APPENDIX A: GUIDELINES FOR MEASUREMENT OF HARD ROCK MASS STRENGTH

Hard rock field description data sheet:

Location:

Sample: Photo: Slope height: Slope length: Waypoint:

Easting: Northing: Elevation: Date: Sheet: of Sketch: Accompany scanline:

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color

1. Light	1. pinkish	1.Pink
2. Dark	2. reddish	2. Red
	3. yellowish	3. Yellow
	4. brownish	4. Brown
	5. olive	5. Olive
	6. greenish	6. Green
	7. bluish	7. Blue
	8. greyish	8. White
		9. Grey
		10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gently inclined (6 - 15)
Moderatley inclined (16 - 30)
Steeply inclined (31 - 60)
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Laminated (2 - 6mm)
Very thin (6 - 20mm)
Thin (20 - 60mm)
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

4) ROCK NAME

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0
point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0
point load = <1
R2 Weak rock: compressive strength = 5.0-20
point load = <1
R3 Medium strong rock: compressive strength = 20-50
point load = 1-2
R4 Strong rock: compressive strength = 50-100
point load = 2-5
R5 Very strong rock: compressive strength = 100-250
point load = 5-10
R6 Extremely strong rock: compressive strength = >250
point load = >10

6) General discont. desc.
Orientation:
Aperture:
Infilling:
Roughness:
Type:
Persistence:

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Texture
1. Crystalline
2. Granular
3. Glassy

Comments

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Seepage (unfilled)
1. Tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (rust staining)
4. damp, no free water
5. occasional drips, not contin
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (lge phenocrysts enclosed in fine grained matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Definition of hard rock field description terms.

Type

0. Fault zone
1. Fault
2. Joint
3. Cleavage
4. Schistocity
5. Shear
6. Fissure
7. Tension crack
8. Foliation
9. Bedding

Persistence

1. Very low persistence	<1m
2. Low persistence	1-3 m
3. Medium persistence	3-10 m
4. High persistence	10-20 m
5. Very high persistence	>20 m

Aperture/width

1. Very tight (<0.1 mm)
2. Tight (0.1-0.25 mm)
3. Partly open (0.25-0.5 mm)
4. Open (0.5-2.5 mm)
5. Moderately wide (2.5-10 mm)
6. Wide (>10 mm)
7. Very wide (1-10 cm)
8. Extremely wide (10-100 cm)
9. Cavernous (>1 m)

Nature of filling

1. Clean
2. Surface staining
3. Non-cohesive
4. Inactive clay or clay matrix
5. Swelling clay or clay matrix
6. Cemented
7. Chlorite, talc or gypsum
8. Other – specify

Compressive strength of infilling (MPa)

S1 Very soft clay	<0.025
S2 Soft clay	0.025-0.05
S3 Firm clay	0.05-0.10
S4 Stiff clay	0.10-0.25
S5 Very stiff clay	0.25-0.50
S6 Hard clay	>0.50
R0 Extremely weak rock	0.25-1.0
R1 Very weak rock	1.0-5.0
R2 Weak rock	5.0-25
R3 Medium strong rock	25-50
R4 Strong rock	50-100
R5 Very strong rock	100-250
R6 Extremely strong rock	>250

Water flow (open)

0. Discontinuity is very tight & dry, water flow along it does not appear possible.
1. The discontinuity is dry with no evidence of water flow.
2. The discontinuity is dry but shows evidence of water flow i.e. rust staining etc.
3. The discontinuity is damp but no free water is present.
4. The discontinuity shows seepage, occasional drops of water, but no continuous flow.
5. The discontinuity shows a continuous flow of water (estimate 1/mm & describe pressure, i.e. low, med, high).

Water flow (filled)

6. The filling materials are heavily consolidated & dry; significant flow appears unlikely due to very low permeability.
7. The filling materials are damp, but no free water is present.
8. The filling materials are wet; occasional drops of water.
9. The filling materials show signs of outwash, continuous flow of water (estimate litres/min).
10. The filling materials are washed Out locally; considerable water flow along out-wash channels (estimate litres/min & describe pressure, i.e. low, med, high).

Termination

0. Neither end visible
1. One end visible
2. Both ends visible

Surface roughness; shape

1. Rough; stepped
2. Smooth; stepped
3. Slickensided; stepped
4. Rough; undulating
5. Smooth; undulating
6. Slickensided; undulating
7. Rough; planar
8. Smooth; planar
9. Slickensided; planar

Weathering

UW. Rock mass shows no loss of strength, discoloration or other effects due to weathering. Maybe slight discolouration on major discontinuity surfaces
SW. Rock mass is not significantly weaker than when unweathered. All the rock material may be discoloured (on joint surfaces too) and may be somewhat weaker externally than in its fresh condition. Some joints may have opened slightly.
MW. The rock mass is significantly weaker than the fresh part of the rock and less than half the rock material is decomposed and /or disintegrated to a soil. Rock material maybe discolored and defect/clast surfaces will have greater discoloration which penetrates slightly into the rock material.
HW. More than half of the rock material is decomposed and/or disintegrated to a soil. Rock material maybe discoloured and defect/clast surfaces will have greater discoloration which penetrates deeply into the rock material.
CW. All rock material is decomposed and/or disintegrated to soil. The original mass structure/fabric is still largely intact.
RS. All rock material is converted to soil. The mass structure and fabric are destroyed.

Block shape

Massive. few joints or very widely spaced
Blocky. approximately equidimensional
Tabular. one dimension considerably smaller than the other two
Columnar. One dimension considerably longer than the other two.
Irregular. Wide variations of block size and shape.
Crushed. Heavily jointed.

Strength

R6.Extremely strong - can only be chipped with a geological hammer.
R5.Very strong - requires many blows of a geological hammer to fracture rock.
R4.Strong - requires more than one blow to fracture rock.
R3.Medium strong - single firm blow of geological hammer will fracture rock. Rock cannot be peeled or scrapped
R2.Weak - shallow indentations made by firm blows with point of geological hammer. Rock can be peeled with difficulty.
R1.Very weak - crumbles under firm blows with points of geological hammer. Can be peeled by a pocket knife.
R0.Extremely weak – Indented by thumb nail.

APPENDIX B: SCANLINE SURVEY OUTLINE

Location:
Sample: Photo: Waypoint:
Easting: Northing: Elevation: Date: Sheet :

Nature and orientation of discontinuities

Joint No.	Distance (m)	Type	Major/ random joint	Dip	Dip Direction (i.e. 297)	Persistence	Termination U/L	Aperture	Nature of infill	Strength of infill	Surface roughness	Water flow	Remarks
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Definition of terms in Appendix A.

APPENDIX C: GUIDELINES FOR MEASUREMENT OF SOFT ROCK MASS STRENGTH

Soft rock field description data sheet (coarse soil):

Location:

Sample: Photo: Slope height: Slope length: Waypoint:

Easting: Northing: Elevation: Date: Sheet: of Sketch: Accompany scanline:

Classification

1) Soil group

1. Coarse
2. Fine
3. Organic

2) Proportions of particle sizes

1. Sand % -
2. Gravel % -
3. Cobbles % -
4. Boulders % -

Major:
Subordinate:
Minor:

3) Max. Particle size (mm)

4) Grading

1. Well graded
2. Poorly graded - uniform
3. Poorly graded - gap

5) Particle shape

1. Rounded
2. Sub-rounded
3. Sub-angular
4. Angular

Equidimensional
Flat &/or Elongated
Irregular

6) Particle weathering & strength

7) Other material

8) Color

1. Light	1. pinkish	1.Pink
2. Dark	2. reddish	2. Red
	3. yellowish	3. Yellow
	4. brownish	4. Brown
	5. olive	5. Olive
	6. greenish	6. Green
	7. bluish	7. Blue
	8. greyish	8. White
		9. Grey
		10. Black

9) Geological information (minerals, parent rock, geological unit)

Undisturbed characteristics

1) Relative density

1. Loosely packed or 'Very loose'
'Loose'
'Medium dense'
'Dense'
5. Tightly packed or 'Very Dense'

Inverted commas indicate no testing to support assigned term.

2) Structure

1. Homogenous
2. Bedded
3. Fissured
4. Polished
5. Slickensided
6. Blocky
7. Lensoidal

3) Moisture condition

1. Dry
2. Moist
3. Wet
4. Saturated

4) Lithology

Additional comments

Soft rock field description data sheet (fine soil):

Location:

Sample: Photo: Slope height: Slope length: Waypoint:

Easting: Northing: Elevation: Date: Sheet: of Sketch: Accompany scanline:

Classification

1) Soil group	2) Proportions of particle sizes	3) Plasticity	4) Color			5) Geological information
		1. High	1. Light	1. pinkish	1.Pink	
1. Coarse	1. Clay % -	2. Low	2. Dark	2. reddish	2. Red	
2. Fine	2. Silt % -			3. yellowish	3. Yellow	
3. Organic	3. Other % -			4. brownish	4. Brown	
				5. olive	5. Olive	
	Major:			6. greenish	6. Green	
	Subordinate:			7. bluish	7. Blue	
	Minor:			8. greyish	8. White	
					9. Grey	
					10. Black	

Undisturbed characteristics

1) Soil strength	2) Structure	3) Moisture condition	4) Granular soil (gravel/sand) Cohesive soil (silt/clay)
1. Very soft	1. Homogenous	1. Dry	
2. Soft	2. Bedded	2. Moist	
3. Firm	3. Fissured	3. Wet	
4. Stiff	4. Polished	4. Saturated	
5. Very stiff	5. Slickensided	**Additional comments**	
6. Hard	6. Blocky		
	7. Lensoidal		

Definition of soft rock field description terms.

Grading

1. Well graded - a good representation of all particle sizes from largest to smallest.
2. Poorly graded (uniformly) - most particles about the same size.

3. Poorly graded (gap) - absence of one or more intermediate sizes within what otherwise would be a well graded material.

Relative density

1. Loosely packed - can be removed from exposures by hand or removed easily by shovel.
2. Tightly packed - required a pick for removal, either as lumps or as disaggregated material.

Very dense, dense, medium dense, loose, and very loose should be written in inverted commas when used without test results.

Structures

1. Homogeneous - the total lack of visible bedding and the same colour and appearance throughout.
2. Bedding - the presence of layers
3. Fissured - breaks along definite planes of fracture with little resistance to fracturing.
4. Polished - fracture planes are polished or glossy.
5. Slickensided - fracture planes are striated.
6. Blocky - cohesive soil that can be broken down into small angular lumps which resist further breakdown.
7. Lensoidal - discontinuous pockets of a soil within a different soil mass.

Moisture condition

1. Dry - looks and feels dry. Runs freely through hands (granular soil); hard, powdery or friable (cohesive soil).
2. Moist - feels cool, darkened in colour. Tends to cohere (granular soil); weakened by moisture but no free water on hands when remoulding (cohesive soil).
3. Wet - feels cool, darkened in colour. Tends to cohere (granular soil); weakened by moisture free water on hands when remoulding (cohesive soil).
4. Saturated - feels cool, darkened in colour and free water is present on the sample.

Plasticity

1. High - can be moulded or deformed over a wide moisture content range, without cracking or showing any tendency to volume change. It also shows no trace of “quick” or dilatant behaviour. Highly plastic clays will become ‘rock hard’ when dry,
2. Low - can be crumbled in the fingers when dry.

Soil Strength

1. Very soft - easily exudes between fingers.
2. Soft easily - indented by fingers.
3. Firm - indented by strong finger pressure and can be indented by thumb pressure.
4. Stiff - cannot be indented by thumb pressure.
5. Very stiff - can be indented by thumb nail.
6. Hard - difficult to indent by thumb nail.

APPENDIX D: METHOD FOR CALCULATING UNCORRECTED AND CORRECTED POINT LOAD STRENGTH

Methodology after Franklin (1985).

The uncorrected point load strength, I_s, is given by:

$$P/D_e^2$$

where: D_e is the "equivalent core diameter", given by:

$$D = 4A/\pi \text{ for the cut block test,}$$

and

$A = WD$ = minimum cross sectional area of a plane through the platen contact points

I_s varies with D_e, so a size correction must be applied to obtain a unique point load strength value for the rock sample.

The corrected point load strength index is $I_{s(50)}$ is defined as the value of that would have been by a diametral test with D = 50 mm. This involves a correction factor, F, determined from:

$$F = D_e/50)^{0.45}$$

This correction factor was then multiplied with the load at failure (P) and the equivalent core diameter:

$$I_{s(50)} = F\ (P/D_e^2)$$

APPENDIX E: METHOD FOR CALCULATING THE MAGNITUDE OF NORMAL STRESS FOR DIRECT SHEAR TESTS

Methodology after Selby (1993).

The magnitude of the normal stress is calculated as follows:

$$\sigma_n = \gamma z$$

where: σ_n = normal stress (N m^{-2} or Pa);
γ = unit weight of soil at field moisture (N m^{-3}); and
Z = depth to shear plane (m).

The normal stress must be converted to a normal force by:

$$\text{normal force} = \gamma z.A$$

where: A = cross-sectional area of sample (m^2).

The mass required to produce this force is given by:

$$\text{mass} = \frac{\text{normal force}}{\text{gravitational acceleration}} = \frac{\gamma z.A}{g}$$

This mass is equivalent to the *in situ* overburden stress for the material in question. Several samples must be tested, each at a different normal stress. Ideally these normal stresses should bracket the one calculated above.

APPENDIX F: ROCK MASS DESCRIPTIONS OF HARD AND SOFT ROCKS

Hard rocks

Rock mass field description data sheet: 20_03_04

Location: Summit 4wd track, right at fork, by rock roundabout at end of track. Hydrothermally altered? andesite similar to that of waypt 40 20 m prior.

Sample: 20_03_07 Photo: 20_03_07 - 08; merge 20_03_05 - 06 Slope height: 5m Slope length: 10m Waypoint: same as waypoint 4

Easting:2837944 Northing: 6337078 Elevation: 773m Date: 20/03/06 Sheet:1 of 1 Sketch: no Accompany scanline: 20_03_01

1) Weathering	2) Color			3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	Altered andesite
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gently inclined (6 - 15)	Laminated (2 - 6mm)	
3. Moderately weathered		3. yellowish	3. Yellow	Moderately inclined (16 - 45)	Very thin (6mm - 20mm)	5) Compressive Strength (Mpa)
4. Highly weathered		4. brownish	4. Brown	Steeply inclined (46 - 60)	Thin (20 - 60mm)	R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R2 Weak rock: compressive strength = 5.0-20 point load = <1
6) General discont. desc.		7. bluish	7. Blue	**3c) Grain size**	Thick (0.6 - 2m)	R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
Orientation: 299/60; 250/75; 166/40		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R4 Strong rock: compressive strength = 50-100 point load = 2-5
Aperture: 6			9. Grey	2. coarse (2-60 mm)	**3d) Fabric**	R5 Very strong rock: compressive strength = 100-250 point load = 5-10
Infilling: Soil, scoriaceous gravel, loose blocks, talus			10. Black	3. medium (60μ to 2mm)	1. Fine fabric (< 25mm)	R6 Extremely strong rock: compressive strength = >250 point load = >10
Roughness: 1	**Number of joint sets**			4. fine (2-60 μ)	2. Coarse fabric (25 - 100mm)	
Type: J	1. Massive, occas random joints			5. very fine (<2 μ)	3. Massive (No fabric observed)	
Persistence: 2	2. One joint set			**Joint spacing**	**Texture**	
Block shape	3. One joint set plus random			1. Extremely close spacing (<20 mm)	1. Crystalline	
1. massive	4. Two joint sets			2. Very close spacing (20-60mm)	2. Granular	
2. blocky	5. Two joint sets plus random			3. Close spacing (60-200mm)	3. Glassy	
3. tabular	6. Three joint sets			4. Moderate spacing (200-600mm)	**Comments**	
4. columnar	7. Three joint sets plus random			5. Wide spacing (600mm-2m)		
5. irregular	8. Four or more joint sets			6. Very wide spacing (2-6m)		
6. crushed	9. Crushed rock, earth-like			7. Extremely wide spacing (>6m)		
Block size	**Seepage (unfilled)**			**Seepage (filled)**		
1. Very large blocks (<1.0 j/m^3)	1. tight/dry, flow not appear possible			1. infill ~~consolidated~~/dry, flow unlikely ~~dt low perm~~		
2. Large blocks (1-3)	2. dry, no evidence of flow			2. infill damp no free water		
3. Medium-sized blocks (3-10)	3. dry, evidence of flow (staining)			3. infill wet, occasional drip		
4. Small blocks (10-30)	4. damp, no free water			4. cont. flow with outwash (l/min)		
5. Very small blocks (>30)	5. seepage/drips, not continuous			5. washed out locally (l/min & pressure)		
	6. contin flow (l/min & pressure)			6. washed out completely (l/min & pressure)		

Igneous rocks	Texture
Grain size	Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)

Not applicable

Not applicable

Outcrop face: 300/80
Grain size: 80%/200%:medium/coarse. .
Schmidt: quite difficult to measure due to rock material shattering. 19, 13, 14, 19, 13, 20, 11, 13, 16, 15, 13, 16, 18, 16, 13, 14, 13, 17, 18, 15.
Discontinuity surface weathering: low

Rock mass field description data sheet: 20_02_02 (point load samples)

Location: Summit 4wd track between second switchback and fork, indurated andesitic outcrop.

Sample: 20_02_02 Photo: 20_02_03, 20_02_04 Slope height: 3.5m Slope length: 5m Waypoint: 12

Easting: 2837755 Northing: 6337062 Elevation: 732m Date: 20/02/06 Sheet: 1 of 1 Sketch: No Accompany scanline: 20_02_02

1) Weathering	2) Color			3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	Indurated andesite
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gently inclined (6 - 15)	Laminated (2 - 6mm)	
3. Moderately weathered		3. yellowish	3. Yellow	Moderately inclined (16 - 45)	Very thin (6mm - 20mm)	5) Compressive Strength (Mpa)
4. Highly weathered		4. brownish	4. Brown	Steeply inclined (46 - 60)	Thin (20 - 60mm)	R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R2 Weak rock: compressive strength = 5.0-20 point load = <1
6) General discont. desc. (refer scanline for further details)		7. bluish	7. Blue	**3c) Grain size**	Thick (0.6 - 2m)	R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
Orientation: 230/70; 120/65; 110/30		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R4 Strong rock: compressive strength = 50-100 point load = 2-5
Aperture: 6			9. Grey	2. coarse (2-60 mm)	**3d) Fabric**	R5 Very strong rock: compressive strength = 100-250 point load = 5-10
Infilling: open, gravel, roots			10. Black	3. medium (60μ to 2mm)	1. Fine fabric (< 25mm)	R6 Extremely strong rock: compressive strength = >250 point load = >10
Roughness: 5	**Number of joint sets**			4. fine (2-60 μ)	2. Coarse fabric (25 - 100mm)	
Type: J	1. Massive, occas random joints			5. very fine (<2 μ)	3. Massive (No fabric observed)	
Persistence: 2	2. One joint set			**Joint spacing**	**Texture**	
Block shape	3. One joint set plus random			1. Extremely close spacing (<20 mm)	1. Crystalline	
1. massive	4. Two joint sets			2. Very close spacing (20-60mm)	2. Granular	
2. blocky	5. Two joint sets plus random			3. Close spacing (60-200mm)	3. Glassy	
3. tabular	6. Three joint sets			4. Moderate spacing (200-600mm)	**Comments**	
4. columnar	7. Three joint sets plus random			5. Wide spacing (600mm-2m)		
5. irregular	8. Four or more joint sets			6. Very wide spacing (2-6m)		
6. crushed	9. Crushed rock, earth-like			7. Extremely wide spacing (>6m)		
Block size	**Seepage (unfilled)**			**Seepage (filled)**		
1. Very large blocks (<1.0 j/m^3)	1. Tight/dry, flow not appear possible			1. infill consolidated/dry, flow unlikely dt low perm		
2. Large blocks (1-3)	2. dry, no evidence of flow			2. infill damp no free water		
3. Medium-sized blocks (3-10)	3. dry, evidence of flow (staining)			3. infill wet, occasional drip		
4. Small blocks (10-30)	4. damp, no free water			4. cont. flow with outwash (l/min)		
5. Very small blocks (>30)	5. Seepage/drips, not continuous			5. washed out locally (l/min & pressure)		
	6. contin flow (l/min & pressure)			6. washed out completely (l/min & pressure)		

Igneous rocks	Texture
Grain size	Porphyritic (Ige phenocrysts enclosed in fine grinaed matrix)
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)

Not applicable

Not applicable

Grain size is moslty 3 (70%) with a little 2 (30%).
Seepage filled maybe damp from recent rain night before.
Colour: no pinkish tinge as seen in some samples.
Shiny fine (1mm) black phenocrysts.
Schmidt hammer results: 24, 40, 30, 39, 36, 41, 48, 36, 30, 26, 41, 43, 30, 41, 36, 26, 34, 41, 46, 34, 28, 42, 40, 42, 36, 32, 43, 44, 45, 36, 43, 45, 38, 27, 48, 37, 32, 44, 50,
Discontinuity surface weathering: low
Outcrop face: 220/70

Rock mass field description data sheet: 26_02_01 (point load samples)

Location: Putauaki rd-Mckee rd intersection, right at first fork (towards water supply), right again, indurated andesitic outcrop. Accessed via mt bike.

Sample: 26_02_01 Photo: 26_02_06 (scoriaceous layer); 05_06_05-07, 08-10 (scanline) Slope height: 10m Slope length: 14m Waypoint: 26

Easting: 2837039 Northing: 6336242 Elevation: 279m Date: 26/02/06 Sheet: 1 of 1 Sketch: No Accompany scanline: 26_02_01

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light
2. Dark
1. pinkish
2. reddish
3. yellowish
4. brownish
5. olive
6. greenish
7. bluish
8. greyish
1.Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Ge
Mo
Ste
Not applicable
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lam
Very
Thin
Not applicable
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc. (refer scanline for further details)
Orientation: 300/85; 230/70; 124/60; distinct random joints
Aperture: 7
Infilling: gravel, sand, roots, open
Roughness: 5/8
Type: J
Persistence: 3

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. Tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. Seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Grain size approximately 50% (3) and 50% (2).
Seepage (filled) damp as moss present.
Schmidt hammer results: 36, 32, 30, 28, 26, 24, 26, 27, 50, 48, 44, 41, 41, 45, 42, 42, 43, 44, 45, 41. Avg = 37.75.
Outcrop face: 300/85
Discontinuity surface weathering: low

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grinaed matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 27_02_01

Location: Summit 4wd track, indurated andesitic outcrop between first and second switchback.

Sample: 27_02_01 Photo: 27_02_01, 02 Slope height: 7m Slope length: 7m Waypoint: 28

Easting: 2838177 Northing: 6336590 Elevation: 467m Date: 27/02/06 Sheet: 1 of 1 Sketch: No Accompany scanline: no

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light
2. Dark
1. pinkish
2. reddish
3. yellowish
4. brownish
5. olive
6. greenish
7. bluish
8. greyish
1.Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Ste
Not applicable
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very t
Thin (
Not applicable
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 234/76; 142/75; 022/70; 100/55
Aperture: max 6, mostly 3, min 1
Infilling: Grit, open, individual grains of parent material
Roughness: 4
Type: J
Persistence: 2 (vegetation ltd)

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. Tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. Seepage/ drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Weathering: rock is strong but the joints are open allowing pieces of rock to easily dislodge.
Colour: pinkish tinge in places.
Shiny small (1mm) black phenocrysts.
Grain size: 80/20 medium/coarse. White feldspathic? phenocrysts coarse.
Joint spacing closer to 600mm.
Discontinuity surface weathering: low
Schmidt hammer: 28, 24, 29, 32, 29, 30, 30, 28, 26, 25, 26, 28, 34, 30, 32, 29, 29, 26, 28, 30. Avg = 28.65.
Outcrop face: 110/80
Seepage (filled) damp due to moss?

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grinaed matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 27_02_02

Location: Summit 4wd track, indurated andesitic outcrop, after waypt 28 between first and second switchback.

Sample: 27_02_02 Photo: 27_02_03, 04 Slope height: 20m Slope length: 7m Waypoint: 29

Easting: 2838209 Northing: 6336630 Elevation: 456m Date: 27/02/06 Sheet: 1 of 1 Sketch: No Accompany scanline: No

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

6) General discont. desc.

Orientation: 074/85; 172/80; 242/5
Aperture: 7 and 8

Infilling: Grit, soil, open.
Roughness: 5
Type: J
Persistence: 3

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

2) Color
1. Light
2. Dark

1. pinkish
2. reddish
3. yellowish
4. brownish
5. olive
6. greenish
7. bluish
8. greyish

1.Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Seepage (unfilled)
1. Tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. Seepage/ drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill ~~consolidated~~/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Stee
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

Not applicable

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (

Not applicable

Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

Comments
Colour: pinkish tinge in places.
Grain size: 60/40 medium/coarse. Coarse phenocrysts are white and feldspathic?
Shiny fine (1mm) black phenocrysts.
Fabric: slaty like, due to weathering? Seen in photos.
Schmidt hammer: 28, 26, 16, 14, 18, 15, 22, 26, 22, 25, 23, 23, 18, 24, 25, 19, 28, 28, 27, 26. Avg = 22.65.
Outcrop face: 091/85
Discontinuity surface weathering: low

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grinaed matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 27_02_03

Location: Summit 4wd track, after 2nd switchback but b4 waypt 12, outcrop of scoriaceous andesite, abundant white hard surface coating, altered source?

Sample: 27_02_03 Photo:27_02_05, 06, 07, 08 Slope height: 15m Slope length: 10m Waypoint:same location as waypoint 2

Easting: 2838019 Northing: 6336815 Elevation: 620m Date: 27/02/06 Sheet: 1 of 1 Sketch: No Accompany scanline: No

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

6) General discont. desc.

Orientation: 028/80; 106/85; 272/55
Aperture: 7

Infilling: clayey residue, gravel and sand, silt , rootlets, open
Roughness: 4
Type: J
Persistence: 4

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

2) Color
1. Light
2. Dark

1. pinkish
2. reddish
3. yellowish
4. brownish
5. olive
6. greenish
7. bluish
8. greyish

1.Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Seepage (unfilled)
1. Tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. Seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Stee
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

Not applicable

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (

Not applicable

Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

4) ROCK NAME
Scoriaceous andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

Comments
Grain size: difficult to tell as very scoriaceous, 15%/85% coarse/medium.
Weathering: scoriaceous texture and clayey buildup suggests weathering, or at least water flow through rock in the case of clayey residue.
Joint spacing: difficult to interpret, @ least two semi-prominent joints 1.5 m apart.
Block size: too scoriaceous to interpret. Perhaps very large or very small.
Seepage (unfilled): clayey buildup is perhaps evidence of water flow.
Schmidt hammer: 10, 11, 18, 13, 13, 17, 20, 20, 17, 16, 16, 19, 16, 13, 14, 15, 18, 17, 22, 16. Avg = 16.5. Difficult to get pure rock surface due to clayey residue but rock appeared weak.
Very scoariaceous rock makes joint determination difficult. Not sure how to categorize these types of rocks - have seen texture like this at waypoint 18.
Strange fine clayey white residue on rock surface is seen throughout the rock on freshly exposed surfaces (photo 27_02_07).
Fresh rock appears brown but the brown is really moss overlaying white residue.
Large white feldspathic? crystals enclosed in fine matrix. Outcrop face: 274/85
Discontinuity surface weathering: moderate

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grinaed matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 27_02_04

Location: Summit 4wd track, semi-indurated andesitic outcrop, after waypoint 29 between first and second switchback.

Sample: 27_02_04 Photo: 06_03_01, 02, 03, 04 Slope height: 20m Slope length: 10m Waypoint: 31

Easting: 2838219 Northing: 6336656 Elevation: 482m Date: 27/02/06 Sheet:1 of 1 Sketch: No Accompany scanline: No

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish, 2. reddish, 3. yellowish, 4. brownish, 5. olive, 6. greenish, 7. bluish, 8. greyish
2. Dark — 1.Pink, 2. Red, 3. Yellow, 4. Brown, 5. Olive, 6. Green, 7. Blue, 8. White, 9. Grey, 10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen… inclined (5 - 15)
Mod… (15 - 30)
Ste… (30 - 60)
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin… (2 - 6mm)
Very … (6 - 20mm)
Thin (… - 60mm)
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

Not applicable

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 092/85; 006/85; 145/15
Aperture: Up to 8 but mostly 5
Infilling: Open, small amount of P.M. grit, moss.
Roughness: 4
Type: J
Persistence: 4

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Texture
1. Crystalline
2. Granular
3. Glassy

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. Tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. Seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Grain size: 50%/50% coarse/medium. White feldspathic? phenocrysts coarse.
Joint spacing: just over 2m.
Discontinuity surface weathering: low
Schmidt hammer: 20, 20, 26, 27, 25, 27, 30, 29, 25, 32, 25, 25, 26, 25, 22, 25, 26, 28, 24, 22. Avg = 20.
Outcrop face: 092/85

Igneous rocks

Grain size
- Aphanitic (minerals not visible to naked eye)
- Phaneritic (minerals visible to naked eye)

Texture
- Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
- Aphyric (no phenocrysts present)
- Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 06_03_02 (Point load samples)

Location: Summit 4wd track, sindurated andesitic outcrop after 2nd switchback, after waypt 32.

Sample: 06_03_03, 03_04_05 (point load) Photo:06_03_08, 09, 10 (outcrop), 11 (closeup) Slope height: 4m Slope length: 12m Waypoint: 34

Easting: 2837801 Northing: 6336881 Elevation: 708m Date: 6/3/06 Sheet: 1of 1 Sketch: No Accompany scanline:No

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish, 2. reddish, 3. yellowish, 4. brownish, 5. olive, 6. greenish, 7. bluish, 8. greyish
2. Dark — 1.Pink, 2. Red, 3. Yellow, 4. Brown, 5. Olive, 6. Green, 7. Blue, 8. White, 9. Grey, 10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen… inclined (5 - 15)
Mod… (15 - 30)
Ste… (30 - 60)
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin… (2 - 6mm)
Very … (6 - 20mm)
Thin (… - 60mm)
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

Not applicable

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 088/40; 242/52.5; 240/55; 330/57.5
Aperture: 7 (3cm)
Infilling: Open, some moss and roots, grit of P.M..
Roughness: 5
Type: J
Persistence: 2 (1-3m)

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Texture
1. Crystalline
2. Granular
3. Glassy

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. Tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. Seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Weathering: fresh where a large block has 'recently' dislodged.
Schmidt hammer: 31, 39, 44, 40, 37, 36, 38, 37, 30, 40, 48, 33, 38, 28, 38, 36, 46, 46, 38, 34. Avg = 37.85.
Joint spacing: 1m.
Almost see indurated jointed rock merge into scoriaceous rock at surface (photo 06_03_11). Weathering??
Outcrop face: 248/85
Discontinuity surface weathering: low
Grain size: 20%/80%: coarse/medium.

Igneous rocks

Grain size
- Aphanitic (minerals not visible to naked eye)
- Phaneritic (minerals visible to naked eye)

Texture
- Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
- Aphyric (no phenocrysts present)
- Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 06_03_03

Location: Summit 4wd track, indurated andesitic outcrop between 2nd switchback and fork, after waypoint 35.

Sample: 06_03_05 Photo: 06_03_12 Slope height: 5m Slope length: 10m Waypoint: 36

Easting: 2837738 Northing: 6337108 Elevation: 749 Date: 6/3/06 Sheet:1 of 1 Sketch: No Accompany scanline: No

1) Weathering	2) Color			3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gen	Lami	Indurated andesite
3. Moderately weathered		3. yellowish	3. Yellow	Mod	Very	5) Compressive Strength (Mpa)
4. Highly weathered		4. brownish	4. Brown	Ste	Thin (	R0 Extremely weak rock: compressive strength = 0.25-1.0
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	point load = <1
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R1 Very weak rock: compressive strength = 1.0-5.0
6) General discont. desc.		7. bluish	7. Blue	3c) Grain size	Thick (0.6 - 2m)	point load = <1
		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R2 Weak rock: compressive strength = 5.0-20
Orientation: 214/80; 000/40; 278/80			9. Grey	2. coarse (2-60 mm)	3d) Fabric	point load = <1
Aperture: 8 (20cm) and 5			10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	R3 Medium strong rock: compressive strength = 20-50
	Number of joint sets			4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	point load = 1-2
Infilling: Moss, open	1. Massive, occas random joints		Joint spacing	5. very fine (<2 µ)	3. Massive (No fabric observed)	R4 Strong rock: compressive strength = 50-100
Roughness: 7	2. One joint set		1. Extremely close spacing (<20 mm)		Texture	point load = 2-5
Type: J	3. One joint set plus random		2. Very close spacing (20-60mm)		1. Crystalline	R5 Very strong rock: compressive strength = 100-250
Persistence: 2 (1-3m)	4. Two joint sets		3. Close spacing (60-200mm)		2. Granular	point load = 5-10
Block shape	5. Two joint sets plus random		4. Moderate spacing (200-600mm)		3. Glassy	R6 Extremely strong rock: compressive strength = >250
1. massive	6. Three joint sets		5. Wide spacing (600mm-2m)		Comments	point load = >10
2. blocky	7. Three joint sets plus random		6. Very wide spacing (2-6m)			
3. tabular	8. Four or more joint sets		7. Extremely wide spacing (>6m)			
4. columnar	9. Crushed rock, earth-like					
5. irregular	Seepage (unfilled)		Seepage (filled)			
6. crushed	1. Tight/dry, flow not appear possible		1. infill consolidated/dry, flow unlikely dt low perm			
Block size	2. dry, no evidence of flow		2. infill damp no free water			
1. Very large blocks (<1.0 j/m^3)	3. dry, evidence of flow (staining)		3. infill wet, occasional drip			
2. Large blocks (1-3)	4. damp, no free water		4. cont. flow with outwash (l/min)			
3. Medium-sized blocks (3-10)	5. Seepage/drips, not continuous		5. washed out locally (l/min & pressure)			
4. Small blocks (10-30)	6. contin flow (l/min & pressure)		6. washed out completely (l/min & pressure)			
5. Very small blocks (>30)	Igneous rocks	Texture				
Grain size		Porphyritic (Ige phenocrysts enclosed in fine grained matrix)				
Aphanitic (minerals not visible to naked eye)		Aphyric (no phenocrysts present)				
Phaneritic (minerals visible to naked eye)		Glomeroporphyritic (phenocrysts grouped in clusters)				

Not applicable

Not applicable

Colour: orangish grey in some places.
Number of joint sets: difficult to tell as outcrop limited in size, therefore any potential joints don't appear more than once (i.e. no paralell joints).

Joint orientation: in photo can see joint 120/75 but other joint is at the right of the photo.
Schmidt hammer: 22, 22, 26, 30, 30, 28, 28, 30, 29, 26, 36, 24, 32, 32, 28, 24, 30, 26, 24, 32. Avg = 27.95
Discontinuity surface weathering: low
Outcrop face: 220/60

Rock mass field description data sheet: 12_03_01

Location: Haulage rd, 1st logging area, bushwhacking up to plateau between lower and middle steps on NW flank of Main Cone SW of 100 m marker summit track. Indurated andesitic outcrop.

Sample: 12_03_01a & b Photo: 12_03_01, 02, 03 Slope height: 15m Slope length: 7m Waypoint: 46

Easting: 2836855 Northing: 6337919 Elevation: 320m Date: 12/03/06 Sheet:1 of 1 Sketch: no Accompany scanline:no

1) Weathering	2) Color			3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gen	Lami	Indurated andesite
3. Moderately weathered		3. yellowish	3. Yellow	Mod	Very	5) Compressive Strength (Mpa)
4. Highly weathered		4. brownish	4. Brown	Ste	Thin (	R0 Extremely weak rock: compressive strength = 0.25-1.0
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	point load = <1
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R1 Very weak rock: compressive strength = 1.0-5.0
6) General discont. desc.		7. bluish	7. Blue	3c) Grain size	Thick (0.6 - 2m)	point load = <1
		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R2 Weak rock: compressive strength = 5.0-20
Orientation: 260/75; 122/75; 350/35			9. Grey	2. coarse (2-60 mm)	3d) Fabric	point load = <1
Aperture: 7(scoria), 4 (non-scoria)			10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	R3 Medium strong rock: compressive strength = 20-50
	Number of joint sets			4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	point load = 1-2
Open, little grit	1. Massive, occas random joints		Joint spacing	5. very fine (<2 µ)	3. Massive (No fabric observed)	R4 Strong rock: compressive strength = 50-100
Roughness: 2	2. One joint set		1. Extremely close spacing (<20 mm)		Texture	point load = 2-5
Type: J	3. One joint set plus random		2. Very close spacing (20-60mm)		1. Crystalline	R5 Very strong rock: compressive strength = 100-250
Persistence: 2	4. Two joint sets		3. Close spacing (60-200mm)		2. Granular	point load = 5-10
Block shape	5. Two joint sets plus random		4. Moderate spacing (200-600mm)		3. Glassy	R6 Extremely strong rock: compressive strength = >250
1. massive	6. Three joint sets		5. Wide spacing (600mm-2m)		Comments	point load = >10
2. blocky	7. Three joint sets plus random		6. Very wide spacing (2-6m)			
3. tabular	8. Four or more joint sets		7. Extremely wide spacing (>6m)			
4. columnar	9. Crushed rock, earth-like					
5. irregular	Seepage (unfilled)		Seepage (filled)			
6. crushed	1. Tight/dry, flow not appear possible		1. infill consolidated/dry, flow unlikely dt low perm			
Block size	2. dry, no evidence of flow		2. infill damp no free water			
1. Very large blocks (<1.0 j/m^3)	3. dry, evidence of flow (staining)		3. infill wet, occasional drip			
2. Large blocks (1-3)	4. damp, no free water		4. cont. flow with outwash (l/min)			
3. Medium-sized blocks (3-10)	5. Seepage/ drips, not continuous		5. washed out locally (l/min & pressure)			
4. Small blocks (10-30)	6. contin flow (l/min & pressure)		6. washed out completely (l/min & pressure)			
5. Very small blocks (>30)	Igneous rocks	Texture				
Grain size		Porphyritic (Ige phenocrysts enclosed in fine grained matrix)				
Aphanitic (minerals not visible to naked eye)		Aphyric (no phenocrysts present)				
Phaneritic (minerals visible to naked eye)		Glomeroporphyritic (phenocrysts grouped in clusters)				

Not applicable

Not applicable

Difficult to get some data due to scoriaceous irregular nature.
See scoriaceous transition into non-scoriaceous (photos). Perhaps the scoriaceous is a result of weathering and not infact a rock type. Although scoriaceous seems to start at a joint (photo) and non-scoriaceous stuff has a different orientation and dip. Similar to pink-grey rock @ adjacent waypts 62-66.
Schmidt hammer scoriaceous: 28, 30, 30, 29, 34, 34, 28, 31, 33, 27, 28, 31, 30, 28, 22, 34, 35, 27, 28, 31. Avg = 29.9.
Schmidt hammer non-scoriaceous: 44, 48, 39, 37, 41, 39, 40, 38, 32, 38, 39, 45, 42, 37, 38, 41, 39, 38, 41, 41. Avg = 39.85.
Grain size: 20%/80% coarse/medium.
Sample a = scoriaceous, sample b = non-scoriaceous.
Discontinuity surface weathering: low
Slaty habit in upper scoriaceous rock.
Outcrop face: 340/75 (outcrop is a pinacle thus essentially > 1 face).

Rock mass field description data sheet: 12_03_02

Location: Haulage rd, 1st logging area, bushwhacking up to plateau between lower and middle steps on NW flank of Main Cone SW of 100 m marker summit track. Indurated andesitic outcrop.

Sample: 12_03_02 Photo: 12_03_04, 05 Slope height: 10m Slope length: 15m Waypoint:47

Easting: 2836870 Northing: 6337844 Elevation: 359m Date: 12/03/06 Sheet: 1 of 1 Sketch: no Accompany scanline: no

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish, 2. reddish, 3. yellowish, 4. brownish, 5. olive, 6. greenish, 7. bluish, 8. greyish
2. Dark — 1.Pink, 2. Red, 3. Yellow, 4. Brown, 5. Olive, 6. Green, 7. Blue, 8. White, 9. Grey, 10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Ste
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)
Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (
Not applicable
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 097/75; 162/85
Aperture: 7/8
Infilling:Open, plants, roots
Roughness: 5
Type: J
Persistence: 2

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. tight & dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Infill damp due to moss.
Stronger than waypoint 46.
Quite a scoriaceous rock. But can see non-scoriaceous surfaces which may be less weathered. Or could be fresh joint surfaces where blocks have recently dislodged.
Outcrop face: 345/80 (outcrop is a pinacle thus essentially > 1 face).
Schmidt hammer: 30, 40, 38, 38, 37, 34, 40, 40, 37, 38, 38, 37, 40, 39, 39, 37, 36, 40, 36, 42. Avg = 37.8.
Discontinuity surface weathering: low

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 13_03_01

Location: Haulage rd, 1st logging area, bushwhacking up lower step on NW flank of Main Cone SW of 100 m marker summit track. Indurated andesitic outcrop.

Sample: 13_03_01, 02 Photo: 13_03_01, 02 (rust staaining), 03,04,05 (outcrop), 06 (white infilling as seen in sample 02) Slope height: 14m Slope length: 22m Waypoint: 48

Easting: 2836846 Northing: 6338061 Elevation: 259m Date: 13/03/06 Sheet:1 of 1 Sketch:no Accompany scanline: no

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish, 2. reddish, 3. yellowish, 4. brownish, 5. olive, 6. greenish, 7. bluish, 8. greyish
2. Dark — 1.Pink, 2. Red, 3. Yellow, 4. Brown, 5. Olive, 6. Green, 7. Blue, 8. White, 9. Grey, 10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Ste
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)
Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (
Not applicable
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation; 345/85; 275/80; 300/80; 170/35
Aperture: up to 7, most 3/4
Infilling: open, soil, roots, white hard gritty infill, dense & strong
Roughness: 7
Type: J
Persistence: 3

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. tight & dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Grain size: 90%/10% : medium/coarse.
Seepage unfilled: rust staining apparent, first observation of this (refer photo).
Joint spacing: close to 2m.
Strength: strength appear very high relative to other outcrops to date.
Seepage filled: infill not consolidated but no evidence of flow.
Joint sets: number maybe ltd by outcrop. Lots of randon joints. Presume that face is a joint face.
Schmidt: 54, 54, 48, 50, 50, 48, 48, 48, 45, 49, 53, 49, 53, 46, 47, 54, 53, 48, 51, 53. Avg = 50.05.
Discontinuity surface weathering: low
Outcrop face: 345/85

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 13_03_02

Location: Haulage rd, 1st logging area, bushwhacking up lower step on NW flank of Main Cone SW of 100 m marker summit track. Indurated andesitic outcrop.

Sample: 13_03_03 Photo: 13_03_07, 08 Slope height: 10m Slope length: 14m Waypoint:49

Easting: 2836790 Northing: 6338010 Elevation: 278m Date: 13/03/06 Sheet:1 of 1 Sketch: no Accompanyscanline: no

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish
2. Dark — 2. reddish; 3. yellowish; 4. brownish; 5. olive; 6. greenish; 7. bluish; 8. greyish

1.Pink; 2. Red; 3. Yellow; 4. Brown; 5. Olive; 6. Green; 7. Blue; 8. White; 9. Grey; 10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Stee
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

Not applicable

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 293/70; 212/65; 140/72.5; 110/10
Aperture: up to 8, mostly 7
Infilling: Plants, soil, open, moss, no grit.
Roughness: 5
Type: J
Persistence: 3

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Comments
Oxidised white crystals (refer sample).
Not a pinkish tinge in samples that became acustomed to on 4wd track samples.
Schmidt: 48, 48, 50, 52, 46, 48, 52, 49, 53, 52, 53, 48, 52, 54, 55, 52, 48, 48, 54, 53.
Avg = 50.75.
Grain size: 10%/90% : coarse/medium.
Number of joint sets: difficult to determine (at least two).
Outcrop face: 315/75
Discontinuity surface weathering: low

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Seepage (unfilled)
1. tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill d
3. infill v
4. cont.
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Not applicable

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 13_03_03

Location: Haulage rd, 1st logging area, bushwhacking up lower step on NW flank of Main Cone SW of 100 m marker summit track. Indurated andesitic outcrop.

Sample: 13_03_05 Photo: 13_03_10; 11 Slope height: 10m Slope length: 15m Waypoint: 50

Easting: 2836755 Northing: 6338067 Elevation: 239m Date: 13/03/06 Sheet: 1of 1 Sketch: no Accompany scanline :no

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish
2. Dark — 2. reddish; 3. yellowish; 4. brownish; 5. olive; 6. greenish; 7. bluish; 8. greyish

1.Pink; 2. Red; 3. Yellow; 4. Brown; 5. Olive; 6. Green; 7. Blue; 8. White; 9. Grey; 10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Stee
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

Not applicable

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 345/70; 150/30; 060/70
Aperture: 3/4
Infilling: Moss, white infill seen @ waypoiny 48
Roughness: 7
Type: J
Persistence: 3

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Comments
Joint spacing: close to 2m.
Seepage (unfilled): Rust stainging again.
Seepage (filled): moss = damp, however white infill looks impermeable.
Sample shows evidence (scoriaceous brown stuff internal on sample) that scoriaceous rock may be result of weathering.
Schmidt hammer: 54, 56, 53, 54, 55, 56, 54, 49, 54, 56, 56, 55, 54, 50, 51, 51, 50, 52, 53, 56. Avg = 53.45.
Outcrop face: 345/70
Discontinuity surface weathering: low
Grain size: 10%/90% : coarse/medium.

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Seepage (unfilled)
1. tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 14_03_01

Location: Haulage rd, 2nd logging area, bushwacking up main dome on NW flank. Indurated dacitic outcrop.

Sample: 14_03_01 Photo: 14_03_01, 02 Slope height: 10m Slope length: 4m Waypoint: 51

Easting: 2836443 Northing: 6337277 Elevation: 235m Date: 14/3/06 Sheet: 1 of 1 Sketch: no Accompany scanline: no

1) Weathering	2) Color			3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	Indurated dacite
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gen	Lamin	
3. Moderately weathered		3. yellowish	3. Yellow	Mod	Very	5) Compressive Strength (Mpa)
4. Highly weathered		4. brownish	4. Brown	Ste	Thin (	R0 Extremely weak rock: compressive strength = 0.25-1.0
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	point load = <1
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R1 Very weak rock: compressive strength = 1.0-5.0
6) General discont. desc.		7. bluish	7. Blue	3c) Grain size	Thick (0.6 - 2m)	point load = <1
		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R2 Weak rock: compressive strength = 5.0-20
Orientation: 250/85; 200/80; 250/ 60			9. Grey	2. coarse (2-60 mm)	3d) Fabric	point load = <1
Aperture: up to 8. Mostly 6/7			10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	R3 Medium strong rock: compressive strength = 20-50
				4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	point load = 1-2
Infilling: Open, soil, blocks, plants	Number of joint sets			5. very fine (<2 µ)	3. Massive (No fabric observed)	R4 Strong rock: compressive strength = 50-100
Roughness: 5	1. Massive, occas random joints		Joint spacing		Texture	point load = 2-5
Type: J	2. One joint set		1. Extremely close spacing (<20 mm)		1. Crystalline	R5 Very strong rock: compressive strength = 100-250
Persistence: 3	3. One joint set plus random		2. Very close spacing (20-60mm)		2. Granular	point load = 5-10
Block shape	4. Two joint sets		3. Close spacing (60-200mm)		3. Glassy	R6 Extremely strong rock: compressive strength = >250
1. massive	5. Two joint sets plus random		4. Moderate spacing (200-600mm)		Comments	point load = >10
2. blocky	6. Three joint sets		5. Wide spacing (600mm-2m)			
3. tabular	7. Three joint sets plus random		6. Very wide spacing (2-6m)			
4. columnar	8. Four or more joint sets		7. Extremely wide spacing (>6m)			
5. irregular	9. Crushed rock, earth-like					
6. crushed	Seepage (unfilled)		Seepage (filled)			
Block size	1. tight/dry, flow not appear possible		1. infill consolidated/dry, flow unlikely dt low perm			
1. Very large blocks (<1.0 j/m^3)	2. dry, no evidence of flow		2. infill damp no free water			
2. Large blocks (1-3)	3. dry, evidence of flow (staining)		3. infill wet, occasional drip			
3. Medium-sized blocks (3-10)	4. damp, no free water		4. cont. flow with outwash (l/min)			
4. Small blocks (10-30)	5. seepage/drips, not continuous		5. washed out locally (l/min & pressure)			
5. Very small blocks (>30)	6. contin flow (l/min & pressure)		6. washed out completely (l/min & pressure)			

Not applicable

Not applicable

Looks like first time that this grey rock has been seen. Same as grey rock sample 13_03_07 that was collected off fallen blocks yesterday on toitoi track track below.

Joint spacing: difficult to interpret with ltd exposure.
Number of joint sets: at least 1 obvious.

Schmidt: 45, 34, 29 26, 39, 34, 33, 34, 29, 30, 36, 40, 41, 31, 31, 39, 37, 38, 31, 33.
Grain size: 30%/70% coarse/medium.
Outcrop face: 250/85
Discontinuity surface weathering: low

Igneous rocks	Texture
Grain size	Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 14_03_02 (point load samples)

Location: Haulage rd, 2nd logging area, bushwacking up main dome on NW flank. Indurated dacitic outcrop.

Sample: 14_03_02 Photo: 03_06_01 Slope height: 10m Slope length: 9m Waypoint: 52

Easting: 2836462 Northing: 6337282 Elevation: 330m Date: 14/03/06 Sheet: 1 of 1 Sketch: no Accompany scanline: 14_03_01

1) Weathering	2) Color			3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	Indurated dacite
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gen	Lamin	
3. Moderately weathered		3. yellowish	3. Yellow	Mod	Very	5) Compressive Strength (Mpa)
4. Highly weathered		4. brownish	4. Brown	Ste	Thin (	R0 Extremely weak rock: compressive strength = 0.25-1.0
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	point load = <1
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R1 Very weak rock: compressive strength = 1.0-5.0
6) General discont. desc.		7. bluish	7. Blue	3c) Grain size	Thick (0.6 - 2m)	point load = <1
		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R2 Weak rock: compressive strength = 5.0-20
Orientation: 250/65; 200/70;			9. Grey	2. coarse (2-60 mm)	3d) Fabric	point load = <1
Aperture: 7			10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	R3 Medium strong rock: compressive strength = 20-50
				4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	point load = 1-2
Infilling: open, blocks	Number of joint sets			5. very fine (<2 µ)	3. Massive (No fabric observed)	R4 Strong rock: compressive strength = 50-100
Roughness: 5	1. Massive, occas random joints		Joint spacing		Texture	point load = 2-5
Type: J	2. One joint set		1. Extremely close spacing (<20 mm)		1. Crystalline	R5 Very strong rock: compressive strength = 100-250
Persistence: 3	3. One joint set plus random		2. Very close spacing (20-60mm)		2. Granular	point load = 5-10
Block shape	4. Two joint sets		3. Close spacing (60-200mm)		3. Glassy	R6 Extremely strong rock: compressive strength = >250
1. massive	5. Two joint sets plus random		4. Moderate spacing (200-600mm)		Comments	point load = >10
2. blocky	6. Three joint sets		5. Wide spacing (600mm-2m)			
3. tabular	7. Three joint sets plus random		6. Very wide spacing (2-6m)			
4. columnar	8. Four or more joint sets		7. Extremely wide spacing (>6m)			
5. irregular	9. Crushed rock, earth-like					
6. crushed	Seepage (unfilled)		Seepage (filled)			
Block size	1. tight/dry, flow not appear possible		1. infill ~~consolidated~~/dry, flow unlikely dt low perm			
1. Very large blocks (<1.0 j/m^3)	2. dry, no evidence of flow		2. infill damp no free water			
2. Large blocks (1-3)	3. dry, evidence of flow (staining)		3. infill wet, occasional drip			
3. Medium-sized blocks (3-10)	4. damp, no free water		4. cont. flow with outwash (l/min)			
4. Small blocks (10-30)	5. seepage/drips, not continuous		5. washed out locally (l/min & pressure)			
5. Very small blocks (>30)	6. contin flow water (l/min & pressure)		6. washed out completely (l/min & pressure)			

Not applicable

Not applicable

Grain size: 30%/70% coarse/medium.
Grey rock again as in previous waypoint 51. Different lava though from 4wd summit track?
Outcrop face: 154/85
Joints more open, infill less gritty and blocks larger than on summit 4wd track.
Schmidt: 42, 37, 29, 30, 38, 35, 34, 30, 35, 30, 41, 31, 32, 35, 33, 34, 41, 40, 34, 39.
Discontinuity surface weathering: low

Igneous rocks	Texture
Grain size	Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 19_03_01 (point load samples)

Location: Approximatley 20 m NE off summit 4wd drive between 2nd switchback and fork.

Sample: 19_01_01 (indurated), 02 (scoriaceous and for point load) Photo: 19_03_02-11(pan),12-13 (thin valley walkthru), 14-18 (mini tomos), 19-20 RMD/scanline outcrop, 21 (RMD/scanline)
Slope height: 12m Slope length: 25m Waypoint: 20m inside summit 4wd track from waypoint 33

Easting: 2837808 Northing: 6336858 Elevation: 672m Date: 19/03/06 Sheet: 1of 1 Sketch: no Accompany scanline: 19_03_01

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light
2. Dark

1. pinkish
2. reddish
3. yellowish
4. brownish
5. olive
6. greenish
7. bluish
8. greyish

1.Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gent
Mod
Ste
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

Not applicable

4) ROCK NAME
Scoriaceous andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 015/45; 155/75; 022/85
Aperture: 8
Infilling:scoriaceous gravel/silt, soil with clayey feel (dt wet?)
Roughness: 1 (rough, stepped)
Type: J
Persistence: 4 (just over 10m)

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Grain size: 20%/80%:coarse/medium.
Joint spacing: just over 2m.
Seepage (unfilled): damp perhaps to moss/valley envt.
Block shape: refer photo 19-20.
Number of joint sets: moss makes it hard to see rock surface. It highlights major joints but hides minor joints (photos 19-21).
Schmidt: 18, 16, 19, 16, 18, 15, 14, 18, 15, 15, 15, 18, 16, 18, 18, 19, 15, 19, 18, 18. Avg = 16.9.
Outcrop face: 350/85
Discontinuity surface weathering: moderate

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 20_03_01 (point load samples)

Location: Summit 4wd track, right at fork, crater wall. Hydrothermally altered? andesite similar to that of waypt 11 20 m prior.

Sample: 20_03_01 (pointload) Photo: 20_03_01, 2, 3 (outcrop), 4 (how crumbly rock is relative to weathered surface) Slope height: 15m Slope length: 10m Waypoint: same as 40

Easting:2837851 Northing: 6337135 Elevation: 758m Date: 20/03/06 Sheet:1 of 1 Sketch: no Accompany scanline: 20_03_01

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light
2. Dark

1. pinkish
2. reddish
3. yellowish
4. brownish
5. olive
6. greenish
7. bluish
8. greyish

1.Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gent
Mod
Ste
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

Not applicable

4) ROCK NAME
Altered andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 307/65; 250/70; 165/45
Aperture: 6
Infilling: Soil, scoriaceous grit, loose blocks, talus
Roughness: 1
Type: J
Persistence: 2

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill ~~consolidated~~/dry, flow unlikely ~~dt low perm~~
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Fabric: semi-slatey appearance (similar to waypoint 29) but weaker.
Grain size: 90%/10%:medium/coarse. Appears finer grained than most samples.
First strength rating this low.
Seepage (filled): difficult to categorise here and at other outcrops as no present flow, however flow is possible perhaps during wetter periods.
Schmidt: quite difficult to measure due to rock material shattering. 15, 16, 15, 14, 18, 20, 13, 12, 15, 15, 15, 14, 16, 17, 14, 15, 14, 16, 18, 14.
Colour: greyish = weathered outer; red = oxidation/altered? Inner.
Outcrop face: 340/80
Compressive strength: weak tendency contrasts most rock units seen previously on 4wd track
Discontinuity surface weathering: high

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 21_03_01

Location: Overlooking McKee rd quarry. Bushwhacked up NE flank of Main Cone close to powerlines to indurated andesitic outcrop.

Sample: 21_03_01 Photo: none taken Slope height: 10m Slope length: 7m Waypoint:60

Easting: 2837974 Northing: 6338241 Elevation: 280m Date: 21/03/06 Sheet:1 of 1 Sketch: no Accompany scanline: no

1) Weathering	2) Color		3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish 1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	Indurated andesite
2. Slightly weathered	2. Dark	2. reddish 2. Red	Gen	Lami	
3. Moderately weathered		3. yellowish 3. Yellow	Mod	Very	5) Compressive Strength (Mpa)
4. Highly weathered		4. brownish 4. Brown	Stee	Thin	R0 Extremely weak rock: compressive strength = 0.25-1.0
5. Completely weathered		5. olive 5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	point load = <1
6. Residual soil		6. greenish 6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R1 Very weak rock: compressive strength = 1.0-5.0
6) General discont. desc.		7. bluish 7. Blue	3c) Grain size	Thick (0.6 - 2m)	point load = <1
		8. greyish 8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R2 Weak rock: compressive strength = 5.0-20
Orientation: 130/65; 280/60		9. Grey	2. coarse (2-60 mm)	3d) Fabric	point load = <1
Aperture: 7 dominantly & max		10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	R3 Medium strong rock: compressive strength = 20-50
	Number of joint sets		4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	point load = 1-2
Infilling: open, plants, blocks, soil	1. Massive, occas random joints		5. very fine (<2 µ)	3. Massive (No fabric observed)	R4 Strong rock: compressive strength = 50-100
Roughness: 4 (ruff undulating)	2. One joint set	Joint spacing		Texture	point load = 2-5
Type: J	3. One joint set plus random	1. Extremely close spacing (<20 mm)		1. Crystalline	R5 Very strong rock: compressive strength = 100-250
Persistence: 2	4. Two joint sets	2. Very close spacing (20-60mm)		2. Granular	point load = 5-10
Block shape	5. Two joint sets plus random	3. Close spacing (60-200mm)		3. Glassy	R6 Extremely strong rock: compressive strength = >250
1. massive	6. Three joint sets	4. Moderate spacing (200-600mm)		Comments	point load = >10
2. blocky	7. Three joint sets plus random	5. Wide spacing (600mm-2m)			
3. tabular	8. Four or more joint sets	6. Very wide spacing (2-6m)			
4. columnar	9. Crushed rock, earth-like	7. Extremely wide spacing (>6m)			
5. irregular	Seepage (unfilled)	Seepage (filled)			
6. crushed	1. tight/dry, flow not appear possible	1. infill consolidated/dry, flow unlikely dt low perm			
Block size	2. dry, no evidence of flow	2. infill damp no free water			
1. Very large blocks (<1.0 j/m^3)	3. dry, evidence of flow (staining)	3. infill wet, occasional drip			
2. Large blocks (1-3)	4. damp, no free water	4. cont. flow with outwash (l/min)			
3. Medium-sized blocks (3-10)	5. seepage/drips, not continuous	5. washed out locally (l/min & pressure)			
4. Small blocks (10-30)	6. contin flow (l/min & pressure)	6. washed out completely (l/min & pressure)			
5. Very small blocks (>30)					

Not applicable

Not applicable

Igneous rocks	Texture
Grain size	Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)

Grain size: 20%:80%/coarse:medium.
Block shape: blocky at top, tabular at base.
Outcrop similar from to pinkish grey andesite on 4wd track.
Schmidt: 40/42/38 (wet, steep, hard to get values, these are general results).
Indurated, Non-scoriaceous appearance.
# of joint sets: two plus random at least.
Outcrop face: 028/80
Discontinuity surface weathering: low

Rock mass field description data sheet: 21_03_02

Location: Indurated andesitic outcropp overlooking McKee-Tarawera rd junction. Accessed from McKee Rd quarry but could also scramble up McKee roadside cutting by logs.

Sample: 21_03_02 Photo: 21_03_05; 6; 7 Slope height: 7m Slope length: 10m Waypoint: 61

Easting: 2837438 Northing: 6338504 Elevation: 146m Date: 21/03/06 Sheet: 1 of 1 Sketch: no Accompany scanline: no

1) Weathering	2) Color		3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish 1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	Indurated andesite
2. Slightly weathered	2. Dark	2. reddish 2. Red	Gen	Lami	
3. Moderately weathered		3. yellowish 3. Yellow	Mod	Very	5) Compressive Strength (Mpa)
4. Highly weathered		4. brownish 4. Brown	Stee	Thin	R0 Extremely weak rock: compressive strength = 0.25-1.0
5. Completely weathered		5. olive 5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	point load = <1
6. Residual soil		6. greenish 6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R1 Very weak rock: compressive strength = 1.0-5.0
6) General discont. desc.		7. bluish 7. Blue	3c) Grain size	Thick (0.6 - 2m)	point load = <1
		8. greyish 8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R2 Weak rock: compressive strength = 5.0-20
Orientation: 015/80; 085/55		9. Grey	2. coarse (2-60 mm)	3d) Fabric	point load = <1
Aperture: 5/6		10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	R3 Medium strong rock: compressive strength = 20-50
	Number of joint sets		4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	point load = 1-2
Infilling: open, plants, soil, too narrow for blocks	1. Massive, occas random joints		5. very fine (<2 µ)	3. Massive (No fabric observed)	R4 Strong rock: compressive strength = 50-100
Roughness: 5 (smooth, undulat8)	2. One joint set	Joint spacing		Texture	point load = 2-5
Type: J	3. One joint set plus random	1. Extremely close spacing (<20 mm)		1. Crystalline	R5 Very strong rock: compressive strength = 100-250
Persistence: 2	4. Two joint sets	2. Very close spacing (20-60mm)		2. Granular	point load = 5-10
Block shape	5. Two joint sets plus random	3. Close spacing (60-200mm)		3. Glassy	R6 Extremely strong rock: compressive strength = >250
1. massive	6. Three joint sets	4. Moderate spacing (200-600mm)		Comments	point load = >10
2. blocky	7. Three joint sets plus random	5. Wide spacing (600mm-2m)			
3. tabular	8. Four or more joint sets	6. Very wide spacing (2-6m)			
4. columnar	9. Crushed rock, earth-like	7. Extremely wide spacing (>6m)			
5. irregular	Seepage (unfilled)	Seepage (filled)			
6. crushed	1. tight/dry, flow not appear possible	1. infill consolidated/dry, flow unlikely dt low perm			
Block size	2. dry, no evidence of flow	2. infill damp no free water			
1. Very large blocks (<1.0 j/m^3)	3. dry, evidence of flow (staining)	3. infill wet, occasional drip			
2. Large blocks (1-3)	4. damp, no free water	4. cont. flow with outwash (l/min)			
3. Medium-sized blocks (3-10)	5. seepage/drips, not continuous	5. washed out locally (l/min & pressure)			
4. Small blocks (10-30)	(l/min &	out			
5. Very small blocks (>30)					

Not applicable

Not applicable

Igneous rocks	Texture
Grain size	Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)

Semi-scoriaceous rock - appears to grade from scoriaceous @ base edges to indurated @ centre (refer photo).
Very irregular joints, difficult to measure.
This outcrop seems to be on Eastern side of the outcrop Ifailed to get to @ second switchback on haulage road. Same rock type?
Schmidt: 36, 34, 34, 36, 37, 36, 36, 37, 33, 38, 37, 36, 34, 34, 38, 36, 36, 37, 37, 38. A
Color: no indication of pinkish colour.
Outcrop face: 009/80
Discontinuity surface weathering: low

Rock mass field description data sheet: 25_03_01

Location: 100 m marker summit track. Indurated andesitic outcrop 20 m NE off track jst after 800 m marker post.

Sample: 25_03_01 (white surface coating), 02 (v/coarse feldspars?), 03 (rock) Photo: 25_03_01 (scoriaceous), 02 (non-scoriaceous), 03, 04 (outcrop with photo 01 & 02 in corner) Slope height: 8m Slope length: 4m Waypoint: 62

Easting: 2837133 Northing: 6337981 Elevation: 315m Date: 25/03/06 Sheet:1 of 1 Sketch: no Accompany scanline: no

1) Weathering	2) Color			3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	Indurated andesite
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gen...	Lamin...	
3. Moderately weathered		3. yellowish	3. Yellow	Mod...	Very ...	**5) Compressive Strength (Mpa)**
4. Highly weathered		4. brownish	4. Brown	Stee...	Thin (...	R0 Extremely weak rock: compressive strength = 0.25-1.0
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	point load = <1
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R1 Very weak rock: compressive strength = 1.0-5.0
6) General discont. desc.		7. bluish	7. Blue	**3c) Grain size**	Thick (0.6 - 2m)	point load = <1
		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R2 Weak rock: compressive strength = 5.0-20
Orientation: 090/45; 030/70; 293/85			9. Grey	2. coarse (2-60 mm)	**3d) Fabric**	point load = <1
Aperture: 7			10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	R3 Medium strong rock: compressive strength = 20-50
	Number of joint sets			4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	point load = 1-2
Infilling: Roots, blocks, grit	1. Massive, occas random joints			5. very fine (<2 µ)	3. Massive (No fabric observed)	R4 Strong rock: compressive strength = 50-100
Roughness: 1 (ruff, stepped)	2. One joint set		**Joint spacing**		**Texture**	point load = 2-5
Type: J	3. One joint set plus random		1. Extremely close spacing (<20 mm)		1. Crystalline	R5 Very strong rock: compressive strength = 100-250
Persistence: 3	4. Two joint sets		2. Very close spacing (20-60mm)		2. Granular	point load = 5-10
Block shape	5. Two joint sets plus random		3. Close spacing (60-200mm)		3. Glassy	R6 Extremely strong rock: compressive strength = >250
1. massive	6. Three joint sets		4. Moderate spacing (200-600mm)		**Comments**	point load = >10
2. blocky	7. Three joint sets plus random		5. Wide spacing (600mm-2m)			
3. tabular	8. Four or more joint sets		6. Very wide spacing (2-6m)			
4. columnar	9. Crushed rock, earth-like		7. Extremely wide spacing (>6m)			
5. irregular	**Seepage (unfilled)**		**Seepage (filled)**			
6. crushed	1. tight/dry, flow not appear possible		1. infill ~~consolidated~~/dry, flow unlikely ~~dt low perm~~			
Block size	2. dry, no evidence of flow		2. infill damp no free water			
1. Very large blocks (<1.0 j/m^3)	3. dry, evidence of flow (staining)		3. infill wet, occasional drip			
2. Large blocks (1-3)	4. damp, no free water		4. cont. flow with outwash (l/min)			
3. Medium-sized blocks (3-10)	5. seepage/drips, not continuous		5. washed out locally (l/min & pressure)			
4. Small blocks (10-30)	6. contin flow (l/min & pressure)		6. washed out completely (l/min & pressure)			
5. Very small blocks (>30)	**Igneous rocks**		Texture			
Grain size			Porphyritic (Ige phenocrysts enclosed in fine grained matrix)			
Aphanitic (minerals not visible to naked eye)			Aphyric (no phenocrysts present)			
Phaneritic (minerals visible to naked eye)			Glomeroporphyritic (phenocrysts grouped in clusters)			

Not applicable

Not applicable

Fabric: slaty appearance.
Grain size: very coarse/ coarse/ medium: 5%/ 25%/ 70%.
Grain size: cleavage leads assumptions that very coarse white crystals are most likely feldspars.
Weathering: outside very scoriaceous, slaty & weaker relative to fresh (photo).
White very resistant coating on rock surface by joints (sample 25_03_01).
Schmidt: 38, 36, 42, 42, 42, 43, 43, 40, 43, 41, 41, 38, 40, 40, 42, 40, 42, 40, 40, 41. Avg
Outcrop face: 100/85
Discontinuity surface weathering: low

Rock mass field description data sheet: 25_03_02

Location: 100 m marker summit track. Indurated andesitic outcrop 20 m SW of track approx 150 m up track from waypt 62.

Sample: 25_03_04 Photo: 25_03_05/6 (both of slaty habit), 7/8/9/10 (outcrop) Slope height: 12m Slope length: 12m Waypoint: 63

Easting: 2837200 Northing: 6337903 Elevation: 390m Date: 25/03/06 Sheet: 1 of 1 Sketch: no Accompany scanline: no

1) Weathering	2) Color			3a) Bedding (inclination)	3b) Bedding (thickness)	4) ROCK NAME
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	Indurated andesite
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gen...	Lamin...	
3. Moderately weathered		3. yellowish	3. Yellow	Mod...	Very ...	**5) Compressive Strength (Mpa)**
4. Highly weathered		4. brownish	4. Brown	Stee...	Thin (...	R0 Extremely weak rock: compressive strength = 0.25-1.0
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	point load = <1
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	R1 Very weak rock: compressive strength = 1.0-5.0
6) General discont. desc.		7. bluish	7. Blue	**3c) Grain size**	Thick (0.6 - 2m)	point load = <1
		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	R2 Weak rock: compressive strength = 5.0-20
Orientation: 248/65; 100/35; 312/50			9. Grey	2. coarse (2-60 mm)	**3d) Fabric**	point load = <1
Aperture: 7 (closer to 1cm)			10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	R3 Medium strong rock: compressive strength = 20-50
	Number of joint sets			4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	point load = 1-2
Infilling: open, grit/gravel, roots.	1. Massive, occas random joints			5. very fine (<2 µ)	3. Massive (No fabric observed)	R4 Strong rock: compressive strength = 50-100
Roughness: 1(ruff, stepped)	2. One joint set		**Joint spacing**		**Texture**	point load = 2-5
Type: J	3. One joint set plus random		1. Extremely close spacing (<20 mm)		1. Crystalline	R5 Very strong rock: compressive strength = 100-250
Persistence: 2	4. Two joint sets		2. Very close spacing (20-60mm)		2. Granular	point load = 5-10
Block shape	5. Two joint sets plus random		3. Close spacing (60-200mm)		3. Glassy	R6 Extremely strong rock: compressive strength = >250
1. massive	6. Three joint sets		4. Moderate spacing (200-600mm)		**Comments**	point load = >10
2. blocky	7. Three joint sets plus random		5. Wide spacing (600mm-2m)			
3. tabular	8. Four or more joint sets		6. Very wide spacing (2-6m)			
4. columnar	9. Crushed rock, earth-like		7. Extremely wide spacing (>6m)			
5. irregular	**Seepage (unfilled)**		**Seepage (filled)**			
6. crushed	1. tight/dry, flow not appear possible		1. infill consolidated/dry, flow unlikely dt low perm			
Block size	2. dry, no evidence of flow		2. infill damp no free water			
1. Very large blocks (<1.0 j/m^3)	3. dry, evidence of flow (staining)		3. infill wet, occasional drip			
2. Large blocks (1-3)	4. damp, no free water		4. cont. flow with outwash (l/min)			
3. Medium-sized blocks (3-10)	5. seepage/drips, not continuous		5. washed out locally (l/min & pressure)			
4. Small blocks (10-30)	6. contin flow (l/min & pressure)		6. washed out completely (l/min & pressure)			
5. Very small blocks (>30)	**Igneous rocks**		Texture			
Grain size			Porphyritic (Ige phenocrysts enclosed in fine grained matrix)			
Aphanitic (minerals not visible to naked eye)			Aphyric (no phenocrysts present)			
Phaneritic (minerals visible to naked eye)			Glomeroporphyritic (phenocrysts grouped in clusters)			

Not applicable

Not applicable

Fabric: slaty habit (photo 05/06) as seen at previous outcrop (waypoint 62).
Strength: appeared semi-scoriaceous across consecutive joint surface ends while indurated across joint face (parallel to joints plane). Samples show this, smaller sample is more indurated.
Schmidt: 43, 41, 43, 43, 45, 44, 45, 46, 45, 44, 43, 46, 44, 44, 45, 41, 42, 45, 45, 43.
Avg = 43.85.
Discontinuity surface weathering: low
Outcrop face: 120/80

Rock mass field description data sheet: 26_03_01

Location: Haulage rd, 1st logging area, bushwhacking base of second step on NW facing flank of Main Cone SW of 100 m marker. Indurated andesitic outcrop.

