scheme. As such this letter provides a review of the following documents.

- ***The proposed drawings as submitted by the client***
 - ***Viewpoint TP Sheets 1 to 3, Client J & P D'Helin, No 14-16 View Point Road McCrae. Dated Feb 2013***
- ***Civiltest Report Pty Ltd – Report Number 1140220A Land Stability Assessment – 14-16 View Point Road McCrae – Dated 15 September 2014***

David Norman Design Drawings – Discussion

1. The proposed development is located at the base of the slope below the line of the current development. It is proposed to demolish the existing development.
2. The proposed development incorporate a number of cuts into the slope to accommodate the three level structure.

Civiltest Report – 1140220A

- a. The Civiltest report is carried out for David Norman Design & Construction 'the client'
- b. The field work was carried out on the 24 March 2014. Note the current report was amended from the original report on 19 May 2014 (refer note on page 20).
- c. The geology is defined from Geovic as Quaternary Aeolian sediments overlying Devonian aged Granodiorite and Granite.
- d. The site conditions are described in section 4. The slopes on site have been measured from 46deg over the steepest section of the site to 26 deg towards Penny Lane.
 - a. Sections through the site record very steep slopes
 - b. Leaning trees are described which have been exacerbated by excavations for the access steps, road and existing dwellings
 - c. No visible defects were noted in the existing building

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e. Site Investigation

- a. Seven boreholes were excavated in total.
- b. BH1 indicates a depth of 15metres of soil
- c. BH2,3 and 4 indicate soil overlying weathered GRANITE at a depth of 2.5m
- d. BH5 was located in the mid slope section of the site and indicates soil to a depth of 1500mm
- e. BH6 and 7 refused to hand auger on GRAVELS (Note no comment is made on the type of GRAVELS)
 - i. *Intrax comment: the depth of soil located at the top of the slope is not consistent with the boreholes found at the base. Typical granite profiles whilst deeply weathered are generally found nearer to the surface than that reported in the Civiltest BH1.*

f. Groundwater was not encountered.

g. Laboratory test on the site materials indicate low moisture contents and typical clayey SAND and sandy CLAY materials.

h. Civiltest presents one slope stability model through Section A-A' on site.

- i. *Note that this section represent the absolute worst case across the site. Shallower slopes are recorded on the western and eastern boundaries parallel to the site*
- a. The model assumes the soil profile from Borehole 1 and indicates the slope has an FOS less the 1.0 the full length of the slope approximately 2.0 to the 3.0 metres deep. The model assumes a circular failure.
 - i. *This model is difficult to believe as the modelling indicates the slopes should have failed to a significant depth. There is no historical evidence that supports this type of failure on the Granite Hillsides of Arthurs Seat. Intrax does not consider that model is a true representation of the site conditions and therefore do not support some of the further assumptions made in models 6.2, and 6.3. It is Intrax's opinion that the modelling does not represent the failure mechanism correctly and therefore cannot correctly model protective works as modelled in Section 6.4.*
 - ii. *Civiltest should review this modelling – and ascertain whether it is relevant to the failure mechanism as discussed in Section 7*

i. Landslide Risk Assessment

- a. The hazards identified provide a reasonable assessment of the potential landslide events for the site however they broadly describe separate types of landslide events.
 - i. *Civiltest describe two hazards*
 - a) *a potential shallow rotational/translational Earth/Debris SLIDE/FLOW within the upper SAND - **This is a contradiction. Does the author mean: active translational earth SLIDE (creep)?***
 - b) *A potential earth debris SLIDE or FLOW. **Given the trigger would be prolonged wet weather then the hazard is more likely to be a FLOW due to the granular nature of the soil (and a slide is covered in (a))***
 - ii. *The frequency analysis is not justified. The author has acknowledged that creep is currently evident (in cuts and retaining walls) therefore the likelihood of this event almost certain. If the author considers an earth*

- debris FLOW then several of the these have occurred in the McCrae area in the last 100 years – so again the event is almost certain.*
- iii. *If on the other hand the author pursues that the hazards are earth slides then the likelihood is reduced as these have not been recorded in the area nor is there any evidence of such landslides in the area apart from a FILL embankment in Foord Lane.*
 - iv. *The Consequences are also not justified and are poorly explained.*
 - b. The risk assessment to property indicates a HIGH RISK rating for property and the risk values determined are considered unacceptable without treatment under the AGS guidelines.
 - c. Risk to Life again is not explained.
 - i. The likelihoods $P_{(H)}$ are ill defined refer a)i above.
 - ii. $P_{(S;H)}$ for Hazard B should be 1.0 because if the hazard described it would impact entire house which also indicate that the person within the house would be buried and therefore $V_{(D;T)}$ would be 1.0 also.
 - iii. The risk to life then would be not acceptable
 - iv. *Intrax considers that the these events should be reviewed against what has been recommended to provide justification for the assessment. Civiltest need to confirm and justify the hazards described.*
 - d. Risk Management and treatment
 - i. Civiltest should review the above risk assessment against the risk management section of the report to provide justification of the reduced likelihood of the events occurring.
 - ii. Dot point three “the slope appears stable”.
 - a) All the information to date in the report contradicts this – there is evidence of soil creep, retaining walls and garden sleepers are tilted. Modelling has FOS 0.8
 - iii. The justification for the requirement of deep foundation is not clear, again as the events described and the information in the report does not indicate the structure is at risk once retaining walls are constructed.
 - iv. A number of clear management and treatment options are given however these are not carried through in the recommendations (ie how will the client construct or install 5.0m soil nails on the upper slope without impacting on the current stability of the slope.
 - v. Final dot point. This item is incorporated to reduce erosion. This is the first mention of erosion! Do some of the landslide hazards identified correlate better with erosion or landslide behavior?

j. Recommendations

a. General comments provided are

- i. How are the retaining walls to be constructed so as not to create local instability?
- ii. How is the retaining wall drainage system to be installed?
- iii. Can the cuts be excavated vertically?
- iv. How are the soil nails to be installed? Is there a safe work procedure for this to ensure that ground conditions are not further destabilized?

k. The report is signed by Mr Jinke Yu, reviewed by Patrick Oai and dated 15 September 2014.

Conclusions :

Intrax finds that the Land Stability Assessment by Civiltest is lacking the required information to adequately conclude that the landslide risk have been addressed in its current format. Civiltest should review the comments given above and if necessary provide justification for the information presented in Report 1140220A or amend the current report accordingly.

Further it is recommended that Civiltest review the landslide hazards and further define these events. The recommended soil nail approach in granular material may not be as effective as some alternative solutions. Civiltest could consider alternatives such as catch fences or similar to slow or reduce the impact that a FLOW may have on the structure. IN addition Civiltest should also undertake to determine the likely volume of such flows and or slides as the recorded events in this area are generally less than 5m³.

Should a further review be required this can be facilitated on hourly rate basis.

Please do not hesitate to contact me directly on **Irrelevant / Sensitive** if
you have any questions or queries regarding this or any other matter.

Kindest Regards,

Irrelevant / Sensitive

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CC: Mr Jinke Yu **Irrelevant / Sensitive**
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