

Earthworks Assessment on Resource Consent Application

2 Dec 2020

Service Request No: 471670

Site Address: **26 Donald St**

Introduction:

This proposal is for a new retirement village at 26 Donald St with associated earthworks.

Legislative Requirements (i.e. District Plan / Standards / RMA):

106 Consent authority may refuse subdivision consent in certain circumstances
(1) A consent authority may refuse to grant a subdivision consent, or may grant a subdivision consent subject to conditions, if it considers that—
(a) there is a significant risk from natural hazards;...

RMA 1991	Applicable
Section 106 – Right of Refusal Subdivision Consent	No

District Plan 30.1.1 Earthworks in the:

- (i) Residential Area (except the Urban Coastal Edge shown on Map 62 and Map 63;
 - (ii) Centres and Business Areas (except the Churton Park Concept Area as shown in Appendix 1 to this chapter);
 - (iii) Institutional Precincts;
 - (iv) Rural Area (excluding the Ridgelines and Hilltops Overlay); and
 - (v) Open Space A and C Areas;
- are Permitted Activities provided that they comply with the following conditions:

30.1.1.1(b)	Exceeds
(i) The cut height or fill depth does not exceed 2.5m measured vertically; and	Cut up to 4m Fill up to 4.5m
(ii) The cut or fill is retained by a building or structure authorised by a building consent (which must be obtained prior to any earthworks commencing); and	Complies
(iii) The area to be cut and/or filled does not exceed 250m ²	~26,000m ²
30.1.1.2	
The cut or fill is no closer than the following (measured on a horizontal plane) to a river (including streams), a wetland or the coastal marine area:	
<ul style="list-style-type: none">• Rural Area 20m• Centres and Business Areas adjoining the Porirua Stream 10m• All other areas 5m	Complies
30.1.1.3	
The cut or fill is not in a Hazard (Flooding) Area;	Complies
30.1.1.4	
There is no visible evidence of settled dust beyond the boundaries of the site.	Can Comply
30.1.1.5	
i) The cut or fill is no closer than 12m to the closest visible edge of the foundation of a high voltage transmission line support structure;	Complies
(ii) earthworks do not reduce the clearance distance from conductor to ground to less than 10m within 12m of the centreline of an electricity transmission line (as shown on the Planning Maps).	Complies

Assessment:

Geotechnical Assessment

A geotechnical assessment has been supplied as part of the application. The geotechnical report was developed by Tonkin and Taylor Ltd (dated August 2020, reference 30309.v4). Further information was also supplied in the form of a geotechnical letter by Tonkin and Taylor Ltd (dated 13 Nov 2020) to satisfy geotechnical questions raised by Council’s peer reviewer ENGE0 Ltd. ENGE0 Ltd (letter dated 1 Dec 2020, Ref: 17766.000.000_02) confirmed that they are comfortable with the geotechnical approach by Tonkin and Taylor Ltd at this stage of the geotechnical assessments process.

The reports by Tonkin and Taylor identified that the site contains a mixture of sedimentary units between 5 and 29m thick, overlying weathered greywacke basement rock. The risk of instability is considered to be focused around the larger cuts during the construction phase and the potential for settlement issues associated with the weaker sedimentary units.

The initial geotechnical report by Tonkin and Taylor (dated August 2020) analysed the geotechnical matters with respect to the resource consent process as shown in figure 1 below:

Planning matters considered	Geotechnical assessment findings
<ul style="list-style-type: none">• Natural hazards that may affect the Proposed Village and adjacent land, being earthquake shaking and associated ground liquefaction/lateral spreading and land instability/subsidence• The potential for earthworks, including excavation and retention associated with the Proposed Village, to affect the stability and/or cause ground deformation of land• The potential for works to affect the groundwater regime at adjacent sites and cause ground deformation or	<ul style="list-style-type: none">• Specific design consideration is not required for Seismic return periods of less than 100 years. Post-shaking settlement and some reduction in ground bearing capacity, lateral support and stiffness may occur somewhere between a 100 to 500 return period event. The Proposed Village development is not assessed to exacerbate seismic hazard effects at adjacent sites.• The proposed excavations will be assessed and supported with suitably designed and constructed retaining walls. No adverse land stability impacts are expected on or around the Site.• The potential cumulative settlement due to fill and/or structural loads, excavations and groundwater drawdown are expected to result in less than 10 mm of settlement at any boundary of the Site and negligible settlement at the location of any neighbouring structure. The Proposed Village is not expected to have any adverse ground deformation and settlement effects on adjacent properties.

Figure 1 – Tonkin and Taylor Summary of key planning matters and findings with respect to earthworks.