Sample: 26_03_01 Photo:26_03_01; 02 Slope height: 15m Slope length: 15m Waypoint: 72

Easting: 2837047 Northing: 6337790 Elevation: 380m Date: 26/03/06 Sheet:1 of 1 Sketch: no Accompany scanline: no

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish, 2. reddish, 3. yellowish, 4. brownish, 5. olive, 6. greenish, 7. bluish, 8. greyish
2. Dark — 1.Pink, 2. Red, 3. Yellow, 4. Brown, 5. Olive, 6. Green, 7. Blue, 8. White, 9. Grey, 10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Stee
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)
Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamir
Very
Thin (
Not applicable
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 245/65; 070/60; 160/85 7 max, 5/6 common
Infilling: open, plants, little gravel
Roughness: 1 (ruff, stepped)
Type: J
Persistence: 3

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Comments
Fabric: semi slatey but may be result of looking at stress release on joint face (photo).
46, 46, 48, 48, 49, 45, 44, 48, 46, 47, 45, 46, 48, 49, 47, 47, 48, 48, 44, 48. Avg = 46.85
# of joint sets: clearly 3 sets.
Outcrop face: 160/85
Discontinuity surface weathering: low

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. tight & dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill ~~consolidated~~/dry, flow unlikely ~~dt low perm~~
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 26_03_02

Location: Haulage rd, 1st logging area, bushwhacking base of second step on a NW facing flank of Main Cone SW of 100 m marker. Gorse restricting close access to outcrop thus data collected from approx 30 m away on mini-outcrop of indurated andesite.

Sample: 26_03_02 (from fallen block) Photo: no photo Slope height: 8m Slope length: 20m Waypoint: 73

Easting: 2837009 Northing: 6337725 Elevation: 424m Date: 26/03/06 Sheet: 1 of 1 Sketch: no Accompany scanline: no

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish, 2. reddish, 3. yellowish, 4. brownish, 5. olive, 6. greenish, 7. bluish, 8. greyish
2. Dark — 1.Pink, 2. Red, 3. Yellow, 4. Brown, 5. Olive, 6. Green, 7. Blue, 8. White, 9. Grey, 10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Stee
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)
Not applicable

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamir
Very
Thin (
Not applicable
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: ??
Aperture: 7
Infilling: See plants, open, presume gravel
Roughness: ??
Type: J
Persistence: 3

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Texture
1. Crystalline
2. Granular
3. Glassy

Comments
Discontinuity surface weathering: low
Schmidt: 41, 44, 44, 45, 45, 42, 41, 45, 44, 42, 41, 45, 44, 42, 46, 42, 44, 44, 41, 45. Av
Some data not retrieveable as outcrop unreachable.
Outcrop face: 320/75

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill da
3. infill we
4. cont. flo
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)
Not applicable

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Igneous rocks

Grain size
Aphanitic (minerals not visible to naked eye)
Phaneritic (minerals visible to naked eye)

Texture
Porphyritic (Ige phenocrysts enclosed in fine grained matrix)
Aphyric (no phenocrysts present)
Glomeroporphyritic (phenocrysts grouped in clusters)

Rock mass field description data sheet: 04_04_01

Location: Up from McKee rd, NE flank of Main Cone, SE of powerlines in felled area. Indurated andesitic outcrop. Below pine tress on lower edge of native bush.

Sample: 04_04_01 Photo: 04_04_01, 02 (outcrop), 03 (outcrop closeup), 04, 05 (joint measured) Slope height: 15m Slope length: 10m Waypoint: 80

Easting: 2838361 Northing: 6338000 Elevation: 249m Date: 04/04/06 Sheet: 1 of 1 Sketch: no Accompany scanline: no

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish
2. Dark — 2. reddish
3. yellowish
4. brownish
5. olive
6. greenish
7. bluish
8. greyish

1.Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Ste
Not applicable
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (
Not applicable
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 040/75
Aperture: 8
Infilling: Open, plants, sitly and gravely
Roughness: ?
Type: J
Persistence: 4

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Texture
1. Crystalline
2. Granular
3. Glassy

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Discontinuity surface weathering: low
Number of joint sets: one obvious.
Description done from 20 m away across gully. Appears representative of outcrops adjacent. Should compare sample to that sample collected on NE of powerlines (21_03_01).
Schmidt: 40, 38, 37, 38, 40, 40, 40, 35, 38, 41, 42, 38, 40, 40, 39, 41, 40, 41, 40, 38. Av
Outcrop face: 335/85
Grain size: coarse/medium: 10%/90%.

Igneous rocks

Grain size	Texture
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)
	Porphyritic (Ige phenocrysts enclosed in fine grained matrix)

Rock mass field description data sheet: 15_04_01 (point load samples)

Location: Haulage rd, 2nd logging area where valley heads off SE between Main Cone and Main Dome. Indurated andesitic outcrop 80 m SE of waypt 86 on Main Cone side of valley. 20 m above valley floor.

Sample: 15_4_02 Photo:15_4_01-04 (outcrop closeup, exposed block at bottom right of photo approx 2m high); 15_4_05-06 (outcrop far away) Slope height: 15 Slope length: 15 Waypoint: 87
Easting: 2836703 Northing: 6337172 Elevation: 288m Date: 15/04/06 Sheet:1 of 1 Sketch: no Accompany scanline: no

1) Weathering
1. Unweathered/ fresh
2. Slightly weathered
3. Moderately weathered
4. Highly weathered
5. Completely weathered
6. Residual soil

2) Color
1. Light — 1. pinkish
2. Dark — 2. reddish
3. yellowish
4. brownish
5. olive
6. greenish
7. bluish
8. greyish

1.Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

3a) Bedding (inclination)
Sub-horizontal (0 - 5)
Gen
Mod
Ste
Not applicable
Very steeply inclined (61 - 80)
Sub-vertical (81 - 90)

3b) Bedding (thickness)
Thinly laminated (< 2mm)
Lamin
Very
Thin (
Not applicable
Mod thin (60 - 200mm)
Mod thick (0.2 0.6mm)
Thick (0.6 - 2m)
Very thick (> 2m)

4) ROCK NAME
Indurated andesite

5) Compressive Strength (Mpa)
R0 Extremely weak rock: compressive strength = 0.25-1.0 point load = <1
R1 Very weak rock: compressive strength = 1.0-5.0 point load = <1
R2 Weak rock: compressive strength = 5.0-20 point load = <1
R3 Medium strong rock: compressive strength = 20-50 point load = 1-2
R4 Strong rock: compressive strength = 50-100 point load = 2-5
R5 Very strong rock: compressive strength = 100-250 point load = 5-10
R6 Extremely strong rock: compressive strength = >250 point load = >10

6) General discont. desc.
Orientation: 294/80; 230/80; 170/15
Aperture: 7
Infilling: Gravel, plants, gravel, soil, silt, blocks
Roughness: 4
Type: J
Persistence: 3

Number of joint sets
1. Massive, occas random joints
2. One joint set
3. One joint set plus random
4. Two joint sets
5. Two joint sets plus random
6. Three joint sets
7. Three joint sets plus random
8. Four or more joint sets
9. Crushed rock, earth-like

3c) Grain size
1. very coarse (>60 mm)
2. coarse (2-60 mm)
3. medium (60µ to 2mm)
4. fine (2-60 µ)
5. very fine (<2 µ)

3d) Fabric
1. Fine fabric (< 25mm)
2. Coarse fabric (25 - 100mm)
3. Massive (No fabric observed)

Joint spacing
1. Extremely close spacing (<20 mm)
2. Very close spacing (20-60mm)
3. Close spacing (60-200mm)
4. Moderate spacing (200-600mm)
5. Wide spacing (600mm-2m)
6. Very wide spacing (2-6m)
7. Extremely wide spacing (>6m)

Texture
1. Crystalline
2. Granular
3. Glassy

Block shape
1. massive
2. blocky
3. tabular
4. columnar
5. irregular
6. crushed

Seepage (unfilled)
1. tight/dry, flow not appear possible
2. dry, no evidence of flow
3. dry, evidence of flow (staining)
4. damp, no free water
5. seepage/drips, not continuous
6. contin flow (l/min & pressure)

Seepage (filled)
1. infill consolidated/dry, flow unlikely dt low perm
2. infill damp no free water
3. infill wet, occasional drip
4. cont. flow with outwash (l/min)
5. washed out locally (l/min & pressure)
6. washed out completely (l/min & pressure)

Block size
1. Very large blocks (<1.0 j/m^3)
2. Large blocks (1-3)
3. Medium-sized blocks (3-10)
4. Small blocks (10-30)
5. Very small blocks (>30)

Comments
Grain size: coarse/medium:10%/90%.
Fabric: almost slaty. Perhaps too coarse to be rated as fabric, maybe moreso block shape?
Schmidt: 48, 48, 48, 47, 48, 50, 50, 51, 48, 47, 50, 49, 49, 48, 50, 50, 51, 48, 50, 49.
Avg = 48.95.
Outcrop face: 260/70
Discontinuity surface weathering: low

Igneous rocks

Grain size	Texture
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)
	Porphyritic (Ige phenocrysts enclosed in fine grained matrix)

Rock mass field description data sheet: 05_06_01

Location: Putauaki rd-Mckee rd intersection, right at first fork (towards water supply), right again, indurated andesitic outcrop. Accessed via mt bike.

Sample: 05_06_01 Photo: 05_06_11-12 Slope height: 10 Slope length: 15 Waypoint: 106

Easting: 2837088 Northing: 6336260 Elevation: 293 Date: 05/06/2006 Sheet: 1 of 1 Sketch: no Accompany scanline: no

1) Weathering	**2) Color**			**3a) Bedding (inclination)**	**3b) Bedding (thickness)**	**4) ROCK NAME**
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gen	Lami	Indurated andesite
3. Moderately weathered		3. yellowish	3. Yellow	Mod	Very	
4. Highly weathered		4. brownish	4. Brown	Ste	Thin (	**5) Compressive Strength (Mpa)**
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	R0 Extremely weak rock: compressive strength = 0.25-1.0
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	point load = <1
6) General discont. desc.		7. bluish	7. Blue	**3c) Grain size**	Thick (0.6 - 2m)	R1 Very weak rock: compressive strength = 1.0-5.0
Orientation: 300/80; 050/80; 220/45; 028/35		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	point load = <1
Aperture: 7			9. Grey	2. coarse (2-60 mm)	**3d) Fabric**	R2 Weak rock: compressive strength = 5.0-20
			10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	point load = <1
Infilling: Gravel. Roots	**Number of joint sets**			4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	R3 Medium strong rock: compressive strength = 20-50
Roughness: 5	1. Massive, occas random joints			5. very fine (<2 µ)	3. Massive (No fabric observed)	point load = 1-2
Type: J	2. One joint set			**Joint spacing**	**Texture**	R4 Strong rock: compressive strength = 50-100
Persistence: 3	3. One joint set plus random			1. Extremely close spacing (<20 mm)	1. Crystalline	point load = 2-5
Block shape	4. Two joint sets			2. Very close spacing (20-60mm)	2. Granular	R5 Very strong rock: compressive strength = 100-250
1. massive	5. Two joint sets plus random			3. Close spacing (60-200mm)	3. Glassy	point load = 5-10
2. blocky	6. Three joint sets			4. Moderate spacing (200-600mm)	**Comments**	R6 Extremely strong rock: compressive strength = >250
3. tabular	7. Three joint sets plus random			5. Wide spacing (600mm-2m)		point load = >10
4. columnar	8. Four or more joint sets			6. Very wide spacing (2-6m)		
5. irregular	9. Crushed rock, earth-like			7. Extremely wide spacing (>6m)		
6. crushed	**Seepage (unfilled)**			**Seepage (filled)**		
Block size	1. Tight/dry, flow not appear possible			1. infill consolidated/dry, flow unlikely dt low perm		
1. Very large blocks (<1.0 j/m^3)	2. dry, no evidence of flow			2. infill damp no free water		
2. Large blocks (1-3)	3. dry, evidence of flow (rust staining)			3. infill wet, occasional drip		
3. Medium-sized blocks (3-10)	4. damp, no free water			4. cont. flow with outwash (l/min)		
4. Small blocks (10-30)	5. occasional drips, not contin			5. washed out locally (l/min & pressure)		
5. Very small blocks (>30)	6. contin flow (l/min & pressure)			6. washed out completely (l/min & pressure)		

Not applicable

Not applicable

Igneous rocks	Texture
Grain size	Porphyritic (lge phenocrysts enclosed in fine grained matrix)
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)

Comments

Grain size: coarse/medium:15%/85%.
Seepage (filled): heavy rain previous night.
Outcrop face: 300/85
Discontinuity surface weathering: low

Rock mass field description data sheet: 20_08_01 (direct shear cores)

Location: 50m along McKee rd from McKee - Tarawera rd junction. Ignimbrite outcrop.

Sample: 20_08_01 Photo: 20_08_02-3 (closeup of ignimbrite description outcrop), 04 (outcrop from far away), 5-6 (join of outcrop from far away), 7-10 (sampling closeup), 11-12 (sampling far away), 13-14 (outcrop of ignimbrite without car) Slope height: 15 m Slope length: 50 m Waypoint:113

Easting: 2837387 Northing: 6338652 Elevation: 93 m Date: 20/08/06 Sheet: 1 of 1 Sketch: no Accompany scanline: no

1) Weathering	**2) Color**			**3a) Bedding (inclination)**	**3b) Bedding (thickness)**	**4) ROCK NAME**
1. Unweathered/ fresh	1. Light	1. pinkish	1.Pink	Sub-horizontal (0 - 5)	Thinly laminated (< 2mm)	
2. Slightly weathered	2. Dark	2. reddish	2. Red	Gen	Lami	Matahina Ignimbrite
3. Moderately weathered		3. yellowish	3. Yellow	Mod	Very	
4. Highly weathered		4. brownish	4. Brown	Ste	Thin (	**5) Compressive Strength (Mpa)**
5. Completely weathered		5. olive	5. Olive	Very steeply inclined (61 - 80)	Mod thin (60 - 200mm)	R0 Extremely weak rock: compressive strength = 0.25-1.0
6. Residual soil		6. greenish	6. Green	Sub-vertical (81 - 90)	Mod thick (0.2 0.6mm)	point load = <1
6) General discont. desc.		7. bluish	7. Blue	**3c) Grain size**	Thick (0.6 - 2m)	R1 Very weak rock: compressive strength = 1.0-5.0
Orientation:		8. greyish	8. White	1. very coarse (>60 mm)	Very thick (> 2m)	point load = <1
Aperture:			9. Grey	2. coarse (2-60 mm)	**3d) Fabric**	R2 Weak rock: compressive strength = 5.0-20
			10. Black	3. medium (60µ to 2mm)	1. Fine fabric (< 25mm)	point load = <1
Infilling:	**Number of joint sets**			4. fine (2-60 µ)	2. Coarse fabric (25 - 100mm)	R3 Medium strong rock: compressive strength = 20-50
Roughness:	1. Massive, occas random joints			5. very fine (<2 µ)	3. Massive (No fabric observed)	point load = 1-2
Type:	2. One joint set			**Joint spacing**	**Texture**	R4 Strong rock: compressive strength = 50-100
Persistenc				close spacing (<20 mm)	1. Crystalline	point load = 2-5
Block sha				spacing (20-60mm)	2. Granular	R5 Very strong rock: compressive strength = 100-250
1. massive				cing (60-200mm)	3. Glassy	point load = 5-10
2. blocky				spacing (200-600mm)	**Comments**	R6 Extremely strong rock: compressive strength = >250
3. tabular				cing (600mm-2m)		point load = >10
4. columna				spacing (2-6m)		
5. irregula				wide spacing (>6m)		
6. crushed				)		
Block siz				ated/dry, flow unlikely dt low perm		
1. Very lar				free water		
2. Large blocks (1-3)	4. damp, no free water			sional drip		
3. Medium-sized blocks (3-10)	5. occasional drips, not contin			4. cont. flow with outwash (l/min)		
4. Small blocks (10-30)	6. contin flow (l/min & pressure)			5. washed out locally (l/min & pressure)		
5. Very small blocks (>30)				6. washed out completely (l/min & pressure)		

Not applicable

Not applicable

Igneous rocks	Texture
Grain size	Porphyritic (lge phenocrysts enclosed in fine grained matrix)
Aphanitic (minerals not visible to naked eye)	Aphyric (no phenocrysts present)
Phaneritic (minerals visible to naked eye)	Glomeroporphyritic (phenocrysts grouped in clusters)

Comments

Questionable as to whether rock mass or soil description is better. Therefore both were carried out. Refer to soil field description data sheet 20_08_01 for further
Grain size incorporating pumice, lithic and ignimbrite matrix.
No discontinuities present in outcrop, therefore discontinuity description is difficult.
Schmidt: 10-12 maximum. However, this is bottom of the scale so questionable.
Penetrometer doesn't break surface.

Soft Rocks

Soft rock field description data sheet (coarse soil): 03_04_01a (describing block and ash flow in entirety)

Location: Block and ash flow outcrop, McKee Road, below north-eastern flank

Sample: 03_04_06 Photo: 03_04_18 Slope height: 3 m (limiting?) Slope length: 20 m Waypoint: 74

Easting: 2838731 Northing: 6338242 Elevation: 128 m Date: 03/04/2006 Sheet: 1 of 1 Sketch: no Accompany scanline: no

Classification

1) Soil grou	2) Proportions of particle sizes	3) Max. Particle size (mm)	6) Particle weathering & strength	7) Other material
1. Coarse	1. Sand % - 30		Slightly weathered, very strong	
2. Fine	2. Gravel % - 35	850 mm		8) Color
3. Organic	3. Cobbles % - 30	4) Grading	5) Particle shape	1. Light 1. pinkish 1.Pink
	4. Boulders % - 5	1. Well graded	1. Rounded	2. reddish 2. Red
	Major:	2. Poorly graded - uniform	2. Subrounded	2. Dark 3. yellowish 3. Yellow
	Subordinate: sandy, gravelly and cobble rich	3. Poorly graded - gap	3. Subangular	4. brownish 4. Brown
	Minor: with minor boulders		4. Angular	5. olive 5. Olive
			Equidimensional	6. greenish 6. Green
			Flat &/or Elongated	7. bluish 7. Blue
			Irregular	8. greyish 8. White
				9. Grey
				10. Black

9) Geological information (minerals, parent rock, geological unit)

Clasts of Indurated andesite.

Undisturbed characteristics

1) Relative density	2) Structure	3) Moisture condition	4) Lithology
1. Loosely packed or 'Very loose'	1. Homogenous	1. Dry	
'Loose'	2. Bedded	2. Moist	Indurated, non-vesicular andesite. Monolithologic deposit.
'Medium dense'	3. Fissured	3. Wet	
'Dense'	4. Polished	4. Saturated	
5. Tightly packed or 'Very Dense'	5. Slickensided	**Additional comments**	
	6. Blocky	Ratio of blocks to matrix 60:40. Matrix supported.	
	7. Lensoidal		

Inverted commas indicate no testing to support assigned term.

Soft rock field description data sheet (fine soil): 03_04_02b (describing block and ash flow matrix)

Location: Block and ash flow outcrop, McKee Road, below north-eastern flank

Sample: 03_04_07 Photo: 03_04_18 Slope height: 3 m (limiting?) Slope length: 20 m Waypoint: 74

Easting: 2838731 Northing: 6338242 Elevation: 128 m Date: 03/04/2006 Sheet: 1 of 1 Sketch: no Accompany scanline: no

Classification

1) Soil grou	2) Proportions of particle sizes	3) Plasticity	4) Color	5) Geological information
1. Coarse	1. Clay % -	1. High	1. Light 1. pinkish 1.Pink	
2. Fine	2. Silt % - 35	2. Low	2. Dark 2. reddish 2. Red	
3. Organic	3. Other % - 40 (sand), 25 (gravel)		3. yellowish 3. Yellow	
			4. brownish 4. Brown	
	Major:		5. olive 5. Olive	
	Subordinate: silty, sandy		6. greenish 6. Green	
	Minor: with some gravel		7. bluish 7. Blue	
			8. greyish 8. White	
			9. Grey	
			10. Black	

Undisturbed characteristics

1) Soil strength	2) Structure	3) Moisture condition	4) Granular soil (gravel/sand) Cohesive soil (silt/clay)
1. Very soft	1. Homogenous	1. Dry	
2. Soft	2. Bedded	2. Moist	
3. Firm	3. Fissured	3. Wet	
4. Stiff	4. Polished	4. Saturated	
5. Very stiff	5. Slickensided	**Additional comments**	
6. Hard	6. Blocky		
	7. Lensoidal	Presence of coarse material (refer soil field description data sheet 03_04_01a). Shows dilatent behaviour due to silt fraction.	

Soft rock field description data sheet (coarse soil): 03_04_02a (describing block and ash flow in entirety)

Location: Block and ash flow outcrop, McKee Road, below eastern flank

Sample: 03_04_07 Photo: 03_04_19 Slope height: 3 m (limiting?) Slope length: 20 m Waypoint: 76

Easting: 2839232 Northing: 6337325 Elevation: 197 m Date: 03/04/2006 Sheet: 1 of 1 Sketch: no Accompany scanline: no

Classification

1) Soil grou	2) Proportions of particle sizes	3) Max. Particle size (mm)	6) Particle weathering & strength	7) Other material
1. Coarse	1. Sand % - 35	950 mm	Slightly weathered, very strong	
2. Fine	2. Gravel % - 30			
3. Organic	3. Cobbles % - 30			
	4. Boulders % - 5			
	Major:			
	Subordinate: sandy, gravelly and cobble rich			
	Minor: with minor boulders			

4) Grading	5) Particle shape
1. Well graded	1. Rounded
2. Poorly graded - uniform	2. Subrounded
3. Poorly graded - gap	3. Subangular
	4. Angular
	Equidimensional
	Flat &/or Elongated
	Irregular

9) Geological information (minerals, parent rock, geological unit)

Clasts of Indurated andesite.

8) Color		
1. Light	1. pinkish	1.Pink
2. Dark	2. reddish	2. Red
	3. yellowish	3. Yellow
	4. brownish	4. Brown
	5. olive	5. Olive
	6. greenish	6. Green
	7. bluish	7. Blue
	8. greyish	8. White
		9. Grey
		10. Black

Undisturbed characteristics

1) Relative density	2) Structure	3) Moisture condition	4) Lithology
1. Loosely packed or 'Very loose'	1. Homogenous	1. Dry	
'Loose'	2. Bedded	2. Moist	Indurated, non-vesicular andesite. Monolithologic deposit.
'Medium dense'	3. Fissured	3. Wet	
'Dense'	4. Polished	4. Saturated	
5. Tightly packed or 'Very Dense'	5. Slickensided	**Additional comments**	
	6. Blocky	Ratio of blocks to matrix 60:40. Matrix supported.	
	7. Lensoidal		

Inverted commas indicate no testing to support assigned term.

Soft rock field description data sheet (fine soil): 03_04_02b (describing block and ash flow matrix)

Location: Block and ash flow outcrop, McKee Road, below eastern flank

Sample: 03_04_07 Photo: 03_04_19 Slope height: 3 m (limiting?) Slope length: 20 m Waypoint: 76

Easting: 2839232 Northing: 6337325 Elevation: 197 m Date: 03/04/2006 Sheet: 1 of 1 Sketch: no Accompany scanline: no

Classification

1) Soil grou	2) Proportions of particle sizes	3) Plasticity
1. Coarse	1. Clay % -	1. High
2. Fine	2. Silt % - 35	2. Low
3. Organic	3. Other % - 40 (sand), 25 (gravel)	
	Major:	
	Subordinate: silty, sandy	
	Minor: with some gravel	

4) Color		
1. Light	1. pinkish	1.Pink
2. Dark	2. reddish	2. Red
	3. yellowish	3. Yellow
	4. brownish	4. Brown
	5. olive	5. Olive
	6. greenish	6. Green
	7. bluish	7. Blue
	8. greyish	8. White
		9. Grey
		10. Black

5) Geological information

Undisturbed characteristics

1) Soil strength	2) Structure	3) Moisture condition	4) Granular soil (gravel/sand) Cohesive soil (silt/clay)
1. Very soft	1. Homogenous	1. Dry	
2. Soft	2. Bedded	2. Moist	
3. Firm	3. Fissured	3. Wet	
4. Stiff	4. Polished	4. Saturated	
5. Very stiff	5. Slickensided	**Additional comments**	
6. Hard	6. Blocky		
	7. Lensoidal	Presence of coarse material (refer soil field description data sheet 03_04_01a). Shows dilatent behaviour due to silt fraction.	

Soft rock field description data sheet (coarse soil): 19_08_01a (describing block and ash flow in entirety)

Location: McKee rd quarry. Approx. 250m from McKee-Tarawera rd junction. Outcrops of block and ash flow.

Sample: 19_08_01. Sample for Laboratory testing collected here. Photo: 19_08_01, 2 (site description), 3 (closeup of matrix finer constituents suggesting clast? supported), 4, 7-9, (large constituents appear matrix supported), 5 (closeup of 6), 6 (shows matrix?). Slope height: 20 m Slope length: 100 m Waypoint: 109

Easting: 2838106 Northing: 6338508 Elevation: 138 m Date: 19/08/2006 Sheet: 1 of 1 Sketch: no Accompany scanline: no

Classification

1) Soil grou	2) Proportions of particle sizes	3) Max. Particle size (mm)	6) Particle weathering & strength	7) Other material
1. Coarse	1. Sand % - 35		Slightly weathered, very strong	
2. Fine	2. Gravel % - 30	3000 mm		8) Color
3. Organic	3. Cobbles % - 20	4) Grading	5) Particle shape	1. Light: 1. pinkish, 2. reddish, 3. yellowish, 4. brownish, 5. olive, 6. greenish, 7. bluish, 8. greyish
	4. Boulders % - 15	1. Well graded	1. Rounded	2. Dark: 1.Pink, 2. Red, 3. Yellow, 4. Brown, 5. Olive, 6. Green, 7. Blue, 8. White, 9. Grey, 10. Black
	Major:	2. Poorly graded - uniform	2. Subrounded	
	Subordinate: sandy and gravelly	3. Poorly graded - gap	3. Subangular	
	Minor: with some cobbles and boulders		4. Angular	
			Equidimensional	
			Flat &/or Elongated	
			Irregular	

9) Geological information (minerals, parent rock, geological unit)

indurated andesite clasts.

Undisturbed characteristics

1) Relative density	2) Structure	3) Moisture condition	4) Lithology
1. Loosely packed or 'Very loose'	1. Homogenous	1. Dry	Indurated, non-vesicular andesite. Monolithologic deposit.
'Loose'	2. Bedded	2. Moist	
'Medium dense'	3. Fissured	3. Wet	
'Dense'	4. Polished	4. Saturated	
5. Tightly packed or 'Very Dense'	5. Slickensided	**Additional comments**	
	6. Blocky	Particle size proportion name representative of how poorly sorted.	
Inverted commas indicate no testing to support assigned term.	7. Lensoidal	Moisture content: weather dependent.	
		Clasts often tabular or flat.	
		Ratio of blocks to matrix 50:50. Matrix supported.	

Soft rock field description data sheet (fine soil): 19_08_01b (describing block and ash flow matrix)

Location: McKee rd quarry. Approx. 250m from McKee-Tarawera rd junction. Outcrops of block and ash flow.

Sample: 19_08_02 Photo: 19_08_01, 2 (site description), 3 (closeup of matrix finer constituents suggesting clast? supported), 4, 7-9, (large constituents appear matrix supported), 5 (closeup of 6), 6 (shows matrix?). Slope height: 20 m Slope length: 100 m Waypoint: 109

Easting: 2838106 Northing: 6338508 Elevation: 138 m Date: 19/08/2006 Sheet: 1 of 1 Sketch: no Accompany scanline: no

Classification

1) Soil grou	2) Proportions of particle sizes	3) Plasticity	4) Color	5) Geological information
1. Coarse	1. Clay % -	1. High	1. Light: 1. pinkish, 2. reddish, 3. yellowish, 4. brownish, 5. olive, 6. greenish, 7. bluish, 8. greyish	Large phenocrysts of ???, indurated andesite.
2. Fine	2. Silt % - 50	2. Low	2. Dark: 1.Pink, 2. Red, 3. Yellow, 4. Brown, 5. Olive, 6. Green, 7. Blue, 8. White, 9. Grey, 10. Black	
3. Organic	3. Other % - 35 (sand), 15 (gravel)			
	Major: SILT			
	Subordinate: sandy			
	Minor: with some gravel			

Undisturbed characteristics

1) Soil strength	2) Structure	3) Moisture condition	4) **Granular soil** (gravel/sand)
1. Very soft	1. Homogenous	1. Dry	**Cohesive soil** (silt/clay)
2. Soft	2. Bedded	2. Moist	
3. Firm	3. Fissured	3. Wet	
4. Stiff	4. Polished	4. Saturated	
5. Very stiff	5. Slickensided	**Additional comments**	
6. Hard	6. Blocky	Shows dilatent behaviour due to silt fraction.	
	7. Lensoidal	Presence of coarse material (refer soil field description data sheet 19_08_01a).	
		Color: no evidence of brownish oxidising seen at a large scale (thus no brownish color).	
		Moisture content: weather dependent.	

Soft rock field description data sheet (coarse soil): 19_08_02a (describing block and ash flow in entirety)

Location: Haulage rd, 200m before 1st opening at the base of 100m walking track.

Sample: 19_08_02 (block and ash flow matrix); 19_08_03 (range of oxidising on clasts) Photo: 19_08_09, 12, 13 (oxidised clasts), 10, 14-15 (site description - note smaller clasts, less matrix), 11 (closeup showing a matrix that is coarser? than description 19_08_01b), 20_08_01 (large boulder from block and ash deposit) Slope height: 4 m (limiting?) Slope length: 50 m Waypoint: 110
Easting: 2837098 Northing: 6338438 Elevation: 139 m Date: 19/08/2006 Sheet: 1 of 1 Sketch: no Accompany scanline: no

Classification

1) Soil grou	2) Proportions of particle sizes	3) Max. Particle size (mm)	6) Particle weathering & strength	7) Other material
1. Coarse	1. Sand % - 30	1000 mm	Slightly weathered, very strong	
2. Fine	2. Gravel % - 35 (medium)			
3. Organic	3. Cobbles % - 25			
	4. Boulders % - 10			
	Major:			
	Subordinate: sandy, gravelly and cobble rich			
	Minor: with minor boulders			

4) Grading	5) Particle shape
1. Well graded	1. Rounded
2. Poorly graded - uniform	2. Subrounded
3. Poorly graded - gap	3. Subangular
	4. Angular
	Equidimensional
	Flat &/or Elongated
	Irregular

9) Geological information (minerals, parent rock, geological unit)

Clasts of Indurated andesite.

8) Color		
1. Light	1. pinkish	1.Pink
2. Dark	2. reddish	2. Red
	3. yellowish	3. Yellow
	4. brownish	4. Brown
	5. olive	5. Olive
	6. greenish	6. Green
	7. bluish	7. Blue
	8. greyish	8. White
		9. Grey
		10. Black

Undisturbed characteristics

1) Relative density	2) Structure	3) Moisture condition	4) Lithology
1. Loosely packed or 'Very loose'	1. Homogenous	1. Dry	Indurated, non-vesicular andesite. Monolithologic deposit.
'Loose'	2. Bedded	2. Moist	
'Medium dense'	3. Fissured	3. Wet	
'Dense'	4. Polished	4. Saturated	
5. Tightly packed or 'Very Dense'	5. Slickensided		
	6. Blocky		
	7. Lensoidal		

Inverted commas indicate no testing to support assigned term.

Additional comments

Clasts more red in appearance than at description 19_08_01. Still similarly indurated andesite though. Older flow as different flow lobe? More weathered? Different composition?
Less boulders than description 19_08_01. End of flow lobe? But matrix seems coarser (sample 19_08
Color: overall is light grey but presence of red clasts (5% of total clasts) throughout deposit, not just at surface.
Relative density: still can extract clasts with fingers, but when plucking them out can feel clasts grinding against adjacent clasts thus altenative rating (could suggest a more clast supported deposit?). Makes sense as less sand than description
Ratio of blocks to matrix 60:40. Matrix supported.
Main difference from description 19_08_01 is the narrower range of clast sizes and the presence of red clasts.

Soft rock field description data sheet (fine soil): 19_08_02b (describing block and ash flow matrix)

Location: Haulage rd, 200m before 1st opening at the base of 100m walking track.

Sample: 19_08_02 (block and ash flow matrix); 19_08_03 (range of oxidising on clasts) Photo: 19_08_09, 12, 13 (oxidised clasts), 10, 14-15 (site description - note smaller clasts, less matrix), 11 (closeup showing a matrix that is coarser? than description 19_08_01b), 20_08_01 (large boulder from block and ash deposit) Slope height: 4 m (limiting?) Slope length: 50 m Waypoint: 110

Easting: 2837098 Northing: 6338438 Elevation: 139 m Date: 19/08/2006 Sheet: 1 of 1 Sketch: no Accompany scanline: no

Classification

1) Soil grou	2) Proportions of particle sizes	3) Plasticity
1. Coarse	1. Clay % -	1. High
2. Fine	2. Silt % - 40	2. Low
3. Organic	3. Other % - 40 (sand), 20 (gravel)	
	Major:	
	Subordinate: silty, sandy	
	Minor: with some gravel	

4) Color			5) Geological information
1. Light	1. pinkish	1.Pink	
2. Dark	2. reddish	2. Red	
	3. yellowish	3. Yellow	
	4. brownish	4. Brown	
	5. olive	5. Olive	
	6. greenish	6. Green	
	7. bluish	7. Blue	
	8. greyish	8. White	
		9. Grey	
		10. Black	

Undisturbed characteristics

1) Soil strength	2) Structure	3) Moisture condition	4) Granular soil (gravel/sand) Cohesive soil (silt/clay)
1. Very soft	1. Homogenous	1. Dry	
2. Soft	2. Bedded	2. Moist	
3. Firm	3. Fissured	3. Wet	
4. Stiff	4. Polished	4. Saturated	
5. Very stiff	5. Slickensided		
6. Hard	6. Blocky		
	7. Lensoidal		

Additional comments

Color: no red as seen at larger scale in clasts.
Presence of coarse material (refer soil field description data sheet 19_08_02a).
Shows dilatent behaviour due to silt fraction.

Soft rock field description data sheet (fine soil): 20_08_01 (direct shear cores)

Location: 50m along McKee rd from McKee - Tarawera rd junction. Ignimbrite outcrop.

Sample: 20_08_01 Photo: 20_08_02-3 (closeup of ignimbrite description outcrop), 04 (outcrop from far away), 5-6 (join of outcrop from far away), 7-10 (sampling closeup), 11-12 (sampling far away), 13-14 (outcrop of ignimbrite without car) Slope height: 15 m Slope length: 50 m Waypoint:113
Easting: 2837387 Northing: 6338652 Elevation: 93 m Date: 20/08/06 Sheet: 1 of 1 Sketch: no Accompany scanline: no

Classification

1) Soil grou	2) Proportions of particle sizes	3) Plasticity	4) Color			5) Geological information
		1. High	1. Light	1. pinkish	1.Pink	
1. Coarse	1. Clay % -	2. Low	2. Dark	2. reddish	2. Red	Matahina Ignimbrite.
2. Fine	2. Silt % - 70			3. yellowish	3. Yellow	
3. Organic	3. Other % - 10 (sand), 20 (gravel)			4. brownish	4. Brown	
				5. olive	5. Olive	
	Major: SILT			6. greenish	6. Green	
	Subordinate:			7. bluish	7. Blue	
	Minor: with some sand and gravel			8. greyish	8. White	
					9. Grey	
					10. Black	

Undisturbed characteristics

1) Soil strength	2) Structure	3) Moisture condition	4) Granular soil (gravel/sand)
1. Very soft	1. Homogenous	1. Dry	Cohesive soil (silt/clay)
2. Soft	2. Bedded	2. Moist	
3. Firm	3. Fissured	3. Wet	
4. Stiff	4. Polished	4. Saturated	
5. Very stiff	5. Slickensided		
6. Hard	6. Blocky		
	7. Lensoidal		

Additional comments

Coarse material: pumice & lithic approx. 12-20% = some, max clast < 70 mm (pumice) = coarse pebbles, < 15 mm (lithics) = medium pebbles, pumice well graded, lithics poorly graded (all similar sizes), subrounded - subangular shape (pumice), subangular shape (lithics), pumice very weak, lithics strong, pumice greyish white, lithics brownish black.

APPENDIX G: UNIT WEIGHT AND POROSITY DATA

HARD ROCKS

Waypoint: 12 RMD: 20_02_02 Scanline: 20_02_02 Sample: 20_02_02 Lithotechnical unit: Indurated andesite
Waypoint: 26 RMD: 26_02_01 Scanline: 26_02_01 Sample: 26_02_01 Lithotechnical unit: Indurated andesite

Formula	1	2	2 - 1	A	B	B - A	C	C - A	$(M_{sat} - Msub)/\rho_w$	$(M_{sat} - M_s)/\rho_w$	$100V_v/V$	M_s/V				
	Saturated-submerged mass of basket (g)	Saturated-submerged mass of basket plus sample (g)	M_{sub} (Saturated submerged mass of sample (g))	Mass of container (g)	Mass of saturated-surface-dry sample plus container (g)	M_{sat} (Saturated-surface-dry mass of sample (g))	Mass of oven-dry sample plus container (g)	M_s (Grain weight (g))	V (Bulk volume (m^3))	V_v (Pore volume (m^3))	n (Porosity (%))	Dry density of rock (g/m^3)	Dry density of rock (kg/m^3)	Unit weight of rock (Nm^3)	Unit weight of rock (kN m3	
1	7.65	177.3	169.65	10.28	433.15	422.87	420.16	409.88	0.000165108	1.30102E-05	7.8798625	2482503.82	2482.50382	24353.3625	24.3533625	
2	7.26	158.82	151.56	10.44	389.14	378.7	377.77	367.33	0.000146596	1.13877E-05		2505731.81	2505.731813	24581.2291		Maximum
3	7.31	138.81	131.5	10.53	337.62	327.09	327.32	316.79	0.000126644	1.03161E-05	8.1457262	2501426.56	2501.426561	24538.9946	24.5389946	
4	7.71	179.45	171.74	10.33	438.91	428.58	425.47	415.14	0.00016786	1.34609E-05	8.0191346	2473127.61	2473.127612	24261.3819	24.2613819	
5	7.7	212.04	204.34	10.47	505.49	495.02	478.17	467.7	0.000201457	2.73626E-05	13.582317	2321583.18	2321.583178	22774.731	22.774731	
6	8.05	209.18	201.13	13.36	496.54	483.18	472.59	459.23	0.000202963	2.39873E-05	11.818563	2262627.81	2262.627806	22196.3788	22.1963788	
7	8	215.91	207.91	10.66	506.55	495.89	478.36	467.7	0.000210289	2.82339E-05	13.426255	2224082.52	2224.08252	21818.2495	21.8182495	
8	7.95	284.13	276.18	10.26	654.66	644.4	607.59	597.33	0.000265938	4.71434E-05	17.72722	2246127.9	2246.127903	22034.5147	22.0345147	
9	7.75	294.03	286.28	10.51	693.74	683.23	653.19	642.68	0.000292166	4.06132E-05	13.900724	2199708.06	2199.708065	21579.1361	21.5791361	
10	7.9	242.11	234.21	13.66	522.7	509.04	463.11	449.45	0.000251003	5.96829E-05		1790613.24	1790.61324	17565.9159		Minimum
11	7.18	290.9	283.72	10.52	678.1	667.58	632.79	622.27	0.000287271	4.53806E-05	15.797118	2166139.33	2166.139327	21249.8268	21.2498268	
12	6.38	265.12	258.74	2.08	623.47	621.39	595.18	593.1	0.000268843	2.83341E-05	10.539261	2206118.46	2206.118463	21642.0221	21.6420221	
13	8.34	215.63	207.29	2.06	514.08	512.02	497.66	495.6	0.000212885	1.64456E-05	7.7251064	2328017.96	2328.017955	22837.8561	22.8378561	
14	7.71	237.26	229.55	2.08	567.98	565.9	548.97	546.89	0.000234321	1.90396E-05	8.125439	2333933.14	2333.933137	22895.8841	22.8958841	
15	8.04	348.62	340.58	2.08	839.08	837	808.38	806.3	0.000349465	3.07478E-05	8.7985367	2307238.26	2307.238258	22634.0073	22.6340073	
16	7.94	263.05	255.11	2.09	648.61	646.52	606.28	604.19	0.00025934	4.2396E-05	16.347653	2329723.53	2329.723532	22854.5879	22.8545879	
17	7.78	350.64	342.86	10.27	855.28	845.01	826.28	816.01	0.000340348	2.90452E-05		2397572.97	2397.57297	23520.1908		Maximum
18	7.8	239.76	231.96	2.07	574.9	572.83	556.44	554.37	0.000233772	1.84888E-05	7.9088849	2371411.88	2371.411884	23263.5506	23.2635506	
19	7.55	316.93	309.38	10.41	771.73	761.32	744.73	734.32	0.000312902	2.70421E-05	8.6423532	2346806.68	2346.806682	23022.1736	23.0221736	
20	6.36	141.97	135.61	10.5	340.06	329.56	326.41	315.91	0.00013556	1.36713E-05	10.085012	2330401.97	2330.401974	22861.2434	22.8612434	
21	7.53	218.63	211.1	2.07	505.55	503.48	478.97	476.9	0.000221389	2.66214E-05		2154128.64	2154.12864	21132.002		Minimum

ρw (density of water) = mass of water per unit volume at 18.7° = 998.444 kg/m^3 = 998444 g/m^3

Porosity(%) statistics	
Mean	11.086422
Standard Error	0.8250283
Median	10.085012
Mode	#N/A
Standard Deviation	3.401679
Sample Variance	11.57142
Kurtosis	-0.9535707
Skewness	0.6893023
Range	10.002114
Sum	188.46917
Count	17
Confidence Level(9	1.748982

Unit weight (kN/m^3) statistics	
Mean	22.7539942
Standard Error	0.23479576
Median	22.8378561
Mode	#N/A
Standard Deviation	0.96808772
Sample Variance	0.93719383
Kurtosis	-0.37896246
Skewness	0.43675544
Range	3.28916776
Sum	386.817901
Count	17
Confidence Level(95.0%)	0.49774477

Waypoint: 52 RMD: 14_03_02 Scanline: 14_03_01 Sample: 14_03_02 Lithotechnical unit: Indurated dacite

Formula	1	2	2 - 1	A	B	B - A	C	C - A	$(M_{sat} - M_{sub})/\rho_w$	$(M_{sat} - M_s)/\rho_w$	$100V_v/V$	M_s/V					
	Saturated-submerged mass of basket (g)	Saturated-submerged mass of basket plus sample (g)	M_{sub} (Saturated submerged mass of sample (g))	Mass of container (g)	Mass of saturated-surface-dry sample plus container (g)	M_{sat} (Saturated-surface-dry mass of sample (g))	Mass of oven-dry sample plus container (g)	M_s (Grain weight (g))	V (Bulk volume (m^3))	V_v (Pore volume (m^3))	n (Porosity (%))	Dry density of rock (g/m^3)	Dry density of rock (kg/m^3)	Unit weight of rock (N/m^3)	Unit weight of rock (kN/m3	Unit weight of rock (kN/m3
1	7.45	168.58	161.13	13.95	416.89	402.94	405.08	391.13	0.000161114	1.18284E-05	7.3416522	2427664.96	2427.664956	23815.3932	23.8153932	23.8153932
2	8.06	168	159.94	13.78	408.71	394.93	395.46	381.68	0.00016147	1.32706E-05	8.2186272	2363777.1	2363.777095	23188.6533	23.1886533	23.1886533
3	7.9	211.32	203.42	10.33	518.77	508.44	503.9	493.57	0.000203068	1.48932E-05		2430567.41	2430.567405	23843.8662	23.8438662	
4	7.67	175.25	167.58	13.84	432.16	418.32	419.03	405.19	0.000167996	1.31505E-05	7.827823	2411896.69	2411.896692	23660.7065	23.6607065	23.6607065
5	7.7	339.83	332.13	10.57	837.1	826.53	805.87	795.3	0.000343985	3.12787E-05		2312019.23	2312.019226	22680.9086	22.6809086	
6	8	527.75	519.75	10.45	1305.15	1294.7	1258.27	1247.82	0.000522987	4.69531E-05	8.9778555	2385946.29	2385.946286	23406.1331	23.4061331	23.4061331
7	9	350.26	341.26	10.68	859.4	848.72	831.17	820.49	0.000344505	2.8274E-05	8.207129	2381646.96	2381.646959	23363.9567	23.3639567	23.3639567
8	7.61	369.35	361.74	13.2	914.66	901.46	887.22	874.02	0.00036645	2.74828E-05	7.4997313	2385100.46	2385.10046	23397.8355	23.3978355	23.3978355
9	7.99	305.61	297.62	13.03	753.3	740.27	726.81	713.78	0.000302726	2.65313E-05	8.7641265	2357842.37	2357.842368	23130.4336	23.1304336	23.1304336
10	7.38	454.3	446.92	10.35	1127.45	1117.1	1089.38	1079.03	0.000456951	3.81293E-05	8.344301	2361371.48	2361.371484	23165.0543	23.1650543	23.1650543

ρw (density of water) = mass of water per unit volume at 18.7° = 998.444 kg/m^3 = 998444 g/m^3

Porosity(%) statistics	
Mean	8.1476557
Standard Error	0.2021426
Median	8.2128781
Mode	#N/A
Standard Deviation	0.5717457
Sample Variance	0.3268932
Kurtosis	-0.9543952
Skewness	-0.0139412
Range	1.6362033
Sum	65.181246
Count	8
Confidence Level(9	0.4779914

Unit weight (kN/m^3) statistics	
Mean	23.3910208
Standard Error	0.08595564
Median	23.3808961
Mode	#N/A
Standard Deviation	0.24311925
Sample Variance	0.05910697
Kurtosis	-0.32492647
Skewness	0.77546923
Range	0.68495959
Sum	187.128166
Count	8
Confidence Level(95.0%)	0.20325278

Waypoint: 33 RMD: 19_03_01 Scanline: 19_03_01 Sample: 19_03_01, 02 Lithotechnical unit: Scoriaceous andesite

Formula	1	2	2 - 1	A	B	B - A	C	C - A	$(M_{sat} - Msub)/\rho_w$	$(M_{sat} - M_s)/\rho_w$	$100V_v/V$	M_s/V					
	Saturated-submerged mass of basket (g)	Saturated-submerged mass of basket plus sample (g)	M_{sub} (Saturated submerged mass of sample (g))	Mass of container (g)	Mass of saturated-surface-dry sample plus container (g)	M_{sat} (Saturated-surface-dry mass of sample (g))	Mass of oven-dry sample plus container (g)	M_s (Grain weight (g))	V (Bulk volume (m^3))	V_v (Pore volume (m^3))	n (Porosity (%))	Dry density of rock (g/m^3)	Dry density of rock (kg/m^3)	Unit weight of rock (N/m^3)	Unit weight of rock (kN/m3	Unit weight of rock (kN/m3	
1	6.45	287.11	280.66	13.75	464.81	451.06	372.54	358.79	0.000317165	9.24138E-05		1131241.1	1131.241104	11097.4752	11.0974752		Minimum
2	7.92	233.27	225.35	11.38	440.6	429.22	378.87	367.49	0.000253068	6.18262E-05	24.430633	1452137.27	1452.137267	14245.4666	14.2454666	14.2454666	
3	8	251.47	243.47	10.69	522.02	511.33	471.02	460.33	0.000241253	5.10795E-05	21.172591	1908081.04	1908.081036	18718.275	18.718275	18.718275	
4	7.5	258.67	251.17	10.42	470.57	460.15	404.71	394.29	0.000255802	6.59626E-05	25.78658	1541386.32	1541.386324	15120.9998	15.1209998	15.1209998	
5	6.81	223.79	216.98	12.83	375.2	362.37	295.28	282.45	0.000226865	8.00445E-05	35.282881	1245012.92	1245.012923	12213.5768	12.2135768	12.2135768	
6	7.85	265.76	257.91	10.3	437.95	427.65	346.58	336.28	0.000275364	9.15124E-05	33.2332	1221218.25	1221.218245	11980.151	11.980151	11.980151	
7	7.54	233.97	226.43	13.18	486.03	472.85	439.06	425.88	0.000224685	4.70432E-05	20.937433	1895456.51	1895.456505	18594.4283	18.5944283	18.5944283	
8	7.52	230.94	223.42	13.32	529.87	516.55	496.37	483.05	0.000219855	3.35522E-05		2197130.17	2197.130166	21553.8469	21.5538469		Maximum
9	7.3	240.18	232.88	13.37	412.19	398.82	332.02	318.65	0.000239297	8.02949E-05	33.554534	1331609.74	1331.609742	13063.0916	13.0630916	13.0630916	
10	7.41	186.5	179.09	13.32	373.85	360.53	329.82	316.5	0.000181945	4.40986E-05	24.237295	1739533.84	1739.533843	17064.827	17.064827	17.064827	

ρw (density of water) = mass of water per unit volume at 18.7° = 998.444 kg/m^3 = 998444 g/m^3

Porosity(%) statistics	
Mean	27.329393
Standard Error	2.0527543
Median	25.108606
Mode	#N/A
Standard Deviation	5.8060661
Sample Variance	33.710403
Kurtosis	-1.885326
Skewness	0.3873319
Range	14.345449
Sum	218.63515
Count	8
Confidence Level(9	4.8539927

Unit weight (kN/m^3) statistics	
Mean	15.125102
Standard Error	0.96457808
Median	14.6832332
Mode	#N/A
Standard Deviation	2.7282388
Sample Variance	7.44328693
Kurtosis	-1.71862104
Skewness	0.28338363
Range	6.73812398
Sum	121.000816
Count	8
Confidence Level(95.0%)	2.28086471

Waypoint: 40 RMD: 20_03_01 Scanline: 20_03_01 Sample: 20_03_01 Lithotechnical unit: Altered andesite

Formula	1	2	2 - 1	A	B	B - A	C	C - A	$(M_{sat} - Msub)/\rho_w$	$(M_{sat} - M_s)/\rho_w$	$100V_v/V$	M_s/V					
	Saturated-submerged mass of basket (g)	Saturated-submerged mass of basket plus sample (g)	M_{sub} (Saturated submerged mass of sample (g))	Mass of container (g)	Mass of saturated-surface-dry sample plus container (g)	M_{sat} (Saturated-surface-dry mass of sample (g))	Mass of oven-dry sample plus container (g)	M_s (Grain weight (g))	V (Bulk volume (m^3))	V_v (Pore volume (m^3))	n (Porosity (%))	Dry density of rock (g/m^3)	Dry density of rock (kg/m^3)	Unit weight of rock (N/m^3)	Unit weight of rock (kN/m3	Unit weight of rock (kN/m3	
1	7.55	228.49	220.94	10.51	471.01	460.5	398.28	387.77	0.000224432	7.28433E-05	32.45674	1727783.1	1727.783104	16949.5522	16.9495522	16.9495522	
2	7.53	254.68	247.15	10.41	544.01	533.6	472.62	462.21	0.000260487	7.15013E-05	27.449068	1774407.13	1774.407127	17406.9339	17.4069339	17.4069339	
3	7.61	259.64	252.03	2.04	538.02	535.98	463.48	461.44	0.000260873	7.46562E-05	28.617871	1768833.19	1768.83319	17352.2536	17.3522536	17.3522536	
4	7.86	202.38	194.52	2.09	428.8	426.71	378.58	376.49	0.000201063	5.02983E-05		1872493.63	1872.49363	18369.1625	18.3691625		Maximum
E	8.08	222.72	214.64	14	461.5	447.5	390.97	376.97	0.000227214	7.06399E-05	31.089614	1659097.63	1659.097631	16275.7478	16.2757478	16.2757478	
6	7.7	334.92	327.22	13.82	703.06	689.24	597.95	584.13	0.000339193	0.000105274	31.036575	1722118.3	1722.118302	16893.9805	16.8939805	16.8939805	
7	7.91	275.46	267.55	2.11	548.36	546.25	453.38	451.27	0.000281902	9.5128E-05		1600805.79	1600.805788	15703.9048	15.7039048		Minimum
8	7.73	293.88	286.15	10.57	603.85	593.28	507.24	496.67	0.000293936	9.67606E-05	32.918866	1689718.76	1689.718755	16576.141	16.576141	16.576141	
9	7.95	276.36	268.41	13.79	573.28	559.49	490.54	476.75	0.00028029	8.28689E-05	29.56547	1700919.18	1700.919183	16686.0172	16.6860172	16.6860172	
10	7.58	269.03	261.45	13.2	572.64	559.44	496.38	483.18	0.0002741	7.63788E-05	27.86531	1762786.58	1762.786584	17292.9364	17.2929364	17.2929364	

ρw (density of water) = mass of water per unit volume at 18.7° = 998.444 kg/m^3 = 998444 g/m^3

Porosity(%) statistics	
Mean	30.124939
Standard Error	0.7301598
Median	30.301023
Mode	#N/A
Standard Deviation	2.0652039
Sample Variance	4.2650672
Kurtosis	-1.6081945
Skewness	0.0399619
Range	5.4697978
Sum	240.99951
Count	8
Confidence Level(9	1.7265537

Unit weight (kN/m^3) statistics	
Mean	16.9291953
Standard Error	0.1434244
Median	16.9217664
Mode	#N/A
Standard Deviation	0.40566545
Sample Variance	0.16456446
Kurtosis	-1.0640977
Skewness	-0.29833597
Range	1.13118616
Sum	135.433563
Count	8
Confidence Level(95.0%)	0.3391448

Soft rocks

Waypoint: 113 RMD: 20_08_01 ; Soil field description: 20_08_01 Scanline: N/A Sample: 20_08_01 Lithotechnical unit: Matahina Ignimbrite

	Length of corer (mm):	Internal diameter of corer (mm):	Volume of corer (mm^3):	Volume of corer (m^3):	Mass of oven dry soil plus tray (g)	Mass of tray (g)	Mass of oven dry soil (g):	Mass of oven dry soil (kg):	Volume of birdseed (cm^3):	Volume of birdseed (m^3):	Volume of soil (m^3):	Dry density (kg/ m^3):	Unit weight of soil (N/m^3)	Unit weight of rock (kN/m3	
1	50.30	60.35	143883.971	0.00014388	185.54	13.31	172.23	0.17223	2.90	0.0000029	0.000140984	1221.628237	11984.17	11.98	
2	49.10	60.50	141150.4031	0.00014115	175.82	10.65	165.17	0.16517	2.70	0.0000027	0.00013845	1192.990387	11703.24	11.70	
3	50.00	60.10	141843.301	0.00014184	177.01	10.46	166.55	0.16655	3.20	0.0000032	0.000138643	1201.28415	11784.60	11.78	
4	50.65	60.30	144645.1764	0.00014465	184.62	10.24	174.38	0.17438	3.40	0.0000034	0.000141245	1234.590833	12111.34		Maximum
5	50.60	60.45	145222.199	0.00014522	176.21	10.5	165.71	0.16571	3.30	0.0000033	0.000141922	1167.611559	11454.27		Minimum
6	49.30	60.35	141023.4547	0.00014102	185.88	13.29	172.59	0.17259	0.40	0.0000004	0.000140623	1227.320154	12040.01	12.04	
7	50.40	60.15	143216.0466	0.00014322	176.49	10.31	166.18	0.16618	1.00	0.000001	0.000142216	1168.503864	11463.02	11.46	
8	49.15	60.05	139200.0615	0.0001392	174.97	10.4	164.57	0.16457	1.50	0.0000015	0.0001377	1195.133817	11724.26	11.72	
9	49.90	60.25	142267.1166	0.00014227	179.03	10.49	168.54	0.16854	5.00	0.000005	0.000137267	1227.825019	12044.96	12.04	
10	50.50	59.90	142309.8314	0.00014231	171.63	10.3	161.33	0.16133	6.00	0.000006	0.00013631	1183.553661	11610.66	11.61	

Dry density

kN/m^3	N/m^3	kg/m^3	g/m^3	g/cm^3
11.79436593	11794.3659	1202.279911	1202279.911	1.20227991

Unit weight (kN/m^3) statistics

Mean	11.7943659
Standard Error	0.07512101
Median	11.7544301
Mode	#N/A
Standard Deviation	0.21247431
Sample Variance	0.04514533
Kurtosis	-1.17078201
Skewness	-0.12473174
Range	0.58194053
Sum	94.3549274
Count	8
Confidence Level(95.0%)	0.17763297

Waypoint: 109 Soil field description: 19_08_01a/b Scanline: N/A Sample: 19_08_01 Lithotechnical unit: Block and ash flow

	Volume of block (mm^3)	Volume of block (m^3)	Mass of oven dry block plus tray (g)	Mass of tray (g)	Mass of oven dry block (g)	Mass of oven dry block (kg)	Dry density (kg/m^3):	Unit weight of rock (N/m^3)	Unit weight of rock (kN/m^3)	
1	42955.77	0.000043	85.05	2.09	82.96	0.083	1931.29	18945.94	18.95	
2	32544.31	0.000033	72.63	10.36	62.27	0.062	1913.39	18770.37	18.77	
3	29960.11	0.000030	69.8	13.75	56.05	0.056	1870.82	18352.75	18.35	
4	82104.43	0.000082	156.53	13.82	142.71	0.143	1738.15	17051.27	17.05	
5	41944.57	0.000042	99.79	13.95	85.84	0.086	2046.51	20076.27	20.08	
6	15971.10	0.000016	33.03	2.08	30.95	0.031	1937.88	19010.56	19.01	
7	16147.21	0.000016	47.44	13.92	33.52	0.034	2075.90	20364.59	20.36	
8	29613.93	0.000030	50.82	13.78	37.04	0.037	1250.76	12269.98		Minimum
9	57715.47	0.000058	150.32	13.2	137.12	0.137	2375.79	23306.53		Maximum
10	81207.00	0.000081	184.21	10.58	173.63	0.174	2138.12	20974.92	20.97	
11	22485.13	0.000022	51.34	2.08	49.26	0.049	2190.78	21491.57	21.49	

Dry density

kN/m^3	N/m^3	kg/m^3	g/m^3	g/cm^3
19.44869	19448.69	1982.537597	1982538	1.98254

Unit weight (kN/m^3) statistics	
Mean	19.4486938
Standard Error	0.46530979
Median	19.0105616
Mode	#N/A
Standard Deviation	1.39592937
Sample Variance	1.94861882
Kurtosis	-0.4452981
Skewness	-0.14906
Range	4.44029161
Sum	175.038244
Count	9
Confidence Level(95.0%)	1.0730063

APPENDIX H: SCHMIDT HAMMER DATA

Indurated andesite

Waypoint	Number	*r*
12	1	39
	2	40
	3	40
	4	41
	5	41
	6	41
	7	41
	8	42
	9	42
	10	43
26	11	43
	12	43
	13	44
	14	44
	15	45
	16	45
	17	46
	18	48
	19	48
	20	50

Waypoint	Number	*r*
28	21	29
	22	29
	23	29
	24	30
	25	30
	26	30
	27	30
	28	32
	29	32
	30	34
29	31	24
	32	25
	33	25
	34	26
	35	26
	36	26
	37	27
	38	28
	39	28
	40	28

Waypoint	Number	*r*
31	41	25
	42	26
	43	26
	44	26
	45	27
	46	27
	47	28
	48	29
	49	30
	50	32
34	61	38
	62	38
	63	38
	64	39
	65	40
	66	40
	67	44
	68	46
	69	46
	70	48

Waypoint	Number	*r*
35	71	28
	72	29
	73	30
	74	30
	75	30
	76	30
	77	32
	78	32
	79	32
	80	36
46	81	39
	82	40
	83	41
	84	41
	85	41
	86	41
	87	42
	88	44
	89	45
	90	48

Waypoint	Number	*r*
47	91	38
	92	38
	93	39
	94	39
	95	40
	96	40
	97	40
	98	40
	99	40
	100	42
48	101	50
	102	50
	103	51
	104	53
	105	53
	106	53
	107	53
	108	54
	109	54
	110	54

Waypoint	Number	*r*
49	111	52
	112	52
	113	52
	114	52
	115	53
	116	53
	117	53
	118	54
	119	54
	120	55
50	121	54
	122	54
	123	54
	124	55
	125	55
	126	56
	127	56
	128	56
	129	56
	130	56
60	131	40
	132	42
	133	38

Waypoint	Number	*r*
61	134	36
	135	36
	136	37
	137	37
	138	37
	139	37
	140	37
	141	38
	142	38
	143	38
62	144	41
	145	41
	146	41
	147	41
	148	41
	149	42
	150	42
	151	43
	152	43
	153	43

Waypoint	Number	*r*
63	154	44
	155	44
	156	45
	157	45
	158	45
	159	45
	160	45
	161	45
	162	46
	163	46
72	164	47
	165	48
	166	48
	167	48
	168	48
	169	48
	170	48
	171	48
	172	49
	173	49

Waypoint	Number	*r*
73	174	44
	175	44
	176	44
	177	44
	178	45
	179	45
	180	45
	181	45
	182	45
	183	46
80	184	40
	185	40
	186	40
	187	40
	188	40
	189	40
	190	41
	191	41
	192	41
	193	42

Waypoint	Number	*r*
87	194	49
	195	50
	196	50
	197	50
	198	50
	199	50
	200	50
	201	51
	202	51
	203	58

Mean	41.21675
Standard Error	0.600981
Median	41
Mode	40
Standard Deviation	8.562659
Sample Variance	73.31912
Kurtosis	-0.80798
Skewness	-0.204898
Range	34
Minimum	24
Maximum	58
Sum	8367
Count	203
Confidence Level(95.0	1.185

Scoriaceous andesite

Waypoint	Number	*r*
2	1	16
	2	17
	3	17
	4	17
	5	18
	6	18
	7	19
	8	20
	9	20
	10	22
33	11	18
	12	18
	13	18
	14	18
	15	18
	16	18
	17	18
	18	19
	19	19
	20	19

Mean	18.35
Standard Error	0.292674
Median	18
Mode	18
Standard Deviation	1.308877
Sample Variance	1.713158
Kurtosis	2.211185
Skewness	0.990128
Range	6
Minimum	16
Maximum	22
Sum	367
Count	20
Confidence Level(95.0	0.612573

Indurated dacite

Waypoint	Number	*r*
51	1	34
	2	34
	3	36
	4	37
	5	38
	6	39
	7	39
	8	40
	9	41
	10	45
52	11	38
	12	42
	13	37
	14	35
	15	40
	16	41
	17	35
	18	35
	19	39
	20	41

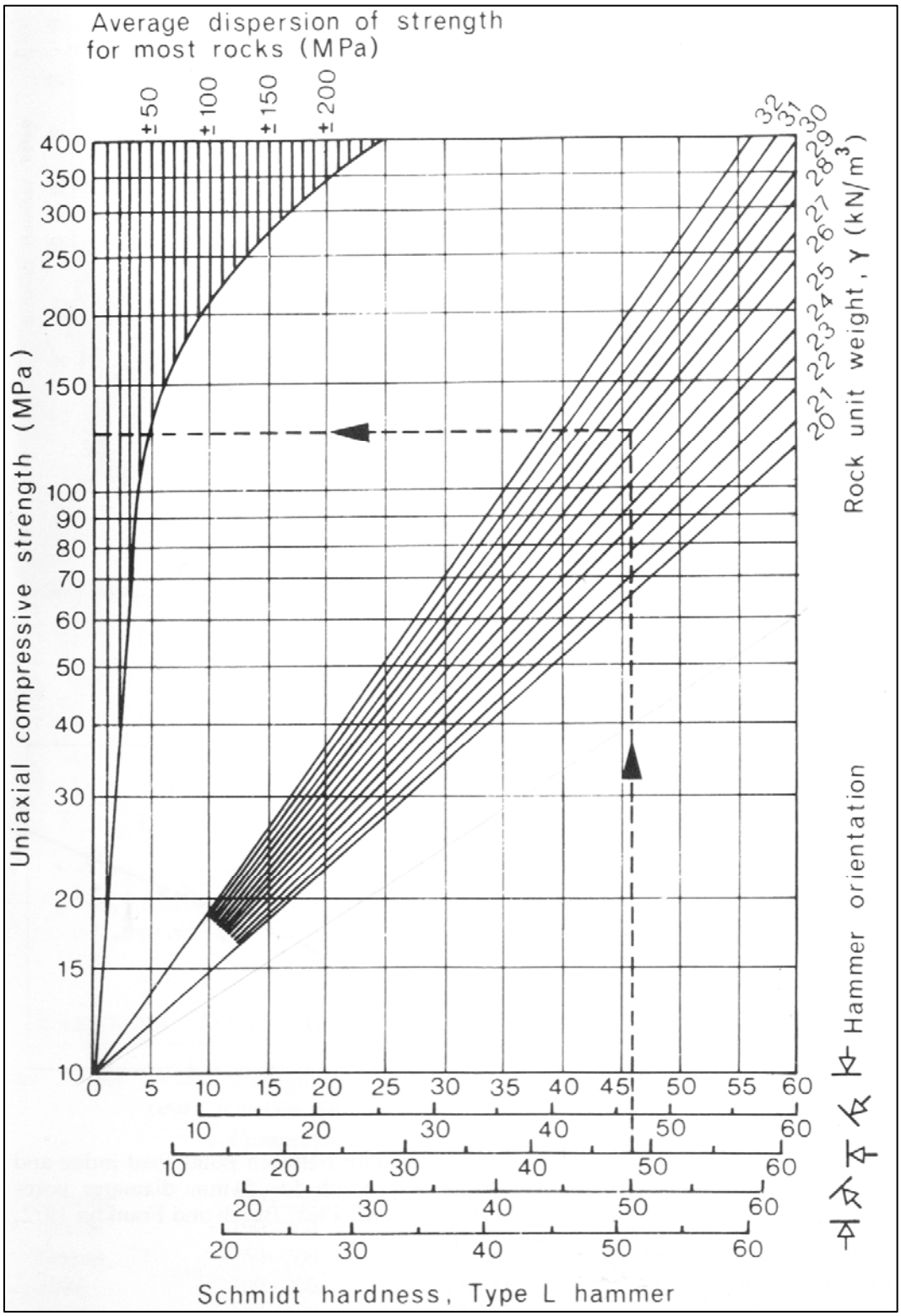
Mean	38.3
Standard Error	0.661338
Median	38.5
Mode	39
Standard Deviation	2.957595
Sample Variance	8.747368
Kurtosis	-0.279573
Skewness	0.311666
Range	11
Minimum	34
Maximum	45
Sum	766
Count	20
Confidence Level(95.0	1.384197

Altered andesite

Waypoint	Number	*r*
40	1	15
	2	15
	3	15
	4	16
	5	16
	6	16
	7	17
	8	18
	9	18
	10	20
4	1	14
	2	15
	3	15
	4	15
	5	15
	6	16
	7	18
	8	19
	9	19
	10	20

Mean	16.6
Standard Error	0.419273
Median	16
Mode	15
Standard Deviation	1.875044
Sample Variance	3.515789
Kurtosis	-0.983737
Skewness	0.598256
Range	6
Minimum	14
Maximum	20
Sum	332
Count	20
Confidence Level(95.0	0.877548

Schmidt hammer rebound-UCS correlation method (Selby 1993).



