

STAGE 3 - SECTION 32

CHAPTER 8

SUBDIVISION, DEVELOPMENT AND EARTHWORKS

TECH REPORT

## Memo

To: Andrew Long, Senior Planner  
City Plan Team, Strategy and Planning – City Planning Unit

From: Yvonne McDonald, Subdivision Engineering Officer  
Engineering Services Team, Specialist Service Department, RD – Building Operations

Date: 13 March 2015

Re: District Plan Review – Earthworks Rules

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### Background on the current District Plan and Banks Peninsula Plan requirements

The District Plan rules for earthworks had been set to the extent that any earth related work within the district, can be, to a certain degree, controlled by a couple of physical parameters to assure that the intended works would not have any negative effects on the existing environment (within the property area, in relation to the neighbouring properties or in respect to the greater environment).

The threshold for cut, fill and volume of displaced soil had been tailored to each zone (living, rural, business, open space, etc). The relationship between cut / volume and property area was probably based on the assessment of potential effects in respect to the average (standard) property size area that could be associated to each residential zone / activity (be that within the urbanised area or over the rural land within the District).

On the flat, the current living zone had been associated with a volume of less than 150 m<sup>3</sup> / Ha. That, for an average size lot area (600 m<sup>2</sup> to 800 m<sup>2</sup>), equated to a maximum allowed volume of around 9 m<sup>3</sup> to 12 m<sup>3</sup>. If combined with the allowed size of the cut or fill, the potential affected area was in the region of 18 m<sup>2</sup> to 24m<sup>2</sup>. In other words, simple earth works requiring disturbance of the soil e.g. cut to install a medium to large swimming pool, fill to create raised or stepped gardens (on the hill side), etc were potentially not affected by the current thresholds.

For rural areas, on the flat, the allowed volume was related to the potential size of that sort of property, usually larger than 2000 m<sup>3</sup>, with most of them being easily measured in hectares. The volume related limit was probably set to allow larger works that may be required by agriculture-related activities within the proximity of existing residential property.

On the hill, the volume related threshold within the City Plan was set to a maximum 10 m<sup>3</sup> / site. The hillside properties have areas no smaller than 650 m<sup>2</sup>, averaging around 750 – 800 m<sup>2</sup>. That translates, for an allowed cut / fill of 0.50 meters, to affected areas no larger than 20 m<sup>2</sup>. Banks Peninsula allowed volumes between 10m<sup>3</sup> and 50m<sup>3</sup> and cut faces between 1.5 and 2.0m. The larger cut faces reduced the affected areas correspondingly. The main reason for setting a maximum threshold per property within hillside areas was the need to protect existing flow-paths and to reduce disturbance of the natural ground. The topsoil and the main subsoil layers are dominated by loess or mixed with loess, a soil that is easily eroded once the thin topsoil is removed.

For rural areas, on the hill, Banks Peninsula Plan had restrictions on cut face and batter heights in addition to the allowed volume of 100m<sup>3</sup> per site. Access tracks, Rural Amenity and Outstanding Natural Landscape areas had additional constraints. These rules were probably set to protect landscape values and land stability whilst facilitating agriculture-related activities.

The cut / fill threshold within Christchurch of 0.50 meters was probably to recognize that, in most of the cases, the proposed work would: require topsoil removal (generally within the limit of 300 to 400 mm thickness); need to allow for fill that did not significantly disturb the current surface water flow paths; modify the acceptable limits in respect to privacy or the recession plan (in the case where a structure will be placed over the new level). Correspondingly, the greater limits within Banks Peninsula were probably to acknowledge the steeper slopes on the Peninsula in addition to the above.

### Engineering consideration of proposed activity standards for earthworks volumes and depths

- Activity standard 1 (Volume), 2 (Depth) and 3 (Steep land)

The objectives and supporting policies summarise the potential issues associated with earthworks. Major engineering risks include land stability, nuisance and stormwater drainage. The following situations have not been considered as they are addressed elsewhere: flood plain or waterway areas, earthquake damaged land areas, earthworks related to subdivision or building consent works.

