

Mike Botting for Paterson Pitts Group – Hearing Stream 15 - Earthworks

1. My full name is Michael James Botting. I hold the position of manager of the Wanaka branch of Patterson Pitts Group.
2. I have a Bachelor of Surveying Degree and am a Registered Professional Surveyor recognised by the New Zealand Institute of Surveyors.
3. I have twenty years of experience as a surveyor, 14 years of which is in the Wanaka area having worked on large land development projects as lead designer for the civil engineering works for the developments of Peninsula Bay and Riverside which total over 500 residential allotments.
4. Although this is a Council hearing, I confirm I have read the Code of Conduct for Expert Witness contained in the Environment Court practice note and I agree to comply with it.
5. My evidence on behalf of Paterson Pitts Group makes recommendations on our submission on Chapter 25 Earthworks, the Stage 1 submissions transferred to Stage 2 and the rebuttal evidence by Council's experts Trent Sunich and Jerome Wyeth.
6. I now support the amended wording of Rules 25.5.12 – 25.5.14 concerning controls to minimize erosion, dust and deposition of material on roads. I also support the change of non-compliance with these rules to Restricted Discretionary.
7. I also support in part the proposed wording changes to Rule 25.5.19 to include an exception for retained earthworks up to 0.5m on or close to the boundary.
8. I do not support the wording of Rule 25.5.19(a)(ii) relating to earthwork cut close to the boundary. I note that the intention of the rule is to permit earthwork cut starting closer to the boundary and sloping down at a suitable gradient that doesn't create stability issues for adjoining properties. I support this intent but bring to Council's attention what I consider an error in the proposed slope distance. I note that the rule and interpretative diagram propose a distance = 1.5 x depth. The expert evidence of Mr Sunich explains the intention is to ensure that a resulting batter slope is no steeper than 1:3 (Refer page 23, paragraph 8.3, of Mr Sunich's evidence). Applying the rule and interpretative diagram a 1m depth of cut x 1.5m is not a slope of 1 vertical to 3 horizontal, it is a slope of 1 vertical to 1.5 horizontal being twice as steep as intended.
9. Attached is a table of common slopes expressed in gradient and slope. Note a gradient describes a direction and steepness of a line and can be expressed in degrees or as a percentage. Slope describes the ratio of vertical change to horizontal change. A gradient of 33.3% is a slope of 1 vertical to 3 horizontal.
10. Attached is an extract from a geotechnical report from GeoSolve, a local geotechnical company. A range of recommended batter slopes are tabled for three classes of materials typically found in the Upper Clutha area. This table is generally applicable to all of our development sites. The table recommends a permanent batter slope of 1 vertical to 3 horizontal for topsoil and uncontrolled fill. I recommend that similar wording is adopted to describe or calculate the resulting maximum permitted batter slope. I propose that Rule 25.5.19(a)(ii) is replaced with the following wording "300mm with a maximum slope batter of 1 vertical to 3 horizontal". A similar change to interpretative diagram 25.4 would also be required.

11. I do not support wording of Rule 25.5.19(a)(i) relating to fill. The formation of earthwork fill close to a boundary should be subject to a similar slope requirement as that of earthwork cut. Therefore propose the following replacement wording "300mm with a maximum slope batter of 1 vertical to 3 horizontal" this rule and also interpretative diagram 25.5.

12. I do not support the wording of Rule 25.5.19(b)(ii) relating to retaining walls that have building consent being exempt. This rule creates the potential for retaining walls up to 2m high to be built close to or on the boundary without needing to obtain resource consent and therefore does not require an adjoining owner to give their affected party approval. Note that retaining walls under 2m in height are exempt from being classed as a building and are not subject to the continuous building length or setback provisions. Therefore I seek deletion of this rule or amendment. Any retaining walls greater than 500mm on or near the boundary should require resource consent irrespective of the requirement for building consent approval.

Table of Common Gradients & Slopes

Gradient Degrees	Slope 1v :1h	Gradient Percent%
0.28°	1:200	0.5%
0.57°	1:100	1.0%
1.15°	1:50	2.0%
5.71°	1:10	10%
6°	1:9.51	10.5%
11.3°	1:5	20%
14.0°	1:4	25%
18.41°	1:3	33.3%
26.6°	1:2	50%
33°	1:1.5	66.6%
45°	1:1	100%

5.4.1 Cut Slopes in Soil Materials

Table 5.2 summarises the recommended batter angles for temporary and permanent slopes up to 6.5 m high, which are formed in the soil materials identified at the site.

Table 5.2 Recommended maximum batter angles for cut slopes up to 6.5 m high in site soils.

Material Type	Recommended Maximum Batter Angles for Temporary Cut Slopes Formed in Soil (horizontal to vertical)		Recommended Maximum Batter Angles for Permanent Cut Slopes Formed in Soil – dry ground only (horizontal to vertical)
	Dry Ground	Wet Ground	
Topsoil and Uncontrolled Fill	2H: 1V	3H: 1V	3H: 1V
Loess/Colluvium, Aeolian Sand and Pond Sediment	1.5H: 1V	2.5H: 1V	2.5H: 1V
Glacial Till	1H: 1V	2H: 1V	2H: 1V

The temporary batter slopes in wet soils are provisional only and should be inspected on a case by case basis.

5.5 Engineered Fill Slopes

All fill should be placed and compacted in accordance with the recommendations of NZS4431: 1989 and Queenstown Lakes District Council Standards. All cut and fill earthworks should be inspected and tested as appropriate during construction and certified by a Chartered Professional Engineer.

All un-retained fill slopes which are less than 6.5 m high should be constructed with a batter slope angle of 2.0H: 1.0V (horizontal to vertical) or flatter and be benched into sloping ground.

Reinforced earth slopes can be considered if batters need to be steeper than 2H:1V.