APPENDIX I: POINT LOAD DATA

Waypoint: 26 RMD: 26_02_01 Scanline: 26_02_01 Sample: 26_02_01 Lithotechnical unit: Indurated andesite
Waypoint: 12 RMD: 20_02_02 Scanline: 20_02_02 Sample: 20_02_02 Lithotechnical unit: Indurated andesite

	W (width mm)	D (distance between two platens mm)	D/W ratio	L (must be > 0.5 D)	Indicated force (units)	P (load) kN	4(W*D)/3.14 D_e^2 (mm^2)	$\sqrt{D_e^2}$ D_e (equivalent diameter (mm))	P/D_e^2 I_s (uncorrected point load strength)	$D_e/50$	$(D_e/50)^{0.45}$ F (size correction factor)	F*Is $I_{s(50)}$ (point load strength index, size	(F*Is)*? UCS (MPa)	
1	62.4	62.4	1	34	8.9	10142.29	4957.68921	70.41086003	2.045769126	1.408217	1.16654458	2.386480885	52.50	
2	59	49.2	0.833898	36.7	9.83	11202.12	3695.95975	60.79440559	3.030908705	1.215888	1.091948423	3.309595981	72.81	
3	61.1	52.7	0.86252	36.45	7.19	8193.57	4099.793137	64.02962702	1.998532438	1.280593	1.117724924	2.233809518	49.14	
4	74.55	52.7	0.706908	44.5	9.95	11338.87	5002.284425	70.7268296	2.266738105	1.414537	1.168897377	2.649584224	58.29	
5	59.7	56.6	0.948074	38.4	9.08	10347.42	4302.301886	65.59193461	2.405088253	1.311839	1.129916098	2.717547935	59.79	
6	75.8	59.55	0.78562	37.75	11.18	12740.58	5747.263249	75.81070669	2.216807821	1.516214	1.205985936	2.673439056	58.82	
7	57.7	53.5	0.92721	37.9	11.21	12774.77	3930.426813	62.69311615	3.250223643	1.253862	1.107165218	3.598534567	79.17	
8	76.95	51.8	0.673164	39.25	9.95	11338.87	5075.145558	71.24005585	2.234195766	1.424801	1.172706713	2.620056373	57.64	
9	51.4	52.8	1.027237	25	6.97	7942.857	3455.470265	58.78324817	2.298632809	1.175665	1.075542581	2.472277465	54.39	
10	64.85	52.4	0.808019	32.6	3.75	4273.342	4326.646227	65.77724703	0.987679932	1.315545	1.131351508			Minimum
11	56.5	49.7	0.879646	29.45	9.78	11145.14	3575.320304	59.79398217	3.117241416	1.19588	1.083825495	3.378545722	74.32800588	
12	52.7	49.15	0.932638	28.35	8.69	9902.971	3297.951435	57.42779323	3.002764436	1.148556	1.064310767	3.19587452	70.30923945	
13	50.4	48.65	0.965278	51.7	8.25	9401.547	3121.932434	55.87425556	3.011451074	1.117485	1.051256721	3.165808182	69.64778	
14	55.75	53.2	0.95426	28.35	9.31	10609.52	3776.301166	61.45161646	2.809501553	1.229032	1.097244691	3.082710663	67.81963458	
15	59.6	55.6	0.932886	30.45	6.07	6917.216	4219.210274	64.95544838	1.639457587	1.299109	1.124968887	1.844338777	40.57545309	
16	56.4	53.4	0.946809	33.725	10.03	11430.04	3834.691931	61.92488943	2.980692325	1.238498	1.101039389	3.281859657	72.20091246	
17	57	54.9	0.963158	33.6	6.78	7726.333	3984.348507	63.12169601	1.939171007	1.262434	1.110564776	2.153575015	47.37865032	
18	59.2	53.1	0.896959	42.375	10.7	12193.57	4002.453974	63.26495059	3.046523371	1.265299	1.11169826	3.386814731	74.50992409	
19	65.8	58.7	0.892097	37.85	13.46	15338.87	4917.836812	70.12729007	3.119027594	1.402546	1.16442809			Maximum
20	64.2	60.2	0.937695	32.525	2.84	3236.305	4920.867122	70.14889252	0.65766958	1.402978	1.16458949	0.765915081	16.85013179	

Is(50) statistics	
Mean	2.717598
Standard Error	0.163722
Median	2.695493
Mode	#N/A
Standard Deviation	0.694613
Sample Variance	0.482487
Kurtosis	2.361367
Skewness	-1.290929
Range	2.832619
Sum	48.91677
Count	18
Confidence Level(95.(	0.345423

UCS (MPa) statistics	
Mean	59.78716132
Standard Error	3.601881315
Median	59.3008569
Mode	#N/A
Standard Deviation	15.28148822
Sample Variance	233.5238821
Kurtosis	2.361366552
Skewness	-1.29092868
Range	62.31762868
Sum	1076.168904
Count	18
Confidence Level(95.0%	7.599305238

Waypoint: 26 RMD: 26_02_01 Scanline: 26_02_01 Sample: 26_02_01 Lithotechnical unit: Indurated andesite
Waypoint: 12 RMD: 20_02_02 Scanline: 20_02_02 Sample: 20_02_02 Lithotechnical unit: Indurated andesite

		PLCN										
		20	21	22	23	24	25	26	27	28	29	30
	1	47.73	50.12	52.50	54.89	57.28	59.66	62.05	64.43	66.82	69.21	71.59
	2	66.19	69.50	72.81	76.12	79.43	82.74	86.05	89.36	92.67	95.98	99.29
	3	44.68	46.91	49.14	51.38	53.61	55.85	58.08	60.31	62.55	64.78	67.01
	4	52.99	55.64	58.29	60.94	63.59	66.24	68.89	71.54	74.19	76.84	79.49
	5	54.35	57.07	59.79	62.50	65.22	67.94	70.66	73.37	76.09	78.81	81.53
	6	53.47	56.14	58.82	61.49	64.16	66.84	69.51	72.18	74.86	77.53	80.20
	7	71.97	75.57	79.17	82.77	86.36	89.96	93.56	97.16	100.76	104.36	107.96
	8	52.40	55.02	57.64	60.26	62.88	65.50	68.12	70.74	73.36	75.98	78.60
	9	49.45	51.92	54.39	56.86	59.33	61.81	64.28	66.75	69.22	71.70	74.17
Minimum	10											
	11	67.57	70.95	74.33	77.71	81.09	84.46	87.84	91.22	94.60	97.98	101.36
	12	63.92	67.11	70.31	73.51	76.70	79.90	83.09	86.29	89.48	92.68	95.88
	13	63.32	66.48	69.65	72.81	75.98	79.15	82.31	85.48	88.64	91.81	94.97
	14	61.65	64.74	67.82	70.90	73.99	77.07	80.15	83.23	86.32	89.40	92.48
	15	36.89	38.73	40.58	42.42	44.26	46.11	47.95	49.80	51.64	53.49	55.33
	16	65.64	68.92	72.20	75.48	78.76	82.05	85.33	88.61	91.89	95.17	98.46
	17	43.07	45.23	47.38	49.53	51.69	53.84	55.99	58.15	60.30	62.45	64.61
	18	67.74	71.12	74.51	77.90	81.28	84.67	88.06	91.44	94.83	98.22	101.60
Maximum	19											
	20	15.32	16.08	16.85	17.62	18.38	19.15	19.91	20.68	21.45	22.21	22.98

PLCN = 20 statistics	
Mean	54.35196484
Standard Error	3.274437559
Median	53.90986991
Mode	#N/A
Standard Deviation	13.89226201
Sample Variance	192.9949439
Kurtosis	2.361366552
Skewness	-1.29092868
Range	56.65238971
Sum	978.3353671
Count	18
Confidence Level(95.0%)	6.908459307

PLCN = 22 statistics	
Mean	59.78716132
Standard Error	3.601881315
Median	59.3008569
Mode	#N/A
Standard Deviation	15.28148822
Sample Variance	233.5238821
Kurtosis	2.361366552
Skewness	-1.29092868
Range	62.31762868
Sum	1076.168904
Count	18
Confidence Level(95.0%)	7.599305238

PLCN = 25 statistics	
Mean	67.93995605
Standard Error	4.093046949
Median	67.38733738
Mode	#N/A
Standard Deviation	17.36532752
Sample Variance	301.5545998
Kurtosis	2.361366552
Skewness	-1.29092868
Range	70.81548714
Sum	1222.919209
Count	18
Confidence Level(95.0%)	8.635574134

Waypoint: 52 RMD: 14_03_02 Scanline: 14_03_01 Sample: 14_03_02 Lithotechnical unit: Indurated dacite

	W (width mm)	D (distance between two platens mm)	D/W ratio	L (must be > 0.5 D)	Indicated force (units)	P (load) kN	4(W*D)/3.14 D_e^2 (mm^2)	$\sqrt{D_e^2}$ D_e (equivalent diameter (mm))	P/D_e^2 I_s (uncorrected point load strength)	$D_e/50$	$(D_e/50)^{0.45}$ F (size correction factor)	F*Is $I_{s(50)}$ (point load strength index, size	(F*Is)*? UCS (MPa)	
1	57.3	53.35	0.931065	26.4	6.37	7259.097	3892.235992	62.38778721	1.865019658	1.247756	1.1047355	2.060353424	45.33	
2	53.9	49	0.909091	30.6	4.3	4900.122	3362.752962	57.98924867	1.457175813	1.159785	1.068980702			Minimum
3	58.85	54	0.917587	31.95	6.96	7931.461	4046.227949	63.60996737	1.960211192	1.272199	1.114422382	2.184503225	48.06	
4	51.2	51	0.996094	32.2	5.95	6780.464	3324.683099	57.66006503	2.039431716	1.153201	1.066245732	2.174535362	47.84	
5	72.9	55.4	0.759945	42.65	7.1	8091.005	5142.18162	71.70900655	1.57345774	1.43418	1.176174246	1.850660471	40.71	
6	85.7	67.1	0.782964	45.5	10.03	11430.04	7321.725805	85.56708365	1.561112382	1.711342	1.273507558	1.988088417	43.74	
7	53	69.15	1.304717	47	7	7977.045	4666.359269	68.31075515	1.709479467	1.366215	1.150756898	1.967195289	43.28	
8	69.45	54.7	0.787617	48.3	9.58	10917.22	4836.928805	69.54803236	2.257055404	1.390961	1.16008999	1.992981275		Maximum
9	73.85	48.8	0.660799	42	7	7977.045	4588.60253	67.73922446	1.738447665	1.354784	1.146414306		43.85	
10	73.3	76.4	1.042292	40.825	10	11395.85	7130.294239	84.44106962	1.598229805	1.688821	1.265938695	2.023260954	44.51	

Is(50) statistics	
Mean	2.030197
Standard Error	0.038951
Median	2.008121
Mode	#N/A
Standard Deviation	0.11017
Sample Variance	0.012137
Kurtosis	-0.101961
Skewness	0.077611
Range	0.333843
Sum	16.24158
Count	8
Confidence Level(95.(	0.092105

UCS (MPa) statistics	
Mean	44.66434065
Standard Error	0.856922576
Median	44.17866451
Mode	#N/A
Standard Deviation	2.423743057
Sample Variance	5.874530405
Kurtosis	-0.10196068
Skewness	0.077611299
Range	7.344540598
Sum	357.3147252
Count	8
Confidence Level(95.0%	2.026299904

Waypoint: 52 RMD: 14_03_02 Scanline: 14_03_01 Sample: 14_03_02 Lithotechnical unit: Indurated dacite

	PLCN											
	20	21	22	23	24	25	26	27	28	29	30	
1	41.21	43.27	45.33	47.39	49.45	51.51	53.57	55.63	57.69	59.75	61.81	
2												Minimum
3	43.69	45.87	48.06	50.24	52.43	54.61	56.80	58.98	61.17	63.35	65.54	
4	43.49	45.67	47.84	50.01	52.19	54.36	56.54	58.71	60.89	63.06	65.24	
5	37.01	38.86	40.71	42.57	44.42	46.27	48.12	49.97	51.82	53.67	55.52	
6	39.76	41.75	43.74	45.73	47.71	49.70	51.69	53.68	55.67	57.65	59.64	
7	39.34	41.31	43.28	45.25	47.21	49.18	51.15	53.11	55.08	57.05	59.02	
8												Maximum
9	39.86	41.85	43.85	45.84	47.83	49.82	51.82	53.81	55.80	57.80	59.79	
10	40.47	42.49	44.51	46.54	48.56	50.58	52.60	54.63	56.65	58.67	60.70	

PLCN = 20 statistics	
Mean	40.60394604
Standard Error	0.779020523
Median	40.16242228
Mode	#N/A
Standard Deviation	2.203402779
Sample Variance	4.854983806
Kurtosis	-0.10196068
Skewness	0.077611299
Range	6.676855089
Sum	324.8315683
Count	8
Confidence Level(95.0%)	1.842090821

PLCN = 22 statistics	
Mean	44.66434065
Standard Error	0.856922576
Median	44.17866451
Mode	#N/A
Standard Deviation	2.423743057
Sample Variance	5.874530405
Kurtosis	-0.10196068
Skewness	0.077611299
Range	7.344540598
Sum	357.3147252
Count	8
Confidence Level(95.0%)	2.026299904

PLCN = 25 statistics	
Mean	50.75493255
Standard Error	0.973775654
Median	50.20302785
Mode	#N/A
Standard Deviation	2.754253474
Sample Variance	7.585912197
Kurtosis	-0.10196068
Skewness	0.077611299
Range	8.346068861
Sum	406.0394604
Count	8
Confidence Level(95.0%)	2.302613527

Waypoint: 40 RMD: 20_03_01 Scanline: 20_03_01 Sample: 20_03_01 Lithotechnical unit: Altered andesite

	W (width mm)	D (distance between two platens mm)	D/W ratio	L (must be > 0.5 D)	Indicated force (units)	P (load) kN	$4(W*D)/3.14$ D_e^2 (mm²)	$\sqrt{D_e^2}$ D_e (equivalent diameter (mm))	P/D_e^2 I_s (uncorrected point load strength)	$D_e/50$	$(D_e/50)^{0.45}$ F (size correction factor)	F*Is $I_{s(50)}$ (point load strength index, size	(F*Is)*? UCS (MPa)	
1	58.18	50.8	0.873152	38.05	3.24	3692.145	3763.115497	61.34423768	0.981140514	1.226885	1.096381494	1.075704302	23.67	
2	64.2	59.8	0.931464	33.9	2.85	3247.701	4888.170331	69.9154513	0.664400053	1.398309	1.162843909	0.772593555	17.00	
3	63.2	61.7	0.976266	33.45	2.51	2860.236	4964.92121	70.46219703	0.576088948	1.409244	1.166927244	0.672253889	14.79	
4	53.7	49.2	0.916201	49.2	4.87	5549.695	3363.949807	57.9995673	1.649755569	1.159991	1.069066294			Maximum
5	61.2	50.7	0.828431	50.7	1.79	2039.723	3950.658589	62.85426468	0.516299592	1.257085	1.108444966	0.572289684	12.59	
6	65.15	60.1	0.922487	60.1	2.86	3259.097	4985.388536	70.60728387	0.653729717	1.412146	1.168007887	0.763561466	16.80	
7	73	52.2	0.715068	52.2	2.71	3088.156	4851.806609	69.65491088	0.636496199	1.393098	1.160891901	0.738903283	16.26	
8	64.2	58.3	0.9081	58.3	1.96	2233.456	4765.557362	69.03301647	0.46866619	1.38066	1.156216282	0.54187948	11.92	
9	65.45	50	0.763942	50	0.7	797.5582	4166.67641	64.54979791	0.191413515	1.290996	1.121801967			Minimum
10	64.8	56.6	0.873457	56.6	1.77	2016.931	4669.835213	68.33619256	0.431906332	1.366724	1.150949711	0.497102467	10.94	

Is(50) statistics	
Mean	0.704286
Standard Error	0.064791
Median	0.705579
Mode	#N/A
Standard Deviation	0.183256
Sample Variance	0.033583
Kurtosis	1.760449
Skewness	1.123393
Range	0.578602
Sum	5.634288
Count	8
Confidence Level(95.(	0.153206

UCS (MPa) statistics	
Mean	15.49429235
Standard Error	1.425397348
Median	15.52272889
Mode	#N/A
Standard Deviation	4.031632522
Sample Variance	16.2540608
Kurtosis	1.760449092
Skewness	1.123392731
Range	12.72924036
Sum	123.9543388
Count	8
Confidence Level(95.0%	3.370529136

Waypoint: 40 RMD: 20_03_01 Scanline: 20_03_01 Sample: 20_03_01 Lithotechnical unit: Altered andesite

	PLCN											
	20	21	22	23	24	25	26	27	28	29	30	
1	21.51	22.59	23.67	24.74	25.82	26.89	27.97	29.04	30.12	31.20	32.27	
2	15.45	16.22	17.00	17.77	18.54	19.31	20.09	20.86	21.63	22.41	23.18	
3	13.45	14.12	14.79	15.46	16.13	16.81	17.48	18.15	18.82	19.50	20.17	
4												Maximum
5	11.45	12.02	12.59	13.16	13.73	14.31	14.88	15.45	16.02	16.60	17.17	
6	15.27	16.03	16.80	17.56	18.33	19.09	19.85	20.62	21.38	22.14	22.91	
7	14.78	15.52	16.26	16.99	17.73	18.47	19.21	19.95	20.69	21.43	22.17	
8	10.84	11.38	11.92	12.46	13.01	13.55	14.09	14.63	15.17	15.71	16.26	
9												Minimum
10	9.94	10.44	10.94	11.43	11.93	12.43	12.92	13.42	13.92	14.42	14.91	

PLCN = 20 statistics	
Mean	14.08572032
Standard Error	1.295815771
Median	14.11157172
Mode	#N/A
Standard Deviation	3.665120475
Sample Variance	13.4331081
Kurtosis	1.760449092
Skewness	1.123392731
Range	11.57203669
Sum	112.6857625
Count	8
Confidence Level(95.0%)	3.064117396

PLCN = 22 statistics	
Mean	15.49429235
Standard Error	1.425397348
Median	15.52272889
Mode	#N/A
Standard Deviation	4.031632522
Sample Variance	16.2540608
Kurtosis	1.760449092
Skewness	1.123392731
Range	12.72924036
Sum	123.9543388
Count	8
Confidence Level(95.0%)	3.370529136

PLCN = 25 statistics	
Mean	17.60715039
Standard Error	1.619769714
Median	17.63946465
Mode	#N/A
Standard Deviation	4.581400594
Sample Variance	20.9892314
Kurtosis	1.760449092
Skewness	1.123392731
Range	14.46504586
Sum	140.8572032
Count	8
Confidence Level(95.0%)	3.830146746

Waypoint: 33 RMD: 19_03_01 Scanline: 19_03_01 Sample: 19_03_01, 02 Lithotechnical unit: Scoriaceous andesite

	W (width mm)	D (distance between two platens mm)	D/W ratio	L (must be > 0.5 D)	Indicated force (units)	P (load) kN	$4(W*D)/3.14$ D_e^2 (mm^2)	$\sqrt{D_e^2}$ D_e (equivalent diameter (mm))	P/D_e^2 I_s (uncorrected point load strength)	$D_e/50$	$(D_e/50)^{0.45}$ F (size correction factor)	F*Is $I_{s(50)}$ (point load strength index, size	(F*Is)*? UCS (MPa)	
1	67.1	64.8	0.965723	36.5	1.46	1663.655	5536.1474	74.40529148	0.300507722	1.488106	1.195873434	0.359369201	7.91	
2	62.4	56.1	0.899038	36.175	2.77	3156.533	4457.15328	66.76191489	0.708194746	1.335238	1.138941588	0.806592449	17.75	
3	66.5	54.4	0.818045	33.375	6.36	7247.701	4606.071377	67.86804386	1.573510272	1.357361	1.147394853	1.805437588	39.72	
4	62.9	59.9	0.952305	33.975	3.16	3600.977	4797.197365	69.26180307	0.750641824	1.385236	1.157939063	0.86919749	19.12	
5	66.1	52.2	0.789713	32.875	2	2279.04	4393.21119	66.28130347	0.518763965	1.325626	1.135244656	0.58892402	12.96	
6	65.2	62.2	0.953988	33.95	0.94	1071.062	5163.546579	71.85782198	0.207427673	1.437156	1.177272015	0.244198794		Minimum
7	61.9	51	0.82391	35.65	6.05	6894.424	4019.489919	63.39944731	1.715248555	1.267989	1.112761165	1.908661979	5.37	
8	55.2	49.6	0.898551	40.15	8.29	9447.131	3486.028014	59.04259492	2.709998539	1.180852	1.077675338	2.920498592		Maximum
9	63	54.9	0.871429	34.625	3.07	3498.413	4403.753613	66.3607837	0.794416124	1.327216	1.135857045	0.902343151	41.99	
10	57.6	54	0.9375	29.3	5.59	6370.208	3960.28428	62.9307896	1.608522848	1.258616	1.109052051	1.783935564	64.25	

Is(50) statistics	
Mean	1.128058
Standard Error	0.215523
Median	0.88577
Mode	#N/A
Standard Deviation	0.609591
Sample Variance	0.371601
Kurtosis	-1.875126
Skewness	0.332674
Range	1.549293
Sum	9.024461
Count	8
Confidence Level(95.(	0.509631

UCS (MPa) statistics	
Mean	24.81726896
Standard Error	4.741502241
Median	19.48694705
Mode	#N/A
Standard Deviation	13.41099355
Sample Variance	179.854748
Kurtosis	-1.87512597
Skewness	0.33267361
Range	34.08444112
Sum	198.5381517
Count	8
Confidence Level(95.0%	11.21187119

Waypoint: 33 RMD: 19_03_01 Scanline: 19_03_01 Sample: 19_03_01, 02 Lithotechnical unit: Scoriaceous andesite

	PLCN										
	20	21	22	23	24	25	26	27	28	29	30
1	7.19	7.55	7.91	8.27	8.62	8.98	9.34	9.70	10.06	10.42	10.78
2	16.13	16.94	17.75	18.55	19.36	20.16	20.97	21.78	22.58	23.39	24.20
3	36.11	37.91	39.72	41.53	43.33	45.14	46.94	48.75	50.55	52.36	54.16
4	17.38	18.25	19.12	19.99	20.86	21.73	22.60	23.47	24.34	25.21	26.08
5	11.78	12.37	12.96	13.55	14.13	14.72	15.31	15.90	16.49	17.08	17.67
6											
7	4.88	5.13	5.37	5.62	5.86	6.10	6.35	6.59	6.84	7.08	7.33
8											
9	38.17	40.08	41.99	43.90	45.81	47.72	49.63	51.53	53.44	55.35	57.26
10	58.41	61.33	64.25	67.17	70.09	73.01	75.93	78.85	81.77	84.69	87.61

PLCN = 20 statistics	
Mean	22.5611536
Standard Error	4.310456583
Median	17.71540641
Mode	#N/A
Standard Deviation	12.19181232
Sample Variance	148.6402876
Kurtosis	-1.87512597
Skewness	0.33267361
Range	30.98585557
Sum	180.4892288
Count	8
Confidence Level(95.0%)	10.19261017

PLCN = 22 statistics	
Mean	24.81726896
Standard Error	4.741502241
Median	19.48694705
Mode	#N/A
Standard Deviation	13.41099355
Sample Variance	179.854748
Kurtosis	-1.87512597
Skewness	0.33267361
Range	34.08444112
Sum	198.5381517
Count	8
Confidence Level(95.0%)	11.21187119

PLCN = 25 statistics	
Mean	28.20144201
Standard Error	5.388070729
Median	22.14425801
Mode	#N/A
Standard Deviation	15.2397654
Sample Variance	232.2504494
Kurtosis	-1.87512597
Skewness	0.33267361
Range	38.73231946
Sum	225.611536
Count	8
Confidence Level(95.0%)	12.74076271

APPENDIX J: SCANLINE SURVEY DATA SHEETS

Scanline data survey sheet: 20_02_02

Location: Summit 4wd track between second switchback and fork, indurated andesitic outcrop.
Sample: 20_02_02 Photo: 20_02_03, 20_02_04 Waypoint: 12 Rock type: Indurated andesite
Easting: 2837755 Northing: 6337062 Elevation: 732m Date: 20/02/2006 Sheet:1 of 1

Nature and orientation of discontinuities

Joint No.	Distance (m)	Type	Major/ random joint	Dip	Dip direction	Persistence	Termination U/L	Aperture	Nature of infill	Strength of filling	Surface roughness	Water flow	Remarks
1	0.0	J	M	72.5	318	3 (outcrop ltd)	J2/outcrop	1	Too tight for fill		5	1	
2	0.41	J	M	70	210	2	Outcrop top/outcrop face	5	Moss, plants, soil/gravel		5	1	
3	0.87	J	r	80	320	2 (outcrop ltd)	J2/J	5	Open joint, some moss, gravel		5	1	
4	1.16	J	M	65	124	2 (outcrop ltd)	J/J	5	Open joint, roots		5	1	
5	1.55	J	M	70	230	1	J/J	6	Open joint, roots		5	1	
6	1.94	J	M	35	110	1	J/J	6	Open joint, roots		5	1	
7	2.03	J	r	85	205	3 (outcrop ltd)	J/J	6	Open joint, roots, bit of soil		5	1	
8	2.5	J	M	60	120	1	J/Rock	1	Toot tight for fill		5	1	
9	2.93	J	r	70	262	1	Rock/J	4	Open, lichen		5	1	
10	3.14	J	M	80	316	3	J/Rock	5	Open, gravel		5	1	
11	3.54	J	M	77.5	297	2	J/J9	6	Open		5	1	
12	3.99	J	M	72.5	324	2	J/J	6	Plant, open, gravel		5	1	
13	4.54	J	M	65	120	1	J/Rock	4	Open, gravel		5	1	
14	5.23	J	M	75	343	1	J10/J	5	Open, gravel		5	1	
15	5.65	J	M	82.5	100	1	Rock/J	5	Moss, open		5	1	

Scanline survey data sheet: 26_02_01

Location: Putauaki rd-McKee rd intersection, right at first fork (towards water supply), right again, indurated andesitic outcrop. Accessed via mountain bike.
Sample: 26_02_01 Photo: 26_02_06; 05_06_05-07, 08-10 Waypoint: 26 Rock type: Indurated andesite
Easting: 2837039 Northing: 6336242 Elevation: 279 m Date: 26/02/06 Sheet: 1 of 2

Nature and orientation of discontinuities

Joint No.	Distance (m)	Type	Major/ random joint	Dip	Dip Direction	Persistence	Termination U/L	Aperture	Nature of infill	Strength of infill	Surface roughness	Water flow	Remarks
1	0	J	M	67.5	210	3?	J/?	3	Mossy, slimy		8	3	General: eroded outcrop bottom difficult for bottom termination
2	0.50	J	M	85	210	1?	Rock/?	6	Mossy, slimy, scoriaceous grit		8	3	General: outcrop very shaded => water more so in moss & night dampness
3	0.90	J	M	60	310	1?	J4/J	6	Mossy, slimy, scoriaceous grit		5	3	
4	1.2	J	M	80	320	1?	Rock/J	6	Mossy, slimy, scoriaceous grit		5	3	
5	0.10	J	M	75	320	3?	J4/J16		Mossy, slimy, scoriaceous grit, open at times		4	3	Scoriaceous layer. Photo 26_02_06
6	1.40	J	M	85	246	1?	J4/?	4	Mossy and slimy, scoriaceous grit		5	3	
7	2.52	J	M	82.5	256	1?	J6/J8	4	Mossy and slimy, scoriaceous grit		5	3	
8	2.44	J	M	45	15	2?	J5/?	5	Mossy and slimy, scoriaceous grit		5	3	
9	2.84	J	M	85	215	2	J5/?	5	Mossy and slimy, scoriaceous grit		5	3	

Scanline survey data sheet: 26_02_01 Sheet: 2 of 2

Joint No.	Distance (m)	Type	Major/ random joint	Dip	Dip Direction	Persistence	Termination U/L	Aperture	Nature of infill	Strength of infill	Surface roughness	Water flow	Remarks
10	3.00	J	M	85	104	2?	J5/?	5	Mossy and slimy, scoriaceous grit		8	1	
11	4.00	J	M	80	160	1?	J5/?	2	Little moss, pretty tight		8	1	
12	4.10	J	M	35	4	1?	J5/?	2	Little moss, pretty tight		8	1	
13	5.18	J	M	80	160	2?	J5/?	6	Mossy, open, scoriaceous grit		8	3	
14	5.67	J	M	25	0	1	J/J5	?			8	3	Couldn't get some joint info
15	6.05	J	M	40	315	1	J/J5	3	Mossy, scoriaceous grit, open at times		8	3	

Scanline survey data sheet: 20_03_01

Location: Summit 4wd track, right at fork, crater wall. Altered andesite similar to that of waypoint 11 20 m prior.
Sample: 20_03_01 (pointload) Photo: 20_03_01, 2, 3 (outcrop), 4 (how crumbly rock is relative to weathered surface) Waypoint: 40 Rock type: Altered andesite
Easting: 2837851 Northing: 6337135 Elevation: 758m Date: 20/03/2006 Sheet: 1 of 1

Nature and orientation of discontinuities

Joint No.	Distance (m)	Type	Major/ random joint	Dip	Dip Direction	Persistence	Termination U/L	Aperture	Nature of infill	Strength of infill	Surface roughness	Water flow	Remarks
1	0.2	J	M	65	300	4	J? (talus obstructing)	7	Weak, altered scoriaceous grit		1	6	
2	0.5	J	M	65	310	4	J? (talus obstructing)	7	Weak, altered scoriaceous grit, gravel		1	6	
3	0.75	J	M	65	305	4	J? (talus obstructing)	7	Weak, altered scoriaceous grit		1	6	
4	0.8	J	r	60	270	4	J? (talus obstructing)	6	Weak, altered scoriaceous grit		1	6	
5	1.0	J	M	70	250	4	J? (talus obstructing)	6	Weak, altered scoriaceous grit, gravel, soil material		1	6	
6	1.1	J	M	70	312	4	J? (talus obstructing)	7	Weak, altered scoriaceous grit		1	6	
7	1.4	J	M	72.5	245	4	J? (talus obstructing)	6	Weak, altered scoriaceous grit		1	6	
8	1.5	J	M	70	248	4	J? (talus obstructing)	6	Weak, altered scoriaceous grit		1	6	
9	1.55	J	M	70	245	4	J? (talus obstructing)	6	Weak, altered scoriaceous grit		1	6	
10	1.56	J	M	75	310	4	J? (talus obstructing)	7	Weak, altered scoriaceous grit, gravel		1	6	
11	1.7	J	M	60	305	4	J? (talus obstructing)	7	Weak, altered scoriaceous grit		1	6	
12	1.8	J	M	75	245	4	J? (talus obstructing)	6	Weak, altered scoriaceous grit		1	6	
13	1.9	J	M	70	314	4	J? (talus obstructing)	7	Weak, altered scoriaceous grit		1	6	
14	2.0	J	M	45	165	3	J? (talus obstructing)	6	Weak, altered scoriaceous grit		1	6	
15	2.5	J	M	60	300	4	J? (talus obstructing)	7	Weak, altered scoriaceous grit		1	6	
16	3.01	J	M	65	305	4	J? (talus obstructing)	7	Weak, altered scoriaceous grit		1	6	

Scanline survey data sheet: 14_03_01

Location: Haulage rd, 2nd logging area, bushwacking up main dome on NW flank. Indurated dacitic outcrop.
Sample: 14_03_02 Photo: 03_06_01 Waypoint: 52 Rock type: Indurated dacite
Easting: 2836462 Northing: 6337282 Elevation: 330m Date: 14/03/2006 Sheet: 1 of 1

Nature and orientation of discontinuities

Joint No.	Distance (m)	Type	Major/ random joint	Dip	Dip Direction	Persistence	Termination U/L	Aperture	Nature of infill	Strength of infill	Surface roughness	Water flow	Remarks
1	0.24	J	M	040	60	3	Outcrop top/talus	? (edge of profile)	None as outcrop edge		4	1	
2	0.40	J	r	060	45	1	J/J1	3	Gritty, silty, soil		4	1	
3	0.55	J	r	055	30	1	J/J1	4	Mossy, open, gritty		5	1	
4	0.95	J	M	149	80	1	J/J6	? (outcrop face)	Mossy, open, gritty		5	1	
5	1.13	J	M	245	75	3	J1/J	7	Open, gritty, gravel, roots		5	1	
6	1.5	J	M	085	37.5	1	J5/J	3	Moss, tight		4	1	
7	1.70	J	M	200	70	3	J1/J	3	Moss, tight		7	1	
8	2.5	J	M	070	45	3	Outcrop top/talus	5	Gritty, soil		7	1	
9	2.90	J	M	137	75	3	J8/outcrop base	? (outcrop face)	Outcrop face		5	1	
10	3.20	J	M	200	70	3	J7/J9	5	Gritty		5	1	
11	2.90	J	M	060	60	2	J8/J	4	Gritty		8	1	
12	3.80	J	M	080	60	3	Outcrop top/talus	8	Cobbles, grit, soil, roots		5	1	
13	4.70	J	M	328	75	1	J12/J12	5	Gritty, open		5	1	
14	4.90	J	r	255	60	2	J8/J12	6	Gritty, open, lichens		5	1	

Scanline survey data sheet: 19_03_01

Location: Approximately 20 m NE off summit 4wd drive between 2nd switchback and fork
Sample: 19_01_01 (indurated), 02 (scoriaceous and for point load) Photo: 19_03_02-11(pan),12-13 (thin valley walkthrough), 14-18 (mini tomos), 19-20 RMD outcrop, 21 (RMD) Waypoint: 20m inside summit 4wd track from waypoint 33 Rock type: Scoriaceous andesite
Easting: 2837808 Northing: 6336858 Elevation: 672m Date: 19/03/2006 Sheet: 1of 1

Nature and orientation of discontinuities

Joint No.	Distance (m)	Type	Major/ random joint	Dip	Dip Direction	Persistence	Termination U/L	Aperture	Nature of infill	Strength of infill	Surface roughness	Water flow	Remarks
1	0.0	J	M	70	147.5	3	Top/base of outcrop	7	None as outcrop edge		1	7	
2	0.1	J	M	55	25	4	J11/J1	7	Scoriaceous grit/gravel, soil		1	7	
3	2.7	J	M	50	24	4	J11/J1	7	Scoriaceous grit/gravel, soil l		1	7	
4	3.4	J	M	50	27	4	J11/J1	7	Scoriaceous grit/gravel, soil		1	7	
5	4.4	J	M	45	28	4	J11/J1	7	Scoriaceous grit/gravel, soil		1	7	
6	6.0	J	M	45	28	3	J11/J1	7	Scoriaceous grit/gravel, soil		1	7	
7	6.9	J	M	85	22	4	J11/J1	7	Scoriaceous grit/gravel, soil		1	7	
8	7.1	J	M	47.5	25	4	J11/J1	7	Scoriaceous grit/gravel, soil		1	7	
9	7.6	J	M	70	145	4	J11/J1	7	Scoriaceous grit/gravel, soil		1	7	
10	8.3	J	M	52.5	32	4	Top/base of outcrop	7	Scoriaceous grit/gravel, soil		1	7	
11	8.3	J	M	45	27	3	J14/J11	7	Scoriaceous grit/gravel, soil		1	7	
12	8.9	J	M	50	40	4	J14/J11	7	Scoriaceous grit/gravel, soil		1	7	
13	9.6	J	M	87.5	24	3	Top/base of outcrop	7	Scoriaceous grit/gravel, soil		1	7	
14	10.1	J	M	55	25	3	J/J14	7	Scoriaceous grit/gravel, soil		1	7	
15	10.7	J	M	52.5	20	3	J/J14	7	Scoriaceous grit/gravel, soil		1	7	
16	10.8	J	M	45	19	3	J/J14	7	Scoriaceous grit/gravel, soil		1	7	
17	11.5	J	M	85	20	3	J/J14	7	Scoriaceous grit/gravel, soil		1	7	

APPENDIX K: STEREONETS AND DISCONTINUITY SPACING

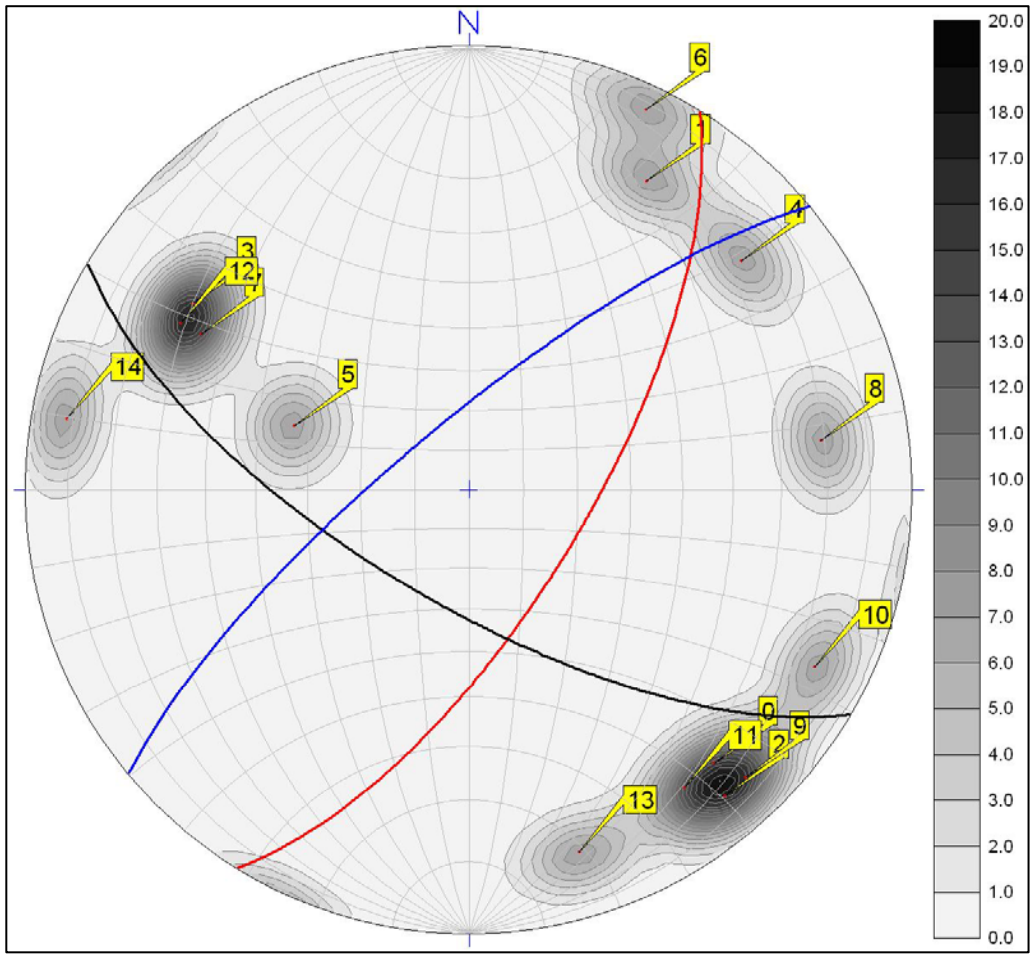
Waypoint: 12 RMD: 20_02_02 Scanline: 20_02_02 Sample: 20_02_02 Lithotechnical unit: Indurated andesite 1

Major discontinuity sets:

Discontinuity set 1 (black line): 70/211

Discontinuity set 1 (blue line): 78/320

Discontinuity set 1 (red line): 69/122



Calculation of *N*

Waypoint: 12 RMD: 20_02_02 Scanline: 20_02_02 Sample: 20_02_02 Lithotechnical unit: Indurated andesite 1

Scanline 1				
Joint #	Joint dip direction	Joint dip	Face dip direction	Face dip
0	318	72.5	220	70
1	210	70		
2	320	80		
3	124	65		
4	230	70		
5	110	35		
6	205	85		
7	120	60		
8	262	70		
9	316	80		
10	297	77.5		
11	324	72.5		
12	120	65		
13	343	75		
14	100	82.5		

Cluster 1		Cluster 2		Cluster 3	
Dip direction	Dip	Dip direction	Dip	Dip direction	Dip
		210	70	318	72.5
				320	80
124	65				
		230	70		
110	35				
		205	85		
120	60				
				316	80
				297	77.5
				324	72.5
120	65				
				343	75
100	82.5				

Average dip direction	114.80		215.00		319.67	
Θ	105.20		5.00		99.67	
Napp (apparent number of discontinuities)	5.00		3.00		6.00	
N = actual number of discontinuities	5.18		34.42		6.09	

Discontinuity spacing

Waypoint: 12 RMD: 20_02_02 Scanline: 20_02_02 Sample: 20_02_02 Lithotechnical unit: Indurated andesite 1

GPS	Discontinuity		Distance (m)	Face		Spacing (apparent)
	Dip direction	Dip		Dip direction	Dip	
12	318	72.5	0	220	70	0.00
	210	70	0.41			0.41
	320	80	0.87			0.46
	124	65	1.16			0.29
	230	70	1.55			0.39
	110	35	1.94			0.39
	205	85	2.03			0.09
	120	60	2.5			0.47
	262	70	2.93			0.43
	316	80	3.14			0.21
	297	77.5	3.54			0.40
	324	72.5	3.99			0.45
	120	65	4.54			0.55
	343	75	5.23			0.69
	100	82.5	5.65			0.42

Spacing (apparent)	
Mean	0.376667
Standard Error	0.044472
Median	0.41
Mode	#N/A
Standard Deviation	0.17224
Sample Variance	0.029667
Kurtosis	1.027653
Skewness	-0.713483
Range	0.69
Minimum	0
Maximum	0.69
Sum	5.65
Count	15
Confidence Level(95.0	0.095383

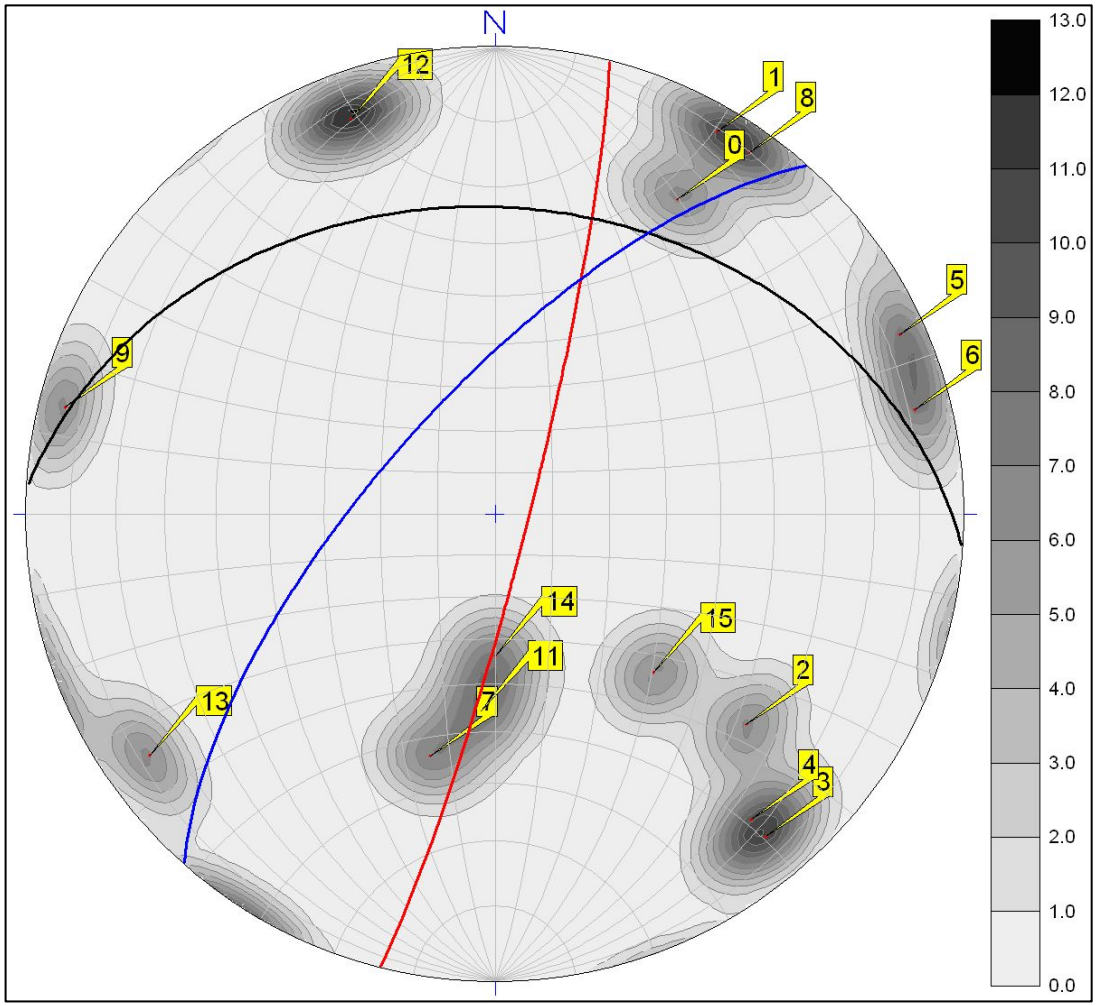
Waypoint: 26 RMD: 26_02_01 Scanline: 26_02_01 Sample: 26_02_01 Lithotechnical unit: Indurated andesite 2

Major discontinuity sets:

Discontinuity set 1 (blue line): 70/312

Discontinuity set 1 (black line): 35/210

Discontinuity set 1 (red line): 84/104



Calculation of *N*

Waypoint: 26 RMD: 26_02_01 Scanline: 26_02_01 Sample: 26_02_01 Lithotechnical unit: Indurated andesite 2

Scanline 2					Cluster 1		Cluster 2		Cluster 3		Cluster 4		Cluster 5		Cluster 6	
Joint #	Joint dip direction	Joint dip	Face dip direction	Face dip	Dip direction	Dip	Dip direction	Dip	Dip direction	Dip	Dip direction	Dip	Dip direction	Dip	Dip direction	Dip
0	210	67.5	300	85			210	67.5								
1	210	85					210	85								
2	310	60													310	60
3	320	80													320	80
4	320	75													320	75
5	246	85							246	85						
6	256	82.5							256	82.5						
7	15	45											15	45		
8	215	85					215	85								
9	104	85									104	85				
10	160	80			160	80										
11	4	35											4	35		
12	160	80			160	80										
13	0	25											0	25		
14	315	40													315	40

Average dip direction	160.00		211.67		251.00		104.00		6.33		316.25	
Θ	140.00		88.33		49.00		164.00		66.30		16.25	
Napp (apparent number of discontinuities)	2.00		3.00		2.00		1.00		3.00		4.00	
N = actual number of discontinuities	3.11		3.00		2.65		3.63		3.28		14.29	

Clusters highlighted yellow represent the three clusters with highest calculated *N*. These are the clusters plotted on stereonets and analysed in this study.

Discontinuity spacing

Waypoint: 26 RMD: 26_02_01 Scanline: 26_02_01 Sample: 26_02_01 Lithotechnical unit: Indurated andesite 2

GPS	Discontinuity		Distance (m)	Face		Spacing (apparent)
	Dip direction	Dip		Dip direction	Dip	
26	210	67.5	0	300	85	0.00
	210	85	0.5			0.50
	310	60	0.9			0.40
	320	80	1.2			0.30
	320	75	0.1			-1.10
	246	85	1.4			1.30
	256	82.5	2.52			1.12
	15	45	2.44			-0.08
	215	85	2.84			0.40
	104	85	3			0.16
	160	80	4			1.00
	4	35	4.1			0.10
	160	80	5.18			1.08
	0	25	5.67			0.49
	315	40	6.05			0.38

Spacing (apparent)	
Mean	0.403333
Standard Error	0.153795
Median	0.4
Mode	#N/A
Standard Deviation	0.595647
Sample Variance	0.354795
Kurtosis	1.859331
Skewness	-0.782587
Range	2.4
Minimum	-1.1
Maximum	1.3
Sum	6.05
Count	15
Confidence Level(95.0	0.329858

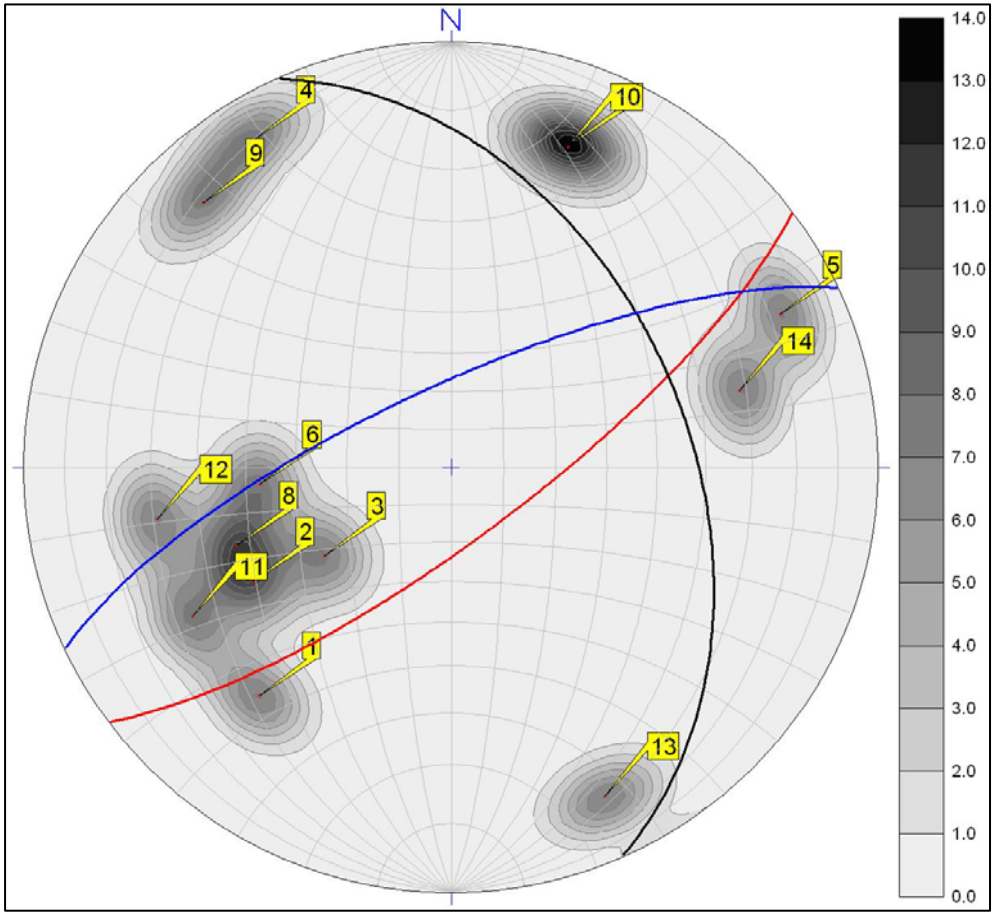
Waypoint: 52 RMD: 14_03_02 Scanline: 14_03_01 Sample: 14_03_02 Lithotechnical unit: Indurated dacite

Major discontinuity sets:

Discontinuity set 1 (red line): 76/143

Discontinuity set 1 (blue line): 74/334

Discontinuity set 1 (black line): 44/066



Calculation of *N*

Waypoint: 52 RMD: 14_03_02 Scanline: 14_03_01 Sample: 14_03_02 Lithotechnical unit: Indurated dacite

Scanline				
Joint #	Joint dip direction	Joint dip	Face dip direction	Face dip
1	40	60	154	85
2	60	45		
3	55	30		
4	149	80		
5	245	75		
6	85	37.5		
7	200	70		
8	70	45		
9	137	75		
10	200	70		
11	60	60		
12	80	60		
13	328	75		
14	255	60		

Cluster 1		Cluster 2		Cluster 3		Cluster 4		Cluster 5	
Dip direction	Dip	Dip direction	Dip	Dip direction	Dip	Dip direction	Dip	Dip direction	Dip
						40	60		
						60	45		
						55	30		
149	80								
				245	75				
						85	37.5		
		200	70						
						70	45		
137	75								
		200	70						
						60	60		
						80	60		
								328	75
				255	60				

Average dip direction	143.00		200.00		250.00		64.29		328.00	
Θ	11.00		46.00		96.00		89.71		172.00	
Napp (apparent number of discontinuities)	2.00		2.00		2.00		7.00		1.00	
N = actual number of discontinuities	10.48		2.78		2.01		7.00		7.19	

Clusters highlighted yellow represent the three clusters with highest calculated *N*. These are the clusters plotted on stereonets and analysed in this study.

Discontinuity spacing

Waypoint: 52 RMD: 14_03_02 Scanline: 14_03_01 Sample: 14_03_02 Lithotechnical unit: Indurated dacite

GPS	Discontinuity		Distance (m)	Face		Sapp
	Dip direction	Dip		Dip direction	Dip	
52	40	60	0.24	154	85	0.24
	60	45	0.4			0.16
	55	30	0.55			0.15
	149	80	0.95			0.40
	245	75	1.13			0.18
	85	37.5	1.5			0.37
	200	70	1.7			0.20
	70	45	2.5			0.80
	137	75	2.9			0.40
	60	60	2.9			0.00
	200	70	3.2			0.30
	80	60	3.8			0.60
	335	75	4.7			0.90
	255	60	4.9			0.20

Spacing (apparent)	
Mean	0.35
Standard Error	0.087706
Median	0.27
Mode	0.4
Standard Deviation	0.328165
Sample Variance	0.107692
Kurtosis	0.45839
Skewness	0.30861
Range	1.2
Minimum	-0.3
Maximum	0.9
Sum	4.9
Count	14
Confidence Level(95.0	0.189477

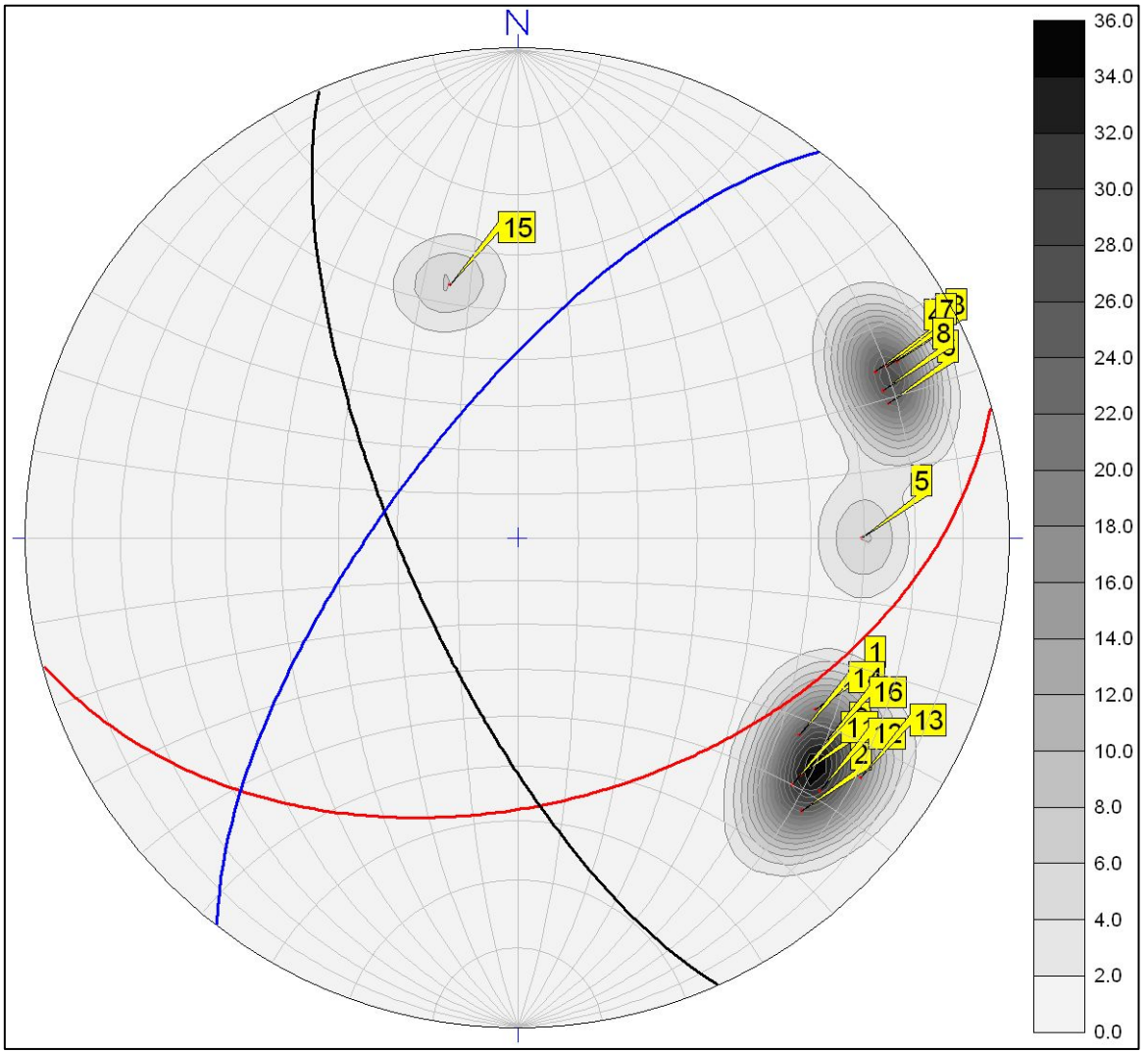
Waypoint: 40 RMD: 20_03_01 Scanline: 20_03_01 Sample: 20_03_01 Lithotechnical unit: Altered andesite

Major discontinuity sets:

Discontinuity set 1 (blue line): 70/308

Discontinuity set 1 (red line): 45/165

Discontinuity set 1 (black line): 74/246



Calculation of *N*

Waypoint: 40 RMD: 20_03_01 Scanline: 20_03_01 Sample: 20_03_01 Lithotechnical unit: Altered andesite

Scanline					Cluster 1		Cluster 2		Cluster 3	
Joint #	Joint dip direction	Joint dip	Face dip direction	Face dip	Dip direction	Dip	Dip direction	Dip	Dip direction	Dip
1	300	60	340	80					300	60
2	314	70							314	70
3	245	75					245	75		
4	245	70					245	70		
5	270	60					270	60		
6	250	70					250	70		
7	245	72.5					245	72.5		
8	248	70					248	70		
9	310	65							310	65
10	305	65							305	65
11	312	65							312	65
12	310	70							310	70
13	305	75							305	75
14	305	60							305	60
15	165	45			165	45				
16	305	65							305	65

Average dip direction	165.00		250.50		307.33	
Θ	175.00		89.50		32.67	
Napp (apparent number of discontinuities)	1.00		6.00		9.00	
N = actual number of discontinuities	11.47		6.00		16.67	

Discontinuity spacing

Waypoint: 40 RMD: 20_03_01 Scanline: 20_03_01 Sample: 20_03_01 Lithotechnical unit: Altered andesite

GPS	Discontinuity		Distance (m)	Face		Spacing (apparent)
	Strike	Angle		Strike	Angle	
40	300	65	0.2	340	80	0.20
	310	65	0.5			0.30
	305	65	0.75			0.25
	270	60	0.8			0.05
	250	70	1			0.20
	312	70	1.1			0.10
	245	72.5	1.4			0.30
	248	70	1.5			0.10
	245	70	1.55			0.05
	310	75	1.56			0.01
	305	60	1.7			0.14
	245	75	1.8			0.10
	314	70	1.9			0.10
	165	45	2			0.10
	300	60	2.5			0.50
	305	65	3			0.50

Spacing (apparent)	
Mean	0.1875
Standard Error	0.037344
Median	0.12
Mode	0.1
Standard Deviation	0.149376
Sample Variance	0.022313
Kurtosis	0.576624
Skewness	1.140256
Range	0.49
Minimum	0.01
Maximum	0.5
Sum	3
Count	16
Confidence Level(95.0	0.079597

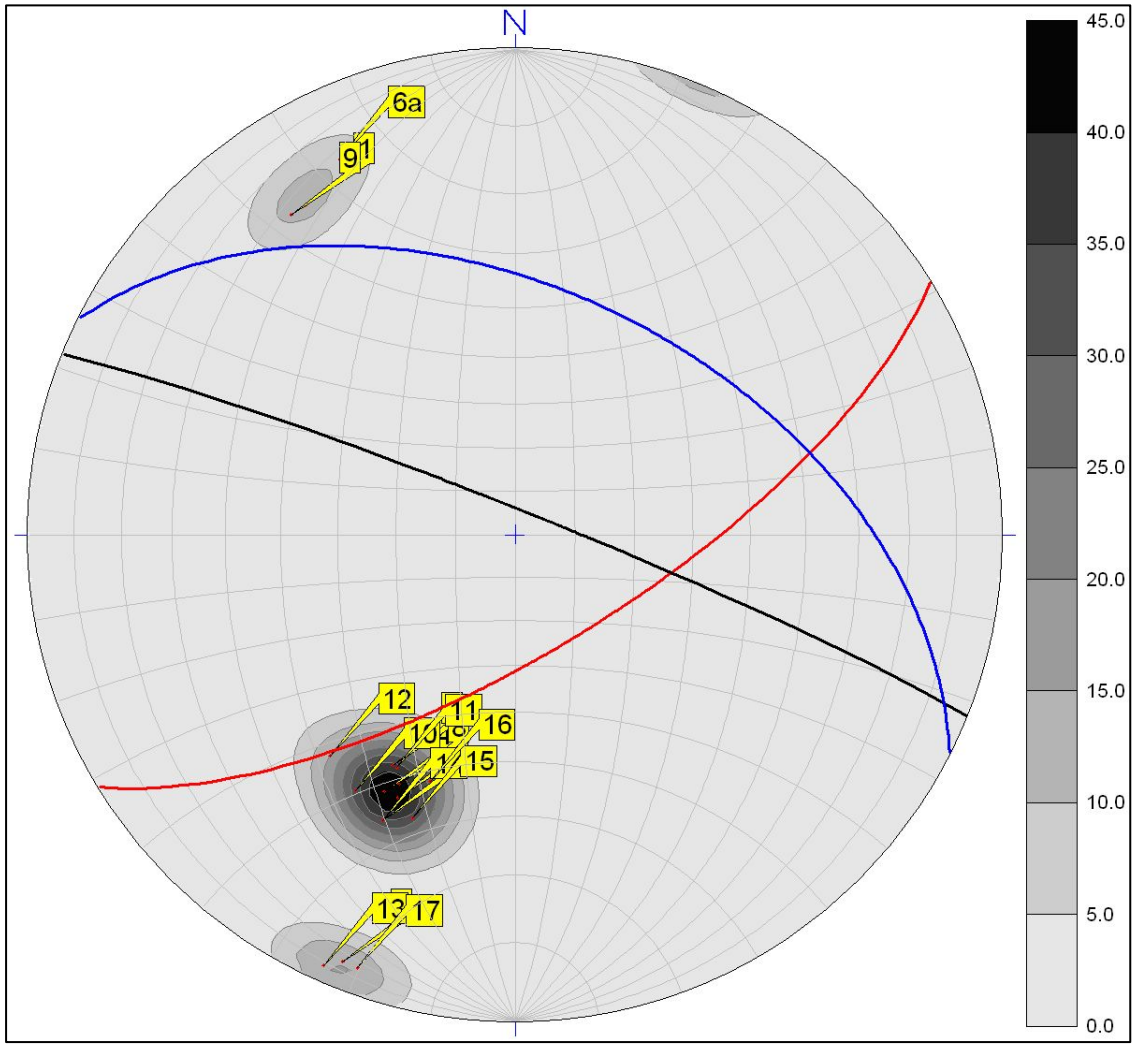
Waypoint: 33 RMD: 19_03_01 Scanline: 19_03_01 Sample: 19_03_01, 02 Lithotechnical unit: Scoriaceous andesite

Major discontinuity sets:

Discontinuity set 1 (blue line): 48/027

Discontinuity set 1 (black line): 86/022

Discontinuity set 1 (red line): 70/149



Calculation of *N*

Waypoint: 33 RMD: 19_03_01 Scanline: 19_03_01 Sample: 19_03_01, 02 Lithotechnical unit: Scoriaceous andesite

Scanline				
Joint #	Joint dip direction	Joint dip	Face dip direction	Face dip
1	147.5	70	350	85
2	25	55		
3	24	50		
4	27	50		
5	28	45		
6	28	45		
7	22	85		
8	25	47.5		
9	145	70		
10	32	52.5		
11	27	45		
12	40	50		
13	24	87.5		
14	25	55		
15	20	52.5		
16	19	45		
17	20	85		

Cluster 1		Cluster 2		Cluster 3	
Dip direction	Dip	Dip direction	Dip	Dip direction	Dip
147.5	70				
				25	55
				24	50
				27	50
				28	45
				28	45
		22	85		
				25	47.5
145	70				
				32	52.5
				27	45
				40	50
		24	87.5		
				25	55
				20	52.5
				19	45
		20	85		

Average dip direction	146.25		22.00		26.67	
Θ	156.25		32.00		36.67	
Napp (apparent number of discontinuities)	2.00		3.00		12.00	
N = actual number of discontinuities	4.97		5.66		20.10	

Discontinuity spacing

Waypoint: 33 RMD: 19_03_01 Scanline: 19_03_01 Sample: 19_03_01, 02 Lithotechnical unit: Scoriaceous andesite

GPS	Discontinuity		Distance (m)	Face		Spacing (apparent)
	Dip direction	Dip		Dip direction	Dip	
33	147	70	0	350	85	0.00
	25	55	0.1			0.10
	24	50	2.7			2.60
	27	50	3.4			0.70
	28	45	4.4			1.00
	28	45	6			1.60
	155	75	6.9			0.90
	22	85	6.9			0.00
	25	47.5	7.1			0.20
	145	70	7.6			0.50
	32	52.5	8.3			0.70
	27	45	8.3			0.00
	40	50	8.9			0.60
	24	87.5	9.6			0.70
	25	55	10.1			0.50
	20	52.5	10.7			0.60
	19	45	10.8			0.10
	20	85	11.5			0.70

Spacing (apparent)	
Mean	0.676471
Standard Error	0.15566
Median	0.6
Mode	0
Standard Deviation	0.641804
Sample Variance	0.411912
Kurtosis	4.460634
Skewness	1.829318
Range	2.6
Minimum	0
Maximum	2.6
Sum	11.5
Count	17
Confidence Level(95.0	0.329985

APPENDIX L: CALCULATIONS OF RQD RATINGS

Waypoint site	Lithotechnical unit	Scanline length (m)	Number of joints	Apparent joint spacing (m)	λ (number of joints per meter >1m)	RQD (%) (100e -0.1λ (0.1λ +	Rock quality
12	Indurated andesite 1	5.65	15	0.38	2.65	97.04	Excellent
26	Indurated andesite 2	6.05	15	0.40	2.48	97.39	Excellent
33	Scoriaceous andesite	11.50	17	0.68	1.48	99.01	Excellent
40	Altered andesite	3.01	16	0.19	5.32	90.01	Good
52	Indurated dacite	4.90	14	0.35	2.86	96.62	Excellent

APPENDIX M: CALCULATION OF RMR PARAMETERS

Waypoint: 12 RMD: 20_02_02 Scanline: 20_02_02 Sample: 20_02_02 Lithotechnical unit: Indurated andesite 1

A.1 Strength of intact rock material

Point-load strength index	> 10 Mpa	4 - 10 Mpa	2 - 4 Mpa	1 - 2 Mpa	Uniaxial preferred at this low range		
Uniaxial compressive strength	> 250 Mpa	100 - 250 Mpa	50 - 100 Mpa	25 - 50 Mpa	5 - 25 Mpa	1 - 5 Mpa	< 1 Mpa
Rating	15	12	7	4	2	1	0

A.2 Drill core quality (RQD)

	90% - 100%	75% - 90%	50% - 75%	25% - 50%	< 25%
Rating	20	17	13	8	3

A.3 Spacing of discontinuities

	> 2 m	0.6 - 2 m	200 - 600 mm	60 - 200 mm	< 60 mm
Rating	20	15	10	8	5

A.4 Condition of discontinuities

Persistence	< 1 m	1 - 3 m	3 - 10 m	10 - 20 m	> 20 m
Rating	6	4	2	1	0
Aperture	None	< 0.1 mm	0.1 - 1.0 mm	1 - 5 mm	> 5 mm
Rating	6	5	4	1	0
Roughness	Very rough	Rough	Slightly rough	Smooth	Slickensided
Rating	6	5	3	1	0
Infill	None	Hard filling < 5 mm	Hard filling > 5mm	Soft filling < 5 mm	Soft filling > 5 mm
Rating	6	4	2	2	0
Weathering	Unweathered	Slightly weathered	Moderately weathered	Highly weathered	Decomposed
Rating	6	5	3	1	0

A.5 Groundwater

General conditions	Completely dry	Damp	Wet	Dripping	Flowing
Rating	15	10	7	4	0

C. Rock mass classes determined from total ratings

Rating	100 - 81	80 - 61	60 - 41	40 - 21	< 21
Class No.	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock

(adapted from Bieniawski, 1989)

Waypoint: 26 RMD: 26_02_01 Scanline: 26_02_01 Sample: 26_02_01 Lithotechnical unit: Indurated andesite 2

A.1 Strength of intact rock material

Point-load strength index	> 10 Mpa	4 - 10 Mpa	2 - 4 Mpa	1 - 2 Mpa	Uniaxial preferred at this low range		
Uniaxial compressive strength	> 250 Mpa	100 - 250 Mpa	50 - 100 Mpa	25 - 50 Mpa	5 - 25 Mpa	1 - 5 Mpa	< 1 Mpa
Rating	15	12	7	4	2	1	0

A.2 Drill core quality (RQD)

	90% - 100%	75% - 90%	50% - 75%	25% - 50%	< 25%
Rating	20	17	13	8	3

A.3 Spacing of discontinuities

	> 2 m	0.6 - 2 m	200 - 600 mm	60 - 200 mm	< 60 mm
Rating	20	15	10	8	5

A.4 Condition of discontinuities

Persistence	< 1 m	1 - 3 m	3 - 10 m	10 - 20 m	> 20 m
Rating	6	4	2	1	0
Aperture	None	< 0.1 mm	0.1 - 1.0 mm	1 - 5 mm	> 5 mm
Rating	6	5	4	1	0
Roughness	Very rough	Rough	Slightly rough	Smooth	Slickensided
Rating	6	5	3	1	0
Infill	None	Hard filling < 5 mm	Hard filling > 5mm	Soft filling < 5 mm	Soft filling > 5 mm
Rating	6	4	2	2	0
Weathering	Unweathered	Slightly weathered	Moderately weathered	Highly weathered	Decomposed
Rating	6	5	3	1	0

A.5 Groundwater

General conditions	Completely dry	Damp	Wet	Dripping	Flowing
Rating	15	10	7	4	0

C. Rock mass classes determined from total ratings

Rating	100 - 81	80 - 61	60 - 41	40 - 21	< 21
Class No.	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock

(adapted from Bieniawski, 1989)

Waypoint: 40 RMD: 20_03_01 Scanline: 20_03_01 Sample: 20_03_01 Lithotechnical unit: Altered andesite

A.1 Strength of intact rock material

Point-load strength index	> 10 Mpa	4 - 10 Mpa	2 - 4 Mpa	1 - 2 Mpa	Uniaxial preferred at this low range		
Uniaxial compressive strength	> 250 Mpa	100 - 250 Mpa	50 - 100 Mpa	25 - 50 Mpa	5 - 25 Mpa	1 - 5 Mpa	< 1 Mpa
Rating	15	12	7	4	2	1	0

A.2 Drill core quality (RQD)

	90% - 100%	75% - 90%	50% - 75%	25% - 50%	< 25%
Rating	20	17	13	8	3

A.3 Spacing of discontinuities

	> 2 m	0.6 - 2 m	200 - 600 mm	60 - 200 mm	< 60 mm
Rating	20	15	10	8	5

A.4 Condition of discontinuities

Persistence	< 1 m	1 - 3 m	3 - 10 m	10 - 20 m	> 20 m
Rating	6	4	2	1	0
Aperture	None	< 0.1 mm	0.1 - 1.0 mm	1 - 5 mm	> 5 mm
Rating	6	5	4	1	0
Roughness	Very rough	Rough	Slightly rough	Smooth	Slickensided
Rating	6	5	3	1	0
Infill	None	Hard filling < 5 mm	Hard filling > 5mm	Soft filling < 5 mm	Soft filling > 5 mm
Rating	6	4	2	2	0
Weathering	Unweathered	Slightly weathered	Moderately weathered	Highly weathered	Decomposed
Rating	6	5	3	1	0

A.5 Groundwater

General conditions	Completely dry	Damp	Wet	Dripping	Flowing
Rating	15	10	7	4	0

C. Rock mass classes determined from total ratings

Rating	100 - 81	80 - 61	60 - 41	40 - 21	< 21
Class No.	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock

(adapted from Bieniawski, 1989)

Waypoint: 52 RMD: 14_03_02 Scanline: 14_03_01 Sample: 14_03_02 Lithotechnical unit: Indurated dacite

A.1 Strength of intact rock material

Point-load strength index	> 10 Mpa	4 - 10 Mpa	2 - 4 Mpa	1 - 2 Mpa	Uniaxial preferred at this low range		
Uniaxial compressive strength	> 250 Mpa	100 - 250 Mpa	50 - 100 Mpa	25 - 50 Mpa	5 - 25 Mpa	1 - 5 Mpa	< 1 Mpa
Rating	15	12	7	4	2	1	0

A.2 Drill core quality (RQD)