The volume changes proposed generally reflect the existing volume restrictions in each District Plan. Where the zoning is similar, the volumes have been simplified across the two Plans to be consistent. Rules have also been simplified to apply site related volume restrictions to those zones where the lot areas are consistent and area related volume restrictions to larger sites e.g. rural land. The depth has been increased to 0.6m, which is the approximate average groundwater depth. This is also consistent with the proposed Ecan rule amendments. Detailed rules to address specific situations have been removed and replaced by exemptions e.g. the construction of access tracks in Rural zones.

The disadvantage (cost) of having rules on volumes and depths is that projects will incur the cost of a consent and the related delays whilst this is processed. The rules could also restrict the use of the land in that certain things are controlled.

The benefit warrants these restrictions.

1. Whilst the requiring of a consent incurs a cost, it also forces an engineering assessment of those earthworks. This leads to better planned works including mitigation and control of risks.
2. The rules provide assurance to adjacent landowners that significant earthworks will be controlled, so reducing associated risks to their property. These risks could be immediate or long term.

Greater control through constraints on the volume, depth and work site slope will limit the following risks:

- Changes in overland stormwater flowpaths
- Changes in subsoil drainage paths
- Concentration of runoff
- Work below the water table
- Transport of sediment, from the surface and underground, during the works and over time
- Land movement due to either shallow or deep instability
- Restrictions on the use of land immediately adjacent to the common boundary.
- Loss of privacy due to changes in level adjacent to the boundary

The requiring of a consent for works outside of these rules will ensure the following engineering considerations are addressed:

- keying-in of fill material to prevent the formation of shear plans and promote fill stability
- adequate compaction to reduce slumping, prevent subsoil groundwater movement and promote slope stability
- location of existing subsoil and surface drainage paths to ensure the works don't cause soil erosion or tunnel gullyng or saturate fill materials thereby increasing slip potential
- selection of cut face profiles and surface protection to mitigate potential erosion, to prevent cut face collapse or reduce downstream sedimentation
- location of cut faces sufficiently far away from structures that their stability is not compromised

- control of groundwater

### Engineering consideration of the other proposed activity standards

#### - Activity standards 4-8

The effects of earthquake damage to land and the creation of the higher technical category zones has lead to a greater requirement for land treatment to allow residential building. This treatment frequently requires greater compactive effort as part of the works. Council has received complaints of damage to properties purportedly due to vibration related to these activities. This standard will ensure the potential for vibration is considered at the planning stage of the work.

Activity standard 5 (Hours of work) ensures earthworks do not create a noise nuisance for adjacent residents. Currently construction noise is controlled through consents and contract documents, not through the City Plan. The costs involved with this standard are minimal as permitted works are minor and can easily be scheduled around the restrictions.

Activity standard 6 (Transmission line separations) reduces the health and safety risks associated with work under electricity transmission lines through requiring consent. Whilst there will be additional costs in obtaining this consent, the benefits of reducing the health and safety risks on site and removing the potential for disruptions to the electricity supply easily outweigh this.

Activity standard 7 (Erosion and Sediment Control) ensures that all earthworks include measures to control erosion and sediment discharge. This will help mitigate issues Council is experiencing with non-compliant discharges from our stormwater system. Whilst there are costs on the landowner through providing these measures, the benefit is City wide in an improved environmental outcome, reduced maintenance of the stormwater system and reduced compliance monitoring.

Activity standard 8 (Fill materials) ensures that fill materials used can be adequately and densely compacted, will not settle and will not discharge pollutants to the air or groundwater. Compliant fill materials are easier to work, will not cause the long term issues detailed above and do not cause environmental degradation thorough pollutant discharge.

### Engineering consideration of the proposed exemptions

The proposed exemptions 1 (tree or post holes), 7 (test pits) and 8 (interment) ensure that the application of the rules is appropriate to the scale and effect of the activity.

The exemptions 2 (wells) and 4 (building) allow for where the earthworks are covered by other consents and prevents double handling.

The exemptions 3 (drains), 6 (ponds), 9 (cultivation) and 11 (rural activities) allow routine, ongoing, low risk activities, typically in rural areas.

The exemptions 5 (hazard mitigation), 6 (utilities) and 10 (sewage ponds) allow ongoing maintenance related activities typically controlled by existing processes.

Most of these exemptions are existing.

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