Ultimately the development is supported by both the Tonkin and Taylor assessments and the ENGE0 Ltd review. No significant geotechnical issues were identified that are considered to require more in-depth investigations at this stage.

The position of the larger cuts may require temporary retaining particularly around existing buildings and the public roads along the north-eastern boundary. As such a Construction Management Plan detailing the staging and stability controls of the earthworks is to be developed and submitted to council prior to earthworks commencing on site.

Monitoring of the earthworks is to be undertaken by a Chartered Professional Engineer. This will allow for assessment of the cuts stability and, if required, remediation measures to be implemented in a timely manner.

The geotechnical reports also considered risks associated with potential settlement effects due to watertable drawdown, reduced lateral confinement and loading by fill or structures. Of which the risk of settlement beyond the site boundaries was considered to be low.

Therefore, provided typical industry controls are undertaken which are in line with the conditions of consent below and the recommendations from both geotechnical reports are adhered to; the application is supported from an earthworks stability viewpoint.

Erosion, Dust and Sediment Controls

Typically, the controls required to minimise the risk posed by erosion, sediment and dust loss from the site are documented in an Earthworks and Sediment Management Plan (ESMP).

The area of earthworks exceeds the threshold under rule 30.1.1.1, which is a general indication that there may be adverse effects from the earthworks activity during construction. As such an ESMP is considered to be required with an initial draft developed by Woods (reference 042-RCT_401_Co-180, Dated 17 august 2020). The controls within the ESMP are general acceptable but further detail is expected to be added once the earthworks contractor has been appointed. Key to this further detail is staging of the earthworks to minimise the potential for erosion and sediment loss from the site.

As such a final ESMP is required as part of the recommended conditions below.

Visual Amenity

The proposed area of earthworks and cut and fill heights exceed the of earthworks threshold under rule 30.2.1.1. Therefore, an assessment on the visual impact is triggered.

Transport Management Plan (TMP)

The volume of excess earthworks material exceeds the threshold under rule 30.2.1.1. Therefore, advice from a transport engineer is expected to be required.

Conclusion:

The proposal is supported from an earthworks point of view, as it is expected that standard industry methodologies will be implemented to minimise any potential earthworks effects.

The following conditions/advice notes are suggested to ensure that standard earthwork methodologies are implemented:

Recommended Conditions

Chartered Professional Engineer

- 1) A Chartered Professional Engineer (CPEng) must be engaged by the consent holder for the detailed design and construction phases of the project.
- 2) The name and the contact details of the CPEng must be provided to the Council's Compliance Monitoring Officer by the Consent Holder, at the time the person is appointed.
- 3) The CPEng will monitor the construction of the temporary and permanent earthworks, retaining structures and drainage. The CPEng will advise on the best methods to ensure:
 - the stability of the site and surrounding land
 - the work does not cause damage, or have the potential to cause damage, to neighbouring land or buildings, including legal road
 - the design and construction of the temporary and permanent earthworks, retaining structures and drainage, are consistent with geotechnical reports undertaken by Tonkin and Taylor Ltd (dated August 2020, reference 30309.v4).

The Consent Holder must follow all the advice of the CPEng in a timely manner.

Construction Management Plan (CMP)

- 4) A Construction Management Plan (CMP) must be developed by the Consent Holder, with input from both the CPEng and submitted to the Council's Compliance Monitoring Officer for certification, at least 10 working days prior to any work commencing on site.

The CMP must be consistent with the finding and recommendations of the geotechnical assessment by Tonkin and Taylor Ltd (dated August 2020, reference 30309.v4) and will include, but is not limited to, the following:

- Measures to ensure earthworks and retaining structures are constructed incrementally to maintain stability of all the slopes
- The maximum height increment of earthworks before the structural support to that earthwork is put in place.
- Other measures to ensure earthworks and retaining structures remain stable, including measures to limit the exposure of unretained earthworks at any one time
- Details of the staging of work
- Roles and responsibilities of key site personnel
- A contact (mobile) telephone number(s) for the on-site manager, where contact can be made 24 hours a day / 7 days a week
- A communication and complaints procedure for adjoining property owners/occupiers and the public.

The CMP must be peer reviewed by the CPEng prior to being submitted to Council, to ensure that the methodology is in accordance with the geotechnical assessment, by Tonkin and Taylor Ltd (dated August 2020, reference 30309.v4) and current engineering best practice. The review must be provided to the Council's Compliance Monitoring Officer when the final CMP is filed for certification.

- 5) No work may commence on site until the CMP is certified. The earthworks and retaining work must be carried out in accordance with the certified CMP.
- 6) Any amendments to the CMP (once work starts) must be approved by:
 - The CPEng, andCertified by the Council's Compliance Monitoring Officer.