	90% - 100%	75% - 90%	50% - 75%	25% - 50%	< 25%
Rating	20	17	13	8	3

A.3 Spacing of discontinuities

	> 2 m	0.6 - 2 m	200 - 600 mm	60 - 200 mm	< 60 mm
Rating	20	15	10	8	5

A.4 Condition of discontinuities

Persistence	< 1 m	1 - 3 m	3 - 10 m	10 - 20 m	> 20 m
Rating	6	4	2	1	0
Aperture	None	< 0.1 mm	0.1 - 1.0 mm	1 - 5 mm	> 5 mm
Rating	6	5	4	1	0
Roughness	Very rough	Rough	Slightly rough	Smooth	Slickensided
Rating	6	5	3	1	0
Infill	None	Hard filling < 5 mm	Hard filling > 5mm	Soft filling < 5 mm	Soft filling > 5 mm
Rating	6	4	2	2	0
Weathering	Unweathered	Slightly weathered	Moderately weathered	Highly weathered	Decomposed
Rating	6	5	3	1	0

A.5 Groundwater

General conditions	Completely dry	Damp	Wet	Dripping	Flowing
Rating	15	10	7	4	0

C. Rock mass classes determined from total ratings

Rating	100 - 81	80 - 61	60 - 41	40 - 21	< 21
Class No.	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock

(adapted from Bieniawski, 1989)

Waypoint: 33 RMD: 19_03_01 Scanline: 19_03_01 Sample: 19_03_01, 02 Lithotechnical unit: Scoriaceous andesite

A.1 Strength of intact rock material

Point-load strength index	> 10 Mpa	4 - 10 Mpa	2 - 4 Mpa	1 - 2 Mpa	Uniaxial preferred at this low range		
Uniaxial compressive strength	> 250 Mpa	100 - 250 Mpa	50 - 100 Mpa	25 - 50 Mpa	5 - 25 Mpa	1 - 5 Mpa	< 1 Mpa
Rating	15	12	7	4	2	1	0

A.2 Drill core quality (RQD)

	90% - 100%	75% - 90%	50% - 75%	25% - 50%	< 25%
Rating	20	17	13	8	3

A.3 Spacing of discontinuities

	> 2 m	0.6 - 2 m	200 - 600 mm	60 - 200 mm	< 60 mm
Rating	20	15	10	8	5

A.4 Condition of discontinuities

Persistence	< 1 m	1 - 3 m	3 - 10 m	10 - 20 m	> 20 m
Rating	6	4	2	1	0
Aperture	None	< 0.1 mm	0.1 - 1.0 mm	1 - 5 mm	> 5 mm
Rating	6	5	4	1	0
Roughness	Very rough	Rough	Slightly rough	Smooth	Slickensided
Rating	6	5	3	1	0
Infill	None	Hard filling < 5 mm	Hard filling > 5mm	Soft filling < 5 mm	Soft filling > 5 mm
Rating	6	4	2	2	0
Weathering	Unweathered	Slightly weathered	Moderately weathered	Highly weathered	Decomposed
Rating	6	5	3	1	0

A.5 Groundwater

General conditions	Completely dry	Damp	Wet	Dripping	Flowing
Rating	15	10	7	4	0

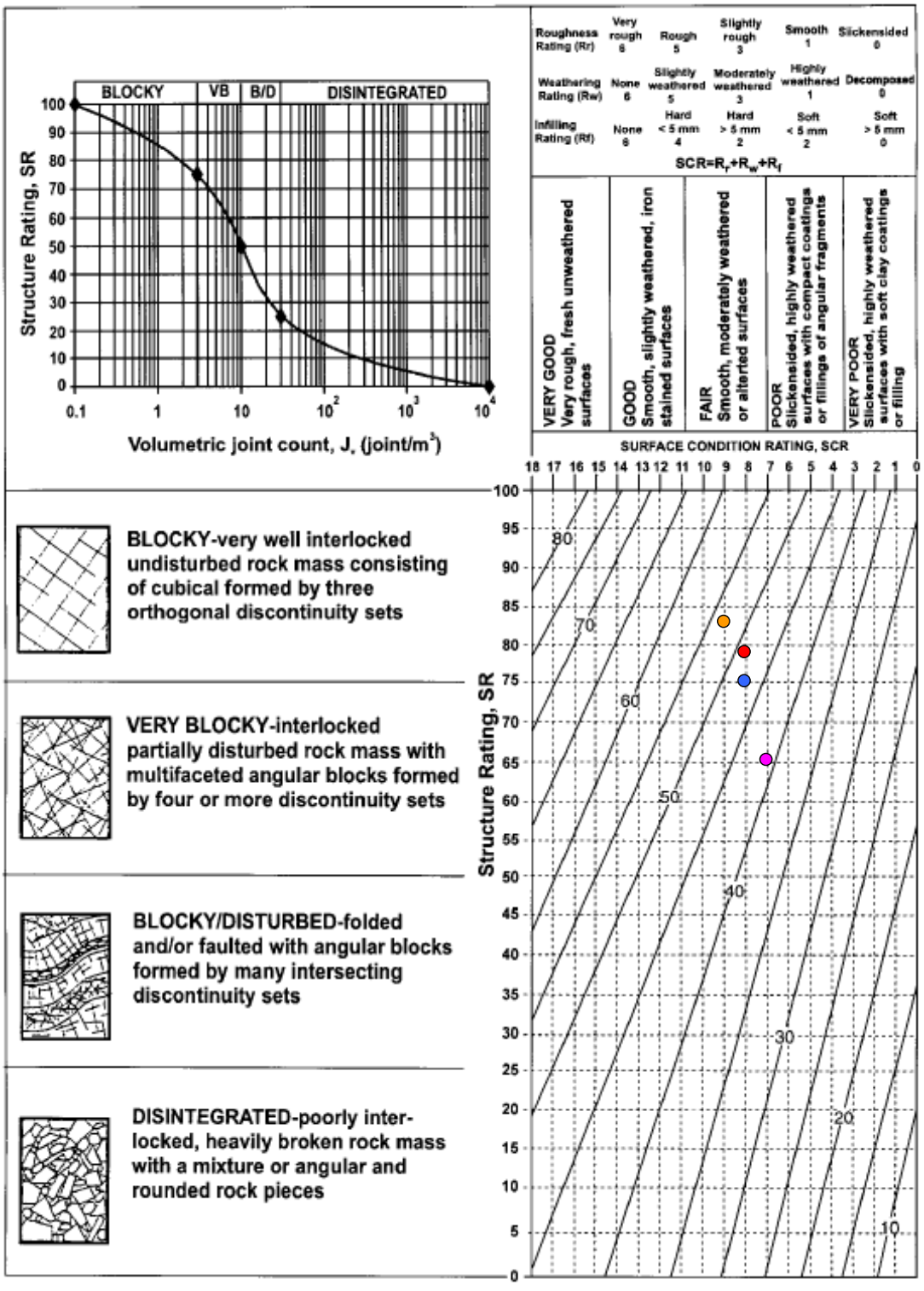
C. Rock mass classes determined from total ratings

Rating	100 - 81	80 - 61	60 - 41	40 - 21	< 21
Class No.	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock

(adapted from Bieniawski, 1989)

APPENDIX N: CALCULATION OF GSI PARAMETERS

	Indurated andesite (red icon)	Indurated dacite (blue icon)	Scoriaceous andesite (orange icon)	Altered andesite (pink icon)
Roughness	3	3	6	6
Weathering	5	5	3	1
Infilling	0	0	0	0
SCR	**8**	**8**	**9**	**7**
SR	**79**	**75**	**83**	**65**
GSI	49	48	53	42



APPENDIX O: COMBINATIONS OF PLCN, m_i AND D, AND ASSOCIATED C AND ø

Indurated andesite

Waypoint: 26 RMD: 26_02_01 Scanline: 26_02_01 Sample: 26_02_01
Waypoint: 12 RMD: 20_02_02 Scanline: 20_02_02 Sample: 20_02_02

Combinations			Equivalent Mohr-Coulomb	
PLCN	mi	D	c	ø
20	20	0	3.29	36.2
20	20	0.1	3.186	35.37
20	20	0.2	3.075	34.45
20	20	0.3	2.954	33.43
20	20	0.4	2.824	32.28
20	20	0.5	2.682	30.99
20	20	0.6	2.528	29.54
20	20	0.7	2.358	27.89
20	20	0.8	2.172	26.01
20	20	0.9	1.968	23.86
20	20	1	1.743	21.4
20	21	0	3.339	36.62
20	21	0.1	3.234	35.79
20	21	0.2	3.121	34.87
20	21	0.3	3	33.85
20	21	0.4	2.868	32.7
20	21	0.5	2.725	31.41
20	21	0.6	2.569	29.95
20	21	0.7	2.397	28.29
20	21	0.8	2.209	26.4
20	21	0.9	2.002	24.23
20	21	1	1.774	21.75
20	22	0	3.386	37.03
20	22	0.1	3.281	36.2
20	22	0.2	3.167	35.28
20	22	0.3	3.044	34.25
20	22	0.4	2.911	33.1
20	22	0.5	2.766	31.8
20	22	0.6	2.608	30.34
20	22	0.7	2.435	28.67
20	22	0.8	2.245	26.77
20	22	0.9	2.035	24.59
20	22	1	1.804	22.09
20	23	0	3.432	37.42
20	23	0.1	3.325	36.59
20	23	0.2	3.21	35.66
20	23	0.3	3.087	34.63
20	23	0.4	2.952	33.48
20	23	0.5	2.806	32.18
20	23	0.6	2.647	30.71
20	23	0.7	2.472	29.04
20	23	0.8	2.279	27.13
20	23	0.9	2.067	24.94
20	23	1	1.834	22.42
20	24	0	3.476	37.79
20	24	0.1	3.369	36.96
20	24	0.2	3.253	36.03
20	24	0.3	3.128	35
20	24	0.4	2.992	33.85
20	24	0.5	2.845	32.55
20	24	0.6	2.684	31.07
20	24	0.7	2.507	29.4
20	24	0.8	2.313	27.48
20	24	0.9	2.098	25.27
20	24	1	1.862	22.74
20	25	0	3.519	38.15
20	25	0.1	3.411	37.31
20	25	0.2	3.294	36.39
20	25	0.3	3.168	35.36
20	25	0.4	3.031	34.2
20	25	0.5	2.88	32.9
20	25	0.6	2.72	31.42
20	25	0.7	2.541	29.74
20	25	0.8	2.345	27.81
20	25	0.9	2.128	25.6
20	25	1	1.889	23.05
20	26	0	3.561	38.49
20	26	0.1	3.452	37.66
20	26	0.2	3.334	36.73
20	26	0.3	3.207	35.7
20	26	0.4	3.069	34.54
20	26	0.5	2.919	33.24
20	26	0.6	2.755	31.75
20	26	0.7	2.575	30.07
20	26	0.8	2.376	28.13
20	26	0.9	2.158	25.91
20	26	1	1.916	23.34
20	27	0	3.601	38.82
20	27	0.1	3.491	37.99
20	27	0.2	3.373	37.06
20	27	0.3	3.245	36.03
20	27	0.4	3.105	34.87
20	27	0.5	2.954	33.56
20	27	0.6	2.789	32.08
20	27	0.7	2.607	30.38
20	27	0.8	2.407	28.44
20	27	0.9	2.186	26.21
20	27	1	1.942	23.63
20	28	0	3.641	39.14
20	28	0.1	3.53	38.3
20	28	0.2	3.41	37.38
20	28	0.3	3.281	36.34
20	28	0.4	3.141	35.18
20	28	0.5	2.988	33.87
20	28	0.6	2.822	32.39
20	28	0.7	2.638	30.69
20	28	0.8	2.437	28.74
20	28	0.9	2.214	26.5
20	28	1	1.968	23.9
20	29	0	3.679	39.44
20	29	0.1	3.567	38.61
20	29	0.2	3.447	37.68
20	29	0.3	3.317	36.65
20	29	0.4	3.176	35.49
20	29	0.5	3.002	34.18
20	29	0.6	2.854	32.69
20	29	0.7	2.669	30.99
20	29	0.8	2.466	29.03
20	29	0.9	2.241	26.78
20	29	1	1.992	24.17
20	30	0	3.716	39.74
20	30	0.1	3.604	38.91
20	30	0.2	3.483	37.98
20	30	0.3	3.352	36.95
20	30	0.4	3.21	35.78
20	30	0.5	3.055	34.47
20	30	0.6	2.885	32.98
20	30	0.7	2.699	31.27
20	30	0.8	2.494	29.31
20	30	0.9	2.267	27.05
20	30	1	2.061	24.44
21	20	0	3.455	36.2
21	20	0.1	3.346	35.57
21	20	0.2	3.228	34.45
21	20	0.3	3.102	33.43
21	20	0.4	2.965	32.28
21	20	0.5	2.816	30.99
21	20	0.6	2.654	29.54
21	20	0.7	2.476	27.89
21	20	0.8	2.281	26.01
21	20	0.9	2.066	23.86
21	20	1	1.83	21.4
21	21	0	3.506	36.62
21	21	0.1	3.396	35.79
21	21	0.2	3.278	34.87
21	21	0.3	3.15	33.85
21	21	0.4	3.012	32.7
21	21	0.5	2.861	31.41
21	21	0.6	2.697	29.95
21	21	0.7	2.517	28.29
21	21	0.8	2.32	26.4
21	21	0.9	2.102	24.23
21	21	1	1.863	21.75
21	22	0	3.556	37.03
21	22	0.1	3.445	36.2
21	22	0.2	3.325	35.28
21	22	0.3	3.196	34.25
21	22	0.4	3.057	33.1
21	22	0.5	2.905	31.8
21	22	0.6	2.739	30.34
21	22	0.7	2.557	28.67
21	22	0.8	2.357	26.77
21	22	0.9	2.137	24.59
21	22	1	1.895	22.09
21	23	0	3.604	37.42
21	23	0.1	3.492	36.59
21	23	0.2	3.371	35.66
21	23	0.3	3.241	34.63
21	23	0.4	3.1	33.48
21	23	0.5	2.947	32.18
21	23	0.6	2.779	30.71
21	23	0.7	2.595	29.04
21	23	0.8	2.393	27.13
21	23	0.9	2.171	24.94
21	23	1	1.925	22.42
21	24	0	3.65	37.79
21	24	0.1	3.537	36.96
21	24	0.2	3.416	36.03
21	24	0.3	3.284	35
21	24	0.4	3.142	33.85
21	24	0.5	2.987	32.55
21	24	0.6	2.818	31.07
21	24	0.7	2.632	29.4
21	24	0.8	2.428	27.48
21	24	0.9	2.203	25.27
21	24	1	1.955	22.74
21	25	0	3.695	38.15
21	25	0.1	3.581	37.31
21	25	0.2	3.459	36.39
21	25	0.3	3.326	35.36
21	25	0.4	3.183	34.2
21	25	0.5	3.027	32.9
21	25	0.6	2.856	31.42
21	25	0.7	2.668	39.74
21	25	0.8	2.462	27.81
21	25	0.9	2.235	25.6
21	25	1	1.984	23.05
21	26	0	3.739	38.49
21	26	0.1	3.624	37.66
21	26	0.2	3.501	36.73
21	26	0.3	3.367	35.7
21	26	0.4	3.222	34.54
21	26	0.5	3.065	33.24
21	26	0.6	2.892	31.75
21	26	0.7	2.703	30.07
21	26	0.8	2.495	28.13
21	26	0.9	2.266	25.91
21	26	1	2.012	23.34
21	27	0	3.782	38.82
21	27	0.1	3.666	37.99
21	27	0.2	3.541	37.06
21	27	0.3	3.407	36.03
21	27	0.4	3.261	34.87
21	27	0.5	3.102	33.56
21	27	0.6	2.928	32.08
21	27	0.7	2.737	30.38
21	27	0.8	2.527	28.44
21	27	0.9	2.296	26.21
21	27	1	2.039	23.63
21	28	0	3.823	39.14
21	28	0.1	3.706	38.3
21	28	0.2	3.581	37.38
21	28	0.3	3.445	36.34
21	28	0.4	3.298	35.18
21	28	0.5	3.138	33.87
21	28	0.6	2.963	32.39
21	28	0.7	2.77	30.69
21	28	0.8	2.559	28.74
21	28	0.9	2.325	26.5
21	28	1	2.066	23.9
21	29	0	3.863	39.44
21	29	0.1	3.746	38.61
21	29	0.2	3.62	37.68
21	29	0.3	3.483	36.65
21	29	0.4	3.335	35.49
21	29	0.5	3.173	34.18
21	29	0.6	2.997	32.69
21	29	0.7	2.803	30.99
21	29	0.8	2.589	29.03
21	29	0.9	2.353	26.78
21	29	1	2.092	24.17
21	30	0	3.902	39.74
21	30	0.1	3.784	38.91
21	30	0.2	3.657	37.98
21	30	0.3	3.52	36.95
21	30	0.4	3.37	35.78
21	30	0.5	3.208	34.47
21	30	0.6	3.03	32.98
21	30	0.7	2.834	31.27
21	30	0.8	2.619	29.31
21	30	0.9	2.381	27.05
21	30	1	2.117	24.44

22	20	0	3.619	36.2
22	20	0.1	3.505	35.37
22	20	0.2	3.382	34.45
22	20	0.3	3.249	33.43
22	20	0.4	3.106	32.28
22	20	0.5	2.95	30.99
22	20	0.6	2.78	29.54
22	20	0.7	2.594	27.89
22	20	0.8	2.39	26.01
22	20	0.9	2.165	23.86
22	20	1	1.917	21.4
22	21	0	3.673	36.62
22	21	0.1	3.557	35.79
22	21	0.2	3.433	34.87
22	21	0.3	3.3	33.85
22	21	0.4	3.155	32.7
22	21	0.5	2.997	31.41
22	21	0.6	2.825	29.95
22	21	0.7	2.637	28.29
22	21	0.8	2.43	26.4
22	21	0.9	2.202	24.23
22	21	1	1.951	21.75
22	22	0	3.725	37.03
22	22	0.1	3.608	36.2
22	22	0.2	3.483	35.28
22	22	0.3	3.348	34.25
22	22	0.4	3.202	33.1
22	22	0.5	3.042	31.8
22	22	0.6	2.869	30.34
22	22	0.7	2.678	28.67
22	22	0.8	2.469	26.77
22	22	0.9	2.239	24.59
22	22	1	1.685	22.09
22	23	0	3.775	37.42
22	23	0.1	3.658	36.59
22	23	0.2	3.531	35.66
22	23	0.3	3.395	34.63
22	23	0.4	3.247	33.48
22	23	0.5	3.086	32.18
22	23	0.6	2.911	30.71
22	23	0.7	2.719	29.04
22	23	0.8	2.507	27.13
22	23	0.9	2.274	24.94
22	23	1	2.017	22.42
22	24	0	3.824	37.79
22	24	0.1	3.705	36.96
22	24	0.2	3.578	36.03
22	24	0.3	3.44	35
22	24	0.4	3.291	33.85
22	24	0.5	3.129	32.55
22	24	0.6	2.952	31.07
22	24	0.7	2.757	29.4
22	24	0.8	2.544	27.48
22	24	0.9	2.308	25.27
22	24	1	2.048	22.74
22	25	0	3.871	38.15
22	25	0.1	3.751	37.31
22	25	0.2	3.623	36.39
22	25	0.3	3.484	35.36
22	25	0.4	3.334	34.2
22	25	0.5	3.17	32.9
22	25	0.6	2.991	31.42
22	25	0.7	2.795	29.74
22	25	0.8	2.579	27.81
22	25	0.9	2.341	25.6
22	25	1	2.078	23.05
22	26	0	3.917	38.49
22	26	0.1	3.796	37.66
22	26	0.2	3.667	36.73
22	26	0.3	3.527	35.7
22	26	0.4	3.375	34.54
22	26	0.5	3.21	33.24
22	26	0.6	3.03	31.75
22	26	0.7	2.832	30.07
22	26	0.8	2.614	28.13
22	26	0.9	2.373	25.91
22	26	1	2.108	23.34
22	27	0	3.961	38.82
22	27	0.1	3.84	37.99
22	27	0.2	3.71	37.06
22	27	0.3	3.569	36.03
22	27	0.4	3.416	34.87
22	27	0.5	3.249	33.56
22	27	0.6	3.067	32.08
22	27	0.7	2.867	30.38
22	27	0.8	2.647	28.44
22	27	0.9	2.405	26.21
22	27	1	2.136	23.63
22	28	0	4.004	39.14
22	28	0.1	3.882	38.3
22	28	0.2	3.751	37.38
22	28	0.3	3.609	36.34
22	28	0.4	3.455	35.18
22	28	0.5	3.287	33.87
22	28	0.6	3.103	32.39
22	28	0.7	2.902	30.69
22	28	0.8	2.68	28.74
22	28	0.9	2.435	26.5
22	28	1	2.164	23.9
22	29	0	4.047	39.44
22	29	0.1	3.924	38.61
22	29	0.2	3.792	37.68
22	29	0.3	3.648	36.65
22	29	0.4	3.493	35.49
22	29	0.5	3.324	34.18
22	29	0.6	3.139	32.69
22	29	0.7	2.936	30.99
22	29	0.8	2.712	29.03
22	29	0.9	2.465	26.78
22	29	1	2.191	24.17
22	30	0	4.008	39.74
22	30	0.1	3.964	38.91
22	30	0.2	3.831	37.98
22	30	0.3	3.687	36.95
22	30	0.4	3.53	35.78
22	30	0.5	3.36	34.47
22	30	0.6	3.173	32.98
22	30	0.7	2.969	31.27
22	30	0.8	2.743	29.31
22	30	0.9	2.494	27.05
22	30	1	2.218	24.44

23	20	0	2.004	21.4
23	20	0.1	3.664	35.37
23	20	0.2	3.536	34.45
23	20	0.3	3.397	33.43
23	20	0.4	3.247	32.28
23	20	0.5	3.084	30.99
23	20	0.6	2.907	29.54
23	20	0.7	2.712	27.89
23	20	0.8	2.498	26.01
23	20	0.9	2.263	23.86
23	20	1	2.004	21.4
23	21	0	3.84	36.62
23	21	0.1	3.719	35.79
23	21	0.2	3.59	34.87
23	21	0.3	3.45	33.85
23	21	0.4	3.298	32.7
23	21	0.5	3.133	31.41
23	21	0.6	2.954	29.95
23	21	0.7	2.757	28.29
23	21	0.8	2.541	26.4
23	21	0.9	2.302	24.23
23	21	1	2.04	21.75
23	22	0	3.894	37.03
23	22	0.1	3.772	36.2
23	22	0.2	3.642	35.28
23	22	0.3	3.5	34.25
23	22	0.4	3.347	33.1
23	22	0.5	3.181	31.8
23	22	0.6	2.999	30.34
23	22	0.7	2.8	28.67
23	22	0.8	2.581	26.77
23	22	0.9	2.341	24.59
23	22	1	2.075	22.09
23	23	0	3.947	37.42
23	23	0.1	3.824	36.59
23	23	0.2	3.692	35.66
23	23	0.3	3.549	34.63
23	23	0.4	3.395	33.48
23	23	0.5	3.227	32.18
23	23	0.6	3.043	30.71
23	23	0.7	2.842	29.04
23	23	0.8	2.621	27.13
23	23	0.9	2.377	24.94
23	23	1	2.109	22.42
23	24	0	3.998	37.79
23	24	0.1	3.874	36.96
23	24	0.2	3.741	36.03
23	24	0.3	3.579	35
23	24	0.4	3.441	33.85
23	24	0.5	3.271	32.55
23	24	0.6	3.086	31.07
23	24	0.7	2.883	29.4
23	24	0.8	2.659	27.48
23	24	0.9	2.413	25.27
23	24	1	2.141	22.74
23	25	0	4.047	38.15
23	25	0.1	3.922	37.31
23	25	0.2	3.788	36.39
23	25	0.3	3.643	35.36
23	25	0.4	3.486	34.2
23	25	0.5	3.314	32.9
23	25	0.6	3.127	31.42
23	25	0.7	2.922	29.74
23	25	0.8	2.697	27.81
23	25	0.9	2.448	25.6
23	25	1	2.173	23.05
23	26	0	4.095	38.49
23	26	0.1	3.969	37.66
23	26	0.2	3.834	36.73
23	26	0.3	3.688	35.7
23	26	0.4	3.529	34.54
23	26	0.5	3.356	33.24
23	26	0.6	3.168	31.75
23	26	0.7	2.961	30.07
23	26	0.8	2.733	28.13
23	26	0.9	2.481	25.91
23	26	1	2.204	23.34
23	27	0	4.141	38.82
23	27	0.1	4.015	37.99
23	27	0.2	3.878	37.06
23	27	0.3	3.731	36.03
23	27	0.4	3.571	34.87
23	27	0.5	3.397	33.56
23	27	0.6	3.207	32.08
23	27	0.7	2.998	30.38
23	27	0.8	2.769	28.44
23	27	0.9	2.514	26.21
23	27	1	2.234	23.63
23	28	0	4.187	39.14
23	28	0.1	4.059	38.3
23	28	0.2	3.922	37.38
23	28	0.3	3.773	36.34
23	28	0.4	3.612	35.18
23	28	0.5	3.437	33.87
23	28	0.6	3.245	32.39
23	28	0.7	3.034	30.69
23	28	0.8	2.802	28.74
23	28	0.9	2.546	26.5
23	28	1	2.263	23.9
23	29	0	4.231	39.44
23	29	0.1	4.102	38.61
23	29	0.2	3.964	37.68
23	29	0.3	3.814	36.65
23	29	0.4	3.652	35.49
23	29	0.5	3.475	34.18
23	29	0.6	3.282	32.69
23	29	0.7	3.069	30.99
23	29	0.8	2.835	29.03
23	29	0.9	2.577	26.78
23	29	1	2.291	24.17
23	30	0	4.274	39.74
23	30	0.1	4.145	38.91
23	30	0.2	4.005	37.98
23	30	0.3	3.855	36.95
23	30	0.4	3.691	35.78
23	30	0.5	3.513	34.47
23	30	0.6	3.318	32.98
23	30	0.7	3.104	31.27
23	30	0.8	2.868	29.31
23	30	0.9	2.607	27.05
23	30	1	2.319	24.44

24	20	0	3.948	36.2
24	20	0.1	3.824	35.37
24	20	0.2	3.69	34.45
24	20	0.3	3.545	33.43
24	20	0.4	3.389	32.28
24	20	0.5	3.218	30.99
24	20	0.6	3.033	29.54
24	20	0.7	2.83	27.89
24	20	0.8	2.607	26.01
24	20	0.9	2.362	23.86
24	20	1	2.091	21.4
24	21	0	4.007	36.62
24	21	0.1	3.881	35.79
24	21	0.2	3.746	34.87
24	21	0.3	3.6	33.85
24	21	0.4	3.442	32.7
24	21	0.5	3.27	31.41
24	21	0.6	3.082	39.95
24	21	0.7	2.877	28.28
24	21	0.8	2.651	26.4
24	21	0.9	2.403	24.23
24	21	1	2.129	21.75
24	22	0	4.064	37.03
24	22	0.1	3.937	36.2
24	22	0.2	3.8	35.28
24	22	0.3	3.653	34.25
24	22	0.4	3.493	33.1
24	22	0.5	3.319	31.8
24	22	0.6	3.13	30.34
24	22	0.7	2.922	28.67
24	22	0.8	2.694	26.77
24	22	0.9	2.442	24.59
24	22	1	2.165	22.09
24	23	0	4.118	37.42
24	23	0.1	3.99	36.59
24	23	0.2	3.853	35.66
24	23	0.3	3.704	34.63
24	23	0.4	3.543	33.48
24	23	0.5	3.367	32.18
24	23	0.6	3.176	30.71
24	23	0.7	2.966	29.04
24	23	0.8	2.735	27.13
24	23	0.9	2.481	24.94
24	23	1	2.2	22.42
24	24	0	4.172	37.79
24	24	0.1	4.042	36.96
24	24	0.2	3.903	36.03
24	24	0.3	3.753	35
24	24	0.4	3.591	33.85
24	24	0.5	3.414	32.55
24	24	0.6	3.22	31.07
24	24	0.7	3.008	29.4
24	24	0.8	2.775	27.48
24	24	0.9	2.518	25.27
24	24	1	2.234	22.74
24	25	0	4.223	38.15
24	25	0.1	4.093	37.31
24	25	0.2	3.953	36.39
24	25	0.3	3.801	35.36
24	25	0.4	3.637	34.2
24	25	0.5	3.459	32.9
24	25	0.6	3.264	31.42
24	25	0.7	3.049	29.74
24	25	0.8	2.814	27.81
24	25	0.9	2.554	25.6
24	25	1	2.267	23.05
24	26	0	4.273	38.49
24	26	0.1	4.124	37.66
24	26	0.2	4.004	36.7
24	26	0.3	3.84	35.7
24	26	0.4	3.68	34.5
24	26	0.5	3.5	33.2
24	26	0.6	3.3	31.75
24	26	0.7	3.089	30.07
24	26	0.8	2.852	28.13
24	26	0.9	2.589	25.91
24	26	1	2.299	23.34
24	27	0	4.322	38.82
24	27	0.1	4.189	37.99
24	27	0.2	4.047	37.06
24	27	0.3	3.893	36.03
24	27	0.4	3.727	34.87
24	27	0.5	3.545	33.56
24	27	0.6	3.346	32.08
24	27	0.7	3.128	30.38
24	27	0.8	2.888	28.44
24	27	0.9	2.632	26.21
24	27	1	2.331	23.63
24	28	0	4.369	39.14
24	28	0.1	4.236	38.3
24	28	0.2	4.092	37.38
24	28	0.3	3.938	36.34
24	28	0.4	3.769	35.18
24	28	0.5	3.586	33.87
24	28	0.6	3.386	32.39
24	28	0.7	3.166	30.69
24	28	0.8	2.924	28.74
24	28	0.9	2.657	26.5
24	28	1	2.631	23.9
24	29	0	4.415	39.44
24	29	0.1	4.281	38.61
24	29	0.2	4.137	37.68
24	29	0.3	3.98	36.65
24	29	0.4	3.811	35.49
24	29	0.5	3.626	34.18
24	29	0.6	3.425	32.69
24	29	0.7	3.203	30.99
24	29	0.8	2.959	29.03
24	29	0.9	2.689	26.78
24	29	1	2.391	24.17
24	30	0	4.46	39.74
24	30	0.1	4.325	38.91
24	30	0.2	4.18	37.98
24	30	0.3	4.022	36.95
24	30	0.4	3.852	35.78
24	30	0.5	3.666	34.47
24	30	0.6	3.462	32.98
24	30	0.7	3.239	31.27
24	30	0.8	2.993	29.31
24	30	0.9	2.721	27.05
24	30	1	2.42	24.44

25	20	0	4.122	36.2
25	20	0.1	3.982	35.37
25	20	0.2	3.843	34.45
25	20	0.3	3.692	33.43
25	20	0.4	3.529	32.28
25	20	0.5	3.352	30.99
25	20	0.6	3.159	29.54
25	20	0.7	2.948	27.89
25	20	0.8	2.715	26.01
25	20	0.9	2.46	23.86
25	20	1	2.178	21.4
25	21	0	4.174	36.62
25	21	0.1	4.042	35.79
25	21	0.2	3.901	34.87
25	21	0.3	3.749	33.85
25	21	0.4	3.585	32.7
25	21	0.5	3.406	31.41
25	21	0.6	3.21	29.95
25	21	0.7	2.996	28.29
25	21	0.8	2.761	26.4
25	21	0.9	2.502	24.23
25	21	1	2.217	21.75
25	22	0	4.233	37.03
25	22	0.1	4.1	36.2
25	22	0.2	3.958	35.28
25	22	0.3	3.804	34.25
25	22	0.4	3.638	33.1
25	22	0.5	3.457	31.8
25	22	0.6	3.26	30.34
25	22	0.7	3.044	28.67
25	22	0.8	2.806	26.77
25	22	0.9	2.544	24.59
25	22	1	2.255	22.09
25	23	0	4.29	37.42
25	23	0.1	4.156	36.59
25	23	0.2	4.013	35.66
25	23	0.3	3.858	34.63
25	23	0.4	3.69	33.48
25	23	0.5	3.507	32.18
25	23	0.6	3.308	30.71
25	23	0.7	3.089	29.04
25	23	0.8	2.849	27.13
25	23	0.9	2.584	24.94
25	23	1	2.292	22.42
25	24	0	4.345	37.79
25	24	0.1	4.21	36.96
25	24	0.2	4.066	36.03
25	24	0.3	3.909	35
25	24	0.4	3.74	33.85
25	24	0.5	3.556	32.55
25	24	0.6	3.354	31.07
25	24	0.7	3.311	29.4
25	24	0.8	2.89	27.48
25	24	0.9	2.632	25.27
25	24	1	2.327	22.74
25	25	0	4.398	38.15
25	25	0.1	4.263	37.31
25	25	0.2	4.117	36.39
25	25	0.3	3.959	35.36
25	25	0.4	3.788	34.2
25	25	0.5	3.602	32.9
25	25	0.6	3.399	31.42
25	25	0.7	3.176	29.74
25	25	0.8	2.931	27.81
25	25	0.9	2.66	25.6
25	25	1	2.362	23.05
25	26	0	4.451	38.49
25	26	0.1	4.314	37.66
25	26	0.2	4.167	36.73
25	26	0.3	4.008	35.7
25	26	0.4	3.863	34.54
25	26	0.5	3.648	33.24
25	26	0.6	3.443	31.75
25	26	0.7	3.218	30.07
25	26	0.8	2.97	28.13
25	26	0.9	2.697	25.91
25	26	1	2.395	23.34
25	27	0	4.501	38.82
25	27	0.1	4.364	37.99
25	27	0.2	4.215	37.06
25	27	0.3	4.055	36.03
25	27	0.4	3.881	34.87
25	27	0.5	3.692	33.56
25	27	0.6	3.485	32.08
25	27	0.7	3.258	30.38
25	27	0.8	3.008	28.44
25	27	0.9	2.732	26.21
25	27	1	2.428	23.63
25	28	0	4.55	39.14
25	28	0.1	4.412	38.3
25	28	0.2	4.263	37.38
25	28	0.3	4.101	36.34
25	28	0.4	3.926	35.18
25	28	0.5	3.735	33.87
25	28	0.6	3.527	32.39
25	28	0.7	3.298	30.69
25	28	0.8	3.045	28.74
25	28	0.9	2.767	26.5
25	28	1	2.459	23.9
25	29	0	4.598	39.44
25	29	0.1	4.459	38.61
25	29	0.2	4.308	37.68
25	29	0.3	4.146	36.65
25	29	0.4	3.969	35.49
25	29	0.5	3.777	34.18
25	29	0.6	3.567	32.69
25	29	0.7	3.336	30.99
25	29	0.8	3.082	29.03
25	29	0.9	2.801	26.78
25	29	1	2.49	24.17
25	30	0	4.645	39.74
25	30	0.1	4.505	38.91
25	30	0.2	4.353	37.98
25	30	0.3	4.189	36.95
25	30	0.4	4.012	35.78
25	30	0.5	3.818	34.47
25	30	0.6	3.606	32.98
25	30	0.7	3.373	31.27
25	30	0.8	3.117	29.31
25	30	0.9	2.834	27.05
25	30	1	2.52	24.44

Altered andesite

Waypoint: 40	RMD: 20_03_01	Scanline: 20_03_01	Sample: 20_03_01	
Combinations			Equivalent Mohr-Coulomb	
PLCN	**mi**	**D**	**c**	**ø**
20	20	0	0.771	34.07
20	20	0.1	0.743	33.13
20	20	0.2	0.713	32.09
20	20	0.3	0.681	30.93
20	20	0.4	0.646	26.95
20	20	0.5	0.609	28.21
20	20	0.6	0.568	26.6
20	20	0.7	0.523	24.79
20	20	0.8	0.4875	22.75
20	20	0.9	0.422	20.46
20	20	1	0.366	17.89
20	21	0	0.783	34.5
20	21	0.1	0.755	33.56
20	21	0.2	0.725	32.51
20	21	0.3	0.692	31.35
20	21	0.4	0.657	30.06
20	21	0.5	0.619	28.62
20	21	0.6	0.578	27
20	21	0.7	0.533	25.17
20	21	0.8	0.484	23.12
20	21	0.9	0.43	20.81
20	21	1	0.372	18.21
20	22	0	0.795	34.91
20	22	0.1	0.766	33.96
20	22	0.2	0.736	32.91
20	22	0.3	0.703	31.75
20	22	0.4	0.667	30.45
20	22	0.5	0.629	29
20	22	0.6	0.587	27.37
20	22	0.7	0.541	25.54
20	22	0.8	0.492	23.47
20	22	0.9	0.438	21.14
20	22	1	0.379	18.52
20	23	0	0.806	35.3
20	23	0.1	0.777	34.35
20	23	0.2	0.747	33.3
20	23	0.3	0.713	32.13
20	23	0.4	0.677	30.83
20	23	0.5	0.638	29.38
20	23	0.6	0.596	27.74
20	23	0.7	0.55	25.9
20	23	0.8	0.5	23.81
20	23	0.9	0.445	21.46
20	23	1	0.386	18.82
20	24	0	0.817	35.67
20	24	0.1	0.788	34.72
20	24	0.2	0.757	33.67
20	24	0.3	0.723	32.5
20	24	0.4	0.687	31.19
20	24	0.5	0.648	29.73
20	24	0.6	0.605	28.09
20	24	0.7	0.558	26.24
20	24	0.8	0.507	24.14
20	24	0.9	0.452	21.78
20	24	1	0.392	19.11
20	25	0	0.827	36.03
20	25	0.1	0.798	35.07
20	25	0.2	0.767	34.02
20	25	0.3	0.733	32.85
20	25	0.4	0.696	31.54
20	25	0.5	0.657	30.08
20	25	0.6	0.613	28.43
20	25	0.7	0.566	26.57
20	25	0.8	0.515	24.46
20	25	0.9	0.459	22.08
20	25	1	0.398	19.39
20	26	0	0.838	36.37
20	26	0.1	0.808	35.42
20	26	0.2	0.777	34.36
20	26	0.3	0.742	33.19
20	26	0.4	0.705	31.88
20	26	0.5	0.665	30.41
20	26	0.6	0.622	28.75
20	26	0.7	0.574	26.88
20	26	0.8	0.522	24.77
20	26	0.9	0.466	22.37
20	26	1	0.404	19.66
20	27	0	0.848	36.7
20	27	0.1	0.818	35.75
20	27	0.2	0.786	34.69
20	27	0.3	0.751	33.52
20	27	0.4	0.714	32.2
20	27	0.5	0.674	30.73
20	27	0.6	0.63	29.07
20	27	0.7	0.582	27.19
20	27	0.8	0.529	25.06
20	27	0.9	0.472	22.65
20	27	1	0.41	19.92
20	28	0	0.857	37.02
20	28	0.1	0.827	36.07
20	28	0.2	0.795	35.01
20	28	0.3	0.76	33.83
20	28	0.4	0.723	32.52
20	28	0.5	0.682	31.04
20	28	0.6	0.637	29.37
20	28	0.7	0.589	27.49
20	28	0.8	0.536	25.35
20	28	0.9	0.478	22.92
20	28	1	0.416	20.18
20	29	0	0.867	37.33
20	29	0.1	0.837	36.37
20	29	0.2	0.804	35.32
20	29	0.3	0.769	34.14
20	29	0.4	0.731	32.82
20	29	0.5	0.69	31.34
20	29	0.6	0.645	29.67
20	29	0.7	0.596	27.78
20	29	0.8	0.543	25.63
20	29	0.9	0.485	23.19
20	29	1	0.421	20.42
20	30	0	0.876	37.63
20	30	0.1	0.845	36.67
20	30	0.2	0.813	35.61
20	30	0.3	0.777	34.43
20	30	0.4	0.739	33.11
20	30	0.5	0.698	31.63
20	30	0.6	0.652	29.95
20	30	0.7	0.603	28.06
20	30	0.8	0.549	25.9
20	30	0.9	0.491	23.45
20	30	1	0.427	20.67
21	20	0	0.81	34.07
21	20	0.1	0.781	33.13
21	20	0.2	0.749	32.09
21	20	0.3	0.716	30.93
21	20	0.4	0.679	29.65
21	20	0.5	0.639	28.21
21	20	0.6	0.597	26.6
21	20	0.7	0.55	24.79
21	20	0.8	0.499	22.75
21	20	0.9	0.444	20.46
21	20	1	0.384	17.89
21	21	0	0.823	34.5
21	21	0.1	0.793	33.56
21	21	0.2	0.761	32.51
21	21	0.3	0.727	31.35
21	21	0.4	0.69	30.06
21	21	0.5	0.65	28.62
21	21	0.6	0.607	27
21	21	0.7	0.559	25.17
21	21	0.8	0.508	23.12
21	21	0.9	0.452	20.81
21	21	1	0.391	18.21
21	22	0	0.835	34.91
21	22	0.1	0.805	33.96
21	22	0.2	0.773	32.91
21	22	0.3	0.738	31.75
21	22	0.4	0.701	30.45
21	22	0.5	0.661	29
21	22	0.6	0.617	27.37
21	22	0.7	0.569	25.54
21	22	0.8	0.517	23.47
21	22	0.9	0.46	21.14
21	22	1	0.398	18.52
21	23	0	0.847	35.3
21	23	0.1	0.817	34.35
21	23	0.2	0.784	33.3
21	23	0.3	0.749	32.13
21	23	0.4	0.711	30.83
21	23	0.5	0.671	29.38
21	23	0.6	0.626	27.74
21	23	0.7	0.578	25.9
21	23	0.8	0.525	23.81
21	23	0.9	0.467	21.46
21	23	1	0.405	18.82
21	24	0	0.858	35.67
21	24	0.1	0.828	34.72
21	24	0.2	0.795	33.67
21	24	0.3	0.76	32.5
21	24	0.4	0.722	31.19
21	24	0.5	0.68	29.73
21	24	0.6	0.635	28.09
21	24	0.7	0.586	26.24
21	24	0.8	0.533	24.14
21	24	0.9	0.475	21.78
21	24	1	0.412	19.11
21	25	0	0.869	36.03
21	25	0.1	0.838	35.07
21	25	0.2	0.805	34.02
21	25	0.3	0.77	32.85
21	25	0.4	0.731	31.54
21	25	0.5	0.69	30.08
21	25	0.6	0.644	28.43
21	25	0.7	0.595	26.57
21	25	0.8	0.541	24.46
21	25	0.9	0.482	22.08
21	25	1	0.418	19.39
21	26	0	0.88	36.37
21	26	0.1	0.849	35.42
21	26	0.2	0.816	34.36
21	26	0.3	0.078	33.19
21	26	0.4	0.741	31.88
21	26	0.5	0.699	30.41
21	26	0.6	0.653	28.75
21	26	0.7	0.603	26.88
21	26	0.8	0.549	24.77
21	26	0.9	0.489	22.37
21	26	1	0.425	19.66
21	27	0	0.89	36.7
21	27	0.1	0.859	35.75
21	27	0.2	0.826	34.69
21	27	0.3	0.789	33.52
21	27	0.4	0.75	32.2
21	27	0.5	0.708	30.73
21	27	0.6	0.661	29.07
21	27	0.7	0.611	27.19
21	27	0.8	0.556	25.06
21	27	0.9	0.496	22.65
21	27	1	0.431	19.92
21	28	0	0.901	37.02
21	28	0.1	0.869	36.07
21	28	0.2	0.835	35.01
21	28	0.3	0.799	33.83
21	28	0.4	0.759	32.52
21	28	0.5	0.716	31.4
21	28	0.6	0.67	29.37
21	28	0.7	0.619	27.49
21	28	0.8	0.563	25.35
21	28	0.9	0.503	22.92
21	28	1	0.437	20.18
21	29	0	0.91	37.33
21	29	0.1	0.879	36.37
21	29	0.2	0.845	35.32
21	29	0.3	0.808	34.14
21	29	0.4	0.768	32.82
21	29	0.5	0.725	31.34
21	29	0.6	0.678	29.67
21	29	0.7	0.626	27.78
21	29	0.8	0.57	25.63
21	29	0.9	0.509	23.19
21	29	1	0.442	20.42
21	30	0	0.92	37.63
21	30	0.1	0.888	36.67
21	30	0.2	0.854	35.61
21	30	0.3	0.817	34.43
21	30	0.4	0.776	33.11
21	30	0.5	0.733	31.63
21	30	0.6	0.685	29.95
21	30	0.7	0.634	28.06
21	30	0.8	0.577	25.9
21	30	0.9	0.515	23.45
21	30	1	0.448	20.67

22	20	0	0.848	34.07
22	20	0.1	0.817	33.13
22	20	0.2	0.784	32.09
22	20	0.3	0.749	30.93
22	20	0.4	0.711	29.65
22	20	0.5	0.669	28.21
22	20	0.6	0.624	26.6
22	20	0.7	0.575	24.79
22	20	0.8	0.522	22.75
22	20	0.9	0.464	20.46
22	20	1	0.402	17.89
22	21	0	0.861	34.5
22	21	0.1	0.83	33.56
22	21	0.2	0.797	32.51
22	21	0.3	0.761	31.35
22	21	0.4	0.722	30.06
22	21	0.5	0.681	28.62
22	21	0.6	0.635	27
22	21	0.7	0.586	25.17
22	21	0.8	0.532	23.12
22	21	0.9	0.473	20.81
22	21	1	0.409	18.21
22	22	0	0.874	34.91
22	22	0.1	0.843	33.96
22	22	0.2	0.809	32.91
22	22	0.3	0.773	31.75
22	22	0.4	0.734	30.45
22	22	0.5	0.691	29
22	22	0.6	0.645	27.37
22	22	0.7	0.595	25.54
22	22	0.8	0.541	23.47
22	22	0.9	0.481	21.41
22	22	1	0.417	18.52
22	23	0	0.886	35.3
22	23	0.1	0.855	34.35
22	23	0.2	0.821	33.3
22	23	0.3	0.784	32.13
22	23	0.4	0.745	30.83
22	23	0.5	0.702	29.38
22	23	0.6	0.655	37.74
22	23	0.7	0.605	25.9
22	23	0.8	0.549	23.81
22	23	0.9	0.489	21.46
22	23	1	0.424	18.82
22	24	0	0.898	35.67
22	24	0.1	0.866	34.72
22	24	0.2	0.832	33.67
22	24	0.3	0.795	32.5
22	24	0.4	0.755	31.19
22	24	0.5	0.712	29.73
22	24	0.6	0.665	28.09
22	24	0.7	0.614	26.24
22	24	0.8	0.558	24.14
22	24	0.9	0.497	21.78
22	24	1	0.431	19.11
22	25	0	0.91	36.03
22	25	0.1	0.878	35.07
22	25	0.2	0.843	34.02
22	25	0.3	0.806	32.85
22	25	0.4	0.765	31.54
22	25	0.5	0.722	30.08
22	25	0.6	0.674	28.43
22	25	0.7	0.623	26.57
22	25	0.8	0.566	24.46
22	25	0.9	0.505	22.08
22	25	1	0.438	19.39
22	26	0	0.921	36.37
22	26	0.1	0.889	35.42
22	26	0.2	0.854	34.36
22	26	0.3	0.816	33.19
22	26	0.4	0.775	31.88
22	26	0.5	0.731	30.41
22	26	0.6	0.683	28.75
22	26	0.7	0.631	26.88
22	26	0.8	0.574	24.77
22	26	0.9	0.512	22.37
22	26	1	0.444	19.66
22	27	0	0.932	36.7
22	27	0.1	0.899	35.75
22	27	0.2	0.864	34.69
22	27	0.3	0.826	33.52
22	27	0.4	0.785	32.2
22	27	0.5	0.741	30.73
22	27	0.6	0.692	29.07
22	27	0.7	0.639	27.19
22	27	0.8	0.582	25.06
22	27	0.9	0.519	22.65
22	27	1	0.451	19.92
22	28	0	0.942	37.02
22	28	0.1	0.91	36.07
22	28	0.2	0.874	35.01
22	28	0.3	0.836	33.83
22	28	0.4	0.795	32.52
22	28	0.5	0.75	31.04
22	28	0.6	0.701	29.37
22	28	0.7	0.648	27.49
22	28	0.8	0.589	25.35
22	28	0.9	0.526	22.92
22	28	1	0.457	20.18
22	29	0	0.953	37.33
22	29	0.1	0.92	36.37
22	29	0.2	0.884	35.32
22	29	0.3	0.845	34.14
22	29	0.4	0.804	32.82
22	29	0.5	0.758	31.34
22	29	0.6	0.709	29.67
22	29	0.7	0.655	27.78
22	29	0.8	0.597	25.63
22	29	0.9	0.533	23.19
22	29	1	0.463	20.42
22	30	0	0.963	37.63
22	30	0.1	0.929	36.67
22	30	0.2	0.894	35.61
22	30	0.3	0.855	34.43
22	30	0.4	0.813	33.11
22	30	0.5	0.767	31.63
22	30	0.6	0.717	29.95
22	30	0.7	0.663	28.06
22	30	0.8	0.604	25.9
22	30	0.9	0.539	23.45
22	30	1	0.469	20.67

23	20	0	0.887	34.07
23	20	0.1	0.855	33.13
23	20	0.2	0.82	32.09
23	20	0.3	0.783	30.93
23	20	0.4	0.743	29.65
23	20	0.5	0.7	28.21
23	20	0.6	0.653	26.6
23	20	0.7	0.602	24.79
23	20	0.8	0.546	22.75
23	20	0.9	0.486	20.46
23	20	1	0.42	17.89
23	21	0	0.901	34.5
23	21	0.1	0.868	33.56
23	21	0.2	0.833	32.51
23	21	0.3	0.769	31.35
23	21	0.4	0.756	30.06
23	21	0.5	0.712	28.62
23	21	0.6	0.664	27
23	21	0.7	0.612	25.17
23	21	0.8	0.556	23.12
23	21	0.9	0.495	20.81
23	21	1	0.428	18.21
23	22	0	0.914	34.91
23	22	0.1	0.881	33.96
23	22	0.2	0.846	32.91
23	22	0.3	0.808	31.75
23	22	0.4	0.767	30.45
23	22	0.5	0.723	29
23	22	0.6	0.675	27.37
23	22	0.7	0.623	25.54
23	22	0.8	0.565	23.47
23	22	0.9	0.503	21.14
23	22	1	0.436	18.52
23	23	0	0.927	35.3
23	23	0.1	0.894	34.35
23	23	0.2	0.858	33.3
23	23	0.3	0.82	32.13
23	23	0.4	0.779	30.83
23	23	0.5	0.734	29.38
23	23	0.6	0.685	27.74
23	23	0.7	0.632	25.9
23	23	0.8	0.575	23.81
23	23	0.9	0.512	21.46
23	23	1	0.443	18.82
23	24	0	0.939	35.67
23	24	0.1	0.906	34.72
23	24	0.2	0.87	33.67
23	24	0.3	0.832	32.5
23	24	0.4	0.79	31.19
23	24	0.5	0.745	29.73
23	24	0.6	0.695	28.09
23	24	0.7	0.642	26.24
23	24	0.8	0.583	24.14
23	24	0.9	0.52	21.78
23	24	1	0.451	19.11
23	25	0	0.951	36.03
23	25	0.1	0.918	35.07
23	25	0.2	0.882	34.02
23	25	0.3	0.843	32.85
23	25	0.4	0.801	31.54
23	25	0.5	0.755	30.08
23	25	0.6	0.705	28.43
23	25	0.7	0.651	26.57
23	25	0.8	0.592	24.46
23	25	0.9	0.528	22.08
23	25	1	0.458	19.39
23	26	0	0.963	36.37
23	26	0.1	0.929	35.42
23	26	0.2	0.893	34.36
23	26	0.3	0.853	33.19
23	26	0.4	0.811	31.88
23	26	0.5	0.765	30.41
23	26	0.6	0.715	28.75
23	26	0.7	0.66	26.88
23	26	0.8	0.6	24.77
23	26	0.9	0.535	22.37
23	26	1	0.465	19.66
23	27	0	0.975	36.7
23	27	0.1	0.94	35.75
23	27	0.2	0.904	34.69
23	27	0.3	0.864	33.52
23	27	0.4	0.821	32.2
23	27	0.5	0.775	30.73
23	27	0.6	0.724	29.07
23	27	0.7	0.669	27.19
23	27	0.8	0.609	25.06
23	27	0.9	0.543	22.65
23	27	1	0.471	19.92
23	28	0	0.986	37.02
23	28	0.1	0.651	36.07
23	28	0.2	0.914	35.01
23	28	0.3	0.874	33.83
23	28	0.4	0.831	32.52
23	28	0.5	0.784	31.04
23	28	0.6	0.733	29.37
23	28	0.7	0.677	27.49
23	28	0.8	0.616	25.235
23	28	0.9	0.55	22.92
23	28	1	0.478	20.18
23	29	0	0.997	37.33
23	29	0.1	0.962	36.37
23	29	0.2	0.924	35.32
23	29	0.3	0.884	34.14
23	29	0.4	0.841	32.82
23	29	0.5	0.793	31.34
23	29	0.6	0.742	29.67
23	29	0.7	0.685	27.78
23	29	0.8	0.624	25.63
23	29	0.9	0.557	23.19
23	29	1	0.484	20.42
23	30	0	1.007	37.63
23	30	0.1	0.972	36.67
23	30	0.2	0.934	35.61
23	30	0.3	0.894	34.43
23	30	0.4	0.85	33.11
23	30	0.5	0.802	31.63
23	30	0.6	0.75	29.95
23	30	0.7	0.694	28.06
23	30	0.8	0.632	25.9
23	30	0.9	0.564	23.45
23	30	1	0.49	20.97

24	20	0	0.925	34.07
24	20	0.1	0.892	33.13
24	20	0.2	0.856	32.09
24	20	0.3	0.817	30.93
24	20	0.4	0.775	29.65
24	20	0.5	0.73	28.21
24	20	0.6	0.681	26.6
24	20	0.7	0.628	24.79
24	20	0.8	0.57	22.75
24	20	0.9	0.507	20.46
24	20	1	0.438	17.89
24	21	0	0.939	34.5
24	21	0.1	0.906	33.56
24	21	0.2	0.869	32.51
24	21	0.3	0.83	31.35
24	21	0.4	0.788	30.06
24	21	0.5	0.742	28.62
24	21	0.6	0.693	27
24	21	0.7	0.639	25.17
24	21	0.8	0.58	23.12
24	21	0.9	0.516	20.18
24	21	1	0.447	18.21
24	22	0	0.953	34.91
24	22	0.1	0.919	33.96
24	22	0.2	0.883	32.91
24	22	0.3	0.843	31.75
24	22	0.4	0.8	30.45
24	22	0.5	0.754	29
24	22	0.6	0.704	27.37
24	22	0.7	0.649	25.54
24	22	0.8	0.59	23.47
24	22	0.9	0.525	21.41
24	22	1	0.455	18.52
24	23	0	0.967	35.3
24	23	0.1	0.932	34.35
24	23	0.2	0.895	33.3
24	23	0.3	0.856	32.13
24	23	0.4	0.812	30.83
24	23	0.5	0.766	29.38
24	23	0.6	0.715	27.74
24	23	0.7	0.66	25.9
24	23	0.8	0.599	23.81
24	23	0.9	0.534	21.46
24	23	1	0.463	18.82
24	24	0	0.98	35.67
24	24	0.1	0.645	234.72
24	24	0.2	0.908	33.67
24	24	0.3	0.867	32.5
24	24	0.4	0.824	31.19
24	24	0.5	0.777	29.73
24	24	0.6	0.725	28.09
24	24	0.7	0.67	26.24
24	24	0.8	0.609	24.14
24	24	0.9	0.542	21.78
24	24	1	0.47	19.11
24	25	0	0.993	36.03
24	25	0.1	0.657	35.07
24	25	0.2	0.92	34.02
24	25	0.3	0.879	32.85
24	25	0.4	0.835	31.54
24	25	0.5	0.787	30.08
24	25	0.6	0.736	28.43
24	25	0.7	0.679	26.57
24	25	0.8	0.618	24.46
24	25	0.9	0.551	22.08
24	25	1	0.478	19.39
24	26	0	1.005	36.37
24	26	0.1	0.969	35.42
24	26	0.2	0.931	34.36
24	26	0.3	0.89	33.19
24	26	0.4	0.846	31.88
24	26	0.5	0.798	30.41
24	26	0.6	0.746	28.75
24	26	0.7	0.689	26.88
24	26	0.8	0.626	24.77
24	26	0.9	0.559	22.37
24	26	1	0.485	19.66
24	27	0	1.017	36.7
24	27	0.1	0.981	35.75
24	27	0.2	0.943	34.69
24	27	0.3	0.901	33.52
24	27	0.4	0.857	32.2
24	27	0.5	0.808	30.73
24	27	0.6	0.755	29.07
24	27	0.7	0.698	27.19
24	27	0.8	0.635	25.06
24	27	0.9	0.566	22.65
24	27	1	0.492	19.92
24	28	0	1.028	37.02
24	28	0.1	0.992	36.07
24	28	0.2	0.954	35.01
24	28	0.3	0.912	33.83
24	28	0.4	0.867	32.52
24	28	0.5	0.818	31.04
24	28	0.6	0.765	29.37
24	28	0.7	0.706	27.49
24	28	0.8	0.643	25.35
24	28	0.9	0.574	22.92
24	28	1	0.499	20.18
24	29	0	1.04	37.33
24	29	0.1	1.003	36.37
24	29	0.2	0.964	35.32
24	29	0.3	0.922	34.14
24	29	0.4	0.877	32.82
24	29	0.5	0.827	31.34
24	29	0.6	0.774	29.67
24	29	0.7	0.715	27.78
24	29	0.8	0.651	25.63
24	29	0.9	0.581	23.19
24	29	1	0.505	20.43
24	30	0	1.051	37.63
24	30	0.1	1.014	36.67
24	30	0.2	0.975	35.61
24	30	0.3	0.932	34.43
24	30	0.4	0.887	33.11
24	30	0.5	0.837	31.63
24	30	0.6	0.783	29.95
24	30	0.7	0.724	28.06
24	30	0.8	0.659	25.9
24	30	0.9	0.588	23.45
24	30	1	0.512	20.67

25	20	0	0.964	34.07
25	20	0.1	0.929	33.13
25	20	0.2	0.892	32.09
25	20	0.3	0.851	30.93
25	20	0.4	0.808	29.65
25	20	0.5	0.761	28.21
25	20	0.6	0.71	26.6
25	20	0.7	0.654	24.79
25	20	0.8	0.594	22.75
25	20	0.9	0.528	20.46
25	20	1	0.457	17.89
25	21	0	0.979	34.5
25	21	0.1	0.944	33.56
25	21	0.2	0.906	32.51
25	21	0.3	0.865	31.35
25	21	0.4	0.821	30.06
25	21	0.5	0.774	28.62
25	21	0.6	0.722	27
25	21	0.7	0.666	25.17
25	21	0.8	0.604	23.12
25	21	0.9	0.538	20.81
25	21	1	0.466	18.21
25	22	0	0.933	34.91
25	22	0.1	0.958	33.69
25	22	0.2	0.92	32.91
25	22	0.3	0.879	31.75
25	22	0.4	0.834	30.45
25	22	0.5	0.786	29
25	22	0.6	0.734	27.37
25	22	0.7	0.677	25.54
25	22	0.8	0.615	23.47
25	22	0.9	0.547	21.14
25	22	1	0.474	18.52
25	23	0	1.007	35.3
25	23	0.1	0.972	34.35
25	23	0.2	0.933	33.3
25	23	0.3	0.891	32.13
25	23	0.4	0.847	30.83
25	23	0.5	0.798	29.38
25	23	0.6	0.745	27.74
25	23	0.7	0.687	25.9
25	23	0.8	0.625	23.81
25	23	0.9	0.556	21.46
25	23	1	0.482	18.82
25	24	0	1.021	35.67
25	24	0.1	0.985	34.72
25	24	0.2	0.946	33.67
25	24	0.3	0.904	32.5
25	24	0.4	0.859	31.19
25	24	0.5	0.809	29.73
25	24	0.6	0.756	28.09
25	24	0.7	0.698	26.24
25	24	0.8	0.634	24.14
25	24	0.9	0.565	21.78
25	24	1	0.49	19.11
25	25	0	1.034	36.03
25	25	0.1	0.998	35.07
25	25	0.2	0.958	34.02
25	25	0.3	0.916	32.85
25	25	0.4	0.87	31.54
25	25	0.5	0.821	30.08
25	25	0.6	0.767	28.43
25	25	0.7	0.708	26.57
25	25	0.8	0.644	24.46
25	25	0.9	0.574	22.08
25	25	1	0.498	19.39
25	26	0	1.047	36.37
25	26	0.1	1.01	35.42
25	26	0.2	0.971	34.36
25	26	0.3	0.928	33.19
25	26	0.4	0.882	31.88
25	26	0.5	0.831	30.41
25	26	0.6	0.777	28.75
25	26	0.7	0.717	26.88
25	26	0.8	0.653	24.77
25	26	0.9	0.582	22.37
25	26	1	0.505	19.66
25	27	0	1.059	36.7
25	27	0.1	1.022	35.75
25	27	0.2	0.982	34.69
25	27	0.3	0.939	33.52
25	27	0.4	0.893	32.2
25	27	0.5	0.842	30.73
25	27	0.6	0.787	29.07
25	27	0.7	0.727	27.19
25	27	0.8	0.661	25.06
25	27	0.9	0.59	22.65
25	27	1	0.512	19.92
25	28	0	1.071	37.02
25	28	0.1	1.034	36.07
25	28	0.2	0.994	35.01
25	28	0.3	0.95	33.83
25	28	0.4	0.903	32.52
25	28	0.5	0.852	31.04
25	28	0.6	0.797	29.37
25	28	0.7	0.736	27.49
25	28	0.8	0.67	25.35
25	28	0.9	0.598	22.92
25	28	1	0.519	20.18
25	29	0	1.083	37.33
25	29	0.1	1.046	36.37
25	29	0.2	1.005	35.32
25	29	0.3	0.961	34.14
25	29	0.4	0.914	32.82
25	29	0.5	0.862	31.34
25	29	0.6	0.806	29.67
25	29	0.7	0.745	27.78
25	29	0.8	0.678	25.63
25	29	0.9	0.606	23.19
25	29	1	0.526	20.42
25	30	0	1.095	37.63
25	30	0.1	1.057	36.67
25	30	0.2	1.016	35.61
25	30	0.3	0.972	34.43
25	30	0.4	0.924	33.11
25	30	0.5	0.872	31.63
25	30	0.6	0.815	29.95
25	30	0.7	0.754	28.06
25	30	0.8	0.687	25.9
25	30	0.9	0.613	23.45
25	30	1	0.533	20.67

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Waypoint: 33 RMD: 19_03_01 Scanline: 19_03_01 Sample: 19_03_01, 02

Combinations			Equivalent Mohr-Coulomb	
PLCN	mi	D	c	ø
20	20	0	1.444	37.4
20	20	0.1	1.402	36.64
20	20	0.2	1.357	35.8
20	20	0.3	1.308	34.85
20	20	0.4	1.255	33.79
20	20	0.5	1.197	32.6
20	20	0.6	1.134	31.24
20	20	0.7	1.065	29.7
20	20	0.8	0.989	27.93
20	20	0.9	0.904	25.89
20	20	1	0.811	25.53
20	21	0	0.465	37.83
20	21	0.1	1.422	37.07
20	21	0.2	1.377	36.22
20	21	0.3	1.327	35.27
20	21	0.4	1.274	34.21
20	21	0.5	1.216	33.02
20	21	0.6	1.152	31.66
20	21	0.7	1.082	30.11
20	21	0.8	1.005	28.33
20	21	0.9	0.92	26.28
20	21	1	0.825	23.9
20	22	0	1.485	38.24
20	22	0.1	1.442	37.47
20	22	0.2	1.396	36.63
20	22	0.3	1.346	35.68
20	22	0.4	1.292	34.62
20	22	0.5	1.233	33.42
20	22	0.6	1.169	32.05
20	22	0.7	1.099	30.5
20	22	0.8	1.021	28.71
20	22	0.9	0.934	26.65
20	22	1	0.838	24.26
20	23	0	1.504	38.62
20	23	0.1	1.461	37.86
20	23	0.2	1.415	37.01
20	23	0.3	1.365	36.06
20	23	0.4	1.31	35
20	23	0.5	1.251	33.8
20	23	0.6	1.186	32.43
20	23	0.7	1.115	30.87
20	23	0.8	1.036	29.08
20	23	0.9	0.949	27.01
20	23	1	0.852	24.6
20	24	0	1.532	39
20	24	0.1	1.48	38.23
20	24	0.2	1.433	37.38
20	24	0.3	1.382	36.43
20	24	0.4	1.327	35.37
20	24	0.5	1.268	34.17
20	24	0.6	1.202	32.8
20	24	0.7	1.13	31.23
20	24	0.8	1.051	29.43
20	24	0.9	0.962	27.35
20	24	1	0.864	24.93
20	25	0	1.542	39.35
20	25	0.1	1.498	38.59
20	25	0.2	1.45	37.74
20	25	0.3	1.399	36.79
20	25	0.4	1.344	35.72
20	25	0.5	1.284	34.52
20	25	0.6	1.218	33.15
20	25	0.7	1.145	31.58
20	25	0.8	1.065	29.77
20	25	0.9	0.976	27.68
20	25	1	0.877	25.25
20	26	0	1.559	39.69
20	26	0.1	1.515	38.93
20	26	0.2	1.468	38.08
20	26	0.3	1.416	37.13
20	26	0.4	1.36	36.06
20	26	0.5	1.3	34.86
20	26	0.6	1.233	33.48
20	26	0.7	1.16	31.91
20	26	0.8	1.079	30.1
20	26	0.9	0.989	28
20	26	1	0.889	25.56
20	27	0	1.577	40.02
20	27	0.1	1.532	39.26
20	27	0.2	1.484	38.41
20	27	0.3	1.432	37.46
20	27	0.4	1.376	36.39
20	27	0.5	1.315	35.18
20	27	0.6	1.248	33.81
20	27	0.7	1.174	32.23
20	27	0.8	1.092	30.42
20	27	0.9	1.001	28.31
20	27	1	0.9	25.85
20	28	0	1.593	40.43
20	28	0.1	1.549	39.58
20	28	0.2	1.5	38.73
20	28	0.3	1.448	37.78
20	28	0.4	1.392	36.71
20	28	0.5	1.33	35.5
20	28	0.6	1.262	34.12
20	28	0.7	1.188	32.54
20	28	0.8	1.105	30.72
20	28	0.9	1.014	28.61
20	28	1	0.912	26.14
20	29	0	1.61	40.64
20	29	0.1	1.565	39.88
20	29	0.2	1.516	39.03
20	29	0.3	1.464	38.08
20	29	0.4	1.407	37.01
20	29	0.5	1.344	35.8
20	29	0.6	1.276	34.42
20	29	0.7	1.201	32.84
20	29	0.8	1.118	31.02
20	29	0.9	1.026	28.9
20	29	1	0.923	26.42
20	30	0	1.626	40.94
20	30	0.1	1.58	40.18
20	30	0.2	1.531	39.33
20	30	0.3	1.479	38.38
20	30	0.4	1.421	37.31
20	30	0.5	1.358	36.1
20	30	0.6	1.29	34.72
20	30	0.7	1.214	33.13
20	30	0.8	1.13	31.31
20	30	0.9	1.037	29.18
20	30	1	0.934	26.69
21	20	0	1.521	37.4
21	20	0.1	1.477	36.64
21	20	0.2	1.429	35.8
21	20	0.3	1.377	34.85
21	20	0.4	1.321	33.79
21	20	0.5	1.261	32.6
21	20	0.6	1.194	31.24
21	20	0.7	1.122	29.7
21	20	0.8	1.041	27.93
21	20	0.9	0.953	25.89
21	20	1	0.854	23.53
21	21	0	1.543	37.83
21	21	0.1	1.498	37.07
21	21	0.2	1.45	36.22
21	21	0.3	1.398	35.27
21	21	0.4	1.342	34.21
21	21	0.5	1.28	33.02
21	21	0.6	1.213	31.66
21	21	0.7	1.14	30.11
21	21	0.8	1.058	28.33
21	21	0.9	0.969	26.28
21	21	1	0.869	23.9
21	22	0	1.564	38.24
21	22	0.1	1.519	37.47
21	22	0.2	1.47	36.63
21	22	0.3	1.418	35.65
21	22	0.4	1.361	34.62
21	22	0.5	1.299	33.42
21	22	0.6	1.231	32.05
21	22	0.7	1.157	30.5
21	22	0.8	1.075	28.71
21	22	0.9	0.984	26.65
21	22	1	0.883	24.26
21	23	0	1.584	38.62
21	23	0.1	1.539	37.86
21	23	0.2	1.49	37.01
21	23	0.3	1.437	36.06
21	23	0.4	1.38	35
21	23	0.5	1.317	33.8
21	23	0.6	1.249	32.43
21	23	0.7	1.174	30.87
21	23	0.8	1.091	29.08
21	23	0.9	0.999	27.01
21	23	1	0.897	24.6
21	24	0	1.604	39
21	24	0.1	1.558	38.23
21	24	0.2	1.509	37.38
21	24	0.3	1.456	36.43
21	24	0.4	1.398	35.37
21	24	0.5	1.335	34.17
21	24	0.6	1.266	32.8
21	24	0.7	1.19	31.23
21	24	0.8	1.106	29.43
21	24	0.9	1.014	27.35
21	24	1	0.91	24.93
21	25	0	1.624	39.35
21	25	0.1	1.577	38.59
21	25	0.2	1.528	37.74
21	25	0.3	1.474	36.79
21	25	0.4	1.416	35.72
21	25	0.5	1.352	34.52
21	25	0.6	1.282	33.15
21	25	0.7	1.206	31.58
21	25	0.8	1.121	29.77
21	25	0.9	1.028	27.68
21	25	1	0.923	25.25
21	26	0	1.642	39.69
21	26	0.1	1.596	38.93
21	26	0.2	1.546	38.08
21	26	0.3	1.4491	37.13
21	26	0.4	1.433	36.06
21	26	0.5	1.369	34.86
21	26	0.6	1.298	33.48
21	26	0.7	1.221	31.91
21	26	0.8	1.136	30.1
21	26	0.9	1.041	28
21	26	1	0.936	25.56
21	27	0	1.66	40.02
21	27	0.1	1.614	39.26
21	27	0.2	1.563	38.41
21	27	0.3	1.509	37.46
21	27	0.4	1.449	36.39
21	27	0.5	1.385	35.18
21	27	0.6	1.314	33.81
21	27	0.7	1.236	32.23
21	27	0.8	1.15	30.42
21	27	0.9	1.055	28.31
21	27	1	0.948	25.85
21	28	0	1.678	40.34
21	28	0.1	1.631	39.58
21	28	0.2	1.58	38.73
21	28	0.3	1.525	37.78
21	28	0.4	1.466	36.71
21	28	0.5	1.401	35.5
21	28	0.6	1.329	34.12
21	28	0.7	1.251	32.54
21	28	0.8	1.164	30.72
21	28	0.9	1.067	28.61
21	28	1	0.96	26.14
21	29	0	1.695	40.64
21	29	0.1	1.648	39.88
21	29	0.2	1.597	39.03
21	29	0.3	1.541	38.08
21	29	0.4	1.481	37.01
21	29	0.5	1.416	35.8
21	29	0.6	1.344	34.42
21	29	0.7	1.265	32.84
21	29	0.8	1.177	31.02
21	29	0.9	1.08	28.9
21	29	1	0.972	26.42
21	30	0	1.712	40.94
21	30	0.1	1.664	40.18
21	30	0.2	1.613	39.33
21	30	0.3	1.557	38.38
21	30	0.4	1.497	37.31
21	30	0.5	1.431	36.1
21	30	0.6	1.358	34.72
21	30	0.7	1.279	33.13
21	30	0.8	1.19	31.31
21	30	0.9	1.092	29.18
21	30	1	0.983	26.69

22	20	0	1.589	37.4
22	20	0.1	1.542	36.64
22	20	0.2	1.492	35.8
22	20	0.3	1.439	34.85
22	20	0.4	1.38	33.79
22	20	0.5	1.317	32.6
22	20	0.6	1.248	31.24
22	20	0.7	1.172	29.7
22	20	0.8	1.088	27.93
22	20	0.9	0.995	25.89
22	20	1	0.892	23.53
22	21	0	1.612	37.83
22	21	0.1	1.565	37.07
22	21	0.2	1.515	36.22
22	21	0.3	1.46	35.27
22	21	0.4	1.401	34.21
22	21	0.5	1.337	33.02
22	21	0.6	1.267	31.66
22	21	0.7	1.19	30.11
22	21	0.8	1.106	28.33
22	21	0.9	1.012	26.28
22	21	1	0.908	23.9
22	22	0	1.634	38.24
22	22	0.1	1.587	37.47
22	22	0.2	1.536	36.63
22	22	0.3	1.481	35.65
22	22	0.4	1.422	34.62
22	22	0.5	1.357	33.42
22	22	0.6	1.286	32.05
22	22	0.7	1.209	30.5
22	22	0.8	1.123	28.71
22	22	0.9	1.028	26.65
22	22	1	0.922	24.26
22	23	0	1.655	38.62
22	23	0.1	1.608	37.86
22	23	0.2	1.556	37.01
22	23	0.3	1.501	36.06
22	23	0.4	1.441	35
22	23	0.5	1.376	33.8
22	23	0.6	1.305	32.43
22	23	0.7	1.226	30.87
22	23	0.8	1.14	29.08
22	23	0.9	1.044	27.01
22	23	1	0.937	24.6
22	24	0	1.676	39
22	24	0.1	1.628	38.23
22	24	0.2	1.576	37.38
22	24	0.3	1.521	36.43
22	24	0.4	1.46	35.37
22	24	0.5	1.394	34.17
22	24	0.6	1.322	32.8
22	24	0.7	1.243	31.23
22	24	0.8	1.156	29.43
22	24	0.9	1.059	27.35
22	24	1	0.951	24.93
22	25	0	1.696	39.35
22	25	0.1	1.648	38.59
22	25	0.2	1.596	37.74
22	25	0.3	1.54	36.79
22	25	0.4	1.479	35.72
22	25	0.5	1.412	34.52
22	25	0.6	1.34	33.15
22	25	0.7	1.26	31.58
22	25	0.8	1.171	29.77
22	25	0.9	1.073	27.68
22	25	1	0.964	25.25
22	26	0	1.715	39.69
22	26	0.1	1.667	38.93
22	26	0.2	1.615	38.08
22	26	0.3	1.558	37.13
22	26	0.4	1.497	36.06
22	26	0.5	1.43	34.86
22	26	0.6	1.356	33.48
22	26	0.7	1.276	31.91
22	26	0.8	1.187	30.1
22	26	0.9	1.088	28
22	26	1	0.978	25.56
22	27	0	1.734	40.02
22	27	0.1	1.686	39.26
22	27	0.2	1.633	38.41
22	27	0.3	1.576	37.46
22	27	0.4	1.514	36.39
22	27	0.5	1.447	35.18
22	27	0.6	1.373	33.81
22	27	0.7	1.291	32.23
22	27	0.8	1.201	30.42
22	27	0.9	1.102	28.31
22	27	1	0.991	25.85
22	28	0	1.753	40.34
22	28	0.1	1.704	39.58
22	28	0.2	1.651	38.73
22	28	0.3	1.593	37.78
22	28	0.4	1.531	36.71
22	28	0.5	1.463	35.5
22	28	0.6	1.388	34.12
22	28	0.7	1.306	32.54
22	28	0.8	1.216	30.72
22	28	0.9	1.115	28.61
22	28	1	1.003	26.14
22	29	0	1.771	4064
22	29	0.1	1.721	39.88
22	29	0.2	1.668	39.03
22	29	0.3	1.61	38.08
22	29	0.4	1.547	37.01
22	29	0.5	1.479	35.8
22	29	0.6	1.404	34.42
22	29	0.7	1.321	32.84
22	29	0.8	1.23	31.02
22	29	0.9	1.128	28.9
22	29	1	1.015	26.42
22	30	0	1.788	40.94
22	30	0.1	1.739	40.18
22	30	0.2	1.685	39.33
22	30	0.3	1.627	38.38
22	30	0.4	1.564	37.31
22	30	0.5	1.495	36.1
22	30	0.6	1.419	34.72
22	30	0.7	1.336	33.13
22	30	0.8	1.243	31.31
22	30	0.9	1.141	29.18
22	30	1	1.027	26.69

23	20	0	1.661	37.4
23	20	0.1	1.613	36.64
23	20	0.2	1.56	35.8
23	20	0.3	1.504	34.85
23	20	0.4	1.443	33.79
23	20	0.5	1.377	32.6
23	20	0.6	1.305	31.24
23	20	0.7	1.225	29.7
23	20	0.8	1.137	27.93
23	20	0.9	1.04	25.89
23	20	1	0.933	23.53
23	21	0	1.685	37.83
23	21	0.1	1.636	37.07
23	21	0.2	1.583	36.22
23	21	0.3	1.527	35.27
23	21	0.4	1.465	34.21
23	21	0.5	1.398	33.02
23	21	0.6	1.325	31.66
23	21	0.7	1.245	30.11
23	21	0.8	1.156	28.33
23	21	0.9	1.058	26.28
23	21	1	0.949	23.9
23	22	0	1.708	38.24
23	22	0.1	1.659	37.47
23	22	0.2	1.606	36.63
23	22	0.3	1.548	35.68
23	22	0.4	1.486	34.62
23	22	0.5	1.419	33.42
23	22	0.6	1.345	32.05
23	22	0.7	1.264	30.5
23	22	0.8	1.174	28.71
23	22	0.9	1.075	26.65
23	22	1	0.964	24.26
23	23	0	1.731	38.62
23	23	0.1	1.681	37.86
23	23	0.2	1.627	37.01
23	23	0.3	1.57	36.06
23	23	0.4	1.507	35
23	23	0.5	1.439	33.8
23	23	0.6	1.364	32.43
23	23	0.7	1.282	30.87
23	23	0.8	1.191	29.08
23	23	0.9	1.091	27.01
23	23	1	0.98	24.6
23	24	0	1.752	39
23	24	0.1	1.702	38.23
23	24	0.2	1.648	37.38
23	24	0.3	1.59	36.43
23	24	0.4	1.527	35.37
23	24	0.5	1.458	34.17
23	24	0.6	1.383	32.8
23	24	0.7	1.3	31.23
23	24	0.8	1.208	29.43
23	24	0.9	1.107	27.35
23	24	1	0.994	24.93
23	25	0	1.773	39.35
23	25	0.1	1.723	38.59
23	25	0.2	1.668	37.74
23	25	0.3	1.61	36.79
23	25	0.4	1.546	35.72
23	25	0.5	1.477	34.52
23	25	0.6	1.401	33.15
23	25	0.7	1.317	31.58
23	25	0.8	1.225	29.77
23	25	0.9	1.122	27.68
23	25	1	1.008	25.25
23	26	0	1.794	39.69
23	26	0.1	1.743	38.93
23	26	0.2	1.688	38.08
23	26	0.3	1.629	37.13
23	26	0.4	1.565	36.06
23	26	0.5	1.495	34.86
23	26	0.6	1.418	33.48
23	26	0.7	1.334	31.91
23	26	0.8	1.241	30.1
23	26	0.9	1.137	28
23	26	1	1.022	25.56
23	27	0	1.813	40.02
23	27	0.1	1.762	39.26
23	27	0.2	1.707	38.41
23	27	0.3	1.648	37.46
23	27	0.4	1.583	36.39
23	27	0.5	1.512	35.18
23	27	0.6	1.432	33.81
23	27	0.7	1.35	32.23
23	27	0.8	1.256	30.42
23	27	0.9	1.152	28.31
23	27	1	1.036	25.85
23	28	0	1.833	40.34
23	28	0.1	1.781	39.58
23	28	0.2	1.726	38.73
23	28	0.3	1.666	37.78
23	28	0.4	1.601	36.71
23	28	0.5	1.53	35.5
23	28	0.6	1.452	34.12
23	28	0.7	1.366	32.54
23	28	0.8	1.271	30.72
23	28	0.9	1.166	28.61
23	28	1	1.049	26.14
23	29	0	1.852	40.64
23	29	0.1	1.8	39.88
23	29	0.2	1.744	39.03
23	29	0.3	1.684	38.08
23	29	0.4	1.618	37.01
23	29	0.5	1.546	35.8
23	29	0.6	1.468	34.42
23	29	0.7	1.381	32.84
23	29	0.8	1.286	31.02
23	29	0.9	1.18	28.9
23	29	1	1.061	26.42
23	30	0	1.87	40.94
23	30	0.1	1.818	40.18
23	30	0.2	1.762	39.33
23	30	0.3	1.701	38.38
23	30	0.4	1.635	37.37
23	30	0.5	1.563	36.1
23	30	0.6	1.484	34.72
23	30	0.7	1.396	33.13
23	30	0.8	1.3	31.31
23	30	0.9	1.193	29.18
23	30	1	1.074	26.69

24	20	0	1.742	37.4
24	20	0.1	1.692	36.64
24	20	0.2	1.637	35.8
24	20	0.3	1.578	34.85
24	20	0.4	1.514	33.79
24	20	0.5	1.444	32.6
24	20	0.6	1.386	31.24
24	20	0.7	1.285	29.7
24	20	0.8	1.193	27.93
24	20	0.9	1.091	25.89
24	20	1	0.978	23.53
24	21	0	1.768	37.83
24	21	0.1	1.716	37.07
24	21	0.2	1.661	36.22
24	21	0.3	1.601	35.27
24	21	0.4	1.537	34.21
24	21	0.5	1.467	33.02
24	21	0.6	1.39	31.66
24	21	0.7	1.306	30.11
24	21	0.8	1.213	28.33
24	21	0.9	1.11	26.28
24	21	1	0.995	23.9
24	22	0	1.792	38.24
24	22	0.1	1.74	37.47
24	22	0.2	1.684	36.63
24	22	0.3	1.624	35.68
24	22	0.4	1.559	34.62
24	22	0.5	1.488	33.42
24	22	0.6	1.411	32.05
24	22	0.7	1.326	30.5
24	22	0.8	1.231	28.71
24	22	0.9	1.127	26.65
24	22	1	1.012	24.26
24	23	0	1.815	38.62
24	23	0.1	1.763	37.86
24	23	0.2	1.707	37.01
24	23	0.3	1.646	36.06
24	23	0.4	1.581	35
24	23	0.5	1.509	33.8
24	23	0.6	1.431	32.43
24	23	0.7	1.345	30.87
24	23	0.8	1.25	29.08
24	23	0.9	1.144	27.01
24	23	1	1.027	24.6
24	24	0	1.838	39
24	24	0.1	1.785	38.23
24	24	0.2	1.729	37.38
24	24	0.3	1.668	36.43
24	24	0.4	1.602	35.37
24	24	0.5	1.529	34.17
24	24	0.6	1.45	32.8
24	24	0.7	1.363	31.23
24	24	0.8	1.267	29.43
24	24	0.9	1.161	27.35
24	24	1	1.043	24.93
24	25	0	1.86	39.35
24	25	0.1	1.807	38.59
24	25	0.2	1.75	37.74
24	25	0.3	1.689	36.79
24	25	0.4	1.622	35.72
24	25	0.5	1.549	34.52
24	25	0.6	1.469	33.15
24	25	0.7	1.382	31.58
24	25	0.8	1.285	29.77
24	25	0.9	1.177	27.68
24	25	1	1.058	25.25
24	26	0	1.881	39.69
24	26	0.1	1.828	39.93
24	26	0.2	1.771	38.08
24	26	0.3	1.709	37.13
24	26	0.4	1.641	36.06
24	26	0.5	1.568	34.86
24	26	0.6	1.488	33.48
24	26	0.7	1.399	31.91
24	26	0.8	1.301	30.1
24	26	0.9	1.193	28
24	26	1	1.072	25.56
24	27	0	1.902	40.02
24	27	0.1	1.849	39.26
24	27	0.2	1.791	38.41
24	27	0.3	1.728	37.46
24	27	0.4	1.66	36.39
24	27	0.5	1.586	35.18
24	27	0.6	1.505	33.81
24	27	0.7	1.416	32.23
24	27	0.8	1.318	30.42
24	27	0.9	1.208	28.31
24	27	1	1.086	25.85
24	28	0	1.922	40.34
24	28	0.1	1.868	39.58
24	28	0.2	1.81	38.73
24	28	0.3	1.747	37.78
24	28	0.4	1.679	36.71
24	28	0.5	1.604	35.5
24	28	0.6	1.523	34.12
24	28	0.7	1.433	32.54
24	28	0.8	1.333	30.72
24	28	0.9	1.223	28.61
24	28	1	1.1	26.14
24	29	0	1.942	40.64
24	29	0.1	1.888	39.88
24	29	0.2	1.829	39.03
24	29	0.3	1.766	38.08
24	29	0.4	1.697	37.01
24	29	0.5	1.622	35.8
24	29	0.6	1.54	34.42
24	29	0.7	1.449	32.84
24	29	0.8	1.349	31.02
24	29	0.9	1.237	28.9
24	29	1	1.113	26.42
24	30	0	1.961	40.94
24	30	0.1	1.907	40.18
24	30	0.2	1.848	39.33
24	30	0.3	1.784	38.38
24	30	0.4	1.715	37.31
24	30	0.5	1.639	36.1
24	30	0.6	1.556	34.72
24	30	0.7	1.465	33.13
24	30	0.8	1.364	31.31
24	30	0.9	1.251	29.18
24	30	1	1.126	26.69

25	20	0	1.805	37.4
25	20	0.1	1.752	36.64
25	20	0.2	1.696	35.8
25	20	0.3	1.635	34.85
25	20	0.4	1.568	33.79
25	20	0.5	1.496	32.6
25	20	0.6	1.418	31.18
25	20	0.7	1.331	29.7
25	20	0.8	1.236	27.93
25	20	0.9	1.131	25.89
25	20	1	1.014	23.53
25	21	0	1.831	37.83
25	21	0.1	1.778	37.07
25	21	0.2	1.721	36.22
25	21	0.3	1.659	35.27
25	21	0.4	1.592	34.24
25	21	0.5	1.52	33.02
25	21	0.6	1.44	31.66
25	21	0.7	1.353	30.11
25	21	0.8	1.256	28.33
25	21	0.9	1.15	26.28
25	21	1	1.031	23.9
25	22	0	1.856	38.24
25	22	0.1	1.803	37.47
25	22	0.2	1.745	36.63
25	22	0.3	1.683	35.68
25	22	0.4	1.615	34.62
25	22	0.5	1.542	33.42
25	22	0.6	1.462	32.05
25	22	0.7	1.373	30.5
25	22	0.8	1.276	28.71
25	22	0.9	1.168	26.65
25	22	1	1.048	24.26
25	23	0	1.881	38.62
25	23	0.1	1.827	37.86
25	23	0.2	1.768	37.01
25	23	0.3	1.706	36.06
25	23	0.4	1.638	35
25	23	0.5	1.563	33.8
25	23	0.6	1.482	32.43
25	23	0.7	1.393	30.87
25	23	0.8	1.295	29.08
25	23	0.9	1.186	27.01
25	23	1	1.064	24.6
25	24	0	1.904	39
25	24	0.1	1.85	38.23
25	24	0.2	1.791	37.38
25	24	0.3	1.728	36.43
25	24	0.4	1.659	35.37
25	24	0.5	1.584	34.17
25	24	0.6	1.503	32.8
25	24	0.7	1.413	31.23
25	24	0.8	1.313	29.43
25	24	0.9	1.203	27.35
25	24	1	1.08	24.93
25	25	0	1.927	39.35
25	25	0.1	1.872	38.59
25	25	0.2	1.813	37.74
25	25	0.3	1.749	36.79
25	25	0.4	1.68	35.72
25	25	0.5	1.605	34.52
25	25	0.6	1.522	33.15
25	25	0.7	1.431	31.58
25	25	0.8	1.331	29.77
25	25	0.9	1.22	27.68
25	25	1	1.096	25.25
25	26	0	1.949	39.69
25	26	0.1	1.894	38.93
25	26	0.2	1.834	38.08
25	26	0.3	1.77	37.13
25	26	0.4	1.7	36.06
25	26	0.5	1.624	34.86
25	26	0.6	1.541	33.48
25	26	0.7	1.449	31.91
25	26	0.8	1.348	30.1
25	26	0.9	1.236	28
25	26	1	1.111	25.56
25	27	0	1.971	40.02
25	27	0.1	1.915	39.26
25	27	0.2	1.855	38.41
25	27	0.3	1.791	37.46
25	27	0.4	1.72	36.39
25	27	0.5	1.644	35.18
25	27	0.6	1.56	33.81
25	27	0.7	1.467	32.23
25	27	0.8	1.365	30.42
25	27	0.9	1.252	28.31
25	27	1	1.125	25.85
25	28	0	1.992	40.34
25	28	0.1	1.936	39.58
25	28	0.2	1.875	38.73
25	28	0.3	1.81	37.78
25	28	0.4	1.739	36.71
25	28	0.5	1.662	35.5
25	28	0.6	1.578	34.12
25	28	0.7	1.484	32.54
25	28	0.8	1.381	30.72
25	28	0.9	1.267	28.61
25	28	1	1.14	26.14
25	29	0	2.012	40.64
25	29	0.1	1.956	39.88
25	29	0.2	1.895	39.03
25	29	0.3	1.829	38.08
25	29	0.4	0.4	37.01
25	29	0.5	1.68	35.8
25	29	0.6	1.595	34.42
25	29	0.7	1.501	32.84
25	29	0.8	1.397	31.02
25	29	0.9	1.282	28.9
25	29	1	1.153	26.42
25	30	0	2.032	40.94
25	30	0.1	1.975	40.18
25	30	0.2	1.914	39.33
25	30	0.3	1.848	38.38
25	30	0.4	1.776	37.31
25	30	0.5	1.698	36.1
25	30	0.6	1.612	34.72
25	30	0.7	1.518	33.13
25	30	0.8	1.413	31.31
25	30	0.9	1.297	29.18
25	30	1	1.167	26.69

Indurated dacite

Waypoint: 52 RMD: 14_03_02 Scanline: 14_03_01 Sample: 14_03_02

Combinations			Equivalent Mohr-Coulomb	
PLCN	mi	D	c	ø
20	22	0	2.495	36.73
20	22	0.1	2.415	35.88
20	22	0.2	2.33	34.94
20	22	0.3	2.238	33.89
20	22	0.4	2.138	32.72
20	22	0.5	2.029	31.4
20	22	0.6	1.911	29.91
20	22	0.7	1.781	28.22
20	22	0.8	1.638	26.29
20	22	0.9	1.482	24.09
20	22	1	1.309	21.57
20	23	0	2.529	37.11
20	23	0.1	2.448	36.27
20	23	0.2	2.362	35.33
20	23	0.3	2.269	34.28
20	23	0.4	2.168	33.1
20	23	0.5	2.059	31.78
20	23	0.6	1.939	30.29
20	23	0.7	1.808	28.59
20	23	0.8	1.664	26.65
20	23	0.9	1.505	24.43
20	23	1	1.331	21.89
20	24	0	2.562	37.49
20	24	0.1	2.481	36.64
20	24	0.2	2.394	35.7
20	24	0.3	2.3	34.65
20	24	0.4	2.198	33.47
20	24	0.5	2.087	32.14
20	24	0.6	1.966	30.65
20	24	0.7	1.834	28.94
20	24	0.8	1.688	26.99
20	24	0.9	1.528	24.76
20	24	1	1.352	22.2
20	25	0	2.593	37.84
20	25	0.1	2.512	36.99
20	25	0.2	2.424	36.05
20	25	0.3	2.329	35
20	25	0.4	2.227	33.82
20	25	0.5	2.115	32.49
20	25	0.6	1.993	30.99
20	25	0.7	1.859	29.28
20	25	0.8	1.712	27.32
20	25	0.9	1.55	25.08
20	25	1	1.372	22.51
20	26	0	2.624	38.19
20	26	0.1	2.542	37.34
20	26	0.2	2.454	36.39
20	26	0.3	2.358	35.34
20	26	0.4	2.254	34.16
20	26	0.5	2.142	32.83
20	26	0.6	2.019	31.32
20	26	0.7	1.884	29.61
20	26	0.8	1.735	27.64
20	26	0.9	1.572	25.39
20	26	1	1.391	22.8
20	27	0	2.654	38.52
20	27	0.1	2.571	37.67
20	27	0.2	2.482	36.72
20	27	0.3	2.386	35.67
20	27	0.4	2.282	34.49
20	27	0.5	2.168	33.15
20	27	0.6	2.044	31.64
20	27	0.7	1.907	29.92
20	27	0.8	1.758	27.95
20	27	0.9	1.592	25.69
20	27	1	1.41	23.08
20	28	0	2.683	38.83
20	28	0.1	2.6	37.98
20	28	0.2	2.51	37.04
20	28	0.3	2.413	35.99
20	28	0.4	2.308	34.8
20	28	0.5	2.193	33.47
20	28	0.6	2.068	31.95
20	28	0.7	1.931	30.23
20	28	0.8	1.779	28.25
20	28	0.9	1.613	25.98
20	28	1	1.429	23.36
21	22	0	2.618	36.73
21	22	0.1	2.534	35.88
21	22	0.2	2.445	34.94
21	22	0.3	2.348	33.89
21	22	0.4	2.243	32.72
21	22	0.5	2.129	31.4
21	22	0.6	2.005	29.91
21	22	0.7	1.869	28.22
21	22	0.8	1.719	26.29
21	22	0.9	1.555	24.09
21	22	1	1.374	21.57
21	23	0	2.653	37.11
21	23	0.1	2.569	36.27
21	23	0.2	2.479	35.33
21	23	0.3	2.381	34.28
21	23	0.4	2.275	33.1
21	23	0.5	2.16	31.78
21	23	0.6	2.034	30.29
21	23	0.7	1.897	28.59
21	23	0.8	1.746	26.65
21	23	0.9	1.579	24.43
21	23	1	1.396	21.89
21	24	0	2.688	37.49
21	24	0.1	2.603	36.64
21	24	0.2	2.512	35.7
21	24	0.3	2.413	34.65
21	24	0.4	2.306	33.47
21	24	0.5	2.19	32.14
21	24	0.6	2.063	30.65
21	24	0.7	1.924	28.94
21	24	0.8	1.771	26.99
21	24	0.9	1.603	24.76
21	24	1	1.418	22.2
21	25	0	2.721	37.84
21	25	0.1	2.636	36.99
21	25	0.2	2.543	36.05
21	25	0.3	2.444	35
21	25	0.4	2.336	33.82
21	25	0.5	2.219	32.49
21	25	0.6	2.091	30.99
21	25	0.7	1.951	29.28
21	25	0.8	1.796	27.32
21	25	0.9	1.626	25.08
21	25	1	1.439	22.51
21	26	0	2.753	38.19
21	26	0.1	2.667	37.34
21	26	0.2	2.574	36.39
21	26	0.3	2.474	35.34
21	26	0.4	2.366	34.16
21	26	0.5	2.247	32.83
21	26	0.6	2.118	31.32
21	26	0.7	1.976	29.61
21	26	0.8	1.821	27.64
21	26	0.9	1.649	25.39
21	26	1	1.46	22.8
21	27	0	2.785	38.52
21	27	0.1	2.698	37.67
21	27	0.2	2.605	36.72
21	27	0.3	2.504	35.67
21	27	0.4	2.394	34.49
21	27	0.5	2.275	33.15
21	27	0.6	2.144	31.64
21	27	0.7	2.001	29.92
21	27	0.8	1.844	27.95
21	27	0.9	1.671	25.69
21	27	1	1.48	23.08
21	28	0	2.816	38.83
21	28	0.1	2.728	37.98
21	28	0.2	2.634	37.04
21	28	0.3	2.535	35.99
21	28	0.4	2.422	34.8
21	28	0.5	2.301	33.47
21	28	0.6	2.17	31.95
21	28	0.7	2.026	30.23
21	28	0.8	1.867	28.25
21	28	0.9	1.692	25.98
21	28	1	1.499	23.36

22	22	0	2.747	36.73
22	22	0.1	2.659	35.88
22	22	0.2	2.565	34.94
22	22	0.3	2.464	33.89
22	22	0.4	2.354	32.72
22	22	0.5	2.234	31.4
22	22	0.6	2.103	29.91
22	22	0.7	1.961	28.22
22	22	0.8	1.804	26.29
22	22	0.9	1.631	24.09
22	22	1	1.442	21.57
22	23	0	2.784	37.11
22	23	0.1	2.696	36.27
22	23	0.2	2.601	35.33
22	23	0.3	2.498	34.28
22	23	0.4	2.387	33.1
22	23	0.5	2.266	31.78
22	23	0.6	2.135	30.29
22	23	0.7	1.99	28.59
22	23	0.8	1.832	26.65
22	23	0.9	1.657	24.43
22	23	1	1.465	21.89
22	24	0	2.82	37.49
22	24	0.1	2.731	36.64
22	24	0.2	2.635	35.7
22	24	0.3	2.532	34.65
22	24	0.4	2.42	33.47
22	24	0.5	2.298	32.14
22	24	0.6	2.165	30.65
22	24	0.7	2.019	28.94
22	24	0.8	1.859	26.99
22	24	0.9	1.682	24.76
22	24	1	1.488	22.2
22	25	0	2.855	37.84
22	25	0.1	2.765	36.99
22	25	0.2	2.669	36.05
22	25	0.3	2.565	35
22	25	0.4	2.451	33.82
22	25	0.5	2.328	32.49
22	25	0.6	2.194	30.99
22	25	0.7	2.047	29.28
22	25	0.8	1.885	27.32
22	25	0.9	1.707	25.08
22	25	1	1.51	22.51
22	26	0	2.889	38.19
22	26	0.1	2.799	37.34
22	26	0.2	2.701	36.39
22	26	0.3	2.596	35.34
22	26	0.4	2.482	34.16
22	26	0.5	2.358	32.83
22	26	0.6	2.222	31.32
22	26	0.7	2.074	29.61
22	26	0.8	1.91	27.64
22	26	0.9	1.73	25.39
22	26	1	1.532	22.8
22	27	0	2.922	38.52
22	27	0.1	2.831	37.67
22	27	0.2	2.733	36.72
22	27	0.3	2.627	35.67
22	27	0.4	2.512	34.49
22	27	0.5	2.387	33.15
22	27	0.6	2.25	31.64
22	27	0.7	2.1	29.92
22	27	0.8	1.935	27.95
22	27	0.9	1.753	25.69
22	27	1	1.553	23.08
22	28	0	2.954	38.83
22	28	0.1	2.836	37.98
22	28	0.2	2.764	37.04
22	28	0.3	2.657	35.99
22	28	0.4	2.541	34.8
22	28	0.5	2.415	33.47
22	28	0.6	2.277	31.95
22	28	0.7	2.126	30.23
22	28	0.8	1.959	28.25
22	28	0.9	1.776	25.98
22	28	1	1.573	23.36

23	22	0	2.87	36.73
23	22	0.1	2.778	35.88
23	22	0.2	2.68	34.94
23	22	0.3	2.574	33.89
23	22	0.4	2.459	32.72
23	22	0.5	2.334	31.4
23	22	0.6	2.198	29.91
23	22	0.7	2.048	28.22
23	22	0.8	1.885	26.29
23	22	0.9	1.704	24.09
23	22	1	1.506	21.57
23	23	0	2.909	37.11
23	23	0.1	2.816	36.27
23	23	0.2	2.717	35.33
23	23	0.3	2.61	34.28
23	23	0.4	2.494	33.1
23	23	0.5	2.368	31.78
23	23	0.6	2.23	30.29
23	23	0.7	2.079	28.59
23	23	0.8	1.914	26.65
23	23	0.9	1.731	24.43
23	23	1	1.531	21.89
23	24	0	2.946	37.49
23	24	0.1	2.853	36.64
23	24	0.2	2.753	35.7
23	24	0.3	2.645	34.65
23	24	0.4	2.528	33.47
23	24	0.5	2.401	32.14
23	24	0.6	2.626	30.65
23	24	0.7	2.109	28.94
23	24	0.8	1.942	26.99
23	24	0.9	1.758	24.76
23	24	1	1.555	22.2
23	25	0	2.983	37.84
23	25	0.1	2.889	36.99
23	25	0.2	2.788	36.05
23	25	0.3	2.679	35
23	25	0.4	2.561	33.82
23	25	0.5	2.433	32.49
23	25	0.6	2.292	30.99
23	25	0.7	2.138	29.28
23	25	0.8	1.969	27.32
23	25	0.9	1.783	25.08
23	25	1	1.578	22.51
23	26	0	3.018	38.19
23	26	0.1	2.924	37.34
23	26	0.2	2.822	36.39
23	26	0.3	2.712	35.34
23	26	0.4	2.593	34.16
23	26	0.5	2.463	32.83
23	26	0.6	2.322	31.32
23	26	0.7	2.167	29.61
23	26	0.8	1.996	27.64
23	26	0.9	1.808	25.39
23	26	1	1.6	22.8
23	27	0	3.053	38.52
23	27	0.1	2.958	37.67
23	27	0.2	2.855	36.72
23	27	0.3	2.745	35.67
23	27	0.4	2.624	34.49
23	27	0.5	2.494	33.15
23	27	0.6	2.351	31.64
23	27	0.7	2.194	29.92
23	27	0.8	2.022	27.95
23	27	0.9	1.832	25.69
23	27	1	1.622	23.08
23	28	0	3.087	38.83
23	28	0.1	2.991	37.98
23	28	0.2	2.887	37.04
23	28	0.3	2.776	35.99
23	28	0.4	2.655	34.8
23	28	0.5	2.523	33.47
23	28	0.6	2.379	31.95
23	28	0.7	2.221	30.23
23	28	0.8	2.047	28.25
23	28	0.9	1.855	25.98
23	28	1	1.644	23.36

24	22	0	2.994	36.73
24	22	0.1	2.898	35.88
24	22	0.2	2.796	34.94
24	22	0.3	2.685	33.89
24	22	0.4	2.565	32.72
24	22	0.5	2.435	31.4
24	22	0.6	2.293	29.91
24	22	0.7	2.137	28.22
24	22	0.8	1.966	26.29
24	22	0.9	1.778	24.09
24	22	1	1.571	21.57
24	23	0	3.034	37.11
24	23	0.1	2.938	36.27
24	23	0.2	2.835	35.33
24	23	0.3	2.723	34.28
24	23	0.4	2.602	33.1
24	23	0.5	2.47	31.78
24	23	0.6	2.327	30.29
24	23	0.7	2.169	28.59
24	23	0.8	1.996	26.65
24	23	0.9	1.806	24.43
24	23	1	1.597	21.89
24	24	0	3.074	37.49
24	24	0.1	2.977	36.64
24	24	0.2	2.872	35.7
24	24	0.3	2.76	34.65
24	24	0.4	2.637	33.47
24	24	0.5	2.505	32.14
24	24	0.6	2.359	30.65
24	24	0.7	2.2	28.94
24	24	0.8	2.026	26.99
24	24	0.9	1.834	24.76
24	24	1	1.622	22.2
24	25	0	3.112	37.84
24	25	0.1	3.014	36.99
24	25	0.2	2.909	36.05
24	25	0.3	2.795	35
24	25	0.4	2.672	33.82
24	25	0.5	2.538	32.49
24	25	0.6	2.391	30.99
24	25	0.7	2.231	29.28
24	25	0.8	2.054	27.32
24	25	0.9	1.86	25.08
24	25	1	1.646	22.51
24	26	0	3.149	38.19
24	26	0.1	3.05	37.34
24	26	0.2	2.944	36.39
24	26	0.3	2.83	35.34
24	26	0.4	2.705	34.16
24	26	0.5	2.57	32.83
24	26	0.6	2.422	31.32
24	26	0.7	2.26	29.61
24	26	0.8	2.082	27.64
24	26	0.9	1.886	25.39
24	26	1	1.67	22.8
24	27	0	3.185	38.52
24	27	0.1	3.086	37.67
24	27	0.2	2.979	36.72
24	27	0.3	2.863	35.67
24	27	0.4	2.738	34.49
24	27	0.5	2.601	33.15
24	27	0.6	2.452	31.64
24	27	0.7	2.289	29.92
24	27	0.8	2.109	27.95
24	27	0.9	1.911	25.69
24	27	1	1.692	23.08
24	28	0	3.22	38.83
24	28	0.1	3.12	37.98
24	28	0.2	3.012	37.04
24	28	0.3	2.896	35.99
24	28	0.4	2.77	34.8
24	28	0.5	2.632	33.47
24	28	0.6	2.482	31.95
24	28	0.7	2.317	30.23
24	28	0.8	2.135	28.25
24	28	0.9	1.935	25.98
24	28	1	1.715	23.36

25	22	0	3.119	36.73
25	22	0.1	3.019	35.88
25	22	0.2	2.912	34.94
25	22	0.3	2.797	33.89
25	22	0.4	2.672	32.72
25	22	0.5	2.536	31.4
25	22	0.6	2.388	29.91
25	22	0.7	2.226	28.22
25	22	0.8	2.048	26.29
25	22	0.9	1.852	24.09
25	22	1	1.637	21.57
25	23	0	3.161	37.11
25	23	0.1	3.061	36.27
25	23	0.2	2.953	35.33
25	23	0.3	2.836	34.28
25	23	0.4	2.71	33.1
25	23	0.5	2.573	31.78
25	23	0.6	2.424	30.29
25	23	0.7	2.26	28.59
25	23	0.8	2.08	26.65
25	23	0.9	1.882	24.43
25	23	1	1.664	21.89
25	24	0	3.202	37.49
25	24	0.1	3.101	36.64
25	24	0.2	2.992	35.7
25	24	0.3	2.875	34.65
25	24	0.4	2.747	33.47
25	24	0.5	2.609	32.14
25	24	0.6	2.458	30.65
25	24	0.7	2.292	28.94
25	24	0.8	2.11	26.99
25	24	0.9	1.91	24.76
25	24	1	1.689	22.2
25	25	0	3.242	37.84
25	25	0.1	3.14	36.99
25	25	0.2	3.03	36.05
25	25	0.3	2.912	35
25	25	0.4	2.783	33.82
25	25	0.5	2.644	32.49
25	25	0.6	2.491	30.99
25	25	0.7	2.324	29.28
25	25	0.8	2.14	27.32
25	25	0.9	1.938	25.08
25	25	1	1.715	22.51
25	26	0	3.28	38.19
25	26	0.1	3.178	37.34
25	26	0.2	3.067	36.39
25	26	0.3	2.948	35.34
25	26	0.4	2.818	34.16
25	26	0.5	2.677	32.83
25	26	0.6	2.523	31.32
25	26	0.7	2.354	29.61
25	26	0.8	2.169	27.64
25	26	0.9	1.964	25.39
25	26	1	1.739	22.8
25	27	0	3.318	38.52
25	27	0.1	3.214	37.67
25	27	0.2	3.103	36.72
25	27	0.3	2.983	35.67
25	27	0.4	2.852	34.49
25	27	0.5	2.71	33.15
25	27	0.6	2.555	31.64
25	27	0.7	2.384	29.92
25	27	0.8	2.197	27.95
25	27	0.9	1.991	25.69
25	27	1	1.763	23.08
25	28	0	3.354	38.83
25	28	0.1	3.25	37.98
25	28	0.2	3.138	37.04
25	28	0.3	3.017	35.99
25	28	0.4	2.885	34.8
25	28	0.5	2.742	33.47
25	28	0.6	2.585	31.95
25	28	0.7	2.413	30.23
25	28	0.8	2.224	28.25
25	28	0.9	2.016	25.98
25	28	1	1.786	23.36

APPENDIX P: DIRECT SHEAR DATA FOR THE SOFT ROCKS

Magnitude of normal load for Matahina Ignimbrite and block and ash flow

	Unit weight of material at field moist (N m^{-3})	Unit weight of material at field moist (kN m^{-3})	Depth to shear plane (m)	Cross sectional area of sample (m^2)	Mass (kg)
Matahina Ignimbrite	11794.36	11.79436	5.0	0.003166922	19.04
Block and ash flow	19448.69	19.44869	5.0	0.003166922	31.39

Block and ash flow direct shear test data

(Shaded cell for each direct shear test indicates peak shear stress)

Direct shear (Block and ash: core 1)

Waypoint: 109 Soil field description: 19_08_01a/b Sample: 19_08_01 Lithotechnical unit: Block and ash flow Normal load: 14.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	10.0	-0.001	0.1	2.3	0.1	-0.001
1.0	33.0	-0.003	0.1	7.7	0.1	-0.003
1.5	40.0	-0.004	0.2	9.3	0.2	-0.004
2.0	50.0	-0.004	0.3	11.6	0.3	-0.004
2.5	63.0	-0.008	0.3	14.6	0.3	-0.008
3.0	69.0	-0.012	0.4	16.0	0.4	-0.012
3.5	77.0	-0.015	0.5	17.9	0.5	-0.015
4.0	85.0	-0.020	0.6	19.8	0.6	-0.020
4.5	93.0	-0.024	0.6	21.6	0.6	-0.024
5.0	100.0	-0.026	0.7	23.2	0.7	-0.026
5.5	107.0	-0.028	0.8	24.9	0.8	-0.028
6.0	112.0	-0.029	0.9	26.0	0.9	-0.029
6.5	119.0	-0.029	1.0	27.7	1.0	-0.029
7.0	123.0	-0.029	1.0	28.6	1.0	-0.029
7.5	127.0	-0.028	1.1	29.5	1.1	-0.028
8.0	131.0	-0.024	1.2	30.5	1.2	-0.024
8.5	135.0	-0.020	1.3	31.4	1.3	-0.020
9.0	140.0	-0.015	1.4	32.5	1.4	-0.015
9.5	145.0	-0.011	1.4	33.7	1.4	-0.011
10.0	148.0	-0.005	1.5	34.4	1.5	-0.005
10.5	150.0	-0.001	1.6	34.9	1.6	-0.001
11.0	154.0	0.007	1.7	35.8	1.7	0.007
11.5	158.0	0.013	1.8	36.7	1.8	0.013
12.0	160.0	0.019	1.9	37.2	1.9	0.019
12.5	164.0	0.025	2.0	38.1	2.0	0.025
13.0	166.0	0.032	2.0	38.6	2.0	0.032
13.5	169.0	0.042	2.1	39.3	2.1	0.042
14.0	172.0	0.052	2.2	40.0	2.2	0.052
14.5	173.0	0.064	2.3	40.2	2.3	0.064
15.0	175.0	0.076	2.4	40.7	2.4	0.076
15.5	177.0	0.086	2.5	41.2	2.5	0.086
16.0	177.0	0.096	2.6	41.2	2.6	0.096
16.5	178.0	0.103	2.7	41.4	2.7	0.103
17.0	179.0	0.116	2.8	41.6	2.8	0.116
17.5	179.0	0.122	2.8	**41.6**	2.8	0.122
18.0	179.0	0.130	2.9	41.6	2.9	0.130
18.5	179.0	0.130	3.0	41.6	3.0	0.130
19.0	179.0	0.132	3.1	41.6	3.1	0.132
19.5	179.0	0.138	3.2	41.6	3.2	0.138
20.0	179.0	0.150	3.3	41.6	3.3	0.150
20.5	179.0	0.157	3.4	41.6	3.4	0.157
21.0	179.0	0.164	3.5	41.6	3.5	0.164
21.5	179.0	0.168	3.6	41.6	3.6	0.168
22.0	179.0	0.173	3.7	41.6	3.7	0.173
22.5	179.0	0.183	3.8	41.6	3.8	0.183
23.0	179.0	0.185	3.9	41.6	3.9	0.185
23.5	179.0	0.195	3.9	41.6	3.9	0.195
24.0	178.0	0.198	4.0	41.4	4.0	0.198
24.5	171.0	0.187	4.1	39.8	4.1	0.187
25.0	173.0	0.201	4.2	40.2	4.2	0.201
25.5	173.0	0.210	4.3	40.2	4.3	0.210
26.0	173.0	0.216	4.4	40.2	4.4	0.216
26.5	173.0	0.224	4.5	40.2	4.5	0.224
27.0	173.0	0.230	4.6	40.2	4.6	0.230
27.5	173.0	0.231	4.7	40.2	4.7	0.231
28.0	173.0	0.233	4.8	40.2	4.8	0.233
28.5	173.0	0.234	4.9	40.2	4.9	0.234
29.0	173.0	0.235	5.0	40.2	5.0	0.235
29.5	172.0	0.235	5.1	40.0	5.1	0.235
30.0	172.0	0.235	5.1	40.0	5.1	0.235
30.5	172.0	0.238	5.2	40.0	5.2	0.238
31.0	172.0	0.238	5.3	40.0	5.3	0.238
31.5	171.0	0.241	5.4	39.8	5.4	0.241
32.0	171.0	0.245	5.5	39.8	5.5	0.245
32.5	171.0	0.247	5.6	39.8	5.6	0.247
33.0	169.0	0.249	5.7	39.3	5.7	0.249
33.5	169.0	0.249	5.8	39.3	5.8	0.249
34.0	169.0	0.257	5.9	39.3	5.9	0.257
34.5	168.0	0.258	6.0	39.1	6.0	0.258
35.0	167.0	0.240	6.1	38.8	6.1	0.240
35.5	167.0	0.240	6.2	38.8	6.2	0.240
36.0	167.0	0.240	6.3	38.8	6.3	0.240
36.5	167.0	0.240	6.3	38.8	6.3	0.240
37.0	167.0	0.241	6.4	38.8	6.4	0.241
37.5	167.0	0.245	6.5	38.8	6.5	0.245
38.0	167.0	0.249	6.6	38.8	6.6	0.249
38.5	167.0	0.251	6.7	38.8	6.7	0.251
39.0	167.0	0.251	6.8	38.8	6.8	0.251
39.5	167.0	0.251	6.9	38.8	6.9	0.251
40.0	167.0	0.255	7.0	38.8	7.0	0.255
40.5	167.0	0.259	7.1	38.8	7.1	0.259

Direct shear (Block and ash: core 2)

Waypoint: 109 Soil field description: 19_08_01a/b Sample: 19_08_01 Lithotechnical unit: Block and ash flow Normal load: 24.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	0.0	0.000	0.1	0.0	0.1	0.000
1.0	0.0	-0.003	0.2	0.0	0.2	-0.003
1.5	12.0	-0.005	0.3	2.8	0.3	-0.005
2.0	35.0	-0.010	0.3	8.1	0.3	-0.010
2.5	46.0	-0.020	0.4	10.7	0.4	-0.020
3.0	57.0	-0.026	0.4	13.3	0.4	-0.026
3.5	75.0	-0.038	0.5	17.4	0.5	-0.038
4.0	90.0	-0.050	0.6	20.9	0.6	-0.050
4.5	101.0	-0.069	0.6	23.5	0.6	-0.069
5.0	113.0	-0.081	0.7	26.3	0.7	-0.081
5.5	123.0	-0.092	0.8	28.6	0.8	-0.092
6.0	133.0	-0.103	0.8	30.9	0.8	-0.103
6.5	143.0	-0.115	0.9	33.2	0.9	-0.115
7.0	153.0	-0.125	1.0	35.6	1.0	-0.125
7.5	160.0	-0.136	1.1	37.2	1.1	-0.136
8.0	167.0	-0.104	1.1	38.8	1.1	-0.104
8.5	174.0	-0.151	1.2	40.5	1.2	-0.151
9.0	183.0	-0.159	1.3	42.5	1.3	-0.159
9.5	192.0	-0.164	1.4	44.6	1.4	-0.164
10.0	199.0	-0.170	1.4	46.3	1.4	-0.170
10.5	206.0	-0.176	1.5	47.9	1.5	-0.176
11.0	215.0	-0.178	1.6	50.0	1.6	-0.178
11.5	220.0	-0.184	1.7	51.1	1.7	-0.184
12.0	227.0	-0.184	1.7	52.8	1.7	-0.184
12.5	236.0	-0.185	1.8	54.9	1.8	-0.185
13.0	240.0	-0.186	1.9	55.8	1.9	-0.186
13.5	246.0	-0.187	2.0	57.2	2.0	-0.187
14.0	251.0	-0.191	2.1	58.4	2.1	-0.191
14.5	258.0	-0.196	2.1	60.0	2.1	-0.196
15.0	262.0	-0.198	2.2	60.9	2.2	-0.198
15.5	268.0	-0.198	2.3	62.3	2.3	-0.198
16.0	274.0	-0.195	2.4	63.7	2.4	-0.195
16.5	276.0	-0.194	2.5	64.2	2.5	-0.194
17.0	281.0	-0.193	2.5	65.3	2.5	-0.193
17.5	284.0	-0.194	2.6	66.0	2.6	-0.194
18.0	287.0	-0.194	2.7	66.7	2.7	-0.194
18.5	289.0	-0.181	2.8	67.2	2.8	-0.181
19.0	292.0	-0.181	2.9	67.9	2.9	-0.181
19.5	293.0	-0.176	3.0	68.1	3.0	-0.176
20.0	294.0	-0.172	3.1	68.4	3.1	-0.172
20.5	294.0	-0.165	3.2	68.4	3.2	-0.165
21.0	296.0	-0.158	3.3	**68.8**	3.3	-0.158
21.5	296.0	-0.154	3.3	68.8	3.3	-0.154
22.0	296.0	-0.150	3.4	68.8	3.4	-0.150
22.5	296.0	-0.148	3.5	68.8	3.5	-0.148
23.0	296.0	-0.147	3.6	68.8	3.6	-0.147
23.5	296.0	-0.144	3.7	68.8	3.7	-0.144
24.0	296.0	-0.140	3.8	68.8	3.8	-0.140
24.5	296.0	-0.134	3.9	68.8	3.9	-0.134
25.0	296.0	-0.126	4.0	68.8	4.0	-0.126
25.5	296.0	-0.119	4.1	68.8	4.1	-0.119
26.0	296.0	-0.114	4.2	68.8	4.2	-0.114
26.5	296.0	-0.110	4.3	68.8	4.3	-0.110
27.0	296.0	-0.103	4.3	68.8	4.3	-0.103
27.5	296.0	-0.096	4.4	68.8	4.4	-0.096
28.0	296.0	-0.090	4.5	68.8	4.5	-0.090
28.5	296.0	-0.081	4.6	68.8	4.6	-0.081
29.0	295.0	-0.077	4.7	68.6	4.7	-0.077
29.5	295.0	-0.071	4.8	68.6	4.8	-0.071
30.0	295.0	-0.070	4.9	68.6	4.9	-0.070
30.5	295.0	-0.064	5.0	68.6	5.0	-0.064
31.0	291.0	-0.059	5.1	67.7	5.1	-0.059
31.5	288.0	-0.056	5.2	67.0	5.2	-0.056
32.0	287.0	-0.055	5.3	66.7	5.3	-0.055
32.5	285.0	-0.052	5.4	66.3	5.4	-0.052
33.0	282.0	-0.051	5.5	65.6	5.5	-0.051
33.5	280.0	-0.051	5.6	65.1	5.6	-0.051
34.0	279.0	-0.051	5.7	64.9	5.7	-0.051
34.5	277.0	-0.051	5.8	64.4	5.8	-0.051
35.0	276.0	-0.048	5.9	64.2	5.9	-0.048
35.5	269.0	-0.048	6.0	62.5	6.0	-0.048
36.0	266.0	-0.048	6.1	61.8	6.1	-0.048
36.5	261.0	-0.051	6.2	60.7	6.2	-0.051
37.0	261.0	-0.053	6.2	60.7	6.2	-0.053
37.5	261.0	-0.056	6.3	60.7	6.3	-0.056
38.0	260.0	-0.057	6.4	60.4	6.4	-0.057
38.5	258.0	-0.057	6.5	60.0	6.5	-0.057
39.0	257.0	-0.057	6.6	59.8	6.6	-0.057
39.5	256.0	-0.058	6.7	59.5	6.7	-0.058
40.0	256.0	-0.061	6.8	59.5	6.8	-0.061
40.5	256.0	-0.065	6.9	59.5	6.9	-0.065
41.0	256.0	-0.068	7.0	59.5	7.0	-0.068
41.5	256.0	-0.071	7.1	59.5	7.1	-0.071
42.0	257.0	-0.075	7.2	59.8	7.2	-0.075
42.5	257.0	-0.082	7.3	59.8	7.3	-0.082
43.0	256.0	-0.089	7.4	59.5	7.4	-0.089
43.5	256.0	-0.097	7.4	59.5	7.4	-0.097
44.0	256.0	-0.106	7.5	59.5	7.5	-0.106
44.5	257.0	-0.113	7.6	59.8	7.6	-0.113
45.0	259.0	-0.114	7.7	60.2	7.7	-0.114
45.5	259.0	-0.119	7.8	60.2	7.8	-0.119
46.0	260.0	-0.123	7.9	60.4	7.9	-0.123
46.5	259.0	-0.130	8.0	60.2	8.0	-0.130
47.0	260.0	-0.132	8.1	60.4	8.1	-0.132
47.5	262.0	-0.132	8.2	60.9	8.2	-0.132
48.0	262.0	-0.133	8.3	60.9	8.3	-0.133
48.5	264.0	-0.136	8.3	61.4	8.3	-0.136
49.0	265.0	-0.138	8.4	61.6	8.4	-0.138
49.5	265.0	-0.141	8.5	61.6	8.5	-0.141
50.0	266.0	-0.141	8.6	61.8	8.6	-0.141
50.5	266.0	-0.141	8.7	61.8	8.7	-0.141
51.0	268.0	-0.141	8.8	62.3	8.8	-0.141

Direct shear (Block and ash: core 3)

Waypoint: 109 Soil field description: 19_08_01a/b Sample: 19_08_01
Lithotechnical unit: Block and ash flow Normal load: 34.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	0.0	0.000	0.1	0.0	0.1	0.000
1.0	29.0	-0.004	0.1	6.7	0.1	-0.004
1.5	45.0	-0.013	0.2	10.5	0.2	-0.013
2.0	54.0	-0.017	0.3	12.6	0.3	-0.017
2.5	70.0	-0.025	0.3	16.3	0.3	-0.025
3.0	86.0	-0.039	0.4	20.0	0.4	-0.039
3.5	102.0	-0.054	0.4	23.7	0.4	-0.054
4.0	117.0	-0.067	0.5	27.2	0.5	-0.067
4.5	127.0	-0.085	0.6	29.5	0.6	-0.085
5.0	139.0	-0.099	0.6	32.3	0.6	-0.099
5.5	153.0	-0.113	0.7	35.6	0.7	-0.113
6.0	164.0	-0.128	0.8	38.1	0.8	-0.128
6.5	178.0	-0.147	0.8	41.4	0.8	-0.147
7.0	184.0	-0.153	0.9	42.8	0.9	-0.153
7.5	194.0	-0.166	1.0	45.1	1.0	-0.166
8.0	202.0	-0.175	1.1	47.0	1.1	-0.175
8.5	213.0	-0.185	1.1	49.5	1.1	-0.185
9.0	219.0	-0.194	1.2	50.9	1.2	-0.194
9.5	228.0	-0.204	1.3	53.0	1.3	-0.204
10.0	235.0	-0.211	1.4	54.6	1.4	-0.211
10.5	244.0	-0.218	1.4	56.7	1.4	-0.218
11.0	253.0	-0.224	1.5	58.8	1.5	-0.224
11.5	260.0	-0.230	1.6	60.4	1.6	-0.230
12.0	269.0	-0.233	1.7	62.5	1.7	-0.233
12.5	276.0	-0.239	1.7	64.2	1.7	-0.239
13.0	283.0	-0.242	1.8	65.8	1.8	-0.242
13.5	290.0	-0.246	1.9	67.4	1.9	-0.246
14.0	297.0	-0.249	2.0	69.0	2.0	-0.249
14.5	302.0	-0.254	2.0	70.2	2.0	-0.254
15.0	308.0	-0.257	2.1	71.6	2.1	-0.257
15.5	315.0	-0.260	2.2	73.2	2.2	-0.260
16.0	320.0	-0.263	2.3	74.4	2.3	-0.263
16.5	328.0	-0.265	2.4	76.3	2.4	-0.265
17.0	330.0	-0.268	2.5	76.7	2.5	-0.268
17.5	334.0	-0.268	2.5	77.7	2.5	-0.268
18.0	340.0	-0.268	2.6	79.0	2.6	-0.268
18.5	352.0	-0.268	2.7	81.8	2.7	-0.268
19.0	354.0	-0.268	2.8	82.3	2.8	-0.268
19.5	346.0	-0.268	2.9	80.4	2.9	-0.268
20.0	346.0	-0.268	3.0	80.4	3.0	-0.268
20.5	346.0	-0.268	3.1	80.4	3.1	-0.268
21.0	348.0	-0.268	3.1	80.9	3.1	-0.268
21.5	350.0	-0.268	3.2	81.4	3.2	-0.268
22.0	352.0	-0.266	3.3	81.8	3.3	-0.266
22.5	352.0	-0.263	3.4	81.8	3.4	-0.263
23.0	354.0	-0.261	3.5	82.3	3.5	-0.261
23.5	353.0	-0.261	3.6	82.1	3.6	-0.261
24.0	354.0	-0.261	3.7	82.3	3.7	-0.261
24.5	356.0	-0.261	3.8	82.8	3.8	-0.261
25.0	356.0	-0.260	3.9	82.8	3.9	-0.260
25.5	357.0	-0.256	4.0	83.0	4.0	-0.256
26.0	358.0	-0.253	4.0	83.2	4.0	-0.253
26.5	357.0	-0.251	4.1	**83.0**	4.1	-0.251
27.0	357.0	-0.250	4.2	83.0	4.2	-0.250
27.5	357.0	-0.248	4.3	83.0	4.3	-0.248
28.0	357.0	-0.247	4.4	83.0	4.4	-0.247
28.5	356.0	-0.247	4.5	82.8	4.5	-0.247
29.0	356.0	-0.246	4.6	82.8	4.6	-0.246
29.5	356.0	-0.244	4.7	82.8	4.7	-0.244
30.0	356.0	-0.244	4.8	82.8	4.8	-0.244
30.5	356.0	-0.244	4.9	82.8	4.9	-0.244
31.0	356.0	-0.244	5.0	82.8	5.0	-0.244
31.5	355.0	-0.244	5.1	82.5	5.1	-0.244
32.0	354.0	-0.244	5.1	82.3	5.1	-0.244
32.5	353.0	-0.244	5.2	82.1	5.2	-0.244
33.0	351.0	-0.244	5.3	81.6	5.3	-0.244
33.5	351.0	-0.244	5.4	81.6	5.4	-0.244
34.0	351.0	-0.243	5.5	81.6	5.5	-0.243
34.5	351.0	-0.243	5.6	81.6	5.6	-0.243
35.0	351.0	-0.243	5.7	81.6	5.7	-0.243
35.5	351.0	-0.243	5.8	81.6	5.8	-0.243
36.0	349.0	-0.243	5.9	81.1	5.9	-0.243
36.5	348.0	-0.247	6.0	80.9	6.0	-0.247
37.0	348.0	-0.247	6.1	80.9	6.1	-0.247
37.5	348.0	-0.248	6.2	80.9	6.2	-0.248
38.0	348.0	-0.249	6.3	80.9	6.3	-0.249
38.5	348.0	-0.251	6.3	80.9	6.3	-0.251
39.0	348.0	-0.252	6.4	80.9	6.4	-0.252
39.5	347.0	-0.254	6.5	80.7	6.5	-0.254
40.0	347.0	-0.255	6.6	80.7	6.6	-0.255
40.5	347.0	-0.256	6.7	80.7	6.7	-0.256
41.0	346.0	-0.258	6.8	80.4	6.8	-0.258
41.5	346.0	-0.258	6.9	80.4	6.9	-0.258
42.0	346.0	-0.258	7.0	80.4	7.0	-0.258
42.5	346.0	-0.258	7.1	80.4	7.1	-0.258
43.0	346.0	-0.258	7.2	80.4	7.2	-0.258
43.5	346.0	-0.258	7.3	80.4	7.3	-0.258
44.0	346.0	-0.258	7.4	80.4	7.4	-0.258
44.5	343.0	-0.258	7.5	79.7	7.5	-0.258
45.0	340.0	-0.259	7.6	79.0	7.6	-0.259
45.5	338.0	-0.260	7.7	78.6	7.7	-0.260
46.0	337.0	-0.262	7.7	78.3	7.7	-0.262
46.5	334.0	-0.266	7.8	77.7	7.8	-0.266
47.0	334.0	-0.268	7.9	77.7	7.9	-0.268
47.5	334.0	-0.270	8.0	77.7	8.0	-0.270
48.0	334.0	-0.271	8.1	77.7	8.1	-0.271
48.5	335.0	-0.273	8.2	77.9	8.2	-0.273
49.0	335.0	-0.275	8.3	77.9	8.3	-0.275
49.5	335.0	-0.276	8.4	77.9	8.4	-0.276
50.0	335.0	-0.277	8.5	77.9	8.5	-0.277
50.5	335.0	-0.279	8.6	77.9	8.6	-0.279
51.0	335.0	-0.279	8.7	77.9	8.7	-0.279
51.5	335.0	-0.281	8.8	77.9	8.8	-0.281
52.0	335.0	-0.283	8.8	77.9	8.8	-0.283

Direct shear (Block and ash: core 4)

Waypoint: 109 Soil field description: 19_08_01a/b Sample: 19_08_01 Lithotechnical unit: Block and ash flow
Normal load: 39.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	0.0	0.000	0.1	0.0	0.1	0.000
1.0	20.0	-0.002	0.1	4.6	0.1	-0.002
1.5	40.0	-0.004	0.2	9.3	0.2	-0.004
2.0	55.0	-0.007	0.3	12.8	0.3	-0.007
2.5	79.0	-0.012	0.3	18.4	0.3	-0.012
3.0	101.0	-0.024	0.3	23.5	0.3	-0.024
3.5	123.0	-0.036	0.4	28.6	0.4	-0.036
4.0	136.0	-0.049	0.5	31.6	0.5	-0.049
4.5	153.0	-0.064	0.5	35.6	0.5	-0.064
5.0	165.0	-0.080	0.6	38.4	0.6	-0.080
5.5	180.0	-0.096	0.6	41.8	0.6	-0.096
6.0	193.0	-0.112	0.7	44.9	0.7	-0.112
6.5	206.0	-0.128	0.8	47.9	0.8	-0.128
7.0	220.0	-0.143	0.8	51.1	0.8	-0.143
7.5	226.0	-0.153	0.9	52.5	0.9	-0.153
8.0	240.0	-0.166	1.0	55.8	1.0	-0.166
8.5	250.0	-0.179	1.1	58.1	1.1	-0.179
9.0	261.0	-0.190	1.1	60.7	1.1	-0.190
9.5	275.0	-0.202	1.2	63.9	1.2	-0.202
10.0	281.0	-0.209	1.3	65.3	1.3	-0.209
10.5	293.0	-0.217	1.3	68.1	1.3	-0.217
11.0	303.0	-0.227	1.4	70.4	1.4	-0.227
11.5	313.0	-0.235	1.5	72.8	1.5	-0.235
12.0	320.0	-0.246	1.6	74.4	1.6	-0.246
12.5	332.0	-0.252	1.6	77.2	1.6	-0.252
13.0	340.0	-0.256	1.7	79.0	1.7	-0.256
13.5	350.0	-0.261	1.8	81.4	1.8	-0.261
14.0	360.0	-0.267	1.8	83.7	1.8	-0.267
14.5	366.0	-0.272	1.9	85.1	1.9	-0.272
15.0	376.0	-0.279	2.0	87.4	2.0	-0.279
15.5	384.0	-0.283	2.1	89.3	2.1	-0.283
16.0	392.0	-0.287	2.1	91.1	2.1	-0.287
16.5	402.0	-0.292	2.2	93.5	2.2	-0.292
17.0	411.0	-0.296	2.3	95.6	2.3	-0.296
17.5	415.0	-0.302	2.4	96.5	2.4	-0.302
18.0	420.0	-0.300	2.5	97.6	2.5	-0.300
18.5	430.0	-0.307	2.5	100.0	2.5	-0.307
19.0	437.0	-0.307	2.6	101.6	2.6	-0.307
19.5	440.0	-0.307	2.7	102.3	2.7	-0.307
20.0	451.0	-0.307	2.8	104.9	2.8	-0.307
20.5	458.0	-0.307	2.8	106.5	2.8	-0.307
21.0	460.0	-0.307	2.9	106.9	2.9	-0.307
21.5	465.0	-0.307	3.0	108.1	3.0	-0.307
22.0	469.0	-0.307	3.1	109.0	3.1	-0.307
22.5	472.0	-0.307	3.2	109.7	3.2	-0.307
23.0	477.0	-0.305	3.3	110.9	3.3	-0.305
23.5	477.0	-0.304	3.3	110.9	3.3	-0.304
24.0	483.0	-0.304	3.4	112.3	3.4	-0.304
24.5	485.0	-0.304	3.5	112.8	3.5	-0.304
25.0	487.0	-0.304	3.6	113.2	3.6	-0.304
25.5	491.0	-0.304	3.7	114.2	3.7	-0.304
26.0	491.0	-0.304	3.8	114.2	3.8	-0.304
26.5	493.0	-0.300	3.9	114.6	3.9	-0.300
27.0	493.0	-0.297	4.0	114.6	4.0	-0.297
27.5	494.0	-0.293	4.0	114.9	4.0	-0.293
28.0	494.0	-0.288	4.1	114.9	4.1	-0.288
28.5	496.0	-0.283	4.2	115.3	4.2	-0.283
29.0	496.0	-0.277	4.3	115.3	4.3	-0.277
29.5	499.0	-0.271	4.4	116.0	4.4	-0.271
30.0	499.0	-0.267	4.5	116.0	4.5	-0.267
30.5	499.0	-0.265	4.6	116.0	4.6	-0.265
31.0	499.0	-0.261	4.7	116.0	4.7	-0.261
31.5	507.0	-0.257	4.8	117.9	4.8	-0.257
32.0	514.0	-0.253	4.8	119.5	4.8	-0.253
32.5	518.0	-0.251	4.9	120.4	4.9	-0.251
33.0	522.0	-0.246	5.0	121.4	5.0	-0.246
33.5	527.0	-0.241	5.1	122.5	5.1	-0.241
34.0	529.0	-0.235	5.2	123.0	5.2	-0.235
34.5	530.0	-0.228	5.3	123.2	5.3	-0.228
35.0	533.0	-0.224	5.3	123.9	5.3	-0.224
35.5	536.0	-0.216	5.4	124.6	5.4	-0.216
36.0	536.0	-0.210	5.5	124.6	5.5	-0.210
36.5	536.0	-0.203	5.6	124.6	5.6	-0.203
37.0	536.0	-0.198	5.7	124.6	5.7	-0.198
37.5	537.0	-0.192	5.8	**124.8**	5.8	-0.192
38.0	537.0	-0.183	5.9	124.8	5.9	-0.183
38.5	537.0	-0.176	6.0	124.8	6.0	-0.176
39.0	537.0	-0.172	6.1	124.8	6.1	-0.172
39.5	537.0	-0.166	6.2	124.8	6.2	-0.166
40.0	537.0	-0.157	6.2	124.8	6.2	-0.157
40.5	537.0	-0.153	6.3	124.8	6.3	-0.153
41.0	532.0	-0.147	6.4	123.7	6.4	-0.147
41.5	531.0	-0.140	6.5	123.5	6.5	-0.140
42.0	530.0	-0.139	6.6	123.2	6.6	-0.139
42.5	529.0	-0.134	6.7	123.0	6.7	-0.134
43.0	529.0	-0.127	6.8	123.0	6.8	-0.127
43.5	524.0	-0.123	6.9	121.8	6.9	-0.123
44.0	520.0	-0.119	7.0	120.9	7.0	-0.119
44.5	519.0	-0.111	7.1	120.7	7.1	-0.111
45.0	518.0	-0.106	7.2	120.4	7.2	-0.106
45.5	517.0	-0.102	7.3	120.2	7.3	-0.102
46.0	515.0	-0.099	7.4	119.7	7.4	-0.099
46.5	512.0	-0.094	7.5	119.0	7.5	-0.094
47.0	510.0	-0.089	7.6	118.6	7.6	-0.089
47.5	504.0	-0.088	7.7	117.2	7.7	-0.088
48.0	504.0	-0.088	7.8	117.2	7.8	-0.088
48.5	504.0	-0.084	7.9	117.2	7.9	-0.084
49.0	505.0	-0.077	8.0	117.4	8.0	-0.077
49.5	505.0	-0.075	8.0	117.4	8.0	-0.075
50.0	503.0	-0.075	8.1	116.9	8.1	-0.075
50.5	503.0	-0.075	8.2	116.9	8.2	-0.075
51.0	503.0	-0.072	8.3	116.9	8.3	-0.072
51.5	504.0	-0.065	8.4	117.2	8.4	-0.065
52.0	504.0	-0.062	8.5	117.2	8.5	-0.062
52.5	504.0	-0.058	8.6	117.2	8.6	-0.058
53.0	503.0	-0.054	8.7	116.9	8.7	-0.054
53.5	503.0	-0.050	8.8	116.9	8.8	-0.050
54.0	503.0	-0.044	8.9	116.9	8.9	-0.044
54.5	503.0	-0.040	9.0	116.9	9.0	-0.040

Direct shear (Block and ash: core 5)
Waypoint: 109 Soil field description: 19_08_01a/b Sample: 19_08_01
Lithotechnical unit: Block and ash flow Normal load: 29.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dia (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	0.0	-0.004	0.1	0.0	0.1	-0.004
1.0	0.0	-0.006	0.2	0.0	0.2	-0.006
1.5	10.0	-0.009	0.3	2.3	0.3	-0.009
2.0	33.0	-0.014	0.3	7.7	0.3	-0.014
2.5	46.0	-0.020	0.4	10.7	0.4	-0.020
3.0	61.0	-0.037	0.4	14.2	0.4	-0.037
3.5	75.0	-0.043	0.5	17.4	0.5	-0.043
4.0	95.0	-0.062	0.5	22.1	0.5	-0.062
4.5	115.0	-0.075	0.6	26.7	0.6	-0.075
5.0	127.0	-0.087	0.7	29.5	0.7	-0.087
5.5	123.0	-0.097	0.8	28.6	0.8	-0.097
6.0	147.0	-0.111	0.8	34.2	0.8	-0.111
6.5	155.0	-0.125	0.9	36.0	0.9	-0.125
7.0	168.0	-0.137	0.9	39.1	0.9	-0.137
7.5	177.0	-0.150	1.0	41.2	1.0	-0.150
8.0	185.0	-0.158	1.1	43.0	1.1	-0.158
8.5	195.0	-0.168	1.2	45.3	1.2	-0.168
9.0	205.0	-0.178	1.2	47.7	1.2	-0.178
9.5	215.0	-0.181	1.3	50.0	1.3	-0.181
10.0	224.0	-0.188	1.4	52.1	1.4	-0.188
10.5	235.0	-0.194	1.5	54.6	1.5	-0.194
11.0	243.0	-0.199	1.5	56.5	1.5	-0.199
11.5	250.0	-0.203	1.6	58.1	1.6	-0.203
12.0	258.0	-0.209	1.7	60.0	1.7	-0.209
12.5	267.0	-0.215	1.8	62.1	1.8	-0.215
13.0	273.0	-0.218	1.8	63.5	1.8	-0.218
13.5	281.0	-0.220	1.9	65.3	1.9	-0.220
14.0	289.0	-0.220	2.0	67.2	2.0	-0.220
14.5	297.0	-0.221	2.1	69.0	2.1	-0.221
15.0	301.0	-0.221	2.1	70.0	2.1	-0.221
15.5	305.0	-0.219	2.2	70.9	2.2	-0.219
16.0	312.0	-0.216	2.3	72.5	2.3	-0.216
16.5	317.0	-0.213	2.4	73.7	2.4	-0.213
17.0	320.0	-0.211	2.5	74.4	2.5	-0.211
17.5	324.0	-0.206	2.6	75.3	2.6	-0.206
18.0	328.0	-0.204	2.6	76.3	2.6	-0.204
18.5	332.0	-0.197	2.7	77.2	2.7	-0.197
19.0	335.0	-0.192	2.8	77.9	2.8	-0.192
19.5	336.0	-0.184	2.9	78.1	2.9	-0.184
20.0	338.0	-0.177	3.0	78.6	3.0	-0.177
20.5	339.0	-0.170	3.1	78.8	3.1	-0.170
21.0	340.0	-0.163	3.2	79.0	3.2	-0.163
21.5	340.0	-0.153	3.3	79.0	3.3	-0.153
22.0	341.0	-0.150	3.3	79.3	3.3	-0.150
22.5	344.0	-0.142	3.4	80.0	3.4	-0.142
23.0	344.0	-0.134	3.5	80.0	3.5	-0.134
23.5	345.0	-0.128	3.6	80.2	3.6	-0.128
24.0	346.0	-0.121	3.7	**80.4**	3.7	-0.121
24.5	346.0	-0.116	3.8	80.4	3.8	-0.116
25.0	346.0	-0.112	3.9	80.4	3.9	-0.112
25.5	346.0	-0.109	4.0	80.4	4.0	-0.109
26.0	345.0	-0.103	4.1	80.2	4.1	-0.103
26.5	345.0	-0.099	4.2	80.2	4.2	-0.099
27.0	345.0	-0.090	4.3	80.2	4.3	-0.090
27.5	345.0	-0.083	4.3	80.2	4.3	-0.083
28.0	345.0	-0.079	4.4	80.2	4.4	-0.079
28.5	342.0	-0.074	4.5	79.5	4.5	-0.074
29.0	341.0	-0.069	4.6	79.3	4.6	-0.069
29.5	340.0	-0.064	4.7	79.0	4.7	-0.064
30.0	339.0	-0.060	4.8	78.8	4.8	-0.060
30.5	337.0	-0.056	4.9	78.3	4.9	-0.056
31.0	337.0	-0.051	5.0	78.3	5.0	-0.051
31.5	336.0	-0.048	5.1	78.1	5.1	-0.048
32.0	334.0	-0.043	5.2	77.7	5.2	-0.043
32.5	331.0	-0.041	5.3	77.0	5.3	-0.041
33.0	330.0	-0.038	5.4	76.7	5.4	-0.038
33.5	329.0	-0.036	5.5	76.5	5.5	-0.036
34.0	328.0	-0.033	5.6	76.3	5.6	-0.033
34.5	327.0	-0.033	5.7	76.0	5.7	-0.033
35.0	327.0	-0.031	5.8	76.0	5.8	-0.031
35.5	327.0	-0.028	5.8	76.0	5.8	-0.028
36.0	324.0	-0.025	5.9	75.3	5.9	-0.025
36.5	324.0	-0.022	6.0	75.3	6.0	-0.022
37.0	323.0	-0.020	6.1	75.1	6.1	-0.020
37.5	323.0	-0.017	6.2	75.1	6.2	-0.017
38.0	324.0	-0.016	6.3	75.3	6.3	-0.016
38.5	324.0	-0.014	6.4	75.3	6.4	-0.014
39.0	324.0	-0.013	6.5	75.3	6.5	-0.013
39.5	324.0	-0.013	6.6	75.3	6.6	-0.013
40.0	324.0	-0.013	6.7	75.3	6.7	-0.013
40.5	324.0	-0.013	6.8	75.3	6.8	-0.013
41.0	324.0	-0.013	6.9	75.3	6.9	-0.013
41.5	324.0	-0.013	6.9	75.3	6.9	-0.013
42.0	324.0	-0.009	7.0	75.3	7.0	-0.009
42.5	324.0	-0.007	7.1	75.3	7.1	-0.007
43.0	324.0	-0.007	7.2	75.3	7.2	-0.007
43.5	324.0	-0.007	7.3	75.3	7.3	-0.007
44.0	324.0	-0.008	7.4	75.3	7.4	-0.008
44.5	324.0	-0.008	7.5	75.3	7.5	-0.008
45.0	323.0	-0.010	7.6	75.1	7.6	-0.010
45.5	322.0	-0.015	7.7	74.9	7.7	-0.015
46.0	322.0	-0.016	7.8	74.9	7.8	-0.016
46.5	322.0	-0.016	7.9	74.9	7.9	-0.016
47.0	322.0	-0.016	8.0	74.9	8.0	-0.016
47.5	322.0	-0.016	8.0	74.9	8.0	-0.016
48.0	322.0	-0.016	8.1	74.9	8.1	-0.016
48.5	322.0	-0.017	8.2	74.9	8.2	-0.017
49.0	322.0	-0.017	8.3	74.9	8.3	-0.017
49.5	322.0	-0.017	8.4	74.9	8.4	-0.017
50.0	322.0	-0.017	8.5	74.9	8.5	-0.017
50.5	322.0	-0.017	8.6	74.9	8.6	-0.017
51.0	322.0	-0.017	8.7	74.9	8.7	-0.017
51.5	322.0	-0.017	8.8	74.9	8.8	-0.017
52.0	322.0	-0.017	8.9	74.9	8.9	-0.017