Earthworks and Sediment Management Plan (ESMP)

- 7) The Earthworks and Sediment Management Plan (ESMP) submitted with the application has been supported in principle. The ESMP was by Woods (reference 042-RCT_401_CO-180, Dated 17 august 2020). It is expected that this will form the basis of the final ESMP, which must be submitted to the Council's Monitoring Officer for certification, at least 10 working days prior to any work commencing on site.

The following additional measures must be implemented:

- An illustrated plan that records the key features of the ESMP
- Measures to limit the area of earthworks exposed to the weather at any one time (sources of dust and sediment)
- Measures to ensure temporary excavations remain stable. Slips or failures can significantly increase dust and sediment
- Stabilisation of the site entrance(s) to minimise the tracking of earth by vehicles onto the adjoining roads
- Detail of the use of diversion bunds/cut-off drains, as required, to minimise stormwater entering the site and discharging onto earthworks areas where it can pick up sediment and not discharged on to sloping ground
- Details of how, throughout construction, all stormwater from roofs, paved and impermeable surfaces will be collected and piped to prevent it discharging onto earthworks areas where it can pick up sediment and not discharged on to sloping ground
- The type and location of silt fences to control water-borne sediment
- Methods for protecting stormwater sumps from the infiltration of water-borne sediment
- Measures to ensure that the discharge of dust created by earthworks, construction and transport activities are suitably controlled to minimise dust hazard or nuisance

- Covering of soil or other material that is stockpiled on the site or transported to, or from, the site, to prevent dust nuisance or erosion by rain and stormwater (creating water-borne sediment)
- The methods for managing and monitoring the ESMP controls
- Nomination of a site person responsible for the implementation and administration of the ESMP.

The ESMP must be peer reviewed by the CPEng prior to being submitted to Council, to ensure that the methodology is in accordance with engineering best practice. The review must be provided to the Council's Compliance Monitoring Officer when the final ESMP is filed for certification.

- 8) No work may commence on site until the ESMP is certified by the Council's Compliance Monitoring Officer. The earthworks and associated work must be carried out in accordance with the certified ESMP.
- 9) Any amendments to the ESMP once work starts must be approved by the following:
 - The CPEng, and
Certified by the Council's Compliance Monitoring Officer.
- 10) The erosion, dust and sediment control measures put in place must not be removed until the site is remediated to the satisfaction of the Council's Compliance Monitoring Officer. 'Remediated' means the ground surface of the areas of earthworks have been stabilised (no longer producing dust or water-borne sediment), and any problems with erosion, dust or sediment that occur during the work have been remedied.

Note:

If necessary, the Council's Compliance Monitoring Officer may require changes to the implementation of the ESMP, to address any problem that occurs during the work or before the ground surface is stabilised.

Producer Statements

- 11) A construction review statement must be supplied by a suitably experienced Chartered Professional Engineer (CPEng) to the Council's Compliance Monitoring Officer within one month of the earthworks being completed. The document should:
 - Provide details of any changes that were necessary to address geotechnical or engineering problems encountered during the earthworks;
 - A certification upon completion of land development and subdivision, Schedule 2A of NZS4404:2010
- 12) A copy of the producer statement 'PS4 – Construction Review' and its accompanying documents for structures/buildings required for the stabilisation of earthworks and, prepared for the associated building consent process, must be provided to the Council's Compliance Monitoring Officer within one month of the structures/buildings being completed.

Grassing of Earthworks

- 13) All exposed areas of earthworks, unless otherwise built on, are to be grassed or re-vegetated within 1 month of completing each stage of the earthworks, to a level of establishment satisfactory to Council's Compliance Monitoring Officer.

The Council's Compliance Monitoring Officer may agree to a longer period than 1 month, if appropriate, and will approve it in writing.

General Earthworks Conditions

- 14) Run-off must be controlled to prevent muddy water flowing, or earth slipping, onto neighbouring properties or the legal road. Sediment, earth or debris must not fall or collect on land beyond the site or enter the Council's stormwater system. Any material that falls on land beyond the site during work or transport must be cleaned up immediately (with the landowner's permission on land that isn't public road). The material must not be swept or washed into street channels or stormwater inlets, or dumped on the side of the road.

Note: As a minimum, 100 mm clarity is required to allow water to be discharged offsite. If clarity is less than 100mm then the water is considered to be muddy and must be captured and treated on site.

- 15) Dust created by earthworks, transport and construction activities must be controlled to minimise nuisance and hazard. The controls must be implemented for the duration of the site works and continue until the site stops producing dust.

Author:

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