Direct shear (Block and ash: core 6)
Waypoint: 109 Soil field description: 19_08_01a/b Sample: 19_08_01
Lithotechnical unit: Block and ash flow Normal load: 44.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dia (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	0.0	0.000	0.1	0.0	0.1	0.000
1.0	0.0	0.000	0.2	0.0	0.2	0.000
1.5	5.0	-0.004	0.3	1.2	0.3	-0.004
2.0	30.0	-0.004	0.3	7.0	0.3	-0.004
2.5	45.0	-0.005	0.4	10.5	0.4	-0.005
3.0	71.0	-0.009	0.4	16.5	0.4	-0.009
3.5	94.0	-0.015	0.5	21.9	0.5	-0.015
4.0	121.0	-0.022	0.5	28.1	0.5	-0.022
4.5	143.0	-0.032	0.5	33.2	0.5	-0.032
5.0	161.0	-0.043	0.6	37.4	0.6	-0.043
5.5	180.0	-0.052	0.6	41.8	0.6	-0.052
6.0	193.0	-0.063	0.7	44.9	0.7	-0.063
6.5	215.0	-0.077	0.8	50.0	0.8	-0.077
7.0	228.0	-0.086	0.8	53.0	0.8	-0.086
7.5	236.0	-0.093	0.9	54.9	0.9	-0.093
8.0	250.0	-0.101	1.0	58.1	1.0	-0.101
8.5	262.0	-0.111	1.0	60.9	1.0	-0.111
9.0	278.0	-0.119	1.1	64.6	1.1	-0.119
9.5	289.0	-0.125	1.2	67.2	1.2	-0.125
10.0	303.0	-0.131	1.2	70.4	1.2	-0.131
10.5	313.0	-0.136	1.3	72.8	1.3	-0.136
11.0	324.0	-0.141	1.4	75.3	1.4	-0.141
11.5	335.0	-0.146	1.4	77.9	1.4	-0.146
12.0	356.0	-0.150	1.5	82.8	1.5	-0.150
12.5	360.0	-0.153	1.6	83.7	1.6	-0.153
13.0	370.0	-0.156	1.6	86.0	1.6	-0.156
13.5	378.0	-0.157	1.7	87.9	1.7	-0.157
14.0	390.0	-0.159	1.8	90.7	1.8	-0.159
14.5	398.0	-0.161	1.9	92.5	1.9	-0.161
15.0	410.0	-0.161	1.9	95.3	1.9	-0.161
15.5	418.0	-0.161	2.0	97.2	2.0	-0.161
16.0	427.0	-0.161	2.1	99.3	2.1	-0.161
16.5	434.0	-0.161	2.2	100.9	2.2	-0.161
17.0	443.0	-0.161	2.2	103.0	2.2	-0.161
17.5	449.0	-0.161	2.3	104.4	2.3	-0.161
18.0	457.0	-0.161	2.4	106.2	2.4	-0.161
18.5	464.0	-0.160	2.5	107.9	2.5	-0.160
19.0	468.0	-0.161	2.5	108.8	2.5	-0.161
19.5	473.0	-0.159	2.6	110.0	2.6	-0.159
20.0	481.0	-0.158	2.7	111.8	2.7	-0.158
20.5	488.0	-0.155	2.8	113.5	2.8	-0.155
21.0	493.0	-0.152	2.9	114.6	2.9	-0.152
21.5	500.0	-0.148	2.9	116.2	2.9	-0.148
22.0	503.0	-0.143	3.0	116.9	3.0	-0.143
22.5	508.0	-0.136	3.1	118.1	3.1	-0.136
23.0	511.0	-0.131	3.2	118.8	3.2	-0.131
23.5	512.0	-0.125	3.3	119.0	3.3	-0.125
24.0	515.0	-0.118	3.4	119.7	3.4	-0.118
24.5	517.0	-0.114	3.4	120.2	3.4	-0.114
25.0	519.0	-0.107	3.5	120.7	3.5	-0.107
25.5	520.0	-0.102	3.6	120.9	3.6	-0.102
26.0	519.0	-0.098	3.7	120.7	3.7	-0.098
26.5	519.0	-0.092	3.8	120.7	3.8	-0.092
27.0	519.0	-0.087	3.9	120.7	3.9	-0.087
27.5	519.0	-0.081	4.0	120.7	4.0	-0.081
28.0	519.0	-0.077	4.1	120.7	4.1	-0.077
28.5	518.0	-0.071	4.2	120.4	4.2	-0.071
29.0	517.0	-0.066	4.3	120.2	4.3	-0.066
29.5	515.0	-0.060	4.4	119.7	4.4	-0.060
30.0	511.0	-0.057	4.5	118.8	4.5	-0.057
30.5	508.0	-0.055	4.6	118.1	4.6	-0.055
31.0	506.0	-0.052	4.7	117.6	4.7	-0.052
31.5	500.0	-0.049	4.8	116.2	4.8	-0.049
32.0	493.0	-0.047	4.9	114.6	4.9	-0.047
32.5	489.0	-0.046	5.0	113.7	5.0	-0.046
33.0	482.0	-0.044	5.1	112.1	5.1	-0.044
33.5	481.0	-0.043	5.2	111.8	5.2	-0.043
34.0	477.0	-0.043	5.3	110.9	5.3	-0.043
34.5	477.0	-0.043	5.4	110.9	5.4	-0.043
35.0	478.0	-0.043	5.4	111.1	5.4	-0.043
35.5	483.0	-0.041	5.5	112.3	5.5	-0.041
36.0	492.0	-0.040	5.6	114.4	5.6	-0.040
36.5	493.0	-0.040	5.7	114.6	5.7	-0.040
37.0	493.0	-0.043	5.8	114.6	5.8	-0.043
37.5	494.0	-0.046	5.9	114.9	5.9	-0.046
38.0	493.0	-0.052	6.0	114.6	6.0	-0.052
38.5	493.0	-0.055	6.1	114.6	6.1	-0.055
39.0	494.0	-0.057	6.1	114.9	6.1	-0.057
39.5	505.0	-0.058	6.2	117.4	6.2	-0.058
40.0	509.0	-0.057	6.3	118.3	6.3	-0.057
40.5	513.0	-0.057	6.4	119.3	6.4	-0.057
41.0	517.0	-0.057	6.5	120.2	6.5	-0.057
41.5	517.0	-0.059	6.6	120.2	6.6	-0.059
42.0	515.0	-0.062	6.7	119.7	6.7	-0.062
42.5	504.0	-0.074	6.8	117.2	6.8	-0.074
43.0	505.0	-0.080	6.9	117.4	6.9	-0.080
43.5	508.0	-0.082	6.9	118.1	6.9	-0.082
44.0	510.0	-0.084	7.0	118.6	7.0	-0.084
44.5	518.0	-0.084	7.1	120.4	7.1	-0.084
45.0	518.0	-0.087	7.2	120.4	7.2	-0.087
45.5	523.0	-0.088	7.3	121.6	7.3	-0.088
46.0	526.0	-0.088	7.4	122.3	7.4	-0.088
46.5	529.0	-0.089	7.5	123.0	7.5	-0.089
47.0	530.0	-0.091	7.5	123.2	7.5	-0.091
47.5	531.0	-0.093	7.6	123.5	7.6	-0.093
48.0	536.0	-0.092	7.7	124.6	7.7	-0.092
48.5	537.0	-0.091	7.8	124.8	7.8	-0.091
49.0	542.0	-0.091	7.9	126.0	7.9	-0.091
49.5	542.0	-0.091	8.0	126.0	8.0	-0.091
50.0	543.0	-0.092	8.1	126.2	8.1	-0.092
50.5	544.0	-0.094	8.2	126.5	8.2	-0.094
51.0	545.0	-0.096	8.2	126.7	8.2	-0.096
51.5	550.0	-0.095	8.3	127.9	8.3	-0.095
52.0	555.0	-0.095	8.4	129.0	8.4	-0.095
52.5	559.0	-0.095	8.5	**130.0**	8.5	-0.095
53.0	558.0	-0.096	8.6	129.7	8.6	-0.096

Direct shear (Block and ash: core 7)

Waypoint: 109 Soil field description: 19_08_01a/b Sample: 19_08_01 Lithotechnical unit: Block and ash flow Normal load: 34.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	0.0	-0.005	0.1	0.0	0.1	-0.005
1.0	29.0	-0.008	0.1	6.7	0.1	-0.008
1.5	43.0	-0.013	0.2	10.0	0.2	-0.013
2.0	59.0	-0.018	0.2	13.7	0.2	-0.018
2.5	82.0	-0.025	0.3	19.1	0.3	-0.025
3.0	100.0	-0.035	0.3	23.2	0.3	-0.035
3.5	124.0	-0.047	0.4	28.8	0.4	-0.047
4.0	138.0	-0.055	0.5	32.1	0.5	-0.055
4.5	155.0	-0.065	0.5	36.0	0.5	-0.065
5.0	164.0	-0.076	0.6	38.1	0.6	-0.076
5.5	183.0	-0.080	0.6	42.5	0.6	-0.080
6.0	192.0	-0.090	0.7	44.6	0.7	-0.090
6.5	199.0	-0.098	0.8	46.3	0.8	-0.098
7.0	210.0	-0.105	0.9	48.8	0.9	-0.105
7.5	220.0	-0.112	0.9	51.1	0.9	-0.112
8.0	233.0	-0.118	1.0	54.2	1.0	-0.118
8.5	241.0	-0.122	1.1	56.0	1.1	-0.122
9.0	251.0	-0.127	1.1	58.4	1.1	-0.127
9.5	260.0	-0.130	1.2	60.4	1.2	-0.130
10.0	270.0	-0.134	1.3	62.8	1.3	-0.134
10.5	281.0	-0.136	1.4	65.3	1.4	-0.136
11.0	289.0	-0.138	1.4	67.2	1.4	-0.138
11.5	299.0	-0.140	1.5	69.5	1.5	-0.140
12.0	306.0	-0.143	1.6	71.1	1.6	-0.143
12.5	318.0	-0.145	1.7	73.9	1.7	-0.145
13.0	324.0	-0.145	1.7	75.3	1.7	-0.145
13.5	330.0	-0.148	1.8	76.7	1.8	-0.148
14.0	335.0	-0.148	1.9	77.9	1.9	-0.148
14.5	343.0	-0.149	2.0	79.7	2.0	-0.149
15.0	349.0	-0.149	2.0	81.1	2.0	-0.149
15.5	354.0	-0.147	2.1	82.3	2.1	-0.147
16.0	360.0	-0.144	2.2	83.7	2.2	-0.144
16.5	365.0	-0.143	2.3	84.9	2.3	-0.143
17.0	370.0	-0.141	2.4	86.0	2.4	-0.141
17.5	374.0	-0.140	2.5	87.0	2.5	-0.140
18.0	378.0	-0.139	2.5	87.9	2.5	-0.139
18.5	382.0	-0.141	2.6	88.8	2.6	-0.141
19.0	387.0	-0.141	2.7	90.0	2.7	-0.141
19.5	396.0	-0.132	2.8	92.1	2.8	-0.132
20.0	399.0	-0.126	2.9	92.8	2.9	-0.126
20.5	399.0	-0.120	3.0	92.8	3.0	-0.120
21.0	400.0	-0.116	3.0	93.0	3.0	-0.116
21.5	401.0	-0.112	3.1	93.2	3.1	-0.112
22.0	406.0	-0.107	3.2	94.4	3.2	-0.107
22.5	409.0	-0.100	3.3	95.1	3.3	-0.100
23.0	411.0	-0.096	3.4	95.6	3.4	-0.096
23.5	412.0	-0.088	3.5	95.8	3.5	-0.088
24.0	413.0	-0.084	3.6	96.0	3.6	-0.084
24.5	414.0	-0.076	3.7	96.3	3.7	-0.076
25.0	414.0	-0.075	3.7	96.3	3.7	-0.075
25.5	417.0	-0.069	3.8	96.9	3.8	-0.069
26.0	418.0	-0.062	3.9	97.2	3.9	-0.062
26.5	418.0	-0.058	4.0	97.2	4.0	-0.058
27.0	418.0	-0.050	4.1	97.2	4.1	-0.050
27.5	418.0	-0.046	4.2	97.2	4.2	-0.046
28.0	418.0	-0.041	4.3	97.2	4.3	-0.041
28.5	418.0	-0.036	4.4	97.2	4.4	-0.036
29.0	418.0	-0.028	4.5	97.2	4.5	-0.028
29.5	418.0	-0.028	4.6	**97.2**	4.6	-0.028
30.0	414.0	-0.021	4.7	96.3	4.7	-0.021
30.5	412.0	-0.017	4.8	95.8	4.8	-0.017
31.0	410.0	-0.014	4.9	95.3	4.9	-0.014
31.5	402.0	-0.012	5.0	93.5	5.0	-0.012
32.0	400.0	-0.011	5.1	93.0	5.1	-0.011
32.5	400.0	-0.008	5.1	93.0	5.1	-0.008
33.0	399.0	-0.007	5.2	92.8	5.2	-0.007
33.5	360.0	-0.080	5.4	83.7	5.4	-0.080
34.0	362.0	-0.078	5.5	84.2	5.5	-0.078
34.5	363.0	-0.076	5.6	84.4	5.6	-0.076
35.0	365.0	-0.074	5.7	84.9	5.7	-0.074
35.5	372.0	-0.071	5.8	86.5	5.8	-0.071
36.0	377.0	-0.067	5.8	87.6	5.8	-0.067
36.5	381.0	-0.059	5.9	88.6	5.9	-0.059
37.0	384.0	-0.058	6.0	89.3	6.0	-0.058
37.5	388.0	-0.052	6.1	90.2	6.1	-0.052
38.0	389.0	-0.049	6.2	90.4	6.2	-0.049
38.5	389.0	-0.049	6.3	90.4	6.3	-0.049
39.0	388.0	-0.040	6.4	90.2	6.4	-0.040
39.5	388.0	-0.038	6.5	90.2	6.5	-0.038
40.0	383.0	-0.035	6.6	89.0	6.6	-0.035
40.5	383.0	-0.031	6.6	89.0	6.6	-0.031
41.0	383.0	-0.030	6.7	89.0	6.7	-0.030
41.5	378.0	-0.030	6.8	87.9	6.8	-0.030
42.0	375.0	-0.026	6.9	87.2	6.9	-0.026
42.5	370.0	-0.027	7.0	86.0	7.0	-0.027
43.0	369.0	-0.026	7.1	85.8	7.1	-0.026
43.5	368.0	-0.025	7.2	85.6	7.2	-0.025
44.0	369.0	-0.023	7.3	85.8	7.3	-0.023
44.5	371.0	-0.022	7.4	86.3	7.4	-0.022
45.0	372.0	-0.021	7.5	86.5	7.5	-0.021
45.5	372.0	-0.021	7.6	86.5	7.6	-0.021
46.0	373.0	-0.021	7.7	86.7	7.7	-0.021
46.5	373.0	-0.021	7.8	86.7	7.8	-0.021
47.0	373.0	-0.021	7.9	86.7	7.9	-0.021
47.5	374.0	-0.023	7.9	87.0	7.9	-0.023
48.0	375.0	-0.024	8.0	87.2	8.0	-0.024
48.5	382.0	-0.025	8.1	88.8	8.1	-0.025
49.0	384.0	-0.024	8.2	89.3	8.2	-0.024
49.5	384.0	-0.025	8.3	89.3	8.3	-0.025
50.0	385.0	-0.025	8.4	89.5	8.4	-0.025
50.5	385.0	-0.026	8.5	89.5	8.5	-0.026
51.0	389.0	-0.028	8.6	90.4	8.6	-0.028
51.5	391.0	-0.028	8.6	90.9	8.6	-0.028

Direct shear (Block and ash: core 8)

Waypoint: 109 Soil field description: 19_08_01a/b Sample: 19_08_01 Lithotechnical unit: Block and ash flow Normal load: 39.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	0.0	0.000	0.1	0.0	0.1	0.000
1.0	9.0	-0.002	0.2	2.1	0.2	-0.002
1.5	34.0	-0.004	0.2	7.9	0.2	-0.004
2.0	47.0	-0.011	0.3	10.9	0.3	-0.011
2.5	64.0	-0.015	0.3	14.9	0.3	-0.015
3.0	84.0	-0.031	0.4	19.5	0.4	-0.031
3.5	105.0	-0.043	0.4	24.4	0.4	-0.043
4.0	121.0	-0.058	0.5	28.1	0.5	-0.058
4.5	138.0	-0.074	0.5	32.1	0.5	-0.074
5.0	153.0	-0.087	0.6	35.6	0.6	-0.087
5.5	170.0	-0.102	0.7	39.5	0.7	-0.102
6.0	182.0	-0.111	0.7	42.3	0.7	-0.111
6.5	196.0	-0.122	0.8	45.6	0.8	-0.122
7.0	208.0	-0.131	0.9	48.4	0.9	-0.131
7.5	220.0	-0.139	0.9	51.1	0.9	-0.139
8.0	230.0	-0.148	1.0	53.5	1.0	-0.148
8.5	240.0	-0.152	1.1	55.8	1.1	-0.152
9.0	249.0	-0.159	1.1	57.9	1.1	-0.159
9.5	259.0	-0.166	1.2	60.2	1.2	-0.166
10.0	270.0	-0.169	1.3	62.8	1.3	-0.169
10.5	281.0	-0.171	1.4	65.3	1.4	-0.171
11.0	292.0	-0.174	1.4	67.9	1.4	-0.174
11.5	301.0	-0.176	1.5	70.0	1.5	-0.176
12.0	314.0	-0.177	1.6	73.0	1.6	-0.177
12.5	321.0	-0.182	1.6	74.6	1.6	-0.182
13.0	331.0	-0.184	1.7	77.0	1.7	-0.184
13.5	340.0	-0.187	1.8	79.0	1.8	-0.187
14.0	348.0	-0.187	1.9	80.9	1.9	-0.187
14.5	356.0	-0.187	1.9	82.8	1.9	-0.187
15.0	363.0	-0.187	2.0	84.4	2.0	-0.187
15.5	371.0	-0.187	2.1	86.3	2.1	-0.187
16.0	375.0	-0.188	2.2	87.2	2.2	-0.188
16.5	382.0	-0.192	2.3	88.8	2.3	-0.192
17.0	393.0	-0.193	2.3	91.4	2.3	-0.193
17.5	400.0	-0.193	2.4	93.0	2.4	-0.193
18.0	408.0	-0.188	2.5	94.9	2.5	-0.188
18.5	412.0	-0.184	2.6	95.8	2.6	-0.184
19.0	418.0	-0.181	2.6	97.2	2.6	-0.181
19.5	423.0	-0.178	2.7	98.3	2.7	-0.178
20.0	427.0	-0.173	2.8	99.3	2.8	-0.173
20.5	431.0	-0.168	2.9	100.2	2.9	-0.168
21.0	432.0	-0.161	3.0	100.4	3.0	-0.161
21.5	436.0	-0.155	3.1	101.4	3.1	-0.155
22.0	439.0	-0.150	3.1	102.1	3.1	-0.150
22.5	440.0	-0.146	3.2	102.3	3.2	-0.146
23.0	440.0	-0.145	3.3	102.3	3.3	-0.145
23.5	441.0	-0.140	3.4	102.5	3.4	-0.140
24.0	441.0	-0.135	3.5	102.5	3.5	-0.135
24.5	442.0	-0.129	3.6	102.8	3.6	-0.129
25.0	442.0	-0.125	3.7	102.8	3.7	-0.125
25.5	443.0	-0.121	3.8	103.0	3.8	-0.121
26.0	443.0	-0.115	3.9	103.0	3.9	-0.115
26.5	443.0	-0.113	4.0	103.0	4.0	-0.113
27.0	443.0	-0.110	4.1	103.0	4.1	-0.110
27.5	443.0	-0.108	4.1	103.0	4.1	-0.108
28.0	443.0	-0.106	4.2	103.0	4.2	-0.106
28.5	443.0	-0.105	4.3	103.0	4.3	-0.105
29.0	442.0	-0.106	4.4	102.8	4.4	-0.106
29.5	442.0	-0.106	4.5	102.8	4.5	-0.106
30.0	443.0	-0.105	4.6	103.0	4.6	-0.105
30.5	443.0	-0.103	4.7	103.0	4.7	-0.103
31.0	443.0	-0.101	4.8	103.0	4.8	-0.101
31.5	444.0	-0.097	4.9	103.2	4.9	-0.097
32.0	444.0	-0.096	5.0	103.2	5.0	-0.096
32.5	444.0	-0.090	5.1	103.2	5.1	-0.090
33.0	444.0	-0.089	5.2	103.2	5.2	-0.089
33.5	445.0	-0.089	5.2	**103.5**	5.2	-0.089
34.0	445.0	-0.089	5.3	103.5	5.3	-0.089
34.5	445.0	-0.088	5.4	103.5	5.4	-0.088
35.0	444.0	-0.088	5.5	103.2	5.5	-0.088
35.5	443.0	-0.091	5.6	103.0	5.6	-0.091
36.0	444.0	-0.091	5.7	103.2	5.7	-0.091
36.5	444.0	-0.091	5.8	103.2	5.8	-0.091
37.0	444.0	-0.091	5.9	103.2	5.9	-0.091
37.5	444.0	-0.091	6.0	103.2	6.0	-0.091
38.0	444.0	-0.090	6.1	103.2	6.1	-0.090
38.5	437.0	-0.092	6.2	101.6	6.2	-0.092
39.0	437.0	-0.094	6.3	101.6	6.3	-0.094
39.5	438.0	-0.095	6.4	101.8	6.4	-0.095
40.0	438.0	-0.095	6.4	101.8	6.4	-0.095
40.5	439.0	-0.095	6.5	102.1	6.5	-0.095
41.0	439.0	-0.095	6.6	102.1	6.6	-0.095
41.5	439.0	-0.095	6.7	102.1	6.7	-0.095
42.0	439.0	-0.091	6.8	102.1	6.8	-0.091
42.5	439.0	-0.088	6.9	102.1	6.9	-0.088
43.0	439.0	-0.084	7.0	102.1	7.0	-0.084
43.5	439.0	-0.082	7.1	102.1	7.1	-0.082
44.0	439.0	-0.079	7.2	102.1	7.2	-0.079
44.5	438.0	-0.076	7.3	101.8	7.3	-0.076
45.0	438.0	-0.074	7.4	101.8	7.4	-0.074
45.5	438.0	-0.071	7.5	101.8	7.5	-0.071
46.0	438.0	-0.070	7.5	101.8	7.5	-0.070
46.5	434.0	-0.067	7.6	100.9	7.6	-0.067
47.0	429.0	-0.067	7.7	99.7	7.7	-0.067
47.5	431.0	-0.067	7.8	100.2	7.8	-0.067
48.0	431.0	-0.066	7.9	100.2	7.9	-0.066
48.5	432.0	-0.063	8.0	100.4	8.0	-0.063
49.0	434.0	-0.063	8.1	100.9	8.1	-0.063
49.5	434.0	-0.061	8.2	100.9	8.2	-0.061
50.0	434.0	-0.060	8.3	100.9	8.3	-0.060
50.5	434.0	-0.061	8.4	100.9	8.4	-0.061
51.0	433.0	-0.064	8.5	100.7	8.5	-0.064
51.5	432.0	-0.065	8.6	100.4	8.6	-0.065
52.0	433.0	-0.065	8.7	100.7	8.7	-0.065
52.5	433.0	-0.065	8.7	100.7	8.7	-0.065
53.0	437.0	-0.063	8.8	101.6	8.8	-0.063
53.5	440.0	-0.062	8.9	102.3	8.9	-0.062

Block and ash flow: calculation of cohesion and friction angle

Cohesion and friction angle calculations

Constants and equations used to calculate c and ø are as follows:
Weight of hanger = 4.5 kg
Sample diameter = 60 mm
Proving ring number = 5736
Proving ring calibration constant = 0.7363 N/division
Dial gauge calibration constant = 0.002 mm/division
Gearing = A:54/36
Shearing rate = 0.183 mm/min
Vertical dial gauge calibration constant = 0.01 mm/division

$$\text{Normal stress (Pa)} = \frac{\text{normal load (kg) x gravity } (ms^{-2})}{\text{area of sample } (m^2)}$$

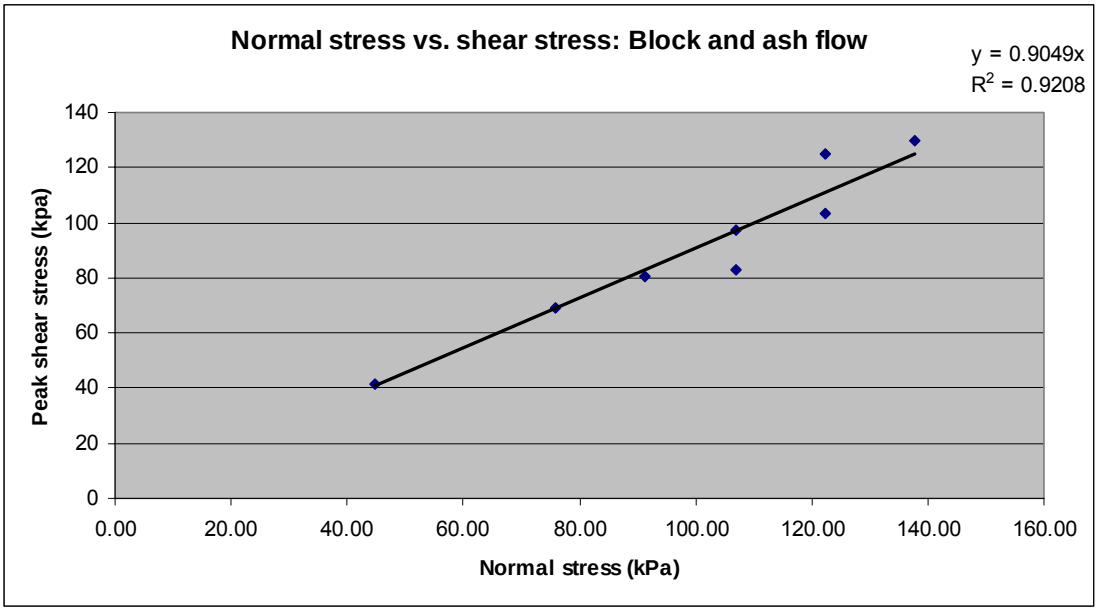
$$\text{Shear stress (Pa)} = \frac{\text{proving ring constant x calibration constant}}{\text{area of sample } (m^2)}$$

Screw-jack displacement (mm) = time (min) x loading rate (mm/min)

Proving ring displacement (mm) = proving ring reading x dial gauge calibration constant

Shear displacement (mm) = screw-jack displacement - proving ring displacement

	Normal load (kg)	Area of sample	Normal stress (Pa)	Normal stress (kPa)	Peak shear stress
Core 1	14.5	0.003167	44915.86	44.92	41.6
Core 2	24.5	0.003167	75892.31	75.89	68.8
Core 5	29.5	0.003167	91380.53	91.38	80.4
Core 3	34.5	0.003167	106868.76	106.87	83
Core 4	39.5	0.003167	122356.99	122.36	124.8
Core 6	44.5	0.003167	137845.21	137.85	130
Core 7	39.5	0.003167	122356.99	122.36	103.5
Core 8	34.5	0.003167	106868.76	106.87	97.2



Matahina Ignimbrite direct shear test data

(Shaded cell for each direct shear test indicates peak shear stress).

Direct shear (Matahina Ignimbrite: core 1)

Waypoint: 113 RMD: 20_08_01 ; Soil field description: 20_08_01 Scanline: N/A
Sample: 20_08_01 Lithotechnical unit: Matahina Ignimbrite Normal load: 9.5 kg
Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	0.0	-0.007	0.1	0.0	0.1	-0.007
1.0	17.0	-0.017	0.1	4.0	0.1	-0.017
1.5	22.0	-0.019	0.2	5.1	0.2	-0.019
2.0	24.5	-0.019	0.3	5.7	0.3	-0.019
2.5	27.0	-0.019	0.4	6.3	0.4	-0.019
3.0	30.0	-0.019	0.5	7.0	0.5	-0.019
3.5	34.0	-0.019	0.6	7.9	0.6	-0.019
4.0	35.0	-0.019	0.7	8.1	0.7	-0.019
4.5	40.0	-0.019	0.7	9.3	0.7	-0.019
5.0	43.5	-0.019	0.8	10.1	0.8	-0.019
5.5	46.0	-0.019	0.9	10.7	0.9	-0.019
6.0	50.0	-0.020	1.0	11.6	1.0	-0.020
6.5	51.0	-0.027	1.1	11.9	1.1	-0.027
7.0	52.0	-0.038	1.2	12.1	1.2	-0.038
7.5	54.0	-0.047	1.3	12.6	1.3	-0.047
8.0	57.0	-0.057	1.4	13.3	1.4	-0.057
8.5	58.0	-0.064	1.4	13.5	1.4	-0.064
9.0	60.0	-0.071	1.5	13.9	1.5	-0.071
9.5	62.0	-0.075	1.6	14.4	1.6	-0.075
10.0	65.0	-0.085	1.7	15.1	1.7	-0.085
10.5	67.0	-0.091	1.8	15.6	1.8	-0.091
11.0	68.5	-0.098	1.9	15.9	1.9	-0.098
11.5	70.0	-0.103	2.0	16.3	2.0	-0.103
12.0	71.0	-0.108	2.1	16.5	2.1	-0.108
12.5	73.0	-0.114	2.1	17.0	2.1	-0.114
13.0	75.0	-0.117	2.2	17.4	2.2	-0.117
13.5	76.0	-0.119	2.3	17.7	2.3	-0.119
14.0	77.0	-0.122	2.4	17.9	2.4	-0.122
14.5	78.5	-0.123	2.5	18.3	2.5	-0.123
15.0	80.0	-0.127	2.6	18.6	2.6	-0.127
15.5	84.0	-0.130	2.7	19.5	2.7	-0.130
16.0	85.0	-0.132	2.8	19.8	2.8	-0.132
16.5	87.0	-0.132	2.8	20.2	2.8	-0.132
17.0	87.0	-0.138	2.9	20.2	2.9	-0.138
17.5	89.0	-0.138	3.0	20.7	3.0	-0.138
18.0	90.5	-0.138	3.1	21.0	3.1	-0.138
18.5	92.0	-0.138	3.2	21.4	3.2	-0.138
19.0	92.0	-0.138	3.3	21.4	3.3	-0.138
19.5	93.0	-0.138	3.4	21.6	3.4	-0.138
20.0	95.0	-0.136	3.5	22.1	3.5	-0.136
20.5	96.0	-0.134	3.6	22.3	3.6	-0.134
21.0	97.0	-0.132	3.6	22.6	3.6	-0.132
21.5	97.0	-0.129	3.7	22.6	3.7	-0.129
22.0	98.0	-0.126	3.8	22.8	3.8	-0.126
22.5	99.0	-0.124	3.9	23.0	3.9	-0.124
23.0	99.5	-0.122	4.0	23.1	4.0	-0.122
23.5	100.0	-0.120	4.1	23.2	4.1	-0.120
24.0	100.0	-0.118	4.2	23.2	4.2	-0.118
24.5	100.0	-0.116	4.3	23.2	4.3	-0.116
25.0	100.0	-0.114	4.4	23.2	4.4	-0.114
25.5	100.5	-0.111	4.5	23.4	4.5	-0.111
26.0	100.5	-0.109	4.6	23.4	4.6	-0.109
26.5	100.5	-0.107	4.6	23.4	4.6	-0.107
27.0	100.5	-0.104	4.7	23.4	4.7	-0.104
27.5	100.5	-0.101	4.8	23.4	4.8	-0.101
28.0	101.0	-0.098	4.9	**23.5**	4.9	-0.098
28.5	101.0	-0.096	5.0	23.5	5.0	-0.096
29.0	101.0	-0.096	5.1	23.5	5.1	-0.094
29.5	101.0	-0.094	5.2	23.5	5.2	-0.090
30.0	101.0	-0.090	5.3	23.5	5.3	-0.089
30.5	101.0	-0.089	5.4	23.5	5.4	-0.088
31.0	101.0	-0.088	5.5	23.5	5.5	-0.088
31.5	101.0	-0.085	5.6	23.5	5.6	-0.085
32.0	101.0	-0.083	5.7	23.5	5.7	-0.083
32.5	101.0	-0.080	5.7	23.5	5.7	-0.080
33.0	101.0	-0.078	5.8	23.5	5.8	-0.078
33.5	101.0	-0.075	5.9	23.5	5.9	-0.075
34.0	101.0	-0.073	6.0	23.5	6.0	-0.073
34.5	101.0	-0.070	6.1	23.5	6.1	-0.070
35.0	101.0	-0.069	6.2	23.5	6.2	-0.069
35.5	101.0	-0.069	6.3	23.5	6.3	-0.069
36.0	101.0	-0.064	6.4	23.5	6.4	-0.064
36.5	101.0	-0.064	6.5	23.5	6.5	-0.064
37.0	101.0	-0.064	6.6	23.5	6.6	-0.064
37.5	101.0	-0.064	6.7	23.5	6.7	-0.064
38.0	101.0	-0.061	6.8	23.5	6.8	-0.061
38.5	101.0	-0.060	6.8	23.5	6.8	-0.060
39.0	101.0	-0.059	6.9	23.5	6.9	-0.059
39.5	101.0	-0.059	7.0	23.5	7.0	-0.059
40.0	101.0	-0.059	7.1	23.5	7.1	-0.059
40.5	101.0	-0.059	7.2	23.5	7.2	-0.059
41.0	101.0	-0.059	7.3	23.5	7.3	-0.059
41.5	101.0	-0.059	7.4	23.5	7.4	-0.059
42.0	101.0	-0.059	7.5	23.5	7.5	-0.059
42.5	99.0	-0.061	7.6	23.0	7.6	-0.061
43.0	99.5	-0.061	7.7	23.1	7.7	-0.061
43.5	100.0	-0.061	7.8	23.2	7.8	-0.061
44.0	101.0	-0.060	7.9	23.5	7.9	-0.060

Direct shear (Matahina Ignimbrite: core 2)

Waypoint: 113 RMD: 20_08_01 ; Soil field description: 20_08_01
Scanline: N/A Sample: 20_08_01 Lithotechnical unit: Matahina Ignimbrite
Normal load: 14.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving rin (units)	Vertical dia (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0	0.0	0.0	0.0	0.000
0.5	24.0	-0.007	0.0	5.6	0.0	-0.007
1.0	35.0	-0.013	0.1	8.1	0.1	-0.013
1.5	43.0	-0.018	0.2	10.0	0.2	-0.018
2.0	49.0	-0.023	0.3	11.4	0.3	-0.023
2.5	55.0	-0.029	0.3	12.8	0.3	-0.029
3.0	60.0	-0.038	0.4	13.9	0.4	-0.038
3.5	64.0	-0.047	0.5	14.9	0.5	-0.047
4.0	69.0	-0.055	0.6	16.0	0.6	-0.055
4.5	72.0	-0.063	0.7	16.7	0.7	-0.063
5.0	76.0	-0.073	0.8	17.7	0.8	-0.073
5.5	81.0	-0.081	0.8	18.8	0.8	-0.081
6.0	84.0	-0.087	0.9	19.5	0.9	-0.087
6.5	89.0	-0.092	1.0	20.7	1.0	-0.092
7.0	92.0	-0.097	1.1	21.4	1.1	-0.097
7.5	96.0	-0.101	1.2	22.3	1.2	-0.101
8.0	100.0	-0.105	1.3	23.2	1.3	-0.105
8.5	102.0	-0.109	1.4	23.7	1.4	-0.109
9.0	106.0	-0.110	1.4	24.6	1.4	-0.110
9.5	110.0	-0.112	1.5	25.6	1.5	-0.112
10.0	112.5	-0.112	1.6	26.2	1.6	-0.112
10.5	115.0	-0.112	1.7	26.7	1.7	-0.112
11.0	117.0	-0.112	1.8	27.2	1.8	-0.112
11.5	120.0	-0.112	1.9	27.9	1.9	-0.112
12.0	122.0	-0.112	2.0	28.4	2.0	-0.112
12.5	125.0	-0.108	2.0	29.1	2.0	-0.108
13.0	127.0	-0.106	2.1	29.5	2.1	-0.106
13.5	129.0	-0.102	2.2	30.0	2.2	-0.102
14.0	131.0	-0.099	2.3	30.5	2.3	-0.099
14.5	133.0	-0.094	2.4	30.9	2.4	-0.094
15.0	134.0	-0.089	2.5	31.2	2.5	-0.089
15.5	136.0	-0.084	2.6	31.6	2.6	-0.084
16.0	136.0	-0.078	2.7	31.6	2.7	-0.078
16.5	138.0	-0.073	2.7	32.1	2.7	-0.073
17.0	140.0	-0.067	2.8	32.5	2.8	-0.067
17.5	140.0	-0.062	2.9	32.5	2.9	-0.062
18.0	142.0	-0.056	3.0	33.0	3.0	-0.056
18.5	143.0	-0.051	3.1	33.2	3.1	-0.051
19.0	144.0	-0.045	3.2	33.5	3.2	-0.045
19.5	144.0	-0.040	3.3	33.5	3.3	-0.040
20.0	144.0	-0.035	3.4	33.5	3.4	-0.035
20.5	145.0	-0.029	3.5	33.7	3.5	-0.029
21.0	145.0	-0.024	3.6	33.7	3.6	-0.024
21.5	145.0	-0.018	3.6	33.7	3.6	-0.018
22.0	145.0	-0.015	3.7	33.7	3.7	-0.015
22.5	145.0	-0.010	3.8	33.7	3.8	-0.010
23.0	145.0	-0.009	3.9	33.7	3.9	-0.009
23.5	147.0	-0.006	4.0	34.2	4.0	-0.006
24.0	149.0	-0.003	4.1	34.6	4.1	-0.003
24.5	150.0	-0.003	4.2	34.9	4.2	-0.003
25.0	150.0	-0.002	4.3	34.9	4.3	-0.002
25.5	152.0	-0.002	4.4	35.3	4.4	-0.002
26.0	153.0	0.000	4.5	35.6	4.5	0.000
26.5	153.0	0.000	4.5	35.6	4.5	0.000
27.0	155.0	0.001	4.6	36.0	4.6	0.001
27.5	156.0	0.009	4.7	36.3	4.7	0.009
28.0	159.0	0.009	4.8	37.0	4.8	0.009
28.5	160.0	0.003	4.9	37.2	4.9	0.003
29.0	160.0	0.002	5.0	37.2	5.0	0.002
29.5	162.0	0.002	5.1	37.7	5.1	0.002
30.0	162.0	0.004	5.2	37.7	5.2	0.004
30.5	164.0	0.008	5.3	38.1	5.3	0.008
31.0	164.0	0.009	5.3	38.1	5.3	0.009
31.5	165.0	0.011	5.4	38.4	5.4	0.011
32.0	166.0	0.013	5.5	38.6	5.5	0.013
32.5	167.0	0.017	5.6	38.8	5.6	0.017
33.0	167.0	0.020	5.7	38.8	5.7	0.020
33.5	168.0	0.022	5.8	39.1	5.8	0.022
34.0	169.0	0.026	5.9	39.3	5.9	0.026
34.5	170.0	0.028	6.0	39.5	6.0	0.028
35.0	171.0	0.030	6.1	39.8	6.1	0.030
35.5	172.0	0.030	6.2	40.0	6.2	0.030
36.0	174.0	0.033	6.2	40.5	6.2	0.033
36.5	175.0	0.036	6.3	40.7	6.3	0.036
37.0	175.0	0.036	6.4	40.7	6.4	0.036
37.5	175.0	0.041	6.5	40.7	6.5	0.041
38.0	176.0	0.043	6.6	40.9	6.6	0.043
38.5	177.0	0.046	6.7	41.2	6.7	0.046
39.0	178.0	0.047	6.8	41.4	6.8	0.047
39.5	178.0	0.046	6.9	41.4	6.9	0.046
40.0	179.0	0.046	7.0	41.6	7.0	0.046
40.5	180.0	0.046	7.1	41.8	7.1	0.046
41.0	181.0	0.047	7.1	42.1	7.1	0.047
41.5	182.0	0.049	7.2	42.3	7.2	0.049
42.0	183.0	0.051	7.3	42.5	7.3	0.051
42.5	183.0	0.052	7.4	42.5	7.4	0.052
43.0	185.0	0.056	7.5	43.0	7.5	0.056
43.5	186.0	0.057	7.6	43.2	7.6	0.057
44.0	186.0	0.059	7.7	43.2	7.7	0.059
44.5	187.0	0.060	7.8	43.5	7.8	0.060
45.0	187.0	0.060	7.9	43.5	7.9	0.060
45.5	187.0	0.062	8.0	43.5	8.0	0.062
46.0	188.0	0.062	8.0	43.7	8.0	0.062
46.5	188.0	0.063	8.1	43.7	8.1	0.063
47.0	189.0	0.063	8.2	**43.9**	8.2	0.063

Direct shear (Matahina Ignimbrite: core 3)

Waypoint: 113 RMD: 20_08_01 ; Soil field description: 20_08_01
Scanline: N/A Sample: 20_08_01 Lithotechnical unit: Matahina Ignimbrite
Normal load: 19.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	0.0	0.000	0.1	0.0	0.1	0.000
1.0	0.0	0.000	0.2	0.0	0.2	0.000
1.5	8.0	-0.001	0.3	1.9	0.3	-0.001
2.0	36.0	-0.002	0.3	8.4	0.3	-0.002
2.5	45.0	-0.002	0.4	10.5	0.4	-0.002
3.0	59.0	-0.003	0.4	13.7	0.4	-0.003
3.5	73.0	-0.007	0.5	17.0	0.5	-0.007
4.0	85.0	-0.013	0.6	19.8	0.6	-0.013
4.5	96.0	-0.019	0.6	22.3	0.6	-0.019
5.0	106.0	-0.025	0.7	24.6	0.7	-0.025
5.5	115.0	-0.031	0.8	26.7	0.8	-0.031
6.0	123.0	-0.037	0.9	28.6	0.9	-0.037
6.5	131.0	-0.043	0.9	30.5	0.9	-0.043
7.0	137.0	-0.047	1.0	31.9	1.0	-0.047
7.5	145.0	-0.052	1.1	33.7	1.1	-0.052
8.0	152.0	-0.058	1.2	35.3	1.2	-0.058
8.5	155.0	-0.060	1.2	36.0	1.2	-0.060
9.0	159.0	-0.063	1.3	37.0	1.3	-0.063
9.5	165.0	-0.067	1.4	38.4	1.4	-0.067
10.0	173.0	-0.073	1.5	40.2	1.5	-0.073
10.5	180.0	-0.077	1.6	41.8	1.6	-0.077
11.0	186.0	-0.080	1.6	43.2	1.6	-0.080
11.5	192.0	-0.082	1.7	44.6	1.7	-0.082
12.0	197.0	-0.086	1.8	45.8	1.8	-0.086
12.5	204.0	-0.087	1.9	47.4	1.9	-0.087
13.0	209.0	-0.089	2.0	48.6	2.0	-0.089
13.5	214.0	-0.090	2.0	49.8	2.0	-0.090
14.0	219.0	-0.090	2.1	50.9	2.1	-0.090
14.5	225.0	-0.090	2.2	52.3	2.2	-0.090
15.0	228.0	-0.090	2.3	53.0	2.3	-0.090
15.5	232.0	-0.090	2.4	53.9	2.4	-0.090
16.0	238.0	-0.090	2.5	55.3	2.5	-0.090
16.5	242.0	-0.089	2.5	56.3	2.5	-0.089
17.0	247.0	-0.086	2.6	57.4	2.6	-0.086
17.5	250.0	-0.082	2.7	58.1	2.7	-0.082
18.0	253.0	-0.075	2.8	58.8	2.8	-0.075
18.5	255.0	-0.069	2.9	59.3	2.9	-0.069
19.0	258.0	-0.063	3.0	60.0	3.0	-0.063
19.5	260.0	-0.055	3.0	60.4	3.0	-0.055
20.0	260.0	-0.049	3.1	60.4	3.1	-0.049
20.5	262.0	-0.040	3.2	60.9	3.2	-0.040
21.0	263.0	-0.032	3.3	61.1	3.3	-0.032
21.5	264.0	-0.032	3.4	61.4	3.4	-0.032
22.0	264.0	-0.015	3.5	61.4	3.5	-0.015
22.5	265.0	-0.007	3.6	**61.6**	3.6	-0.007
23.0	265.0	-0.003	3.7	61.6	3.7	-0.003
23.5	265.0	0.010	3.8	61.6	3.8	0.010
24.0	265.0	0.021	3.9	61.6	3.9	0.021
24.5	264.0	0.027	4.0	61.4	4.0	0.027
25.0	264.0	0.036	4.0	61.4	4.0	0.036
25.5	264.0	0.044	4.1	61.4	4.1	0.044
26.0	264.0	0.051	4.2	61.4	4.2	0.051
26.5	264.0	0.059	4.3	61.4	4.3	0.059
27.0	264.0	0.064	4.4	61.4	4.4	0.064
27.5	262.0	0.072	4.5	60.9	4.5	0.072
28.0	259.0	0.076	4.6	60.2	4.6	0.076
28.5	258.0	0.084	4.7	60.0	4.7	0.084
29.0	258.0	0.087	4.8	60.0	4.8	0.087
29.5	258.0	0.092	4.9	60.0	4.9	0.092
30.0	258.0	0.096	5.0	60.0	5.0	0.096
30.5	258.0	0.100	5.1	60.0	5.1	0.100
31.0	258.0	0.105	5.2	60.0	5.2	0.105
31.5	258.0	0.102	5.2	60.0	5.2	0.102
32.0	258.0	0.108	5.3	60.0	5.3	0.108
32.5	258.0	0.112	5.4	60.0	5.4	0.112
33.0	258.0	0.117	5.5	60.0	5.5	0.117
33.5	258.0	0.122	5.6	60.0	5.6	0.122
34.0	258.0	0.128	5.7	60.0	5.7	0.128
34.5	258.0	0.134	5.8	60.0	5.8	0.134
35.0	258.0	0.139	5.9	60.0	5.9	0.139
35.5	258.0	0.146	6.0	60.0	6.0	0.146
36.0	256.0	0.151	6.1	59.5	6.1	0.151
36.5	255.0	0.158	6.2	59.3	6.2	0.158
37.0	252.0	0.163	6.3	58.6	6.3	0.163
37.5	252.0	0.171	6.4	58.6	6.4	0.171
38.0	250.0	0.174	6.5	58.1	6.5	0.174
38.5	250.0	0.176	6.5	58.1	6.5	0.176
39.0	249.0	0.179	6.6	57.9	6.6	0.179
39.5	247.0	0.181	6.7	57.4	6.7	0.181
40.0	246.0	0.187	6.8	57.2	6.8	0.187
40.5	245.0	0.189	6.9	57.0	6.9	0.189
41.0	245.0	0.194	7.0	57.0	7.0	0.194
41.5	242.0	0.196	7.1	56.3	7.1	0.196
42.0	241.0	0.200	7.2	56.0	7.2	0.200
42.5	240.0	0.203	7.3	55.8	7.3	0.203
43.0	240.0	0.208	7.4	55.8	7.4	0.208
43.5	240.0	0.212	7.5	55.8	7.5	0.212
44.0	238.0	0.215	7.6	55.3	7.6	0.215
44.5	236.0	0.220	7.7	54.9	7.7	0.220
45.0	236.0	0.221	7.8	54.9	7.8	0.221
45.5	236.0	0.225	7.9	54.9	7.9	0.225

Direct shear (Matahina Ignimbrite: core 4)

Waypoint: 113 RMD: 20_08_01 ; Soil field description: 20_08_01 Scanline: N/A Sample: 20_08_01
Lithotechnical unit: Matahina Ignimbrite Normal load: 24.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear disp (mm)	Shear stress (kPa)	Shear disp (mm)	Vertical disp (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	15.0	-0.004	0.1	3.5	0.1	-0.004
1.0	34.0	-0.017	0.1	7.9	0.1	-0.017
1.5	45.0	-0.029	0.2	10.5	0.2	-0.029
2.0	56.0	-0.042	0.3	13.0	0.3	-0.042
2.5	68.0	-0.055	0.3	15.8	0.3	-0.055
3.0	82.0	-0.070	0.4	19.1	0.4	-0.070
3.5	92.0	-0.083	0.5	21.4	0.5	-0.083
4.0	101.0	-0.098	0.5	23.5	0.5	-0.098
4.5	111.0	-0.111	0.6	25.8	0.6	-0.111
5.0	121.0	-0.123	0.7	28.1	0.7	-0.123
5.5	129.0	-0.136	0.7	30.0	0.7	-0.136
6.0	137.0	-0.148	0.8	31.9	0.8	-0.148
6.5	145.0	-0.161	0.9	33.7	0.9	-0.161
7.0	154.0	-0.169	1.0	35.8	1.0	-0.169
7.5	163.0	-0.177	1.0	37.9	1.0	-0.177
8.0	169.0	-0.183	1.1	39.3	1.1	-0.183
8.5	178.0	-0.191	1.2	41.4	1.2	-0.191
9.0	185.0	-0.198	1.3	43.0	1.3	-0.198
9.5	192.0	-0.203	1.4	44.6	1.4	-0.203
10.0	196.0	-0.208	1.4	45.6	1.4	-0.208
10.5	202.0	-0.211	1.5	47.0	1.5	-0.211
11.0	210.0	-0.213	1.6	48.8	1.6	-0.213
11.5	215.0	-0.215	1.7	50.0	1.7	-0.215
12.0	220.0	-0.216	1.8	51.1	1.8	-0.216
12.5	223.0	-0.217	1.8	51.8	1.8	-0.217
13.0	228.0	-0.217	1.9	53.0	1.9	-0.217
13.5	230.0	-0.217	2.0	53.5	2.0	-0.217
14.0	230.0	-0.217	2.1	53.5	2.1	-0.217
14.5	238.0	-0.217	2.2	55.3	2.2	-0.217
15.0	241.0	-0.216	2.3	56.0	2.3	-0.216
15.5	244.0	-0.214	2.3	56.7	2.3	-0.214
16.0	244.0	-0.213	2.4	56.7	2.4	-0.213
16.5	249.0	-0.209	2.5	57.9	2.5	-0.209
17.0	250.0	-0.208	2.6	58.1	2.6	-0.208
17.5	252.0	-0.205	2.7	58.6	2.7	-0.205
18.0	253.0	-0.203	2.8	58.8	2.8	-0.203
18.5	255.0	-0.200	2.9	59.3	2.9	-0.200
19.0	256.0	-0.198	3.0	59.5	3.0	-0.198
19.5	257.0	-0.198	3.1	59.8	3.1	-0.198
20.0	258.0	-0.196	3.1	60.0	3.1	-0.196
20.5	258.5	-0.195	3.2	60.1	3.2	-0.195
21.0	259.0	-0.194	3.3	60.2	3.3	-0.194
21.5	260.0	-0.193	3.4	60.4	3.4	-0.193
22.0	260.0	-0.193	3.5	60.4	3.5	-0.193
22.5	261.0	-0.192	3.6	60.7	3.6	-0.192
23.0	261.0	-0.192	3.7	60.7	3.7	-0.192
23.5	261.5	-0.191	3.8	60.8	3.8	-0.191
24.0	262.0	-0.190	3.9	60.9	3.9	-0.190
24.5	262.0	-0.189	4.0	60.9	4.0	-0.189
25.0	262.0	-0.189	4.1	60.9	4.1	-0.189
25.5	262.0	-0.189	4.1	60.9	4.1	-0.189
26.0	262.0	-0.189	4.2	60.9	4.2	-0.189
26.5	262.5	-0.189	4.3	61.0	4.3	-0.189
27.0	264.0	-0.191	4.4	61.4	4.4	-0.191
27.5	266.0	-0.193	4.5	61.8	4.5	-0.193
28.0	269.0	-0.193	4.6	62.5	4.6	-0.193
28.5	271.0	-0.195	4.7	63.0	4.7	-0.195
29.0	272.0	-0.195	4.8	63.2	4.8	-0.195
29.5	273.0	-0.195	4.9	63.5	4.9	-0.195
30.0	275.0	-0.196	4.9	63.9	4.9	-0.196
30.5	276.0	-0.196	5.0	64.2	5.0	-0.196
31.0	278.0	-0.196	5.1	64.6	5.1	-0.196
31.5	279.0	-0.199	5.2	64.9	5.2	-0.199
32.0	279.0	-0.200	5.3	64.9	5.3	-0.200
32.5	280.0	-0.200	5.4	65.1	5.4	-0.200
33.0	280.0	-0.200	5.5	65.1	5.5	-0.200
33.5	281.0	-0.200	5.6	65.3	5.6	-0.200
34.0	282.0	-0.199	5.7	65.6	5.7	-0.199
34.5	282.0	-0.199	5.7	65.6	5.7	-0.199
35.0	282.5	-0.198	5.8	65.7	5.8	-0.198
35.5	283.0	-0.197	5.9	65.8	5.9	-0.197
36.0	283.0	-0.197	6.0	65.8	6.0	-0.197
36.5	284.0	-0.195	6.1	66.0	6.1	-0.195
37.0	284.0	-0.193	6.2	66.0	6.2	-0.193
37.5	284.0	-0.193	6.3	66.0	6.3	-0.193
38.0	284.0	-0.191	6.4	66.0	6.4	-0.191
38.5	285.0	-0.190	6.5	**66.3**	6.5	-0.190
39.0	285.0	-0.188	6.6	66.3	6.6	-0.188
39.5	285.0	-0.187	6.7	66.3	6.7	-0.187
40.0	285.0	-0.185	6.8	66.3	6.8	-0.185
40.5	285.0	-0.182	6.8	66.3	6.8	-0.182
41.0	285.0	-0.181	6.9	66.3	6.9	-0.181
41.5	285.0	-0.178	7.0	66.3	7.0	-0.178
42.0	285.0	-0.175	7.1	66.3	7.1	-0.175
42.5	285.0	-0.173	7.2	66.3	7.2	-0.173
43.0	285.0	-0.172	7.3	66.3	7.3	-0.172
43.5	284.0	-0.171	7.4	66.0	7.4	-0.171
44.0	285.0	-0.168	7.5	66.3	7.5	-0.168
44.5	285.0	-0.166	7.6	66.3	7.6	-0.166

Direct shear (Matahina Ignimbrite: core 5)

Waypoint: 113 RMD: 20_08_01 ; Soil field description: 20_08_01
Scanline: N/A Sample: 20_08_01 Lithotechnical unit: Matahina Ignimbrite
Normal load: 29.5 kg Gearing ratio: 54/36 = 0.183 mm min^{-1}

Time (mins)	Proving ring (units)	Vertical dial (units)	Shear displ (mm)	Shear stress (kPa)	Shear displ (mm)	Vertical displ (mm)
0.0	0.0	0.000	0.0	0.0	0.0	0.000
0.5	10.0	-0.004	0.1	2.3	0.1	-0.004
1.0	31.0	-0.010	0.1	7.2	0.1	-0.010
1.5	45.0	-0.025	0.2	10.5	0.2	-0.025
2.0	60.0	-0.035	0.2	13.9	0.2	-0.035
2.5	77.0	-0.049	0.3	17.9	0.3	-0.049
3.0	93.0	-0.068	0.4	21.6	0.4	-0.068
3.5	107.0	-0.090	0.4	24.9	0.4	-0.090
4.0	118.0	-0.112	0.5	27.4	0.5	-0.112
4.5	127.0	-0.130	0.6	29.5	0.6	-0.130
5.0	139.0	-0.149	0.6	32.3	0.6	-0.149
5.5	149.0	-0.169	0.7	34.6	0.7	-0.169
6.0	161.0	-0.186	0.8	37.4	0.8	-0.186
6.5	170.0	-0.201	0.8	39.5	0.8	-0.201
7.0	177.0	-0.215	0.9	41.2	0.9	-0.215
7.5	191.0	-0.233	1.0	44.4	1.0	-0.233
8.0	199.0	-0.244	1.1	46.3	1.1	-0.244
8.5	209.0	-0.256	1.1	48.6	1.1	-0.256
9.0	219.0	-0.272	1.2	50.9	1.2	-0.272
9.5	228.0	-0.282	1.3	53.0	1.3	-0.282
10.0	236.0	-0.291	1.4	54.9	1.4	-0.291
10.5	246.0	-0.299	1.4	57.2	1.4	-0.299
11.0	255.0	-0.307	1.5	59.3	1.5	-0.307
11.5	262.0	-0.313	1.6	60.9	1.6	-0.313
12.0	271.0	-0.319	1.7	63.0	1.7	-0.319
12.5	279.0	-0.324	1.7	64.9	1.7	-0.324
13.0	288.0	-0.328	1.8	67.0	1.8	-0.328
13.5	294.0	-0.332	1.9	68.4	1.9	-0.332
14.0	303.0	-0.335	2.0	70.4	2.0	-0.335
14.5	308.0	-0.335	2.0	71.6	2.0	-0.335
15.0	315.0	-0.338	2.1	73.2	2.1	-0.338
15.5	321.0	-0.339	2.2	74.6	2.2	-0.339
16.0	326.0	-0.339	2.3	75.8	2.3	-0.339
16.5	331.0	-0.339	2.4	77.0	2.4	-0.339
17.0	334.0	-0.339	2.4	77.7	2.4	-0.339
17.5	340.0	-0.337	2.5	79.0	2.5	-0.337
18.0	342.0	-0.336	2.6	79.5	2.6	-0.336
18.5	346.0	-0.333	2.7	80.4	2.7	-0.333
19.0	348.0	-0.330	2.8	80.9	2.8	-0.330
19.5	340.0	-0.326	2.9	79.0	2.9	-0.326
20.0	350.0	-0.321	3.0	**81.4**	3.0	-0.321
20.5	350.0	-0.319	3.1	81.4	3.1	-0.319
21.0	350.0	-0.315	3.1	81.4	3.1	-0.315
21.5	350.0	-0.312	3.2	81.4	3.2	-0.312
22.0	350.0	-0.307	3.3	81.4	3.3	-0.307
22.5	350.0	-0.306	3.4	81.4	3.4	-0.306
23.0	350.0	-0.302	3.5	81.4	3.5	-0.302
23.5	350.0	-0.300	3.6	81.4	3.6	-0.300
24.0	350.0	-0.299	3.7	81.4	3.7	-0.299
24.5	349.0	-0.295	3.8	81.1	3.8	-0.295
25.0	348.0	-0.295	3.9	80.9	3.9	-0.295
25.5	346.0	-0.295	4.0	80.4	4.0	-0.294
26.0	343.0	-0.294	4.1	79.7	4.1	-0.294
26.5	342.0	-0.294	4.2	79.5	4.2	-0.293
27.0	341.0	-0.293	4.3	79.3	4.3	-0.290
27.5	340.0	-0.290	4.4	79.0	4.4	-0.288
28.0	338.0	-0.288	4.4	78.6	4.4	-0.286
28.5	337.0	-0.286	4.5	78.3	4.5	-0.286
29.0	337.0	-0.283	4.6	78.3	4.6	-0.283
29.5	334.0	-0.282	4.7	77.7	4.7	-0.282
30.0	333.0	-0.278	4.8	77.4	4.8	-0.278
30.5	330.0	-0.275	4.9	76.7	4.9	-0.275
31.0	329.0	-0.272	5.0	76.5	5.0	-0.272
31.5	327.0	-0.268	5.1	76.0	5.1	-0.268
32.0	326.0	-0.266	5.2	75.8	5.2	-0.266
32.5	325.0	-0.263	5.3	75.6	5.3	-0.263
33.0	323.0	-0.261	5.4	75.1	5.4	-0.261
33.5	321.0	-0.258	5.5	74.6	5.5	-0.258
34.0	319.0	-0.258	5.6	74.2	5.6	-0.258
34.5	318.0	-0.255	5.7	73.9	5.7	-0.255
35.0	314.0	-0.253	5.8	73.0	5.8	-0.253
35.5	313.0	-0.253	5.9	72.8	5.9	-0.253
36.0	312.0	-0.250	6.0	72.5	6.0	-0.250
36.5	310.0	-0.249	6.1	72.1	6.1	-0.249
37.0	308.0	-0.247	6.2	71.6	6.2	-0.247
37.5	305.0	-0.247	6.3	70.9	6.3	-0.247
38.0	305.0	-0.246	6.3	70.9	6.3	-0.246
38.5	305.0	-0.246	6.4	70.9	6.4	-0.246
39.0	305.0	-0.245	6.5	70.9	6.5	-0.245
39.5	305.0	-0.245	6.6	70.9	6.6	-0.245
40.0	305.0	-0.244	6.7	70.9	6.7	-0.244
40.5	305.0	-0.243	6.8	70.9	6.8	-0.243
41.0	305.0	-0.242	6.9	70.9	6.9	-0.242
41.5	305.0	-0.241	7.0	70.9	7.0	-0.241
42.0	302.0	-0.239	7.1	70.2	7.1	-0.239
42.5	300.0	-0.239	7.2	69.7	7.2	-0.239

Matahina Ignimbrite: calculation of cohesion and friction angle

Cohesion and friction angle calculations

Constants and equations used to calculate c and ø are as follows:
Weight of hanger = 4.5 kg
Sample diameter = 60 mm
Proving ring number = 5736
Proving ring calibration constant = 0.7363 N/division
Dial gauge calibration constant = 0.002 mm/division
Gearing = A:54/36
Shearing rate = 0.183 mm/min
Vertical dial gauge calibration constant = 0.01 mm/division

$$\text{Normal stress (Pa)} = \frac{\text{normal load (kg)} \times \text{gravity } (ms^{-2})}{\text{area of sample } (m^2)}$$

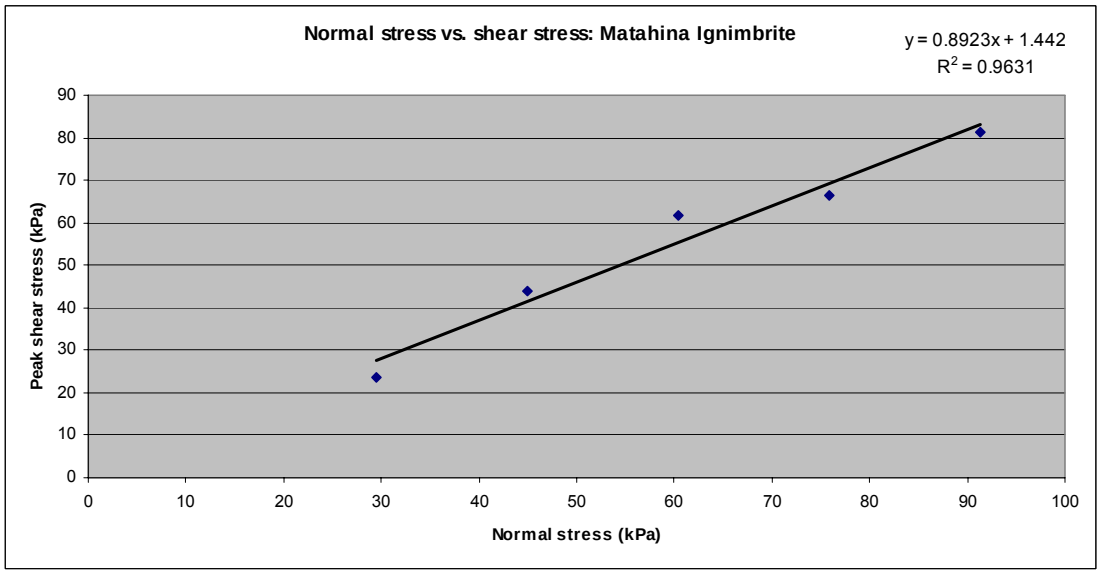
$$\text{Shear stress (Pa)} = \frac{\text{proving ring constant} \times \text{calibration constant}}{\text{area of sample } (m^2)}$$

Screw-jack displacement (mm) = time (min) x loading rate (mm/min)

Proving ring displacement (mm) = proving ring reading x dial gauge calibration constant

Shear displacement (mm) = screw-jack displacement - proving ring displacement

	Normal load (kg)	Area of sample	Normal stress (Pa)	Normal stress	Peak shear
Core 1	9.5	0.003167	29427.63	29.43	23.5
Core 2	14.5	0.003167	44915.86	44.92	43.9
Core 3	19.5	0.003167	60404.08	60.40	61.6
Core 4	24.5	0.003167	75892.31	75.89	66.3
Core 5	29.5	0.003167	91380.53	91.38	81.4



APPENDIX Q: X/Y CO-ORDINATE PAIRS FOR EACH SLOPE PROFILE

Slope profile 2

Slope surface		Indurated andesite		Altered andesite		Block and ash flow		Matahina Ignimbrite	
x	y	x	y	x	y	x	y	x	y
0	65.4	220	67.36	1705	760	550	121.36	0	65.4
55	60.71	275	75.54	1760	751.64	605	137.68	55	60.71
110	60	330	80	1815	740	660	156.51	110	60
165	65.7	385	84.46	1870	740	715	180.9	165	65.7
220	67.36	440	99.79	1925	747.99	770	198.4	220	67.36
275	75.54	495	110.47	1980	740.01	825	230.62	2585	67.36
330	80	550	121.36			880	272.22		
385	84.46	578	106			935	308.26		
440	99.79	605	96						
495	110.47	660	106.51						
550	121.36	715	130.9						
605	137.68	770	148.4						
660	156.51	825	180.6						
715	180.9	880	252.22						
770	198.4	880	252.22						
825	230.62	935	308.26						
880	272.22	990	346.03						
935	308.26	1045	384.14						
990	346.03	1100	431.87						
1045	384.14	1155	470.94						
1100	431.87	1210	496.91						
1155	470.94	1265	532.7						
1210	496.91	1320	563.74						
1265	532.7	1375	602.9						
1320	563.74	1430	645.02						
1375	602.9	1485	681.15						
1430	645.02	1540	706.93						
1485	681.15	1595	717.79						
1540	706.93	1650	743.08						
1595	717.79	1705	760						
1650	743.08	1980	740.01						
1705	760	2035	727.53						
1760	751.64	2090	695.36						
1815	740	2145	667.59						
1870	740	2200	632.2						
1925	747.99	2255	604.46						
1980	740.01	2310	570.55						
2035	727.53	2365	553.86						
2090	695.36	2420	525.98						
2145	667.59	2475	501.26						
2200	632.2	2530	475.3						
2255	604.46	2585	440						
2310	570.55								
2365	553.86								
2420	525.98								
2475	501.26								
2530	475.3								
2585	440								

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0	189.278	189.278	189.278	189.278	189.278	189.278	189.278	189.278	189.278	189.278	189.278
55	188.1404	188.7023	192.4797	197.3682	203.4437	210.4526	218.3536	227.1468	236.7328	246.8049	257.5117
110	186.9958	188.1087	195.5084	204.8917	216.2898	229.1295	243.2684	258.6549	275.0796	292.0106	309.7017
165	185.8442	187.4971	198.372	211.9088	228.0395	245.8786	265.1978	285.913	307.7423	329.9979	353.0364
220	184.6855	186.8674	201.0775	218.4685	238.8546	261.0711	284.8321	310.044	336.3807	363.04	390.4752
275	183.5194	186.2192	203.6313	224.6107	248.857	274.9652	302.6183	331.731	361.9513	392.3882	423.5845
330	182.3458	185.5525	206.0389	230.3688	258.1413	287.749	318.8659	351.4269	385.0657	418.8196	453.3139
385	181.1647	184.8671	208.3055	235.7711	266.7823	299.5647	333.7997	369.4502	406.1436	442.8569	480.2914
440	179.9757	184.1626	210.4356	240.8413	274.8408	310.5229	347.5889	386.0352	425.4877	464.8716	504.9583
495	178.7789	183.439	212.4333	245.6002	282.3666	320.7114	360.3651	401.3603	443.325	485.139	527.6387
550	177.5741	182.6959	214.3024	250.0655	289.4013	330.2015	372.2325	415.5649	459.8309	503.8702	548.5791
605	176.361	181.9332	216.046	254.2526	295.98	339.0519	383.2756	428.7603	475.1441	521.2307	567.972
660	175.1394	181.1506	217.6674	258.1751	302.1323	347.3114	393.5637	441.0373	489.3767	537.3534	585.971
715	173.9094	180.3478	219.1691	261.8449	307.8839	355.0214	403.1548	452.4704	502.6205	552.3467	602.7011
770	172.6705	179.5245	220.5536	265.2724	313.2569	362.2168	412.0973	463.1223	514.9517	566.3003	618.2652
825	171.4227	178.6806	221.8232	268.467	318.2704	368.9278	420.4328	473.0457	526.4345	579.2894	632.7494
880	170.1657	177.8156	222.9798	271.4369	322.9411	375.1805	428.1967	482.2856	537.1232	591.3775	646.2263
935	168.8994	176.9293	224.0251	274.1893	327.2838	380.9973	435.4195	490.8805	547.0646	602.6189	658.7577
990	167.6236	176.0213	224.9606	276.7308	331.3114	386.3979	442.1278	498.8639	556.2985	613.06	670.3967
1045	166.3379	175.0914	225.7879	279.0671	335.0351	391.3997	448.3446	506.2646	564.8598	622.7412	681.189
1100	165.0422	174.1391	226.5079	281.2034	338.465	396.0176	454.0902	513.1079	572.7785	631.6975	691.1743
1155	163.7363	173.1641	227.1218	283.1441	341.6101	400.265	459.3823	519.4157	580.081	639.9591	700.3871
1210	162.4199	172.1661	227.6304	284.8933	344.478	404.1536	464.2363	525.2075	586.7903	647.5528	708.8575
1265	161.0927	171.1445	228.0345	286.4544	347.0757	407.6936	468.6658	530.5	592.9265	654.5018	716.6118
1320	159.7545	170.0991	228.3345	287.8306	349.4091	410.894	472.6829	535.3081	598.5073	660.8264	723.6731
1375	158.4049	169.0292	228.5309	289.0244	351.4836	413.7628	476.2978	539.6448	603.5481	666.5444	730.0614
1430	157.0438	167.9346	228.624	290.0382	353.3038	416.3067	479.5198	543.5213	608.0622	671.6713	735.7943
1485	155.6708	166.8146	228.6138	290.8738	354.8734	418.5317	482.3567	546.9474	612.0614	676.2206	740.887
1540	154.2856	165.6688	228.5004	291.5327	356.1958	420.4429	484.8153	549.9315	615.5557	680.2037	745.3527
1595	152.8878	164.4966	228.2836	292.0162	357.2739	422.0445	486.9012	552.4809	618.5536	683.6307	749.2025
1650	151.4771	163.2975	227.9631	292.325	358.1097	423.3401	488.6193	554.6014	621.0624	686.5098	752.4459
1705	150.0532	162.0708	227.5385	292.4598	358.705	424.3324	489.9734	556.298	623.0878	688.8479	755.0907
1760	148.6156	160.816	227.0092	292.4209	359.0609	425.0235	490.9666	557.5746	624.6348	690.6506	757.1432
1815	147.164	159.5324	226.3744	292.208	359.1783	425.415	491.601	558.434	625.7067	691.9219	758.6082
1870	145.6979	158.2192	225.6333	291.8209	359.0573	425.5077	491.878	558.8782	626.306	692.6649	759.489
1925	144.2169	156.8758	224.7848	291.2588	358.6976	425.3017	491.7982	558.9081	626.4342	692.8811	759.7878
1980	142.7205	155.5013	223.8277	290.5208	358.0986	424.7966	491.3615	558.5239	626.0914	692.5712	759.5052
2035	141.2083	154.0949	222.7606	289.6055	357.259	423.9914	490.5669	557.7246	625.2769	691.7344	758.6406
2090	139.6797	152.6558	221.5819	288.5112	356.1773	422.8843	489.4126	556.5085	623.9888	690.3688	757.1919
2145	138.1342	151.1829	220.2899	287.2358	354.851	421.473	487.8962	554.8728	622.2243	688.4713	755.1558
2200	136.5713	149.6753	218.8824	285.777	353.2775	419.7543	486.0141	552.8139	619.9792	686.0373	752.5275
2255	134.9902	148.132	217.3573	284.1319	351.4535	417.7246	483.7622	550.3269	617.2483	683.0613	749.3009
2310	133.3903	146.5518	215.7121	282.2973	349.375	415.3792	481.1352	547.4061	614.0251	679.536	745.4681
2365	131.7711	144.9335	213.9439	280.2693	347.0375	412.7128	478.127	544.0444	610.3019	675.4529	741.0197
2420	130.1317	143.2758	212.0498	278.0439	344.4357	409.719	474.7303	540.2336	606.0693	670.8018	735.9446
2475	128.4714	141.5774	210.0263	275.6162	341.5636	406.3907	470.9367	535.9641	601.3167	665.5708	730.2297
2530	126.7893	139.8367	207.8696	272.9808	338.4142	402.7196	466.7366	531.2249	596.0316	659.7461	723.8598
2585	125.0847	138.0521	205.5756	270.1317	334.9798	398.6961	462.1188	526.0033	590.1997	653.3118	716.8175

Slope profile 2a

Slope surface		Indurated andesite		Altered andesite		Matahina Ignimbrite	
x	y	x	y	x	y	x	y
330	160	330	160	2035	740	330	70
385	160	385	160	2090	755.22	2827.45	70
440	164.6	440	164.6	2145	740		
495	172.27	495	172.27	2200	740		
550	180.35	550	180.35	2255	747.84		
605	204.7	605	204.7	2310	760		
660	217.77	660	217.77				
715	218.27	715	218.27				
770	226.52	770	226.52				
825	245.21	825	245.21				
880	260.22	880	260.22				
935	274.73	935	274.73				
990	283.8	990	283.8				
1045	304.82	1045	304.82				
1100	332.88	1100	332.88				
1155	349.45	1155	349.45				
1210	371.05	1210	371.05				
1265	411.08	1265	411.08				
1320	440	1320	440				
1375	440	1375	440				
1430	436.77	1430	436.77				
1485	467.67	1485	467.67				
1540	493.78	1540	493.78				
1595	520.74	1595	520.74				
1650	550.54	1650	550.54				
1705	563.63	1705	563.63				
1760	594.39	1760	594.39				
1815	626.84	1815	626.84				
1870	654.74	1870	654.74				
1925	690.02	1925	690.02				
1980	722.97	1980	722.97				
2035	740	2035	740				
2090	755.22	2311	760				
2145	740	2365	753.86				
2200	740	2420	726.03				
2255	747.84	2475	710.36				
2310	760	2530	691.46				
2365	753.86	2585	653.83				
2420	726.03	2640	615.22				
2475	710.36	2695	575.6				
2530	691.46	2750	542.26				
2585	653.83	2805	504.57				
2640	615.22	2827.45	493.73				
2695	575.6						
2750	542.26						
2805	504.57						
2827.45	493.73						

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0	189.278	189.278	189.278	189.278	189.278	189.278	189.278	189.278	189.278	189.278	189.278
55	188.1404	188.7023	192.4797	197.3682	203.4437	210.4526	218.3536	227.1468	236.7328	246.8049	257.5117
110	186.9958	188.1087	195.5084	204.8917	216.2898	229.1295	243.2684	258.6549	275.0796	292.0106	309.7017
165	185.8442	187.4971	198.372	211.9088	228.0395	245.8786	265.1978	285.913	307.7423	329.9979	353.0364
220	184.6855	186.8674	201.0775	218.4685	238.8546	261.0711	284.8321	310.044	336.3807	363.04	390.4752
275	183.5194	186.2192	203.6313	224.6107	248.857	274.9652	302.6183	331.731	361.9513	392.3882	423.5845
330	182.3458	185.5525	206.0389	230.3688	258.1413	287.749	318.8659	351.4269	385.0657	418.8196	453.3139
385	181.1647	184.8671	208.3055	235.7711	266.7823	299.5647	333.7997	369.4502	406.1436	442.8569	480.2914
440	179.9757	184.1626	210.4356	240.8413	274.8408	310.5229	347.5889	386.0352	425.4877	464.8716	504.9583
495	178.7789	183.439	212.4333	245.6002	282.3666	320.7114	360.3651	401.3603	443.325	485.139	527.6387
550	177.5741	182.6959	214.3024	250.0655	289.4013	330.2015	372.2325	415.5649	459.8309	503.8702	548.5791
605	176.361	181.9332	216.046	254.2526	295.98	339.0519	383.2756	428.7603	475.1441	521.2307	567.972
660	175.1394	181.1506	217.6674	258.1751	302.1323	347.3114	393.5637	441.0373	489.3767	537.3534	585.971
715	173.9094	180.3478	219.1691	261.8449	307.8839	355.0214	403.1548	452.4704	502.6205	552.3467	602.7011
770	172.6705	179.5245	220.5536	265.2724	313.2569	362.2168	412.0973	463.1223	514.9517	566.3003	618.2652
825	171.4227	178.6806	221.8232	268.467	318.2704	368.9278	420.4328	473.0457	526.4345	579.2894	632.7494
880	170.1657	177.8156	222.9798	271.4369	322.9411	375.1805	428.1967	482.2856	537.1232	591.3775	646.2263
935	168.8994	176.9293	224.0251	274.1893	327.2838	380.9973	435.4195	490.8805	547.0646	602.6189	658.7577
990	167.6236	176.0213	224.9606	276.7308	331.3114	386.3979	442.1278	498.8639	556.2985	613.06	670.3967
1045	166.3379	175.0914	225.7879	279.0671	335.0351	391.3997	448.3446	506.2646	564.8598	622.7412	681.189
1100	165.0422	174.1391	226.5079	281.2034	338.465	396.0176	454.0902	513.1079	572.7785	631.6975	691.1743
1155	163.7363	173.1641	227.1218	283.1441	341.6101	400.265	459.3823	519.4157	580.081	639.9591	700.3871
1210	162.4199	172.1661	227.6304	284.8933	344.478	404.1536	464.2363	525.2075	586.7903	647.5528	708.8575
1265	161.0927	171.1445	228.0345	286.4544	347.0757	407.6936	468.6658	530.5	592.9265	654.5018	716.6118
1320	159.7545	170.0991	228.3345	287.8306	349.4091	410.894	472.6829	535.3081	598.5073	660.8264	723.6731
1375	158.4049	169.0292	228.5309	289.0244	351.4836	413.7628	476.2978	539.6448	603.5481	666.5444	730.0614
1430	157.0438	167.9346	228.624	290.0382	353.3038	416.3067	479.5198	543.5213	608.0622	671.6713	735.7943
1485	155.6708	166.8146	228.6138	290.8738	354.8734	418.5317	482.3567	546.9474	612.0614	676.2206	740.887
1540	154.2856	165.6688	228.5004	291.5327	356.1958	420.4429	484.8153	549.9315	615.5557	680.2037	745.3527
1595	152.8878	164.4966	228.2836	292.0162	357.2739	422.0445	486.9012	552.4809	618.5536	683.6307	749.2025
1650	151.4771	163.2975	227.9631	292.325	358.1097	423.3401	488.6193	554.6014	621.0624	686.5098	752.4459
1705	150.0532	162.0708	227.5385	292.4598	358.705	424.3324	489.9734	556.298	623.0878	688.8479	755.0907
1760	148.6156	160.816	227.0092	292.4209	359.0609	425.0235	490.9666	557.5746	624.6348	690.6506	757.1432
1815	147.164	159.5324	226.3744	292.208	359.1783	425.415	491.601	558.434	625.7067	691.9219	758.6082
1870	145.6979	158.2192	225.6333	291.8209	359.0573	425.5077	491.878	558.8782	626.306	692.6649	759.489
1925	144.2169	156.8758	224.7848	291.2588	358.6976	425.3017	491.7982	558.9081	626.4342	692.8811	759.7878
1980	142.7205	155.5013	223.8277	290.5208	358.0986	424.7966	491.3615	558.5239	626.0914	692.5712	759.5052
2035	141.2083	154.0949	222.7606	289.6055	357.259	423.9914	490.5669	557.7246	625.2769	691.7344	758.6406
2090	139.6797	152.6558	221.5819	288.5112	356.1773	422.8843	489.4126	556.5085	623.9888	690.3688	757.1919
2145	138.1342	151.1829	220.2899	287.2358	354.851	421.473	487.8962	554.8728	622.2243	688.4713	755.1558
2200	136.5713	149.6753	218.8824	285.777	353.2775	419.7543	486.0141	552.8139	619.9792	686.0373	752.5275
2255	134.9902	148.132	217.3573	284.1319	351.4535	417.7246	483.7622	550.3269	617.2483	683.0613	749.3009
2310	133.3903	146.5518	215.7121	282.2973	349.375	415.3792	481.1352	547.4061	614.0251	679.536	745.4681
2365	131.7711	144.9335	213.9439	280.2693	347.0375	412.7128	478.127	544.0444	610.3019	675.4529	741.0197
2420	130.1317	143.2758	212.0498	278.0439	344.4357	409.719	474.7303	540.2336	606.0693	670.8018	735.9446
2475	128.4714	141.5774	210.0263	275.6162	341.5636	406.3907	470.9367	535.9641	601.3167	665.5708	730.2297
2530	126.7893	139.8367	207.8696	272.9808	338.4142	402.7196	466.7366	531.2249	596.0316	659.7461	723.8598
2585	125.0847	138.0521	205.5756	270.1317	334.9798	398.6961	462.1188	526.0033	590.1997	653.3118	716.8175

Slope profile 3

Slope surface		Indurated andesite		Altered andesite		Block and ash flow		Scoriaceous andesite		Matahina Ignimbrite	
x	y	x	y	x	y	x	y	x	y	x	y
0	50.06	85	70	1705	760	330	80	2145	740	0	50.06
55	57.92	85	70	1760	757.99	385	80	2200	740	55	57.92
110	80	110	80	1815	748.01	440	91.73	2255	719.94	85	70
165	80	165	80	1870	729.83	495	96.8	2310	686.17	2585	70
220	80	220	80	1925	720	550	113.24	2365	663.82		
275	80	275	80	1980	720	605	128.78	2420	625.77		
330	80	330	80	2035	742.52	660	139.35	2475	580.36		
385	80	330	70	2090	754.6	715	151.73	2530	556.29		
440	91.73	385	70	2145	740	770	181.76	2585	525.06		
495	96.8	440	70			825	205.01				
550	113.24	495	70			880	238.72				
605	128.78	550	70			935	272.3				
660	139.35	605	78.78								
715	151.73	660	89.35								
770	181.76	715	101.73								
825	205.01	770	131.76								
880	238.72	825	155.01								
935	272.3	880	188.72								
990	305.12	905	222.3								
1045	337.7	935	272.3								
1100	374.2	990	305.12								
1155	401.76	1045	337.7								
1210	456.41	1100	374.2								
1265	490.75	1155	401.76								
1320	531.26	1210	456.41								
1375	569.61	1265	490.75								
1430	596.83	1320	531.26								
1485	620.63	1375	569.61								
1540	654.88	1430	596.83								
1595	697.41	1485	620.63								
1650	727.34	1540	654.88								
1705	760	1595	697.41								
1760	757.99	1650	727.34								
1815	748.01	1705	760								
1870	729.83	2145	690								
1925	720	2200	690								
1980	720	2255	669.94								
2035	742.52	2310	636.17								
2090	754.6	2365	613.82								
2145	740	2420	575.77								
2200	740	2475	530.36								
2255	719.94	2530	506.29								
2310	686.17	2585	475.06								
2365	663.82										
2420	625.77										
2475	580.36										
2530	556.29										
2585	525.06										

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0	40	40	40	40	40	40	40	40	40	40	40
55	48.06045	59.83567	72.62443	85.48162	98.91705	48.06045	126.1956	139.9215	153.5926	167.4438	181.6963
110	54.95102	74.32573	94.14836	113.4523	133.2501	116.4484	172.8052	192.5167	212.0692	231.8184	252.091
165	61.06899	86.20917	111.2152	135.2515	159.7281	156.5411	208.3482	232.495	256.4137	280.5478	305.3014
220	66.62754	96.45428	125.6544	153.5309	181.8157	187.4686	237.8387	265.6159	293.1119	320.8415	349.2717
275	71.75678	105.5393	138.2915	169.4336	200.9658	213.2565	263.3183	294.2046	324.7663	355.579	387.1631
330	76.54308	113.7424	149.5839	183.5782	217.9542	235.5985	285.8614	319.48	352.7375	386.2622	420.6217
385	81.04721	121.2429	159.8169	196.345	233.2535	255.4006	306.1176	342.1772	377.8442	413.794	450.6358
440	85.31388	128.1642	169.1829	207.988	247.1777	273.2155	324.5154	362.7804	400.6255	438.768	477.8551
495	89.37709	134.5956	177.8189	218.6867	259.9479	289.4105	341.3553	381.6289	421.4585	461.5996	502.7335
550	93.26346	140.6043	185.8267	228.5738	271.7267	304.2444	356.858	398.9714	440.6197	482.5929	525.6038
605	96.99422	146.2425	193.2845	237.7505	282.6382	317.9078	371.1911	414.9969	458.3188	501.9787	546.7178
660	100.5867	151.5516	200.2536	246.2962	292.7793	330.5458	384.4854	429.8527	474.7194	519.9368	566.2722
715	104.0552	156.565	206.7834	254.2746	302.2276	342.2721	396.8452	443.6562	489.952	536.6104	584.4234
770	107.4118	161.3103	212.9145	261.7375	311.0462	353.1775	408.3556	456.5029	504.1223	552.1161	601.2986
825	110.6667	165.8105	218.6804	268.7279	319.2873	363.3358	419.0864	468.4716	517.3177	566.5497	617.0025
880	113.8284	170.085	224.1092	275.2819	326.9947	372.8082	429.0962	479.628	529.6111	579.9913	631.6224
935	116.9048	174.1506	229.2248	281.4298	334.2051	381.6458	438.4343	490.0275	541.0639	592.5084	645.2321
990	119.9022	178.0214	234.0479	287.1978	340.9502	389.8917	447.1428	499.7175	551.7286	604.1583	657.8942
1045	122.8265	181.71	238.5962	292.6084	347.257	397.5827	455.2579	508.7385	561.65	614.9906	669.6625
1100	125.6827	185.2273	242.885	297.6809	353.1491	404.7505	462.8108	517.1254	570.8668	625.0475	680.5833
1155	128.4755	188.5827	246.928	302.4326	358.6469	411.4225	469.8285	524.9087	579.4127	634.3661	690.6969
1210	131.2088	191.7849	250.737	306.8781	363.7682	417.6223	476.3348	532.1149	587.317	642.9784	700.0382
1265	133.8864	194.8414	254.3226	311.0307	368.5288	423.3707	482.3503	538.7671	594.6052	650.9124	708.6378
1320	136.5114	197.7589	257.694	314.902	372.9424	428.6859	487.8933	544.8856	601.2998	658.1927	716.5224
1375	139.087	200.5435	260.8595	318.5022	377.0213	433.5839	492.9795	550.4882	607.4204	664.8408	723.7154
1430	141.6156	203.2006	263.8266	321.8405	380.7762	438.0785	497.6231	555.5905	612.9842	670.8754	730.2371
1485	144.0999	205.7353	266.6019	324.9248	384.2166	442.1822	501.8363	560.2062	618.0062	676.3131	736.1055
1540	146.5422	208.1519	269.1914	327.7624	387.3509	445.9057	505.6299	564.3473	622.4995	681.1679	741.336
1595	148.9443	210.4545	271.6003	330.3595	390.1865	449.2584	509.0133	568.024	626.4756	685.4525	745.9421
1650	151.3083	212.6469	273.8334	332.722	392.7298	452.2486	511.9946	571.2455	629.9441	689.1773	749.9353
1705	153.636	214.7324	275.895	334.8546	394.9865	454.8835	514.5807	574.0192	632.9135	692.3514	753.3253
1760	155.9289	216.7142	277.7888	336.7619	396.9614	457.1692	516.7777	576.3518	635.3908	694.9825	756.1202
1815	158.1886	218.5949	279.5184	338.4475	398.6589	459.1109	518.5904	578.2485	637.3816	697.0765	758.3267
1870	160.4165	220.3773	281.0867	339.9148	400.0823	460.713	520.023	579.7136	638.8906	698.6384	759.9498
1925	162.6138	222.0636	282.4965	341.1666	401.2346	461.979	521.0784	580.7504	639.9211	699.6717	760.9933
1980	164.7819	223.6561	283.75	342.2053	402.1182	462.9116	521.7591	581.3612	640.4755	700.1788	761.4595
2035	166.9217	225.1568	284.8494	343.0328	402.7347	463.5129	522.0664	581.5473	640.5549	700.1607	761.3495
2090	169.0345	226.5674	285.7964	343.6506	403.0855	463.7841	522.001	581.3092	640.1596	699.6175	760.6631
2145	171.1212	227.8896	286.5925	344.0599	403.1712	463.7259	521.5629	580.6462	639.2887	698.548	759.3988
2200	173.1828	229.1251	287.2391	344.2614	402.992	463.3381	520.751	579.557	637.9403	696.9496	757.5535
2255	175.2201	230.275	287.737	344.2554	402.5476	462.6198	519.5636	578.0391	636.1112	694.8188	755.1231
2310	177.234	231.3409	288.0871	344.042	401.837	461.5696	517.9981	576.0892	633.7974	692.1507	752.1018
2365	179.2253	232.3237	288.29	343.6208	400.8589	460.1852	516.0511	573.7029	630.9935	688.9389	748.4826
2420	181.1947	233.2246	288.3458	342.991	399.6112	458.4635	513.7182	570.8746	627.6929	685.1759	744.2567
2475	183.1429	234.0445	288.2548	342.1515	398.0915	456.4007	510.9942	567.5977	623.8878	680.8526	739.4137
2530	185.0706	234.7842	288.0167	341.1006	396.2966	453.9922	507.8728	563.8645	619.5688	675.958	733.9413
2585	186.9784	235.4446	287.6313	339.8365	394.2228	451.2325	504.3465	559.6658	614.7252	670.4799	727.8255
2640	188.867	236.0262	287.0978	338.3568	391.8656	448.115	500.4069	554.9911	609.3444	664.4036	721.0498

Slope profile 3a

Slope surface		Indurated andesite		Altered andesite		Block and ash flow		Scoriaceous andesite		Matahina Ignimbrite	
x	y	x	y	x	y	x	y	x	y	x	y
0	50.06	85	70	1705	760	330	80	2145	740	0	50.06
55	57.92	85	70	1760	757.99	385	80	2200	740	55	57.92
110	80	110	80	1815	748.01	440	91.73	2255	719.94	85	70
165	80	165	80	1870	729.83	495	96.8	2310	686.17	2585	70
220	80	220	80	1925	720	550	113.24	2365	663.82		
275	80	275	80	1980	720	605	128.78	2420	625.77		
330	80	330	80	2035	742.52	660	139.35	2475	580.36		
385	80	330	70	2090	754.6	715	151.73	2530	556.29		
440	91.73	385	70	2145	740	770	181.76	2585	525.06		
495	96.8	440	70			825	205.01				
550	113.24	495	70			880	238.72				
605	128.78	550	70			935	272.3				
660	139.35	605	78.78								
715	151.73	660	89.35								
770	181.76	715	101.73								
825	205.01	770	131.76								
880	238.72	825	155.01								
935	272.3	880	188.72								
990	305.12	905	222.3								
1045	337.7	935	272.3								
1100	374.2	990	305.12								
1155	401.76	1045	337.7								
1210	456.41	1100	374.2								
1265	490.75	1155	401.76								
1320	531.26	1210	456.41								
1375	569.61	1265	490.75								
1430	596.83	1320	531.26								
1485	620.63	1375	569.61								
1540	654.88	1430	596.83								
1595	697.41	1485	620.63								
1650	727.34	1540	654.88								
1705	760	1595	697.41								
1760	757.99	1650	727.34								
1815	748.01	1705	760								
1870	729.83	2145	690								
1925	720	2200	690								
1980	720	2255	669.94								
2035	742.52	2310	636.17								
2090	754.6	2365	613.82								
2145	740	2420	575.77								
2200	740	2475	530.36								
2255	719.94	2530	506.29								
2310	686.17	2585	475.06								
2365	663.82										
2420	625.77										
2475	580.36										
2530	556.29										
2585	525.06										

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0	40	40	40	40	40	40	40	40	40	40	40
55	48.06045	59.83567	72.62443	85.48162	98.91705	48.06045	126.1956	139.9215	153.5926	167.4438	181.6963
110	54.95102	74.32573	94.14836	113.4523	133.2501	116.4484	172.8052	192.5167	212.0692	231.8184	252.091
165	61.06899	86.20917	111.2152	135.2515	159.7281	156.5411	208.3482	232.495	256.4137	280.5478	305.3014
220	66.62754	96.45428	125.6544	153.5309	181.8157	187.4686	237.8387	265.6159	293.1119	320.8415	349.2717
275	71.75678	105.5393	138.2915	169.4336	200.9658	213.2565	263.3183	294.2046	324.7663	355.579	387.1631
330	76.54308	113.7424	149.5839	183.5782	217.9542	235.5985	285.8614	319.48	352.7375	386.2622	420.6217
385	81.04721	121.2429	159.8169	196.345	233.2535	255.4006	306.1176	342.1772	377.8442	413.794	450.6358
440	85.31388	128.1642	169.1829	207.988	247.1777	273.2155	324.5154	362.7804	400.6255	438.768	477.8551
495	89.37709	134.5956	177.8189	218.6867	259.9479	289.4105	341.3553	381.6289	421.4585	461.5996	502.7335
550	93.26346	140.6043	185.8267	228.5738	271.7267	304.2444	356.858	398.9714	440.6197	482.5929	525.6038
605	96.99422	146.2425	193.2845	237.7505	282.6382	317.9078	371.1911	414.9969	458.3188	501.9787	546.7178
660	100.5867	151.5516	200.2536	246.2962	292.7793	330.5458	384.4854	429.8527	474.7194	519.9368	566.2722
715	104.0552	156.565	206.7834	254.2746	302.2276	342.2721	396.8452	443.6562	489.952	536.6104	584.4234
770	107.4118	161.3103	212.9145	261.7375	311.0462	353.1775	408.3556	456.5029	504.1223	552.1161	601.2986
825	110.6667	165.8105	218.6804	268.7279	319.2873	363.3358	419.0864	468.4716	517.3177	566.5497	617.0025
880	113.8284	170.085	224.1092	275.2819	326.9947	372.8082	429.0962	479.628	529.6111	579.9913	631.6224
935	116.9048	174.1506	229.2248	281.4298	334.2051	381.6458	438.4343	490.0275	541.0639	592.5084	645.2321
990	119.9022	178.0214	234.0479	287.1978	340.9502	389.8917	447.1428	499.7175	551.7286	604.1583	657.8942
1045	122.8265	181.71	238.5962	292.6084	347.257	397.5827	455.2579	508.7385	561.65	614.9906	669.6625
1100	125.6827	185.2273	242.885	297.6809	353.1491	404.7505	462.8108	517.1254	570.8668	625.0475	680.5833
1155	128.4755	188.5827	246.928	302.4326	358.6469	411.4225	469.8285	524.9087	579.4127	634.3661	690.6969
1210	131.2088	191.7849	250.737	306.8781	363.7682	417.6223	476.3348	532.1149	587.317	642.9784	700.0382
1265	133.8864	194.8414	254.3226	311.0307	368.5288	423.3707	482.3503	538.7671	594.6052	650.9124	708.6378
1320	136.5114	197.7589	257.694	314.902	372.9424	428.6859	487.8933	544.8856	601.2998	658.1927	716.5224
1375	139.087	200.5435	260.8595	318.5022	377.0213	433.5839	492.9795	550.4882	607.4204	664.8408	723.7154
1430	141.6156	203.2006	263.8266	321.8405	380.7762	438.0785	497.6231	555.5905	612.9842	670.8754	730.2371
1485	144.0999	205.7353	266.6019	324.9248	384.2166	442.1822	501.8363	560.2062	618.0062	676.3131	736.1055
1540	146.5422	208.1519	269.1914	327.7624	387.3509	445.9057	505.6299	564.3473	622.4995	681.1679	741.336
1595	148.9443	210.4545	271.6003	330.3595	390.1865	449.2584	509.0133	568.024	626.4756	685.4525	745.9421
1650	151.3083	212.6469	273.8334	332.722	392.7298	452.2486	511.9946	571.2455	629.9441	689.1773	749.9353
1705	153.636	214.7324	275.895	334.8546	394.9865	454.8835	514.5807	574.0192	632.9135	692.3514	753.3253
1760	155.9289	216.7142	277.7888	336.7619	396.9614	457.1692	516.7777	576.3518	635.3908	694.9825	756.1202
1815	158.1886	218.5949	279.5184	338.4475	398.6589	459.1109	518.5904	578.2485	637.3816	697.0765	758.3267
1870	160.4165	220.3773	281.0867	339.9148	400.0823	460.713	520.023	579.7136	638.8906	698.6384	759.9498
1925	162.6138	222.0636	282.4965	341.1666	401.2346	461.979	521.0784	580.7504	639.9211	699.6717	760.9933
1980	164.7819	223.6561	283.75	342.2053	402.1182	462.9116	521.7591	581.3612	640.4755	700.1788	761.4595
2035	166.9217	225.1568	284.8494	343.0328	402.7347	463.5129	522.0664	581.5473	640.5549	700.1607	761.3495
2090	169.0345	226.5674	285.7964	343.6506	403.0855	463.7841	522.001	581.3092	640.1596	699.6175	760.6631
2145	171.1212	227.8896	286.5925	344.0599	403.1712	463.7259	521.5629	580.6462	639.2887	698.548	759.3988
2200	173.1828	229.1251	287.2391	344.2614	402.992	463.3381	520.751	579.557	637.9403	696.9496	757.5535
2255	175.2201	230.275	287.737	344.2554	402.5476	462.6198	519.5636	578.0391	636.1112	694.8188	755.1231
2310	177.234	231.3409	288.0871	344.042	401.837	461.5696	517.9981	576.0892	633.7974	692.1507	752.1018
2365	179.2253	232.3237	288.29	343.6208	400.8589	460.1852	516.0511	573.7029	630.9935	688.9389	748.4826
2420	181.1947	233.2246	288.3458	342.991	399.6112	458.4635	513.7182	570.8746	627.6929	685.1759	744.2567
2475	183.1429	234.0445	288.2548	342.1515	398.0915	456.4007	510.9942	567.5977	623.8878	680.8526	739.4137
2530	185.0706	234.7842	288.0167	341.1006	396.2966	453.9922	507.8728	563.8645	619.5688	675.958	733.9413
2585	186.9784	235.4446	287.6313	339.8365	394.2228	451.2325	504.3465	559.6658	614.7252	670.4799	727.8255
2640	188.867	236.0262	287.0978	338.3568	391.8656	448.115	500.4069	554.9911	609.3444	664.4036	721.0498

Slope profile 4

Slope surface		Indurated andesite		Altered andesite		Block and ash flow		Scoriaceous andesite		Matahina Ignimbrite	
x	y	x	y	x	y	x	y	x	y	x	y
165	71.31	165	71.31	1925	760	1155	279.44	2475	772.81	165	70
220	74.31	220	74.31	1980	753.49	1210	301.52	2530	721.54	2745	70
275	88.21	275	88.21	2035	748.36	1265	338.64	2585	676.72		
330	104.56	330	104.56	2090	745.42	1320	371.8	2640	640.76		
385	122.7	385	122.7	2145	740	1375	411.15	2695	601.89		
440	149.17	440	149.17	2200	733.5	1430	452.55	2745	565.57		
495	165.98	495	165.98	2255	743.94	1485	491.48				
550	174.58	550	174.58	2310	771.07						
605	180	605	180	2365	800						
660	180	660	180	2420	800						
715	185.53	715	185.53	2475	772.81						
770	192.92	770	192.92								
825	199.02	825	199.02								
880	215.34	880	215.34								
935	231.81	935	231.81								
990	249.6	990	249.6								
1045	263.16	1045	263.16								
1100	270.52	1100	270.52								
1155	279.44	1155	279.44								
1210	301.52	1210	280								
1265	338.64	1265	288.64								
1320	371.8	1320	321.8								
1375	411.15	1375	361.15								
1430	452.55	1430	402.55								
1485	491.48	1485	491.48								
1540	525.01	1540	525.01								
1595	567.69	1595	567.69								
1650	609.67	1650	609.67								
1705	648.78	1705	648.78								
1760	671.64	1760	671.64								
1815	695.95	1815	695.95								
1870	732.36	1870	732.36								
1925	760	1925	760								
1980	753.49	2475	722.81								
2035	748.36	2530	671.54								
2090	745.42	2585	626.72								
2145	740	2640	590.76								
2200	733.5	2695	551.89								
2255	743.94	2745	515.57								
2310	771.07										
2365	800										
2420	800										
2475	772.81										
2530	721.54										
2585	676.72										
2640	640.76										
2695	601.89										
2745	565.57										

Fmin	
x	y
694.44	183.46
771.77	189.08
848.83	197.53
925.54	208.8
1001.78	222.88
1077.45	239.75
1152.45	259.39
1226.68	281.77
1300.03	306.86
1372.42	334.63
1443.73	365.03
1513.89	398.04
1582.78	433.6
1650.32	471.66
1716.42	512.18
1780.99	555.09
1843.93	600.35
1905.18	647.89
1964.63	697.65
2022.22	749.55

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1155	204.0944	283.2155	307.8025	361.6353	416.4197	472.2348	525.8146	581.7916	636.4997	693.0421	749.7135
1210	202.4793	284.1271	309.3574	364.4679	420.4282	477.3576	531.9527	588.9496	644.6249	702.1435	759.7748
1265	200.8513	284.9303	310.7712	367.0893	424.1565	482.1325	537.6799	595.6329	652.2141	710.6467	769.1766
1320	199.21	285.6258	312.0458	369.5037	427.6118	486.5697	543.0093	601.857	659.2857	718.573	777.9428
1375	197.555	286.2144	313.1829	371.7154	430.8007	490.6783	547.9524	607.6363	665.8563	725.9413	786.0947
1430	195.8861	286.6969	314.1841	373.7279	433.7291	494.4667	552.5197	612.9832	671.9405	732.7683	793.6512
1485	194.2028	287.0738	315.0505	375.5444	436.4023	497.9419	556.7203	617.909	677.5515	739.0692	800.6292
1540	192.5048	287.3454	315.7834	377.1677	438.8249	501.1107	560.5625	622.4236	682.7009	744.8572	807.0436
1595	190.7917	287.5122	316.3836	378.6004	441.001	503.9787	564.0537	626.536	687.3991	750.1442	812.9079
1650	189.063	287.5741	316.8519	379.8445	442.9343	506.5511	567.2003	630.2541	691.6553	754.9408	818.2338
1705	187.3184	287.5314	317.1889	380.9019	444.628	508.8324	570.0081	633.5847	695.4776	759.2562	823.0318
1760	185.5574	287.384	317.395	381.7742	446.0847	510.8264	572.4819	636.534	698.8731	763.0987	827.311
1815	183.7796	287.1317	317.4704	382.4627	447.3068	512.5365	574.6262	639.1073	701.848	766.4752	831.0796
1870	181.9843	286.7742	317.4153	382.9683	448.2962	513.9655	576.4446	641.309	704.4077	769.392	834.3444
1925	180.1712	286.3112	317.2295	383.2917	449.0545	515.1158	577.9402	643.1429	706.5566	771.8543	837.1113
1980	178.3397	285.7421	316.913	383.4335	449.5827	515.9893	579.1154	644.6123	708.2985	773.8663	839.3852
2035	176.4891	285.0664	316.4651	383.3938	449.8818	516.5873	579.9723	645.7197	709.6364	775.4317	841.1701
2090	174.6189	284.2831	315.8855	383.1725	449.9522	516.9108	580.5122	646.4667	710.5726	776.5531	842.4692
2145	172.7285	283.3915	315.1733	382.7694	449.7939	516.9604	580.7361	646.8549	711.1086	777.2324	843.2846
2200	170.8172	282.3905	314.3277	382.1839	449.4068	516.736	580.6442	646.8846	711.2455	777.4708	843.6179
2255	168.8842	281.279	313.3476	381.4151	448.7903	516.2374	580.2365	646.5561	710.9833	777.2688	843.4695
2310	166.9289	280.0556	312.2317	380.4619	447.9434	515.4637	579.5123	645.8688	710.3217	776.6258	842.8392
2365	164.9504	278.7189	310.9786	379.3229	446.8647	514.4138	578.4703	644.8214	709.2595	775.5409	841.7259
2420	162.9478	277.2672	309.5866	377.9965	445.5527	513.0858	577.1089	643.4124	707.7949	774.0122	840.1277
2475	160.9203	275.6987	308.0538	376.4807	444.0052	511.4777	575.4258	641.6392	705.9255	772.0371	838.0418
2530	158.867	274.0114	306.378	374.7732	442.2198	509.5867	573.4181	639.4988	703.648	769.6121	835.4646
2585	156.7868	272.2031	304.5571	372.8713	440.1935	507.4098	571.0825	636.9877	700.9584	766.733	832.3915
2640	154.6786	270.2714	302.5882	370.772	437.9231	504.9433	568.4149	634.1012	697.8519	763.3945	828.8171
2695	152.5412	268.2136	300.4686	368.472	435.4047	502.1828	565.4106	630.8344	694.323	759.5908	824.7346
2750	150.3735	266.0267	298.1949	365.9675	432.634	499.1234	562.0642	627.1812	690.3653	755.3146	820.1367
2805	148.1741	263.7076	295.7637	363.2542	429.6061	495.7598	558.3696	623.1348	685.9711	750.5581	815.0145
2860	145.9416	261.2527	293.171	360.3275	426.3155	492.0855	554.3197	618.6876	681.1322	745.3118	809.3582
2915	143.6743	258.6582	290.4125	357.1821	422.7561	488.0936	549.9068	613.8308	675.839	739.5656	803.1563
2970	141.3707	255.9199	287.4835	353.8122	418.9211	483.7763	545.122	608.5546	670.0807	733.3075	796.3963
3025	139.0289	253.033	284.3785	350.2113	414.8027	479.1247	539.9554	602.8481	663.8451	726.5243	789.0636
3080	136.647	249.9924	281.092	346.3721	410.3925	474.129	534.396	596.6988	657.1188	719.2013	781.1423
3135	134.2229	246.7924	277.6173	342.2867	405.6809	468.7782	528.4313	590.0929	649.8865	711.3217	772.6142
3190	131.7541	243.4268	273.9473	337.9461	400.6574	463.06	522.0475	583.0149	642.131	702.8668	763.459
3245	129.2382	239.8886	270.074	333.3404	395.31	456.9606	515.2291	575.4475	633.8332	693.8156	753.6537
3300	126.6724	236.1699	265.9887	328.4584	389.6253	450.4645	507.9584	567.3709	624.9714	684.1443	743.1728
3355	124.0534	232.2623	261.6813	323.2875	383.5885	443.5543	500.2157	558.7631	615.5214	673.8265	731.9871
3410	121.378	228.1558	257.1407	317.8138	377.1825	436.2103	491.9789	549.5992	605.4556	662.8317	720.0638
3465	118.6423	223.8397	252.3542	312.0213	370.3882	428.4102	483.2226	539.8508	594.7426	651.1257	707.3657
3520	115.842	219.3014	247.3078	305.8918	363.1839	420.1286	473.918	529.4856	583.3469	638.6695	693.8501
3575	112.9723	214.527	241.9849	299.4046	355.5446	411.3363	464.0321	518.4668	571.2276	625.4182	679.4684
3630	110.0277	209.5003	236.367	292.536	347.4417	402	453.527	506.7516	558.3376	611.32	664.1642
3685	107.0022	204.2026	230.4326	285.2584	338.8417	392.0808	442.3585	494.2904	544.6221	596.315	647.8721
3740	103.8886	198.6123	224.1564	277.5396	329.706	381.5331	430.475	481.0255	530.0171	580.3328	630.5156

Slope profile 4a

Slope surface		Indurated andesite		Altered andesite		Block and ash flow		Scoriaceous andesite		Matahina Ignimbrite	
x	y	x	y	x	y	x	y	x	y	x	y
110	240	110	190	1540	793.46	110	240	1210	538.13	110	70
165	240	165	190	1595	800	165	240	1265	576.61	2674.31	70
220	232.63	220	182.63	1650	796.83	220	232.63	1320	614.04		
275	222.15	275	172.15	1705	762.11	275	222.15	1375	652.69		
330	220	330	170	1760	737.29	330	220	1430	697.51		
385	220.31	385	170.31	1815	733.6	385	220.31	1485	739.64		
440	224.39	440	174.39	1870	742.03	440	224.39	1540	793.46		
495	234.36	495	184.36	1925	746.14	495	234.36				
550	247.88	550	197.88	1980	749.02	550	247.88				
605	259.28	605	209.28	2035	760	605	259.28				
660	271.28	660	221.28	2090	753.03	660	271.28				
715	284.88	715	234.88			715	284.88				
770	301.35	770	251.35			770	301.35				
825	315.89	825	265.89			825	315.89				
880	338.3	880	288.3			880	338.3				
935	365.64	935	315.64			935	365.64				
990	395.56	990	345.56			990	395.56				
1045	429.26	1045	379.26			1045	429.26				
1100	461.68	1100	411.68			1100	461.68				
1155	506.94	1155	456.94			1155	506.94				
1210	538.13	1210	488.13			1210	538.13				
1265	576.61	1265	526.61			2585	439.58				
1320	614.04	1320	564.04			2640	396.45				
1375	652.69	1375	602.69			2674.31	372.22				
1430	697.51	1430	647.51								
1485	739.64	1485	689.64								
1540	793.46	1540	743.46								
1595	800	2090	753.03								
1650	796.83	2145	722.17								
1705	762.11	2200	688.45								
1760	737.29	2255	660.91								
1815	733.6	2310	635.78								
1870	742.03	2365	596.94								
1925	746.14	2420	552.77								
1980	749.02	2475	513.54								
2035	760	2530	477.56								
2090	753.03	2585	439.58								
2145	722.17	2615	389.58								
2200	688.45	2640	346.45								
2255	660.91	2674.31	322.22								
2310	635.78										
2365	596.94										
2420	552.77										
2475	513.54										
2530	477.56										
2585	439.58										
2640	396.45										
2674.31	372.22										

Fmin	
x	y
511	238.29
585.63	247.23
659.99	258.16
734.03	271.08
807.7	285.97
880.94	302.84
953.71	321.66
1025.94	342.43
1097.6	365.12
1168.61	389.72
1238.95	416.22
1308.55	444.6
1377.36	474.82
1445.34	506.88
1512.44	540.75
1578.6	576.41
1643.79	613.83
1707.94	652.98
1771.03	693.83
1833	736.36

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
110	232.6596	238.819	246.4981	255.4653	265.6812	277.0951	288.896	302.0015	315.4833	330.0292	345.1546
165	231.2442	240.3652	251.5865	264.5055	279.0149	295.0016	311.319	329.2269	347.4499	366.9193	386.9844
220	229.82	241.8265	256.4124	272.992	291.3871	311.4275	331.6798	353.7122	375.9597	399.569	423.7565
275	228.387	243.2044	260.9904	280.9751	302.9156	326.5962	350.3382	375.9932	401.7492	428.9477	456.6944
330	226.9449	244.5003	265.3333	288.4964	313.6934	340.6756	367.5536	396.4417	425.3136	455.6886	486.5772
385	225.4936	245.7155	269.4525	295.5913	323.7956	353.796	383.5202	415.3285	447.005	480.2323	513.9383
440	224.0328	246.8512	273.3581	302.2898	333.2835	366.0603	398.3882	432.8579	467.0843	502.9009	539.1615
495	222.5625	247.9085	277.0592	308.6177	342.2083	377.5521	412.2767	449.1891	485.7515	523.9376	562.5347
550	221.0825	248.8884	280.5638	314.5973	350.613	388.3399	425.2814	464.4483	503.1638	543.532	584.2798
605	219.5924	249.7919	283.8792	320.2482	358.5341	398.4809	437.4812	478.7382	519.4475	561.8351	604.5725
660	218.0922	250.6196	287.012	325.5875	366.003	408.0233	448.9419	492.1431	534.7055	578.9692	623.5547
715	216.5815	251.3725	289.9681	330.6302	373.0469	417.0082	459.7185	504.7335	549.0235	595.0355	641.3428
770	215.0603	252.051	292.7528	335.3898	379.6895	425.471	469.8583	516.5691	562.4733	610.1183	658.0335
825	213.5282	252.656	295.371	339.8782	385.9515	433.4422	479.4016	527.7006	575.1157	624.2888	673.7085
880	211.9851	253.1878	297.827	344.1059	391.8511	440.9485	488.3834	538.1716	587.0029	637.6078	688.4371
935	210.4306	253.647	300.125	348.0825	397.4044	448.0133	496.8341	548.0202	598.18	650.1278	702.2788
990	208.8646	254.0339	302.2684	351.8164	402.6259	454.6571	504.7804	557.2792	608.686	661.8941	715.2853
1045	207.2867	254.3488	304.2605	355.3154	407.5282	460.8981	512.2459	565.9776	618.5552	672.9461	727.5012
1100	205.6967	254.5921	306.1043	358.5863	412.1227	466.7525	519.2511	574.1409	627.8176	683.3186	738.9658
1155	204.0944	254.7639	307.8025	361.6353	416.4197	472.2348	525.8146	581.7916	636.4997	693.0421	749.7135
1210	202.4793	254.8644	309.3574	364.4679	420.4282	477.3576	531.9527	588.9496	644.6249	702.1435	759.7748
1265	200.8513	254.8937	310.7712	367.0893	424.1565	482.1325	537.6799	595.6329	652.2141	710.6467	769.1766
1320	199.21	254.8518	312.0458	369.5037	427.6118	486.5697	543.0093	601.857	659.2857	718.573	777.9428
1375	197.555	254.7386	313.1829	371.7154	430.8007	490.6783	547.9524	607.6363	665.8563	725.9413	786.0947
1430	195.8861	254.554	314.1841	373.7279	433.7291	494.4667	552.5197	612.9832	671.9405	732.7683	793.6512
1485	194.2028	254.298	315.0505	375.5444	436.4023	497.9419	556.7203	617.909	677.5515	739.0692	800.6292
1540	192.5048	253.9703	315.7834	377.1677	438.8249	501.1107	560.5625	622.4236	682.7009	744.8572	807.0436
1595	190.7917	253.5705	316.3836	378.6004	441.001	503.9787	564.0537	626.536	687.3991	750.1442	812.9079
1650	189.063	253.0985	316.8519	379.8445	442.9343	506.5511	567.2003	630.2541	691.6553	754.9408	818.2338
1705	187.3184	252.5536	317.1889	380.9019	444.628	508.8324	570.0081	633.5847	695.4776	759.2562	823.0318
1760	185.5574	251.9356	317.395	381.7742	446.0847	510.8264	572.4819	636.534	698.8731	763.0987	827.311
1815	183.7796	251.2439	317.4704	382.4627	447.3068	512.5365	574.6262	639.1073	701.848	766.4752	831.0796
1870	181.9843	250.4777	317.4153	382.9683	448.2962	513.9655	576.4446	641.309	704.4077	769.392	834.3444
1925	180.1712	249.6366	317.2295	383.2917	449.0545	515.1158	577.9402	643.1429	706.5566	771.8543	837.1113
1980	178.3397	248.7196	316.913	383.4335	449.5827	515.9893	579.1154	644.6123	708.2985	773.8663	839.3852
2035	176.4891	247.726	316.4651	383.3938	449.8818	516.5873	579.9723	645.7197	709.6364	775.4317	841.1701
2090	174.6189	246.6548	315.8855	383.1725	449.9522	516.9108	580.5122	646.4667	710.5726	776.5531	842.4692
2145	172.7285	245.505	315.1733	382.7694	449.7939	516.9604	580.7361	646.8549	711.1086	777.2324	843.2846
2200	170.8172	244.2755	314.3277	382.1839	449.4068	516.736	580.6442	646.8846	711.2455	777.4708	843.6179
2255	168.8842	242.9651	313.3476	381.4151	448.7903	516.2374	580.2365	646.5561	710.9833	777.2688	843.4695
2310	166.9289	241.5725	312.2317	380.4619	447.9434	515.4637	579.5123	645.8688	710.3217	776.6258	842.8392
2365	164.9504	240.0962	310.9786	379.3229	446.8647	514.4138	578.4703	644.8214	709.2595	775.5409	841.7259
2420	162.9478	238.5347	309.5866	377.9965	445.5527	513.0858	577.1089	643.4124	707.7949	774.0122	840.1277
2475	160.9203	236.8863	308.0538	376.4807	444.0052	511.4777	575.4258	641.6392	705.9255	772.0371	838.0418
2530	158.867	235.1492	306.378	374.7732	442.2198	509.5867	573.4181	639.4988	703.648	769.6121	835.4646
2585	156.7868	233.3213	304.5571	372.8713	440.1935	507.4098	571.0825	636.9877	700.9584	766.733	832.3915
2640	154.6786	231.4007	302.5882	370.772	437.9231	504.9433	568.4149	634.1012	697.8519	763.3945	828.8171
2695	152.5412	229.3848	300.4686	368.472	435.4047	502.1828	565.4106	630.8344	694.323	759.5908	824.7346

Slope profile 5

Slope surface		Indurated andesite		Altered andesite		Block and ash flow		Matahina Ignimbrite	
x	y	x	y	x	y	x	y	x	y
0	140.79	0	140.79	1650	740	1430	726.09	0	75.54
55	168.78	55	168.78	1705	740	1485	760.93	2585	75.54
110	187.36	110	187.36	1760	742.15	1540	780		
165	201.68	165	201.68	1815	748.08	1595	769.8		
220	208.66	220	208.66	1870	754.56	1650	740		
275	214.28	275	214.28	1925	746.24	2090	685.28		
330	219.39	330	219.39	1980	734.98	2145	657.11		
385	226.8	385	226.8	2035	721.11	2200	630.12		
440	235.35	440	235.35	2090	685.28	2255	610.59		
495	239.42	495	239.42			2310	563.15		
550	240	550	240			2365	532.54		
605	257.26	605	257.26			2420	494.33		
660	275.02	660	275.02			2475	465.07		
715	300.64	715	300.64			2530	430.71		
770	335.05	770	335.05			2585	399.24		
825	377.37	825	377.37						
880	410.24	880	410.24						
935	460.46	935	460.46						
990	499.98	990	499.98						
1045	549.75	1045	549.75						
1100	589.22	1100	589.22						
1155	617.26	1155	617.26						
1210	628.93	1210	628.93						
1265	634.17	1265	634.17						
1320	664.3	1320	664.3						
1375	688.73	1375	688.73						
1430	726.09	1430	726.09						
1485	760.93	1510	740						
1540	780	1540	730						
1595	769.8	1595	719.8						
1650	740	1650	690						
1705	740	2090	635.28						
1760	742.15	2145	607.11						
1815	748.08	2200	580.12						
1870	754.56	2255	560.59						
1925	746.24	2310	513.15						
1980	734.98	2365	482.54						
2035	721.11	2420	444.33						
2090	685.28	2475	415.07						
2145	657.11	2530	380.71						
2200	630.12	2585	349.24						
2255	610.59								
2310	563.15								
2365	532.54								
2420	494.33								
2475	465.07								
2530	430.71								
2585	399.24								

Fmin	
x	y
26.32	154.18
117.02	158.59
207.5	166.22
297.65	177.06
387.36	191.1
476.52	208.32
565.01	228.71
652.71	252.22
739.52	278.85
825.34	308.54
910.04	341.27
993.52	376.98
1075.68	415.65
1156.41	457.21
1235.62	501.62
1313.19	548.81
1389.04	598.74
1463.06	651.33
1535.16	706.52
1605.26	764.24

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1045	100.9135	168.4981	218.3159	301.632	328.1351	382.5765	436.3114	489.5725	535.8153	596.1362	647.3845
1100	103.1276	171.7885	222.4599	307.2418	334.2163	389.6307	444.3299	498.5494	545.6261	607.0361	659.2107
1155	105.2951	174.9341	226.3961	312.5449	339.9603	396.2854	451.8883	507.0068	554.8656	617.2979	670.3423
1210	107.4189	177.9425	230.1352	317.5567	345.3837	402.5605	459.0095	514.97	563.5621	626.9529	680.8131
1265	109.5015	180.8207	233.6866	322.2908	350.5016	408.4735	465.7134	522.4619	571.7404	636.0289	690.6534
1320	111.5453	183.5746	237.0589	326.7591	355.3271	414.04	472.0179	529.5023	579.4223	644.5502	699.8896
1375	113.5523	186.2099	240.2595	330.9726	359.872	419.2736	477.9387	536.109	586.6273	652.5386	708.5454
1430	115.5244	188.7315	243.2952	334.9408	364.1468	424.1868	483.4899	542.2979	593.3729	660.0134	716.6419
1485	117.4634	191.1438	246.1721	338.6723	368.1608	428.7905	488.6842	548.0832	599.6746	666.992	724.1978
1540	119.3709	193.4511	248.8957	342.1749	371.9226	433.0947	493.5328	553.4775	605.5461	673.4897	731.2298
1595	121.2484	195.657	251.471	345.4556	375.4397	437.1081	498.0459	558.4921	611	679.5203	737.753
1650	123.0973	197.7649	253.9025	348.5205	378.719	440.8388	502.2323	563.1373	616.0472	685.0961	743.7807
1705	124.9188	199.7778	256.1943	351.3755	381.7665	444.2937	506.1004	567.4219	620.6978	690.2283	749.3249
1760	126.7141	201.6988	258.3502	354.0254	384.5878	447.4794	509.6572	571.3542	624.9605	694.9265	754.3962
1815	128.4844	203.5302	260.3734	356.475	387.1878	450.4015	512.9093	574.9415	628.8433	699.1996	759.0041
1870	130.2306	205.2746	262.2672	358.7282	389.5709	453.0652	515.8625	578.19	632.3532	703.0554	763.1571
1925	131.9536	206.9342	264.0341	360.7889	391.7412	455.4749	518.5218	581.1055	635.4963	706.5005	766.8624
1980	133.6545	208.5109	265.6769	362.6603	393.702	457.6347	520.8918	583.6931	638.278	709.5411	770.1267
2035	135.334	210.0067	267.1977	364.3452	395.4567	459.5481	522.9764	585.9569	640.7031	712.1823	772.9554
2090	136.9929	211.4232	268.5987	365.8463	397.0078	461.2182	524.7789	587.9008	642.7756	714.4286	775.3533
2145	138.632	212.7621	269.8816	367.1658	398.3577	462.6475	526.3024	589.528	644.4989	716.2836	777.3244
2200	140.2519	214.0247	271.0483	368.3057	399.5086	463.8384	527.5491	590.841	645.8758	717.7504	778.872
2255	141.8533	215.2125	272.1002	369.2676	400.462	464.7927	528.5211	591.842	646.9085	718.8313	779.9985
2310	143.4368	216.3267	273.0385	370.053	401.2195	465.5118	529.2199	592.5324	647.5987	719.5282	780.7059
2365	145.003	217.3684	273.8646	370.6629	401.7821	465.9967	529.6466	592.9135	647.9474	719.842	780.9952
2420	146.5525	218.3386	274.5793	371.0982	402.1506	466.2484	529.8018	592.9858	647.9552	719.7734	780.8668
2475	148.0858	219.2383	275.1836	371.3595	402.3256	466.267	529.6857	592.7495	647.6221	719.3222	780.3207
2530	149.6034	220.0683	275.6782	371.4473	402.3074	466.0527	529.2982	592.204	646.9476	718.4877	779.3559
2585	151.1057	220.8295	276.0636	371.3615	402.0958	465.6051	528.6386	591.3487	645.9306	717.2685	777.9708
2640	152.5933	221.5225	276.3404	371.1022	401.6907	464.9235	527.7061	590.1821	644.5696	715.6627	776.1633
2695	154.0664	222.148	276.5088	370.6689	401.0913	464.007	526.499	588.7024	642.8622	713.6677	773.9303
2750	155.5257	222.7066	276.5691	370.061	400.2969	462.854	525.0156	586.9072	640.8057	711.2802	771.2681
2805	156.9713	223.1987	276.5214	369.2776	399.3063	461.463	523.2534	584.7937	638.3969	708.4962	768.1723
2860	158.4038	223.6249	276.3654	368.3177	398.1179	459.8316	521.2097	582.3583	635.6315	705.311	764.6377
2915	159.8234	223.9854	276.1012	367.1799	396.7301	457.9573	518.881	579.597	632.5051	701.7193	760.658
2970	161.2306	224.2806	275.7284	365.8624	395.1408	455.8372	516.2637	576.5052	629.0122	697.7146	756.2264
3025	162.6255	224.5107	275.2465	364.3634	393.3474	453.4677	513.3531	573.0774	625.1466	693.2898	751.3347
3080	164.0086	224.676	274.6549	362.6806	391.3472	450.8449	510.1444	569.3076	620.9015	688.4369	745.9739
3135	165.3801	224.7766	273.953	360.8114	389.137	447.9645	506.6319	565.1889	616.2688	683.1468	740.1339
3190	166.7404	224.8125	273.1399	358.7529	386.7132	444.8214	502.8091	560.7138	611.24	677.409	733.8032
3245	168.0896	224.7839	272.2146	356.5019	384.0718	441.4099	498.669	555.8735	605.805	671.2123	726.9689
3300	169.4281	224.6906	271.1759	354.0546	381.2081	437.7238	494.2035	550.6584	599.9528	664.5437	719.6168
3355	170.7561	224.5327	270.0226	351.4069	378.1173	433.7561	489.4039	545.0577	593.6712	657.389	711.7308
3410	172.0739	224.3099	268.7532	348.5544	374.7936	429.4991	484.26	539.0596	586.9462	649.7319	703.2929
3465	173.3816	224.0221	267.366	345.4919	371.2308	424.9439	478.761	532.6504	579.7626	641.5546	694.283
3520	174.6795	223.669	265.8591	342.2137	367.4219	420.0809	472.8942	525.8153	572.1029	632.8369	684.6785
3575	175.9679	223.2503	264.2306	338.7137	363.3593	414.8993	466.646	518.5373	563.9479	623.5561	674.454
3630	177.2469	222.7657	262.4781	334.9848	359.0342	409.387	460.0006	510.7976	555.2756	613.6867	663.5809

Slope profile 5a

Slope surface		Indurated andesite		Altered andesite		Block and ash flow		Matahina Ignimbrite	
x	y	x	y	x	y	x	y	x	y
110	185.14	110	135.14	1760	747.08	110	185.14	110	70
165	172.62	165	122.62	1815	754.68	165	172.62	2690.76	70
220	171.19	220	121.19	1870	747.78	220	171.19		
275	176.07	275	126.07	1925	741.78	275	176.07		
330	182.35	330	132.35	1980	740	330	182.35		
385	188.54	385	138.54	2035	740	385	188.54		
440	194.76	440	144.76	2090	773.54	440	194.76		
495	201.47	495	151.47	2145	780	495	201.47		
550	210.67	550	160.67			550	210.67		
605	219.85	605	169.85			605	219.85		
660	231.65	660	181.65			660	231.65		
715	244.74	715	194.74			715	244.74		
770	260.68	770	210.68			770	260.68		
825	277.09	825	227.09			825	277.09		
880	302.17	880	252.17			880	302.17		
935	321.35	935	271.35			935	321.35		
990	342.83	990	292.83			990	342.83		
1045	374.6	1045	324.6			1045	374.6		
1100	400.67	1100	350.67			1100	400.67		
1155	432.91	1155	382.91			1155	432.91		
1210	467.12	1210	417.12			1210	467.12		
1265	495.52	1265	445.52			1265	495.52		
1320	534.25	1320	484.25			1320	534.25		
1375	565.74	1375	515.74			1375	565.74		
1430	612.51	1430	562.51			1430	612.51		
1485	630.95	1485	580.95			1485	630.95		
1540	659.42	1540	609.42			1540	659.42		
1595	687.28	1595	637.28	Fmin		1595	687.28		
1650	722.56	1650	672.56	x	y	1650	722.56		
1705	735.48	1705	685.48			1705	735.48		
1760	747.08	1760	697.08	477	199.27	1760	747.08		
1815	754.68	2145	730	553.9	191.66	2145	780		
1870	747.78	2200	709.32	631.1	188.33	2200	759.32		
1925	741.78	2255	674.84	708.37	189.31	2255	724.84		
1980	740	2310	668	785.47	194.58	2310	687.64		
2035	740	2365	662.91	862.15	204.14	2365	662.91		
2090	773.54	2420	633.68	938.18	217.95				
2145	780	2475	628.45	1013.33	235.97				
2200	759.32	2530	616.05	1087.35	258.14				
2255	724.84	2585	587.2	1160.03	284.4				
2310	687.64	2640	547.04	1231.14	314.67				
2365	662.91	2690.76	501.99	1300.44	348.84				
2420	633.68			1367.74	386.82				
2475	628.45			1432.83	428.48				
2530	616.05			1495.49	473.71				
2585	587.2			1555.54	522.35				
2640	547.04			1612.78	574.25				
2690.76	501.99			1667.05	629.26				
				1718.18	687.21				
				1766	747.91				

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1045	100.9135	168.4981	218.3159	301.632	328.1351	382.5765	436.3114	489.5725	535.8153	596.1362	647.3845
1100	103.1276	171.7885	222.4599	307.2418	334.2163	389.6307	444.3299	498.5494	545.6261	607.0361	659.2107
1155	105.2951	174.9341	226.3961	312.5449	339.9603	396.2854	451.8883	507.0068	554.8656	617.2979	670.3423
1210	107.4189	177.9425	230.1352	317.5567	345.3837	402.5605	459.0095	514.97	563.5621	626.9529	680.8131
1265	109.5015	180.8207	233.6866	322.2908	350.5016	408.4735	465.7134	522.4619	571.7404	636.0289	690.6534
1320	111.5453	183.5746	237.0589	326.7591	355.3271	414.04	472.0179	529.5023	579.4223	644.5502	699.8896
1375	113.5523	186.2099	240.2595	330.9726	359.872	419.2736	477.9387	536.109	586.6273	652.5386	708.5454
1430	115.5244	188.7315	243.2952	334.9408	364.1468	424.1868	483.4899	542.2979	593.3729	660.0134	716.6419
1485	117.4634	191.1438	246.1721	338.6723	368.1608	428.7905	488.6842	548.0832	599.6746	666.992	724.1978
1540	119.3709	193.4511	248.8957	342.1749	371.9226	433.0947	493.5328	553.4775	605.5461	673.4897	731.2298
1595	121.2484	195.657	251.471	345.4556	375.4397	437.1081	498.0459	558.4921	611	679.5203	737.753
1650	123.0973	197.7649	253.9025	348.5205	378.719	440.8388	502.2323	563.1373	616.0472	685.0961	743.7807
1705	124.9188	199.7778	256.1943	351.3755	381.7665	444.2937	506.1004	567.4219	620.6978	690.2283	749.3249
1760	126.7141	201.6988	258.3502	354.0254	384.5878	447.4794	509.6572	571.3542	624.9605	694.9265	754.3962
1815	128.4844	203.5302	260.3734	356.475	387.1878	450.4015	512.9093	574.9415	628.8433	699.1996	759.0041
1870	130.2306	205.2746	262.2672	358.7282	389.5709	453.0652	515.8625	578.19	632.3532	703.0554	763.1571
1925	131.9536	206.9342	264.0341	360.7889	391.7412	455.4749	518.5218	581.1055	635.4963	706.5005	766.8624
1980	133.6545	208.5109	265.6769	362.6603	393.702	457.6347	520.8918	583.6931	638.278	709.5411	770.1267
2035	135.334	210.0067	267.1977	364.3452	395.4567	459.5481	522.9764	585.9569	640.7031	712.1823	772.9554
2090	136.9929	211.4232	268.5987	365.8463	397.0078	461.2182	524.7789	587.9008	642.7756	714.4286	775.3533
2145	138.632	212.7621	269.8816	367.1658	398.3577	462.6475	526.3024	589.528	644.4989	716.2836	777.3244
2200	140.2519	214.0247	271.0483	368.3057	399.5086	463.8384	527.5491	590.841	645.8758	717.7504	778.872
2255	141.8533	215.2125	272.1002	369.2676	400.462	464.7927	528.5211	591.842	646.9085	718.8313	779.9985
2310	143.4368	216.3267	273.0385	370.053	401.2195	465.5118	529.2199	592.5324	647.5987	719.5282	780.7059
2365	145.003	217.3684	273.8646	370.6629	401.7821	465.9967	529.6466	592.9135	647.9474	719.842	780.9952
2420	146.5525	218.3386	274.5793	371.0982	402.1506	466.2484	529.8018	592.9858	647.9552	719.7734	780.8668
2475	148.0858	219.2383	275.1836	371.3595	402.3256	466.267	529.6857	592.7495	647.6221	719.3222	780.3207
2530	149.6034	220.0683	275.6782	371.4473	402.3074	466.0527	529.2982	592.204	646.9476	718.4877	779.3559
2585	151.1057	220.8295	276.0636	371.3615	402.0958	465.6051	528.6386	591.3487	645.9306	717.2685	777.9708
2640	152.5933	221.5225	276.3404	371.1022	401.6907	464.9235	527.7061	590.1821	644.5696	715.6627	776.1633
2695	154.0664	222.148	276.5088	370.6689	401.0913	464.007	526.499	588.7024	642.8622	713.6677	773.9303
2750	155.5257	222.7066	276.5691	370.061	400.2969	462.854	525.0156	586.9072	640.8057	711.2802	771.2681
2805	156.9713	223.1987	276.5214	369.2776	399.3063	461.463	523.2534	584.7937	638.3969	708.4962	768.1723
2860	158.4038	223.6249	276.3654	368.3177	398.1179	459.8316	521.2097	582.3583	635.6315	705.311	764.6377
2915	159.8234	223.9854	276.1012	367.1799	396.7301	457.9573	518.881	579.597	632.5051	701.7193	760.658
2970	161.2306	224.2806	275.7284	365.8624	395.1408	455.8372	516.2637	576.5052	629.0122	697.7146	756.2264
3025	162.6255	224.5107	275.2465	364.3634	393.3474	453.4677	513.3531	573.0774	625.1466	693.2898	751.3347
3080	164.0086	224.676	274.6549	362.6806	391.3472	450.8449	510.1444	569.3076	620.9015	688.4369	745.9739
3135	165.3801	224.7766	273.953	360.8114	389.137	447.9645	506.6319	565.1889	616.2688	683.1468	740.1339
3190	166.7404	224.8125	273.1399	358.7529	386.7132	444.8214	502.8091	560.7138	611.24	677.409	733.8032
3245	168.0896	224.7839	272.2146	356.5019	384.0718	441.4099	498.669	555.8735	605.805	671.2123	726.9689
3300	169.4281	224.6906	271.1759	354.0546	381.2081	437.7238	494.2035	550.6584	599.9528	664.5437	719.6168
3355	170.7561	224.5327	270.0226	351.4069	378.1173	433.7561	489.4039	545.0577	593.6712	657.389	711.7308
3410	172.0739	224.3099	268.7532	348.5544	374.7936	429.4991	484.26	539.0596	586.9462	649.7319	703.2929
3465	173.3816	224.0221	267.366	345.4919	371.2308	424.9439	478.761	532.6504	579.7626	641.5546	694.283
3520	174.6795	223.669	265.8591	342.2137	367.4219	420.0809	472.8942	525.8153	572.1029	632.8369	684.6785
3575	175.9679	223.2503	264.2306	338.7137	363.3593	414.8993	466.646	518.5373	563.9479	623.5561	674.454
3630	177.2469	222.7657	262.4781	334.9848	359.0342	409.387	460.0006	510.7976	555.2756	613.6867	663.5809

Slope profile 6

Slope surface		Indurated andesite		Altered andesite		Block and ash flow		Matahina Ignimbrite	
x	y	x	y	x	y	x	y	x	y
0	86.61	550	70.49	1815	760	0	86.61	0	70
55	86.78	605	79.87	1870	751.44	55	86.78	2585	70
110	85.97	660	87.71	1925	740	110	85.97		
165	90.91	715	94.75	1980	740	165	90.91		
220	100.21	770	115.69	2035	740	220	100.21		
275	100	825	128.8	2090	760	275	100		
330	100	880	146.39			330	100		
385	103.68	935	150			385	103.68		
440	102.67	990	183.59			440	102.67		
495	103.35	1025	222.67			495	103.35		
550	120.49	1045	272.67			550	120.49		
605	129.87	1100	314.59			605	129.87		
660	137.71	1155	354.11			660	137.71		
715	144.75	1210	388.44			715	144.75		
770	165.69	1265	416.86			770	165.69		
825	178.8	1320	452.24			825	178.8		
880	196.39	1375	488.57			880	196.39		
935	200	1430	524.03			935	200		
990	233.59	1485	575.88			990	233.59		
1045	272.67	1540	614.7			1045	272.67		
1100	314.59	1595	638.9						
1155	354.11	1650	687.51						
1210	388.44	1705	721.75						
1265	416.86	1760	746.33						
1320	452.24	1815	760						
1375	488.57	2090	760						
1430	524.03	2145	760						
1485	575.88	2200	721.29						
1540	614.7	2255	688.74						
1595	638.9	2310	656.37						
1650	687.51	2365	614.08						
1705	721.75	2420	577.25						
1760	746.33	2475	564.7						
1815	760	2530	554.06						
1870	751.44	2585	540.38						
1925	740								
1980	740								
2035	740								
2090	760								
2145	760								
2200	721.29								
2255	688.74								
2310	656.37								
2365	614.08								
2420	577.25								
2475	564.7								
2530	554.06								
2585	540.38								

Fmin	
x	y
200	96.83
312.57	92.85
425.21	93.1
537.77	97.59
650.07	106.29
761.97	119.2
873.31	136.31
983.92	157.58
1093.66	182.99
1202.37	212.5
1309.89	246.07
1416.08	283.66
1520.78	325.2
1623.85	370.65
1725.14	419.93
1824.5	472.98
1921.81	529.73
2016.92	590.08
2109.69	653.97
2200	721.29

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
110	83.0376	92.02305	104.4626	118.9758	135.3427	152.8111	170.7608	189.5659	208.416	227.8316	247.1907
165	83.27095	96.24998	113.51	132.996	154.4457	176.9449	199.7814	223.494	247.107	271.3081	295.3467
220	83.50366	100.2009	121.6816	145.3611	171.0162	197.6412	224.472	252.1921	279.6958	307.8088	335.6761
275	83.73572	103.9072	129.1436	156.4642	185.7332	215.891	246.139	277.289	308.1247	339.5906	370.7421
330	83.96714	107.3943	136.0129	166.5577	199.0083	232.2716	265.5238	299.6906	333.4594	367.8786	401.9245
385	84.19792	110.6829	142.3753	175.8157	211.1138	247.1549	283.0955	319.9637	356.3604	393.4271	430.0689
440	84.42807	113.7902	148.2961	184.364	222.2408	260.7974	299.1737	338.4909	377.2711	416.7403	455.7386
495	84.6576	116.7306	153.8263	192.2974	232.5299	273.385	313.988	355.5452	396.5066	438.1751	479.3313
550	84.8865	119.5166	159.0067	199.6891	242.0878	285.0574	327.7098	371.3297	414.3003	457.9953	501.1404
605	85.11479	122.1586	163.8703	206.5972	250.9982	295.9229	340.4713	386	430.8308	476.4025	521.3898
660	85.34247	124.6659	168.4448	213.0689	259.3279	306.0675	352.3767	399.679	446.2385	493.5548	540.2549
715	85.56954	127.0464	172.7529	219.1427	267.131	315.5608	363.5102	412.4653	460.6362	509.5789	557.8761
770	85.79601	129.307	176.8143	224.851	274.4526	324.4598	373.9408	424.4396	474.1159	524.5783	574.368
825	86.02189	131.4541	180.6455	230.2209	281.3303	332.8123	383.7258	435.6688	486.7537	538.6385	589.8252
880	86.24717	133.493	184.2609	235.2755	287.7958	340.6584	392.9134	446.2091	498.6139	551.8313	604.3272
935	86.47187	135.4286	187.673	240.0349	293.8764	348.0325	401.5447	456.1084	509.7505	564.2176	617.9412
990	86.69598	137.2654	190.8927	244.5162	299.5955	354.9639	409.6547	465.4076	520.2101	575.8495	630.7248
1045	86.91952	139.0072	193.9296	248.7346	304.9735	361.4782	417.274	474.1419	530.0329	586.7717	642.7275
1100	87.14249	140.6576	196.7921	252.703	310.0281	367.5974	424.4288	482.342	539.2535	597.0233	653.9922
1155	87.36488	142.2197	199.4877	256.4332	314.7749	373.341	431.1424	490.0348	547.9024	606.6382	664.5566
1210	87.58671	143.6965	202.0231	259.9354	319.2276	378.7261	437.4351	497.2438	556.0062	615.6464	674.4534
1265	87.80798	145.0905	204.4043	263.2188	323.3983	383.7678	443.3247	503.9898	563.5886	624.0739	683.7118
1320	88.02869	146.4041	206.6366	266.2913	327.2979	388.4794	448.8272	510.2911	570.6702	631.9442	692.3573
1375	88.24885	147.6394	208.7248	269.1602	330.936	392.8729	453.9566	516.1641	577.2695	639.2777	700.4126
1430	88.46847	148.7984	210.6732	271.8321	334.321	396.9588	458.7255	521.6231	583.4028	646.0928	707.8979
1485	88.68754	149.8829	212.4856	274.3125	337.4606	400.7465	463.1449	526.6811	589.0848	652.4056	714.8311
1540	88.90607	150.8945	214.1654	276.6067	340.3615	404.2443	467.2249	531.3495	594.3284	658.2307	721.228
1595	89.12406	151.8345	215.7158	278.7193	343.0299	407.4599	470.9741	535.6385	599.145	663.5809	727.1029
1650	89.34152	152.7045	217.1396	280.6544	345.4711	410.3997	474.4006	539.5571	603.5449	668.4676	732.4684
1705	89.55846	153.5054	218.4392	282.4156	347.69	413.0697	477.5111	543.1134	607.5371	672.9008	737.3354
1760	89.77486	154.2385	219.6168	284.0062	349.6906	415.4751	480.3119	546.3145	611.1297	676.8896	741.7139
1815	89.99075	154.9047	220.6743	285.429	351.4768	417.6204	482.8083	549.1665	614.3297	680.4417	745.6125
1870	90.20613	155.5048	221.6136	286.6865	353.0519	419.5096	485.0051	551.6749	617.1431	683.5639	749.0385
1925	90.42099	156.0396	222.436	287.7809	354.4185	421.1463	486.9063	553.8443	619.5752	686.262	751.9986
1980	90.63534	156.5098	223.143	288.714	355.5793	422.5333	488.5153	555.6787	621.6305	688.5412	754.4982
2035	90.84918	156.9159	223.7355	289.4874	356.536	423.673	489.835	557.1814	623.3127	690.4055	756.5419
2090	91.06252	157.2585	224.2145	290.1024	357.2904	424.5675	490.8678	558.3551	624.6249	691.8582	758.1332
2145	91.27537	157.5379	224.5807	290.5599	357.8439	425.2183	491.6154	559.2018	625.5694	692.902	759.2752
2200	91.48772	157.7546	224.8346	290.8608	358.1972	425.6266	492.0793	559.7231	626.1477	693.5388	759.9697
2255	91.69957	157.9087	224.9767	291.0055	358.3509	425.793	492.2601	559.9199	626.3611	693.7695	760.2181
2310	91.91094	158.0004	225.0072	290.9942	358.3055	425.7178	492.1581	559.7925	626.2097	693.5947	760.0208
2365	92.12182	158.0299	224.926	290.8269	358.0607	425.4008	491.7733	559.3406	625.6934	693.014	759.3774
2420	92.33223	157.9971	224.7331	290.5034	357.6162	424.8417	491.1049	558.5636	624.8113	692.0265	758.2868
2475	92.54215	157.9021	224.4282	290.0231	356.9711	424.0393	490.1518	557.4599	623.5617	690.6303	756.747
2530	92.7516	157.7448	224.0109	289.3853	356.1246	422.9923	488.9123	556.0278	621.9426	688.823	754.7554
2585	92.96057	157.5248	223.4804	288.5889	355.0749	421.6988	487.3843	554.2645	619.9509	686.6013	752.3082
2640	93.16908	157.2421	222.8361	287.6325	353.8205	420.1567	485.5649	552.1671	617.5831	683.9612	749.4011
2695	93.37712	156.8962	222.0768	286.5147	352.3591	418.3632	483.451	549.7316	614.8348	680.8978	746.0287

Slope profile 6a

Slope surface		Indurated andesite		Altered andesite		Matahina Ignimbrite	
x	y	x	y	x	y	x	y
110	213.82	110	213.82	1595	740	110	70
165	251.53	165	251.53	1650	740	2585	70
220	275.89	220	275.89	1705	740		
275	302.47	275	302.47	1760	746.29		
330	325.12	330	325.12	1815	760		
385	343.59	385	343.59	1870	755.69		
440	357.03	440	357.03	1925	728.42		
495	366.75	495	366.75				
550	380	550	380				
605	394.2	605	394.2				
660	400	660	400				
715	409.82	715	409.82				
770	432.08	770	432.08				
825	447.63	825	447.63				
880	453.41	880	453.41				
935	484.02	935	484.02				
990	515.36	990	515.36				
1045	540.08	1045	540.08				
1100	546.18	1100	546.18				
1155	565.73	1155	565.73				
1210	568.8	1210	568.8				
1265	604.03	1265	604.03				
1320	639.65	1320	639.65				
1375	678.99	1375	678.99				
1430	707.55	1430	707.55				
1485	747.04	1485	747.04				
1540	760	1540	760				
1595	740	1595	740				
1650	740	1925	728.42				
1705	740	1980	700.07				
1760	746.29	2035	659.97				
1815	760	2090	624.17				
1870	755.69	2145	592.76				
1925	728.42	2200	541.38				
1980	700.07	2255	502.28				
2035	659.97	2310	465.93				
2090	624.17	2365	428.69				
2145	592.76	2420	397.39				
2200	541.38	2475	368.13				
2255	502.28	2530	329.93				
2310	465.93	2585	288.36				
2365	428.69						
2420	397.39						
2475	368.13						
2530	329.93						
2585	288.36						

Fmin	
x	y
150	241.25
234.14	246.06
318.11	253.34
401.82	263.08
485.22	275.26
568.22	289.89
650.75	306.94
732.75	326.41
814.15	348.27
894.87	372.5
974.84	399.09
1054	428.02
1132.28	459.25
1209.61	492.77
1285.93	528.53
1361.16	566.52
1435.25	606.69
1508.12	649.02
1579.73	693.47
1650	740

Watertable											
x	y										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1265	95.43261	149.8279	207.7938	265.8595	325.5512	385.5838	444.8977	505.374	564.8267	625.1923	684.7328
1320	95.22905	150.8432	209.8052	268.7575	329.3075	390.174	450.2948	511.5824	571.8251	632.9873	693.3096
1375	95.02507	151.787	211.6789	271.4574	332.807	394.4503	455.3224	517.3657	578.3441	640.2483	701.2986
1430	94.82064	152.6606	213.4185	273.9652	336.0577	398.4226	459.9928	522.7379	584.3998	646.9932	708.7198
1485	94.61577	153.4651	215.0274	276.2861	339.0668	402.1	464.3166	527.7117	590.0064	653.2379	715.5908
1540	94.41046	154.2018	216.5084	278.4247	341.8406	405.4905	468.3035	532.2982	595.1766	658.9968	721.9272
1595	94.2047	154.8714	217.8641	280.3853	344.3849	408.6012	471.9619	536.5072	599.9218	664.2824	727.7432
1650	93.99849	155.475	219.0968	282.1714	346.7047	411.4386	475.2996	540.3478	604.2518	669.1059	733.051
1705	93.79182	156.0132	220.2087	283.7865	348.8044	414.0082	478.3232	543.8276	608.1756	673.4773	737.8616
1760	93.5847	156.4867	221.2015	285.2334	350.688	416.3149	481.0386	546.9535	611.701	677.4054	742.1847
1815	93.37712	156.8962	222.0768	286.5147	352.3591	418.3632	483.451	549.7316	614.8348	680.8978	746.0287
1870	93.16908	157.2421	222.8361	287.6325	353.8205	420.1567	485.5649	552.1671	617.5831	683.9612	749.4011
1925	92.96057	157.5248	223.4804	288.5889	355.0749	421.6988	487.3843	554.2645	619.9509	686.6013	752.3082
1980	92.7516	157.7448	224.0109	289.3853	356.1246	422.9923	488.9123	556.0278	621.9426	688.823	754.7554
2035	92.54215	157.9021	224.4282	290.0231	356.9711	424.0393	490.1518	557.4599	623.5617	690.6303	756.747
2090	92.33223	157.9971	224.7331	290.5034	357.6162	424.8417	491.1049	558.5636	624.8113	692.0265	758.2868
2145	92.12182	158.0299	224.926	290.8269	358.0607	425.4008	491.7733	559.3406	625.6934	693.014	759.3774
2200	91.91094	158.0004	225.0072	290.9942	358.3055	425.7178	492.1581	559.7925	626.2097	693.5947	760.0208
2255	91.69957	157.9087	224.9767	291.0055	358.3509	425.793	492.2601	559.9199	626.3611	693.7695	760.2181
2310	91.48772	157.7546	224.8346	290.8608	358.1972	425.6266	492.0793	559.7231	626.1477	693.5388	759.9697
2365	91.27537	157.5379	224.5807	290.5599	357.8439	425.2183	491.6154	559.2018	625.5694	692.902	759.2752
2420	91.06252	157.2585	224.2145	290.1024	357.2904	424.5675	490.8678	558.3551	624.6249	691.8582	758.1332
2475	90.84918	156.9159	223.7355	289.4874	356.536	423.673	489.835	557.1814	623.3127	690.4055	756.5419
2530	90.63534	156.5098	223.143	288.714	355.5793	422.5333	488.5153	555.6787	621.6305	688.5412	754.4982
2585	90.42099	156.0396	222.436	287.7809	354.4185	421.1463	486.9063	553.8443	619.5752	686.262	751.9986
2640	90.20613	155.5048	221.6136	286.6865	353.0519	419.5096	485.0051	551.6749	617.1431	683.5639	749.0385
2695	89.99075	154.9047	220.6743	285.429	351.4768	417.6204	482.8083	549.1665	614.3297	680.4417	745.6125
2750	89.77486	154.2385	219.6168	284.0062	349.6906	415.4751	480.3119	546.3145	611.1297	676.8896	741.7139
2805	89.55846	153.5054	218.4392	282.4156	347.69	413.0697	477.5111	543.1134	607.5371	672.9008	737.3354
2860	89.34152	152.7045	217.1396	280.6544	345.4711	410.3997	474.4006	539.5571	603.5449	668.4676	732.4684
2915	89.12406	151.8345	215.7158	278.7193	343.0299	407.4599	470.9741	535.6385	599.145	663.5809	727.1029
2970	88.90607	150.8945	214.1654	276.6067	340.3615	404.2443	467.2249	531.3495	594.3284	658.2307	721.228
3025	88.68754	149.8829	212.4856	274.3125	337.4606	400.7465	463.1449	526.6811	589.0848	652.4056	714.8311
3080	88.46847	148.7984	210.6732	271.8321	334.321	396.9588	458.7255	521.6231	583.4028	646.0928	707.8979
3135	88.24885	147.6394	208.7248	269.1602	330.936	392.8729	453.9566	516.1641	577.2695	639.2777	700.4126
3190	88.02869	146.4041	206.6366	266.2913	327.2979	388.4794	448.8272	510.2911	570.6702	631.9442	692.3573
3245	87.80798	145.0905	204.4043	263.2188	323.3983	383.7678	443.3247	503.9898	563.5886	624.0739	683.7118
3300	87.58671	143.6965	202.0231	259.9354	319.2276	378.7261	437.4351	497.2438	556.0062	615.6464	674.4534
3355	87.36488	142.2197	199.4877	256.4332	314.7749	373.341	431.1424	490.0348	547.9024	606.6382	664.5566
3410	87.14249	140.6576	196.7921	252.703	310.0281	367.5974	424.4288	482.342	539.2535	597.0233	653.9922
3465	86.91952	139.0072	193.9296	248.7346	304.9735	361.4782	417.274	474.1419	530.0329	586.7717	642.7275
3520	86.69598	137.2654	190.8927	244.5162	299.5955	354.9639	409.6547	465.4076	520.2101	575.8495	630.7248
3575	86.47187	135.4286	187.673	240.0349	293.8764	348.0325	401.5447	456.1084	509.7505	564.2176	617.9412
3630	86.24717	133.493	184.2609	235.2755	287.7958	340.6584	392.9134	446.2091	498.6139	551.8313	604.3272
3685	86.02189	131.4541	180.6455	230.2209	281.3303	332.8123	383.7258	435.6688	486.7537	538.6385	589.8252
3740	85.79601	129.307	176.8143	224.851	274.4526	324.4598	373.9408	424.4396	474.1159	524.5783	574.368

APPENDIX R: COMBINATIONS OF EARTHQUAKE FORCE, WATERTABLE ELEVATION AND D, AND RESULTING F VALUES

Slope profile 4

WT	F	D	G
0	1.5	0	0
0	1.34	0	0.05
0	1.21	0	0.1
0	1.09	0	0.15
0	1	0	0.2
0	0.83	0	0.3
0	0.7	0	0.4
0	1.46	0.1	0
0	1.3	0.1	0.05
0	1.17	0.1	0.1
0	1.06	0.1	0.15
0	0.97	0.1	0.2
0	0.81	0.1	0.3
0	0.68	0.1	0.4
0	1.41	0.2	0
0	1.26	0.2	0.05
0	1.14	0.2	0.1
0	1.03	0.2	0.15
0	0.94	0.2	0.2
0	0.78	0.2	0.3
0	0.66	0.2	0.4
0	1.36	0.3	0
0	1.22	0.3	0.05
0	1.1	0.3	0.1
0	0.99	0.3	0.15
0	0.9	0.3	0.2
0	0.75	0.3	0.3
0	0.64	0.3	0.4
0	1.3	0.4	0
0	1.17	0.4	0.05
0	1.05	0.4	0.1
0	0.95	0.4	0.15
0	0.86	0.4	0.2
0	0.72	0.4	0.3
0	0.61	0.4	0.4
0	1.24	0.5	0
0	1.11	0.5	0.05
0	1	0.5	0.1
0	0.91	0.5	0.15
0	0.82	0.5	0.2
0	0.69	0.5	0.3
0	0.58	0.5	0.4
0	1.18	0.6	0
0	1.05	0.6	0.05
0	0.95	0.6	0.1
0	0.86	0.6	0.15
0	0.78	0.6	0.2
0	0.65	0.6	0.3
0	0.55	0.6	0.4
0	1.1	0.7	0
0	0.99	0.7	0.05
0	0.89	0.7	0.1
0	0.8	0.7	0.15
0	0.73	0.7	0.2
0	0.61	0.7	0.3
0	0.51	0.7	0.4
0	1.02	0.8	0
0	0.91	0.8	0.05
0	0.82	0.8	0.1
0	0.74	0.8	0.15
0	0.68	0.8	0.2
0	0.57	0.8	0.3
0	0.48	0.8	0.4
0	0.93	0.9	0
0	0.83	0.9	0.05
0	0.75	0.9	0.1
0	0.68	0.9	0.15
0	0.62	0.9	0.2
0	0.52	0.9	0.3
0	0.43	0.9	0.4
0	0.83	1	0
0	0.74	1	0.05
0	0.67	1	0.1
0	0.6	1	0.15
0	0.55	1	0.2
0	0.46	1	0.3
0	0.39	1	0.4

WT	F	D	G
10	1.49	0	0
10	1.33	0	0.05
10	1.2	0	0.1
10	1.08	0	0.15
10	0.98	0	0.2
10	0.82	0	0.3
10	0.69	0	0.4
10	1.44	0.1	0
10	1.29	0.1	0.05
10	1.16	0.1	0.1
10	1.05	0.1	0.15
10	0.95	0.1	0.2
10	0.79	0.1	0.3
10	0.67	0.1	0.4
10	1.4	0.2	0
10	1.25	0.2	0.05
10	1.12	0.2	0.1
10	1.02	0.2	0.15
10	0.92	0.2	0.2
10	0.77	0.2	0.3
10	0.65	0.2	0.4
10	1.35	0.3	0
10	1.2	0.3	0.05
10	1.08	0.3	0.1
10	0.98	0.3	0.15
10	0.89	0.3	0.2
10	0.74	0.3	0.3
10	0.63	0.3	0.4
10	1.29	0.4	0
10	1.15	0.4	0.05
10	1.04	0.4	0.1
10	0.94	0.4	0.15
10	0.85	0.4	0.2
10	0.71	0.4	0.3
10	0.6	0.4	0.4
10	1.23	0.5	0
10	1.1	0.5	0.05
10	0.99	0.5	0.1
10	0.9	0.5	0.15
10	0.81	0.5	0.2
10	0.68	0.5	0.3
10	0.57	0.5	0.4
10	1.16	0.6	0
10	1.04	0.6	0.05
10	0.94	0.6	0.1
10	0.85	0.6	0.15
10	0.77	0.6	0.2
10	0.64	0.6	0.3
10	0.54	0.6	0.4
10	1.09	0.7	0
10	0.97	0.7	0.05
10	0.88	0.7	0.1
10	0.79	0.7	0.15
10	0.72	0.7	0.2
10	0.6	0.7	0.3
10	0.51	0.7	0.4
10	1.01	0.8	0
10	0.9	0.8	0.05
10	0.81	0.8	0.1
10	0.74	0.8	0.15
10	0.67	0.8	0.2
10	0.56	0.8	0.3
10	0.47	0.8	0.4
10	0.92	0.9	0
10	0.82	0.9	0.05
10	0.74	0.9	0.1
10	0.67	0.9	0.15
10	0.61	0.9	0.2
10	0.51	0.9	0.3
10	0.43	0.9	0.4
10	0.82	1	0
10	0.73	1	0.05
10	0.66	1	0.1
10	0.6	1	0.15
10	0.54	1	0.2
10	0.45	1	0.3
10	0.38	1	0.4

WT	F	D	G
20	1.4	0	0
20	1.25	0	0.05
20	1.12	0	0.1
20	1.01	0	0.15
20	0.92	0	0.2
20	0.76	0	0.3
20	0.64	0	0.4
20	1.36	0.1	0
20	1.21	0.1	0.05
20	1.09	0.1	0.1
20	0.98	0.1	0.15
20	0.89	0.1	0.2
20	0.74	0.1	0.3
20	0.62	0.1	0.4
20	1.32	0.2	0
20	1.17	0.2	0.05
20	1.05	0.2	0.1
20	0.95	0.2	0.15
20	0.86	0.2	0.2
20	0.71	0.2	0.3
20	0.6	0.2	0.4
20	1.27	0.3	0
20	1.13	0.3	0.05
20	1.02	0.3	0.1
20	0.92	0.3	0.15
20	0.83	0.3	0.2
20	0.69	0.3	0.3
20	0.58	0.3	0.4
20	1.22	0.4	0
20	1.08	0.4	0.05
20	0.97	0.4	0.1
20	0.88	0.4	0.15
20	0.8	0.4	0.2
20	0.66	0.4	0.3
20	0.55	0.4	0.4
20	1.16	0.5	0
20	1.03	0.5	0.05
20	0.93	0.5	0.1
20	0.84	0.5	0.15
20	0.76	0.5	0.2
20	0.63	0.5	0.3
20	0.53	0.5	0.4
20	1.1	0.6	0
20	0.98	0.6	0.05
20	0.88	0.6	0.1
20	0.79	0.6	0.15
20	0.72	0.6	0.2
20	0.59	0.6	0.3
20	0.5	0.6	0.4
20	1.03	0.7	0
20	0.92	0.7	0.05
20	0.82	0.7	0.1
20	0.74	0.7	0.15
20	0.67	0.7	0.2
20	0.56	0.7	0.3
20	0.47	0.7	0.4
20	0.95	0.8	0
20	0.85	0.8	0.05
20	0.76	0.8	0.1
20	0.69	0.8	0.15
20	0.62	0.8	0.2
20	0.52	0.8	0.3
20	0.43	0.8	0.4
20	0.87	0.9	0
20	0.77	0.9	0.05
20	0.69	0.9	0.1
20	0.63	0.9	0.15
20	0.57	0.9	0.2
20	0.47	0.9	0.3
20	0.39	0.9	0.4
20	0.77	1	0
20	0.69	1	0.05
20	0.62	1	0.1
20	0.56	1	0.15
20	0.51	1	0.2
20	0.42	1	0.3
20	0.35	1	0.4

WT	F	D	G
30	1.31	0	0
30	1.17	0	0.05
30	1.05	0	0.1
30	0.94	0	0.15
30	0.85	0	0.2
30	0.7	0	0.3
30	0.58	0	0.4
30	1.27	0.1	0
30	1.13	0.1	0.05
30	1.01	0.1	0.1
30	0.91	0.1	0.15
30	0.82	0.1	0.2
30	0.68	0.1	0.3
30	0.57	0.1	0.4
30	1.23	0.2	0
30	1.1	0.2	0.05
30	0.98	0.2	0.1
30	0.88	0.2	0.15
30	0.8	0.2	0.2
30	0.66	0.2	0.3
30	0.55	0.2	0.4
30	1.19	0.3	0
30	1.06	0.3	0.05
30	0.95	0.3	0.1
30	0.85	0.3	0.15
30	0.77	0.3	0.2
30	0.63	0.3	0.3
30	0.53	0.3	0.4
30	1.14	0.4	0
30	1.01	0.4	0.05
30	0.91	0.4	0.1
30	0.82	0.4	0.15
30	0.74	0.4	0.2
30	0.61	0.4	0.3
30	0.51	0.4	0.4
30	1.08	0.5	0
30	0.97	0.5	0.05
30	0.86	0.5	0.1
30	0.78	0.5	0.15
30	0.7	0.5	0.2
30	0.58	0.5	0.3
30	0.48	0.5	0.4
30	1.02	0.6	0
30	0.91	0.6	0.05
30	0.82	0.6	0.1
30	0.73	0.6	0.15
30	0.66	0.6	0.2
30	0.55	0.6	0.3
30	0.46	0.6	0.4
30	0.96	0.7	0
30	0.85	0.7	0.05
30	0.76	0.7	0.1
30	0.69	0.7	0.15
30	0.62	0.7	0.2
30	0.51	0.7	0.3
30	0.43	0.7	0.4
30	0.89	0.8	0
30	0.79	0.8	0.05
30	0.71	0.8	0.1
30	0.64	0.8	0.15
30	0.58	0.8	0.2
30	0.47	0.8	0.3
30	0.39	0.8	0.4
30	0.81	0.9	0
30	0.72	0.9	0.05
30	0.64	0.9	0.1
30	0.58	0.9	0.15
30	0.52	0.9	0.2
30	0.43	0.9	0.3
30	0.36	0.9	0.4
30	0.72	1	0
30	0.64	1	0.05
30	0.57	1	0.1
30	0.51	1	0.15
30	0.47	1	0.2
30	0.38	1	0.3
30	0.32	1	0.4

WT	F	D	G
40	1.2	0	0
40	1.06	0	0.05
40	0.95	0	0.1
40	0.85	0	0.15
40	0.77	0	0.2
40	0.62	0	0.3
40	0.51	0	0.4
40	1.16	0.1	0
40	1.03	0.1	0.05
40	0.92	0.1	0.1
40	0.82	0.1	0.15
40	0.74	0.1	0.2
40	0.61	0.1	0.3
40	0.5	0.1	0.4
40	1.12	0.2	0
40	1	0.2	0.05
40	0.89	0.2	0.1
40	0.8	0.2	0.15
40	0.72	0.2	0.2
40	0.59	0.2	0.3
40	0.48	0.2	0.4
40	1.08	0.3	0
40	0.96	0.3	0.05
40	0.86	0.3	0.1
40	0.77	0.3	0.15
40	0.69	0.3	0.2
40	0.57	0.3	0.3
40	0.47	0.3	0.4
40	1.04	0.4	0
40	0.92	0.4	0.05
40	0.82	0.4	0.1
40	0.74	0.4	0.15
40	0.66	0.4	0.2
40	0.54	0.4	0.3
40	0.45	0.4	0.4
40	0.99	0.5	0
40	0.88	0.5	0.05
40	0.78	0.5	0.1
40	0.7	0.5	0.15
40	0.63	0.5	0.2
40	0.52	0.5	0.3
40	0.42	0.5	0.4
40	0.93	0.6	0
40	0.83	0.6	0.05
40	0.74	0.6	0.1
40	0.66	0.6	0.15
40	0.6	0.6	0.2
40	0.49	0.6	0.3
40	0.4	0.6	0.4
40	0.87	0.7	0
40	0.78	0.7	0.05
40	0.69	0.7	0.1
40	0.62	0.7	0.15
40	0.56	0.7	0.2
40	0.46	0.7	0.3
40	0.38	0.7	0.4
40	0.81	0.8	0
40	0.72	0.8	0.05
40	0.64	0.8	0.1
40	0.57	0.8	0.15
40	0.52	0.8	0.2
40	0.42	0.8	0.3
40	0.35	0.8	0.4
40	0.74	0.9	0
40	0.65	0.9	0.05
40	0.58	0.9	0.1
40	0.52	0.9	0.15
40	0.47	0.9	0.2
40	0.38	0.9	0.3
40	0.32	0.9	0.4
40	0.65	1	0
40	0.58	1	0.05
40	0.52	1	0.1
40	0.46	1	0.15
40	0.42	1	0.2
40	0.34	1	0.3
40	0.28	1	0.4

WT	F	D	G
50	1.06	0	0
50	0.94	0	0.05
50	0.83	0	0.1
50	0.74	0	0.15
50	0.67	0	0.2
50	0.54	0	0.3
50	0.44	0	0.4
50	1.03	0.1	0
50	0.91	0.1	0.05
50	0.81	0.1	0.1
50	0.72	0.1	0.15
50	0.65	0.1	0.2
50	0.52	0.1	0.3
50	0.42	0.1	0.4
50	1	0.2	0
50	0.88	0.2	0.05
50	0.78	0.2	0.1
50	0.7	0.2	0.15
50	0.62	0.2	0.2
50	0.5	0.2	0.3
50	0.41	0.2	0.4
50	0.96	0.3	0
50	0.85	0.3	0.05
50	0.76	0.3	0.1
50	0.67	0.3	0.15
50	0.6	0.3	0.2
50	0.49	0.3	0.3
50	0.4	0.3	0.4
50	0.92	0.4	0
50	0.81	0.4	0.05
50	0.72	0.4	0.1
50	0.64	0.4	0.15
50	0.58	0.4	0.2
50	0.47	0.4	0.3
50	0.38	0.4	0.4
50	0.88	0.5	0
50	0.78	0.5	0.05
50	0.69	0.5	0.1
50	0.61	0.5	0.15
50	0.55	0.5	0.2
50	0.44	0.5	0.3
50	0.36	0.5	0.4
50	0.83	0.6	0
50	0.73	0.6	0.05
50	0.65	0.6	0.1
50	0.58	0.6	0.15
50	0.52	0.6	0.2
50	0.42	0.6	0.3
50	0.34	0.6	0.4
50	0.78	0.7	0
50	0.69	0.7	0.05
50	0.61	0.7	0.1
50	0.54	0.7	0.15
50	0.49	0.7	0.2
50	0.39	0.7	0.3
50	0.32	0.7	0.4
50	0.72	0.8	0
50	0.64	0.8	0.05
50	0.56	0.8	0.1
50	0.5	0.8	0.15
50	0.45	0.8	0.2
50	0.36	0.8	0.3
50	0.3	0.8	0.4
50	0.65	0.9	0
50	0.58	0.9	0.05
50	0.51	0.9	0.1
50	0.46	0.9	0.15
50	0.41	0.9	0.2
50	0.33	0.9	0.3
50	0.27	0.9	0.4
50	0.58	1	0
50	0.51	1	0.05
50	0.46	1	0.1
50	0.41	1	0.15
50	0.36	1	0.2
50	0.29	1	0.3
50	0.24	1	0.4

WT = watertable elevation

F = factor of safety

D = disturbance factor

G = earthquake force

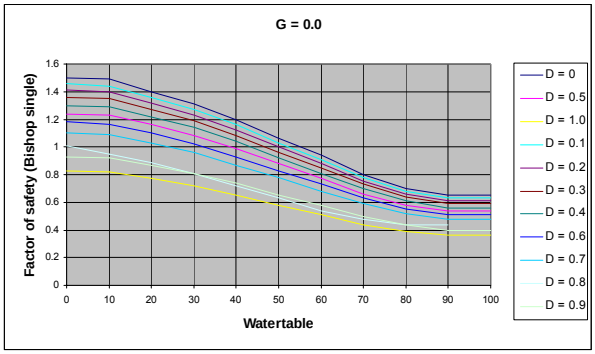
WT	F	D	G
60	0.94	0	0
60	0.82	0	0.05
60	0.73	0	0.1
60	0.64	0	0.15
60	0.57	0	0.2
60	0.46	0	0.3
60	0.36	0	0.4
60	0.91	0.1	0
60	0.8	0.1	0.05
60	0.7	0.1	0.1
60	0.62	0.1	0.15
60	0.56	0.1	0.2
60	0.44	0.1	0.3
60	0.35	0.1	0.4
60	0.88	0.2	0
60	0.77	0.2	0.05
60	0.68	0.2	0.1
60	0.6	0.2	0.15
60	0.54	0.2	0.2
60	0.43	0.2	0.3
60	0.34	0.2	0.4
60	0.85	0.3	0
60	0.74	0.3	0.05
60	0.66	0.3	0.1
60	0.58	0.3	0.15
60	0.52	0.3	0.2
60	0.41	0.3	0.3
60	0.33	0.3	0.4
60	0.81	0.4	0
60	0.71	0.4	0.05
60	0.63	0.4	0.1
60	0.56	0.4	0.15
60	0.5	0.4	0.2
60	0.4	0.4	0.3
60	0.32	0.4	0.4
60	0.77	0.5	0
60	0.68	0.5	0.05
60	0.6	0.5	0.1
60	0.53	0.5	0.15
60	0.47	0.5	0.2
60	0.38	0.5	0.3
60	0.3	0.5	0.4
60	0.73	0.6	0
60	0.64	0.6	0.05
60	0.57	0.6	0.1
60	0.5	0.6	0.15
60	0.45	0.6	0.2
60	0.36	0.6	0.3
60	0.29	0.6	0.4
60	0.68	0.7	0
60	0.6	0.7	0.05
60	0.53	0.7	0.1
60	0.47	0.7	0.15
60	0.42	0.7	0.2
60	0.33	0.7	0.3
60	0.27	0.7	0.4
60	0.63	0.8	0
60	0.56	0.8	0.05
60	0.49	0.8	0.1
60	0.44	0.8	0.15
60	0.39	0.8	0.2
60	0.31	0.8	0.3
60	0.25	0.8	0.4
60	0.58	0.9	0
60	0.51	0.9	0.05
60	0.45	0.9	0.1
60	0.4	0.9	0.15
60	0.35	0.9	0.2
60	0.28	0.9	0.3
60	0.23	0.9	0.4
60	0.51	1	0
60	0.45	1	0.05
60	0.4	1	0.1
60	0.35	1	0.15
60	0.31	1	0.2
60	0.25	1	0.3
60	0.2	1	0.4

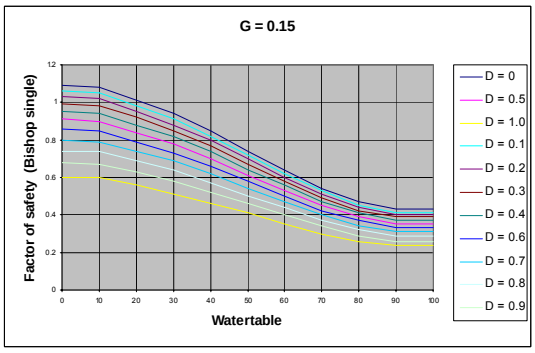
WT	F	D	G
70	0.8	0	0
70	0.7	0	0.05
70	0.62	0	0.1
70	0.54	0	0.15
70	0.48	0	0.2
70	0.38	0	0.3
70	0.3	0	0.4
70	0.78	0.1	0
70	0.68	0.1	0.05
70	0.6	0.1	0.1
70	0.53	0.1	0.15
70	0.46	0.1	0.2
70	0.37	0.1	0.3
70	0.29	0.1	0.4
70	0.75	0.2	0
70	0.66	0.2	0.05
70	0.58	0.2	0.1
70	0.51	0.2	0.15
70	0.45	0.2	0.2
70	0.35	0.2	0.3
70	0.28	0.2	0.4
70	0.73	0.3	0
70	0.64	0.3	0.05
70	0.56	0.3	0.1
70	0.49	0.3	0.15
70	0.43	0.3	0.2
70	0.34	0.3	0.3
70	0.27	0.3	0.4
70	0.7	0.4	0
70	0.61	0.4	0.05
70	0.53	0.4	0.1
70	0.47	0.4	0.15
70	0.42	0.4	0.2
70	0.33	0.4	0.3
70	0.26	0.4	0.4
70	0.66	0.5	0
70	0.58	0.5	0.05
70	0.51	0.5	0.1
70	0.45	0.5	0.15
70	0.4	0.5	0.2
70	0.31	0.5	0.3
70	0.24	0.5	0.4
70	0.63	0.6	0
70	0.55	0.6	0.05
70	0.48	0.6	0.1
70	0.42	0.6	0.15
70	0.37	0.6	0.2
70	0.29	0.6	0.3
70	0.23	0.6	0.4
70	0.59	0.7	0
70	0.51	0.7	0.05
70	0.45	0.7	0.1
70	0.4	0.7	0.15
70	0.35	0.7	0.2
70	0.28	0.7	0.3
70	0.22	0.7	0.4
70	0.54	0.8	0
70	0.48	0.8	0.05
70	0.42	0.8	0.1
70	0.37	0.8	0.15
70	0.32	0.8	0.2
70	0.26	0.8	0.3
70	0.2	0.8	0.4
70	0.5	0.9	0
70	0.43	0.9	0.05
70	0.38	0.9	0.1
70	0.34	0.9	0.15
70	0.3	0.9	0.2
70	0.23	0.9	0.3
70	0.18	0.9	0.4
70	0.44	1	0
70	0.39	1	0.05
70	0.34	1	0.1
70	0.3	1	0.15
70	0.26	1	0.2
70	0.21	1	0.3
70	0.16	1	0.4

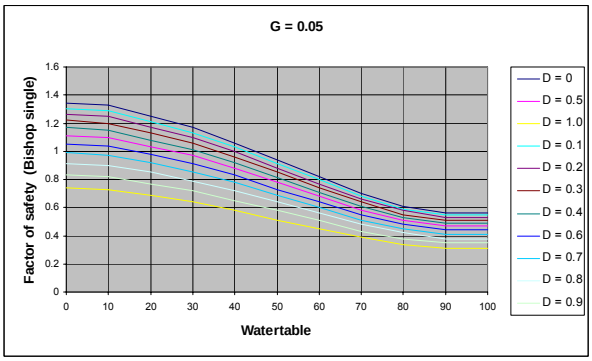
WT	F	D	G
80	0.7	0	0
80	0.61	0	0.05
80	0.54	0	0.1
80	0.47	0	0.15
80	0.41	0	0.2
80	0.32	0	0.3
80	0.24	0	0.4
80	0.68	0.1	0
80	0.59	0.1	0.05
80	0.52	0.1	0.1
80	0.45	0.1	0.15
80	0.4	0.1	0.2
80	0.31	0.1	0.3
80	0.24	0.1	0.4
80	0.66	0.2	0
80	0.58	0.2	0.05
80	0.5	0.2	0.1
80	0.44	0.2	0.15
80	0.39	0.2	0.2
80	0.3	0.2	0.3
80	0.23	0.2	0.4
80	0.64	0.3	0
80	0.55	0.3	0.05
80	0.48	0.3	0.1
80	0.42	0.3	0.15
80	0.37	0.3	0.2
80	0.29	0.3	0.3
80	0.22	0.3	0.4
80	0.61	0.4	0
80	0.53	0.4	0.05
80	0.46	0.4	0.1
80	0.41	0.4	0.15
80	0.36	0.4	0.2
80	0.28	0.4	0.3
80	0.21	0.4	0.4
80	0.58	0.5	0
80	0.51	0.5	0.05
80	0.44	0.5	0.1
80	0.39	0.5	0.15
80	0.34	0.5	0.2
80	0.26	0.5	0.3
80	0.2	0.5	0.4
80	0.55	0.6	0
80	0.48	0.6	0.05
80	0.42	0.6	0.1
80	0.37	0.6	0.15
80	0.32	0.6	0.2
80	0.25	0.6	0.3
80	0.19	0.6	0.4
80	0.52	0.7	0
80	0.45	0.7	0.05
80	0.39	0.7	0.1
80	0.34	0.7	0.15
80	0.3	0.7	0.2
80	0.23	0.7	0.3
80	0.18	0.7	0.4
80	0.48	0.8	0
80	0.42	0.8	0.05
80	0.36	0.8	0.1
80	0.32	0.8	0.15
80	0.28	0.8	0.2
80	0.22	0.8	0.3
80	0.17	0.8	0.4
80	0.44	0.9	0
80	0.38	0.9	0.05
80	0.33	0.9	0.1
80	0.29	0.9	0.15
80	0.25	0.9	0.2
80	0.2	0.9	0.3
80	0.15	0.9	0.4
80	0.39	1	0
80	0.34	1	0.05
80	0.29	1	0.1
80	0.26	1	0.15
80	0.23	1	0.2
80	0.18	1	0.3
80	0.13	1	0.4

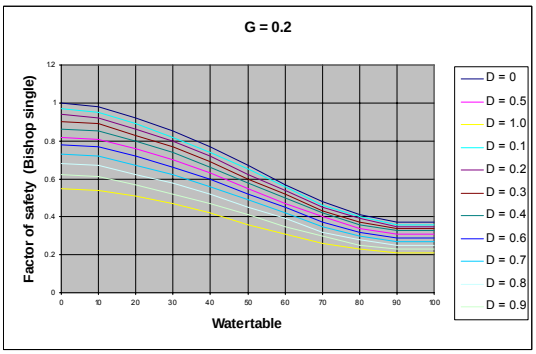
WT	F	D	G
90	0.65	0	0
90	0.56	0	0.05
90	0.49	0	0.1
90	0.43	0	0.15
90	0.37	0	0.2
90	0.29	0	0.3
90	0.22	0	0.4
90	0.63	0.1	0
90	0.55	0.1	0.05
90	0.47	0.1	0.1
90	0.41	0.1	0.15
90	0.36	0.1	0.2
90	0.28	0.1	0.3
90	0.21	0.1	0.4
90	0.61	0.2	0
90	0.53	0.2	0.05
90	0.46	0.2	0.1
90	0.4	0.2	0.15
90	0.35	0.2	0.2
90	0.27	0.2	0.3
90	0.2	0.2	0.4
90	0.59	0.3	0
90	0.51	0.3	0.05
90	0.44	0.3	0.1
90	0.39	0.3	0.15
90	0.34	0.3	0.2
90	0.26	0.3	0.3
90	0.2	0.3	0.4
90	0.56	0.4	0
90	0.49	0.4	0.05
90	0.43	0.4	0.1
90	0.37	0.4	0.15
90	0.33	0.4	0.2
90	0.25	0.4	0.3
90	0.19	0.4	0.4
90	0.54	0.5	0
90	0.47	0.5	0.05
90	0.41	0.5	0.1
90	0.35	0.5	0.15
90	0.31	0.5	0.2
90	0.24	0.5	0.3
90	0.18	0.5	0.4
90	0.51	0.6	0
90	0.44	0.6	0.05
90	0.38	0.6	0.1
90	0.33	0.6	0.15
90	0.29	0.6	0.2
90	0.22	0.6	0.3
90	0.17	0.6	0.4
90	0.48	0.7	0
90	0.41	0.7	0.05
90	0.36	0.7	0.1
90	0.31	0.7	0.15
90	0.27	0.7	0.2
90	0.21	0.7	0.3
90	0.16	0.7	0.4
90	0.44	0.8	0
90	0.38	0.8	0.05
90	0.33	0.8	0.1
90	0.29	0.8	0.15
90	0.25	0.8	0.2
90	0.19	0.8	0.3
90	0.15	0.8	0.4
90	0.4	0.9	0
90	0.35	0.9	0.05
90	0.3	0.9	0.1
90	0.26	0.9	0.15
90	0.23	0.9	0.2
90	0.18	0.9	0.3
90	0.14	0.9	0.4
90	0.36	1	0
90	0.31	1	0.05
90	0.27	1	0.1
90	0.24	1	0.15
90	0.21	1	0.2
90	0.16	1	0.3
90	0.12	1	0.4

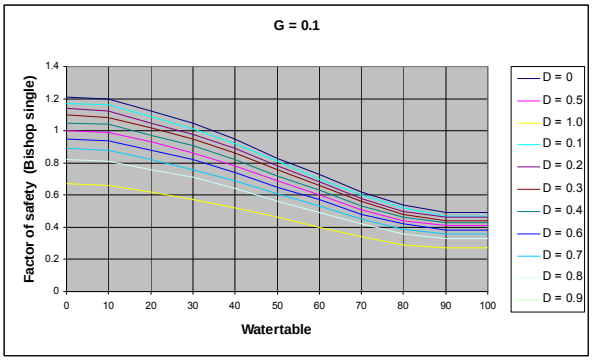
WT	F	D	G
100	0.65	0	0
100	0.56	0	0.05
100	0.49	0	0.1
100	0.43	0	0.15
100	0.37	0	0.2
100	0.29	0	0.3
100	0.22	0	0.4
100	0.63	0.1	0
100	0.55	0.1	0.05
100	0.47	0.1	0.1
100	0.41	0.1	0.15
100	0.36	0.1	0.2
100	0.28	0.1	0.3
100	0.21	0.1	0.4
100	0.61	0.2	0
100	0.53	0.2	0.05
100	0.46	0.2	0.1
100	0.4	0.2	0.15
100	0.35	0.2	0.2
100	0.27	0.2	0.3
100	0.2	0.2	0.4
100	0.59	0.3	0
100	0.51	0.3	0.05
100	0.44	0.3	0.1
100	0.39	0.3	0.15
100	0.34	0.3	0.2
100	0.26	0.3	0.3
100	0.2	0.3	0.4
100	0.56	0.4	0
100	0.49	0.4	0.05
100	0.43	0.4	0.1
100	0.37	0.4	0.15
100	0.33	0.4	0.2
100	0.25	0.4	0.3
100	0.19	0.4	0.4
100	0.54	0.5	0
100	0.47	0.5	0.05
100	0.41	0.5	0.1
100	0.35	0.5	0.15
100	0.31	0.5	0.2
100	0.24	0.5	0.3
100	0.18	0.5	0.4
100	0.51	0.6	0
100	0.44	0.6	0.05
100	0.38	0.6	0.1
100	0.33	0.6	0.15
100	0.29	0.6	0.2
100	0.22	0.6	0.3
100	0.17	0.6	0.4
100	0.48	0.7	0
100	0.41	0.7	0.05
100	0.36	0.7	0.1
100	0.31	0.7	0.15
100	0.27	0.7	0.2
100	0.21	0.7	0.3
100	0.16	0.7	0.4
100	0.44	0.8	0
100	0.38	0.8	0.05
100	0.33	0.8	0.1
100	0.29	0.8	0.15
100	0.25	0.8	0.2
100	0.19	0.8	0.3
100	0.15	0.8	0.4
100	0.4	0.9	0
100	0.35	0.9	0.05
100	0.3	0.9	0.1
100	0.26	0.9	0.15
100	0.23	0.9	0.2
100	0.18	0.9	0.3
100	0.14	0.9	0.4
100	0.36	1	0
100	0.31	1	0.05
100	0.27	1	0.1
100	0.24	1	0.15
100	0.21	1	0.2
100	0.16	1	0.3
100	0.12	1	0.4

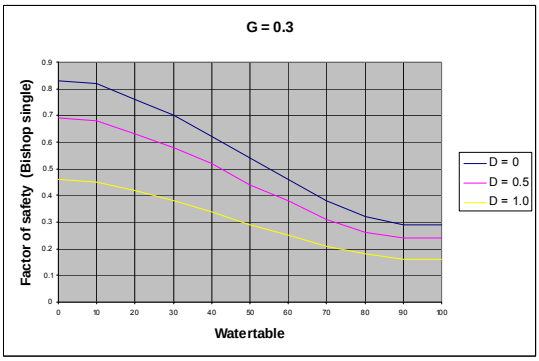

G = 0.0
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9

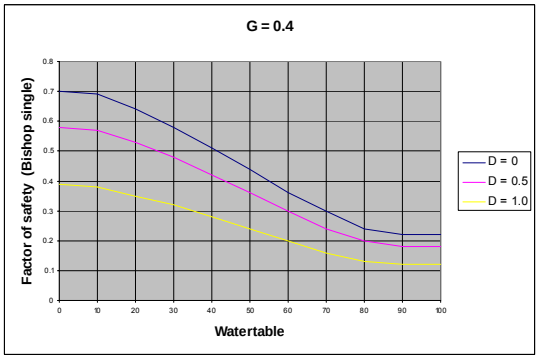

G = 0.15
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.05
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.2
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.1
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.3
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0


G = 0.4
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0

Slope profile 4a

Analysis	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G
1	0	1.8	0	0	10	1.8	0	0	20	1.76	0	0	30	1.7	0	0	40	1.6	0	0	50	1.47	0	0
2	0	1.59	0	0.05	10	1.59	0	0.05	20	1.55	0	0.05	30	1.5	0	0.05	40	1.41	0	0.05	50	1.29	0	0.05
3	0	1.42	0	0.1	10	1.41	0	0.1	20	1.39	0	0.1	30	1.33	0	0.1	40	1.25	0	0.1	50	1.14	0	0.1
4	0	1.27	0	0.15	10	1.27	0	0.15	20	1.24	0	0.15	30	1.19	0	0.15	40	1.12	0	0.15	50	1.02	0	0.15
5	0	1.15	0	0.2	10	1.15	0	0.2	20	1.12	0	0.2	30	1.08	0	0.2	40	1.01	0	0.2	50	0.92	0	0.2
6	0	0.95	0	0.3	10	0.95	0	0.3	20	0.93	0	0.3	30	0.89	0	0.3	40	0.83	0	0.3	50	0.75	0	0.3
7	0	0.8	0	0.4	10	0.8	0	0.4	20	0.78	0	0.4	30	0.75	0	0.4	40	0.69	0	0.4	50	0.62	0	0.4
8	0	1.75	0.1	0	10	1.74	0.1	0	20	1.71	0.1	0	30	1.64	0.1	0	40	1.55	0.1	0	50	1.42	0.1	0
9	0	1.54	0.1	0.05	10	1.54	0.1	0.05	20	1.51	0.1	0.05	30	1.45	0.1	0.05	40	1.37	0.1	0.05	50	1.25	0.1	0.05
10	0	1.37	0.1	0.1	10	1.37	0.1	0.1	20	1.34	0.1	0.1	30	1.29	0.1	0.1	40	1.21	0.1	0.1	50	1.11	0.1	0.1
11	0	1.23	0.1	0.15	10	1.23	0.1	0.15	20	1.21	0.1	0.15	30	1.16	0.1	0.15	40	1.09	0.1	0.15	50	0.99	0.1	0.15
12	0	1.12	0.1	0.2	10	1.11	0.1	0.2	20	1.09	0.1	0.2	30	1.04	0.1	0.2	40	0.98	0.1	0.2	50	0.89	0.1	0.2
13	0	0.93	0.1	0.3	10	0.92	0.1	0.3	20	0.9	0.1	0.3	30	0.86	0.1	0.3	40	0.8	0.1	0.3	50	0.73	0.1	0.3
14	0	0.78	0.1	0.4	10	0.78	0.1	0.4	20	0.76	0.1	0.4	30	0.72	0.1	0.4	40	0.67	0.1	0.4	50	0.6	0.1	0.4
15	0	1.69	0.2	0	10	1.69	0.2	0	20	1.66	0.2	0	30	1.59	0.2	0	40	1.5	0.2	0	50	1.38	0.2	0
16	0	1.5	0.2	0.05	10	1.49	0.2	0.05	20	1.46	0.2	0.05	30	1.4	0.2	0.05	40	1.32	0.2	0.05	50	1.21	0.2	0.05
17	0	1.33	0.2	0.1	10	1.33	0.2	0.1	20	1.3	0.2	0.1	30	1.25	0.2	0.1	40	1.18	0.2	0.1	50	1.07	0.2	0.1
18	0	1.2	0.2	0.15	10	1.2	0.2	0.15	20	1.17	0.2	0.15	30	1.12	0.2	0.15	40	1.05	0.2	0.15	50	0.96	0.2	0.15
19	0	1.08	0.2	0.2	10	1.08	0.2	0.2	20	1.06	0.2	0.2	30	1.01	0.2	0.2	40	0.95	0.2	0.2	50	0.86	0.2	0.2
20	0	0.9	0.2	0.3	10	0.9	0.2	0.3	20	0.88	0.2	0.3	30	0.84	0.2	0.3	40	0.78	0.2	0.3	50	0.7	0.2	0.3
21	0	0.76	0.2	0.4	10	0.76	0.2	0.4	20	0.74	0.2	0.4	30	0.7	0.2	0.4	40	0.65	0.2	0.4	50	0.58	0.2	0.4
22	0	1.64	0.3	0	10	1.63	0.3	0	20	1.6	0.3	0	30	1.54	0.3	0	40	1.45	0.3	0	50	1.33	0.3	0
23	0	1.44	0.3	0.05	10	1.44	0.3	0.05	20	1.41	0.3	0.05	30	1.35	0.3	0.05	40	1.28	0.3	0.05	50	1.17	0.3	0.05
24	0	1.29	0.3	0.1	10	1.29	0.3	0.1	20	1.26	0.3	0.1	30	1.21	0.3	0.1	40	1.13	0.3	0.1	50	1.04	0.3	0.1
25	0	1.16	0.3	0.15	10	1.15	0.3	0.15	20	1.13	0.3	0.15	30	1.08	0.3	0.15	40	1.01	0.3	0.15	50	0.92	0.3	0.15
26	0	1.05	0.3	0.2	10	1.04	0.3	0.2	20	1.02	0.3	0.2	30	0.98	0.3	0.2	40	0.91	0.3	0.2	50	0.83	0.3	0.2
27	0	0.87	0.3	0.3	10	0.87	0.3	0.3	20	0.85	0.3	0.3	30	0.81	0.3	0.3	40	0.75	0.3	0.3	50	0.68	0.3	0.3
28	0	0.73	0.3	0.4	10	0.73	0.3	0.4	20	0.71	0.3	0.4	30	0.68	0.3	0.4	40	0.63	0.3	0.4	50	0.56	0.3	0.4
29	0	1.57	0.4	0	10	1.57	0.4	0	20	1.53	0.4	0	30	1.47	0.4	0	40	1.39	0.4	0	50	1.28	0.4	0
30	0	1.39	0.4	0.05	10	1.38	0.4	0.05	20	1.35	0.4	0.05	30	1.3	0.4	0.05	40	1.22	0.4	0.05	50	1.12	0.4	0.05
31	0	1.24	0.4	0.1	10	1.23	0.4	0.1	20	1.21	0.4	0.1	30	1.16	0.4	0.1	40	1.09	0.4	0.1	50	0.99	0.4	0.1
32	0	1.11	0.4	0.15	10	1.11	0.4	0.15	20	1.08	0.4	0.15	30	1.04	0.4	0.15	40	0.97	0.4	0.15	50	0.89	0.4	0.15
33	0	1	0.4	0.2	10	1	0.4	0.2	20	0.98	0.4	0.2	30	0.93	0.4	0.2	40	0.88	0.4	0.2	50	0.8	0.4	0.2
34	0	0.83	0.4	0.3	10	0.83	0.4	0.3	20	0.81	0.4	0.3	30	0.77	0.4	0.3	40	0.72	0.4	0.3	50	0.65	0.4	0.3
35	0	0.7	0.4	0.4	10	0.7	0.4	0.4	20	0.68	0.4	0.4	30	0.65	0.4	0.4	40	0.6	0.4	0.4	50	0.54	0.4	0.4
36	0	1.5	0.5	0	10	1.5	0.5	0	20	1.46	0.5	0	30	1.4	0.5	0	40	1.32	0.5	0	50	1.22	0.5	0
37	0	1.33	0.5	0.05	10	1.32	0.5	0.05	20	1.29	0.5	0.05	30	1.24	0.5	0.05	40	1.17	0.5	0.05	50	1.07	0.5	0.05
38	0	1.18	0.5	0.1	10	1.18	0.5	0.1	20	1.15	0.5	0.1	30	1.1	0.5	0.1	40	1.04	0.5	0.1	50	0.95	0.5	0.1
39	0	1.06	0.5	0.15	10	1.06	0.5	0.15	20	1.03	0.5	0.15	30	0.99	0.5	0.15	40	0.93	0.5	0.15	50	0.85	0.5	0.15
40	0	0.96	0.5	0.2	10	0.96	0.5	0.2	20	0.93	0.5	0.2	30	0.89	0.5	0.2	40	0.84	0.5	0.2	50	0.76	0.5	0.2
41	0	0.8	0.5	0.3	10	0.8	0.5	0.3	20	0.77	0.5	0.3	30	0.74	0.5	0.3	40	0.69	0.5	0.3	50	0.62	0.5	0.3
42	0	0.67	0.5	0.4	10	0.67	0.5	0.4	20	0.65	0.5	0.4	30	0.62	0.5	0.4	40	0.57	0.5	0.4	50	0.51	0.5	0.4
43	0	1.42	0.6	0	10	1.42	0.6	0	20	1.39	0.6	0	30	1.33	0.6	0	40	1.25	0.6	0	50	1.15	0.6	0
44	0	1.26	0.6	0.05	10	1.25	0.6	0.05	20	1.22	0.6	0.05	30	1.17	0.6	0.05	40	1.1	0.6	0.05	50	1.01	0.6	0.05
45	0	1.12	0.6	0.1	10	1.12	0.6	0.1	20	1.09	0.6	0.1	30	1.04	0.6	0.1	40	0.98	0.6	0.1	50	0.9	0.6	0.1
46	0	1.01	0.6	0.15	10	1	0.6	0.15	20	0.98	0.6	0.15	30	0.93	0.6	0.15	40	0.88	0.6	0.15	50	0.8	0.6	0.15
47	0	0.91	0.6	0.2	10	0.91	0.6	0.2	20	0.88	0.6	0.2	30	0.84	0.6	0.2	40	0.79	0.6	0.2	50	0.72	0.6	0.2
48	0	0.76	0.6	0.3	10	0.75	0.6	0.3	20	0.73	0.6	0.3	30	0.7	0.6	0.3	40	0.65	0.6	0.3	50	0.59	0.6	0.3
49	0	0.64	0.6	0.4	10	0.64	0.6	0.4	20	0.62	0.6	0.4	30	0.58	0.6	0.4	40	0.54	0.6	0.4	50	0.49	0.6	0.4
50	0	1.34	0.7	0	10	1.33	0.7	0	20	1.3	0.7	0	30	1.24	0.7	0	40	1.17	0.7	0	50	1.08	0.7	0
51	0	1.18	0.7	0.05	10	1.18	0.7	0.05	20	1.15	0.7	0.05	30	1.1	0.7	0.05	40	1.03	0.7	0.05	50	0.95	0.7	0.05
52	0	1.05	0.7	0.1	10	1.05	0.7	0.1	20	1.02	0.7	0.1	30	0.98	0.7	0.1	40	0.92	0.7	0.1	50	0.84	0.7	0.1
53	0	0.95	0.7	0.15	10	0.94	0.7	0.15	20	0.92	0.7	0.15	30	0.88	0.7	0.15	40	0.82	0.7	0.15	50	0.75	0.7	0.15
54	0	0.86	0.7	0.2	10	0.85	0.7	0.2	20	0.83	0.7	0.2	30	0.79	0.7	0.2	40	0.74	0.7	0.2	50	0.67	0.7	0.2
55	0	0.71	0.7	0.3	10	0.71	0.7	0.3	20	0.69	0.7	0.3	30	0.65	0.7	0.3	40	0.61	0.7	0.3	50	0.55	0.7	0.3
56	0	0.6	0.7	0.4	10	0.6	0.7	0.4	20	0.58	0.7	0.4	30	0.55	0.7	0.4	40	0.51	0.7	0.4	50	0.46	0.7	0.4
57	0	1.24	0.8	0	10	1.24	0.8	0	20	1.21	0.8	0	30	1.15	0.8	0	40	1.09	0.8	0	50	1	0.8	0
58	0	1.1	0.8	0.05	10	1.1	0.8	0.05	20	1.07	0.8	0.05	30	1.02	0.8	0.05	40	0.96	0.8	0.05	50	0.88	0.8	0.05
59	0	0.98	0.8	0.1	10	0.98	0.8	0.1	20	0.95	0.8	0.1	30	0.9	0.8	0.1	40	0.85	0.8	0.1	50	0.78	0.8	0.1
60	0	0.88	0.8	0.15	10	0.88	0.8	0.15	20	0.85	0.8	0.15	30	0.81	0.8	0.15	40	0.76	0.8	0.15	50	0.69	0.8	0.15
61	0	0.8	0.8	0.2	10	0.8	0.8	0.2	20	0.77	0.8	0.2	30	0.73	0.8	0.2	40	0.69	0.8	0.2	50	0.62	0.8	0.2
62	0	0.66	0.8	0.3	10	0.66	0.8	0.3	20	0.64	0.8	0.3	30	0.61	0.8	0.3	40	0.56	0.8	0.3	50	0.51	0.8	0.3
63	0	0.56	0.8	0.4	10	0.56	0.8	0.4	20	0.54	0.8	0.4	30	0.51	0.8	0.4	40	0.47	0.8	0.4	50	0.42	0.8	0.4
64	0	1.14	0.9	0	10	1.14	0.9	0	20	1.11	0.9	0	30	1.05	0.9	0	40	0.99	0.9	0	50	0.91	0.9	0
65	0	1.01	0.9	0.05	10	1.01	0.9	0.05	20	0.98	0.9	0.05	30	0.93	0.9	0.05	40	0.87	0.9	0.05	50	0.8	0.9	0.05
66	0	0.9	0.9	0.1	10	0.9	0.9	0.1	20	0.87	0.9	0.1	30	0.83	0.9	0.1	40	0.78	0.9	0.1	50	0.71	0.9	0.1
67	0	0.81	0.9	0.15	10	0.81	0.9	0.15	20	0.78	0.9	0.15	30	0.74	0.9	0.15	40	0.7	0.9	0.15	50	0.63	0.9	0.15
68	0	0.73	0.9	0.2	10	0.73	0.9	0.2	20	0.71	0.9	0.2	30	0.67	0.9	0.2	40	0.63	0.9	0.2	50	0.57	0.9	0.2
69	0	0.61	0.9	0.3	10	0.61	0.9	0.3	20	0.59	0.9	0.3	30	0.55	0.9	0.3	40	0.52	0.9	0.3	50	0.47	0.9	0.3
70	0	0.51	0.9	0.4	10	0.51	0.9	0.4	20	0.49	0.9	0.4	30	0.46	0.9	0.4	40	0.43	0.9	0.4	50	0.39	0.9	0.4
71	0	1.02	1	0	10	1.02	1	0	20	0.99	1	0	30	0.94	1	0	40	0.88	1	0	50	0.81	1	0
72	0	0.9	1	0.05	10	0.9	1	0.05	20	0.87	1	0.05	30	0.83	1	0.05	40	0.78	1	0.05	50	0.71	1	0.05
73	0	0.81	1	0.1	10	0.8	1	0.1	20	0.78	1	0.1	30	0.74	1	0.1	40	0.69	1	0.1	50	0.63	1	0.1
74	0	0.72	1	0.15	10	0.72	1	0.15	20	0.7	1	0.15	30	0.66	1	0.15	40	0.62	1	0.15	50	0.56	1	0.15
75	0	0.66	1	0.2	10	0.65	1	0.2	20	0.63	1	0.2	30	0.59	1	0.2	40	0.56	1	0.2	50	0.51	1	0.2
76	0	0.54	1	0.3	10	0.54	1	0.3	20	0.52	1	0.3	30	0.49	1	0.3	40	0.46	1	0.3	50	0.42	1	0.3
77	0	0.46	1	0.4	10	0.46	1	0.4	20	0.44	1	0.4	30	0.41	1	0.4	40	0.38	1	0.4	50	0.34	1	0.4

WT = watertable elevation

F = factor of safety

D = disturbance factor

G = earthquake force

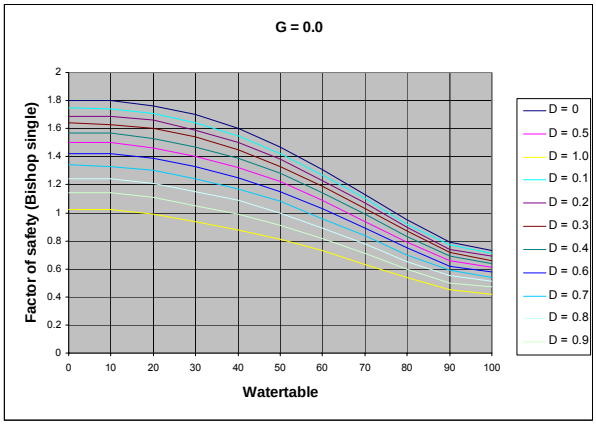
WT	F	D	G
60	1.31	0	0
60	1.15	0	0.05
60	1.01	0	0.1
60	0.9	0	0.15
60	0.81	0	0.2
60	0.65	0	0.3
60	0.54	0	0.4
60	1.27	0.1	0
60	1.11	0.1	0.05
60	0.98	0.1	0.1
60	0.87	0.1	0.15
60	0.78	0.1	0.2
60	0.63	0.1	0.3
60	0.52	0.1	0.4
60	1.23	0.2	0
60	1.08	0.2	0.05
60	0.95	0.2	0.1
60	0.85	0.2	0.15
60	0.76	0.2	0.2
60	0.61	0.2	0.3
60	0.5	0.2	0.4
60	1.19	0.3	0
60	1.04	0.3	0.05
60	0.92	0.3	0.1
60	0.82	0.3	0.15
60	0.73	0.3	0.2
60	0.59	0.3	0.3
60	0.49	0.3	0.4
60	1.14	0.4	0
60	1	0.4	0.05
60	0.88	0.4	0.1
60	0.78	0.4	0.15
60	0.7	0.4	0.2
60	0.57	0.4	0.3
60	0.47	0.4	0.4
60	1.09	0.5	0
60	0.95	0.5	0.05
60	0.84	0.5	0.1
60	0.75	0.5	0.15
60	0.67	0.5	0.2
60	0.54	0.5	0.3
60	0.45	0.5	0.4
60	1.03	0.6	0
60	0.9	0.6	0.05
60	0.8	0.6	0.1
60	0.71	0.6	0.15
60	0.63	0.6	0.2
60	0.51	0.6	0.3
60	0.42	0.6	0.4
60	0.96	0.7	0
60	0.84	0.7	0.05
60	0.75	0.7	0.1
60	0.66	0.7	0.15
60	0.59	0.7	0.2
60	0.48	0.7	0.3
60	0.4	0.7	0.4
60	0.89	0.8	0
60	0.78	0.8	0.05
60	0.69	0.8	0.1
60	0.62	0.8	0.15
60	0.55	0.8	0.2
60	0.45	0.8	0.3
60	0.37	0.8	0.4
60	0.82	0.9	0
60	0.72	0.9	0.05
60	0.63	0.9	0.1
60	0.56	0.9	0.15
60	0.5	0.9	0.2
60	0.41	0.9	0.3
60	0.33	0.9	0.4
60	0.73	1	0
60	0.64	1	0.05
60	0.56	1	0.1
60	0.5	1	0.15
60	0.45	1	0.2
60	0.36	1	0.3
60	0.3	1	0.4

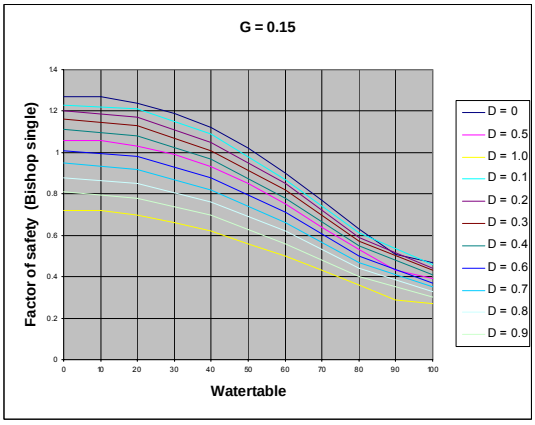
WT	F	D	G
70	1.13	0	0
70	0.99	0	0.05
70	0.87	0	0.1
70	0.77	0	0.15
70	0.68	0	0.2
70	0.55	0	0.3
70	0.44	0	0.4
70	1.1	0.1	0
70	0.96	0.1	0.05
70	0.84	0.1	0.1
70	0.74	0.1	0.15
70	0.66	0.1	0.2
70	0.53	0.1	0.3
70	0.43	0.1	0.4
70	1.07	0.2	0
70	0.93	0.2	0.05
70	0.82	0.2	0.1
70	0.72	0.2	0.15
70	0.64	0.2	0.2
70	0.51	0.2	0.3
70	0.42	0.2	0.4
70	1.03	0.3	0
70	0.9	0.3	0.05
70	0.79	0.3	0.1
70	0.7	0.3	0.15
70	0.62	0.3	0.2
70	0.5	0.3	0.3
70	0.4	0.3	0.4
70	0.99	0.4	0
70	0.86	0.4	0.05
70	0.76	0.4	0.1
70	0.67	0.4	0.15
70	0.59	0.4	0.2
70	0.48	0.4	0.3
70	0.39	0.4	0.4
70	0.94	0.5	0
70	0.82	0.5	0.05
70	0.72	0.5	0.1
70	0.64	0.5	0.15
70	0.57	0.5	0.2
70	0.45	0.5	0.3
70	0.37	0.5	0.4
70	0.89	0.6	0
70	0.78	0.6	0.05
70	0.68	0.6	0.1
70	0.6	0.6	0.15
70	0.54	0.6	0.2
70	0.43	0.6	0.3
70	0.35	0.6	0.4
70	0.84	0.7	0
70	0.73	0.7	0.05
70	0.64	0.7	0.1
70	0.57	0.7	0.15
70	0.5	0.7	0.2
70	0.4	0.7	0.3
70	0.33	0.7	0.4
70	0.78	0.8	0
70	0.68	0.8	0.05
70	0.59	0.8	0.1
70	0.53	0.8	0.15
70	0.47	0.8	0.2
70	0.37	0.8	0.3
70	0.3	0.8	0.4
70	0.71	0.9	0
70	0.62	0.9	0.05
70	0.54	0.9	0.1
70	0.48	0.9	0.15
70	0.43	0.9	0.2
70	0.34	0.9	0.3
70	0.28	0.9	0.4
70	0.63	1	0
70	0.55	1	0.05
70	0.48	1	0.1
70	0.43	1	0.15
70	0.38	1	0.2
70	0.31	1	0.3
70	0.25	1	0.4

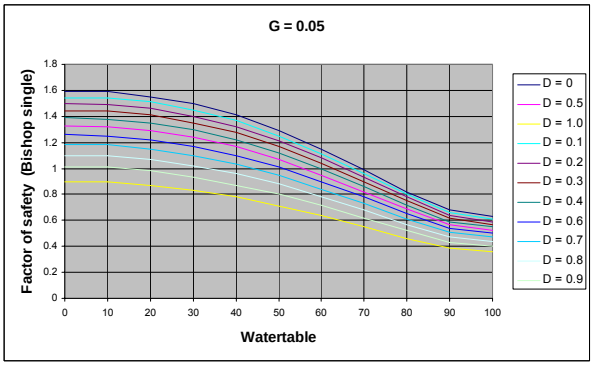
WT	F	D	G
80	0.95	0	0
80	0.82	0	0.05
80	0.72	0	0.1
80	0.63	0	0.15
80	0.56	0	0.2
80	0.44	0	0.3
80	0.35	0	0.4
80	0.92	0.1	0
80	0.8	0.1	0.05
80	0.7	0.1	0.1
80	0.61	0.1	0.15
80	0.54	0.1	0.2
80	0.43	0.1	0.3
80	0.34	0.1	0.4
80	0.9	0.2	0
80	0.78	0.2	0.05
80	0.68	0.2	0.1
80	0.59	0.2	0.15
80	0.53	0.2	0.2
80	0.41	0.2	0.3
80	0.33	0.2	0.4
80	0.87	0.3	0
80	0.75	0.3	0.05
80	0.65	0.3	0.1
80	0.57	0.3	0.15
80	0.51	0.3	0.2
80	0.4	0.3	0.3
80	0.32	0.3	0.4
80	0.83	0.4	0
80	0.72	0.4	0.05
80	0.63	0.4	0.1
80	0.55	0.4	0.15
80	0.49	0.4	0.2
80	0.38	0.4	0.3
80	0.31	0.4	0.4
80	0.79	0.5	0
80	0.69	0.5	0.05
80	0.6	0.5	0.1
80	0.53	0.5	0.15
80	0.47	0.5	0.2
80	0.37	0.5	0.3
80	0.29	0.5	0.4
80	0.75	0.6	0
80	0.65	0.6	0.05
80	0.57	0.6	0.1
80	0.5	0.6	0.15
80	0.44	0.6	0.2
80	0.35	0.6	0.3
80	0.28	0.6	0.4
80	0.7	0.7	0
80	0.61	0.7	0.05
80	0.53	0.7	0.1
80	0.47	0.7	0.15
80	0.41	0.7	0.2
80	0.33	0.7	0.3
80	0.26	0.7	0.4
80	0.65	0.8	0
80	0.57	0.8	0.05
80	0.5	0.8	0.1
80	0.44	0.8	0.15
80	0.38	0.8	0.2
80	0.3	0.8	0.3
80	0.24	0.8	0.4
80	0.6	0.9	0
80	0.52	0.9	0.05
80	0.45	0.9	0.1
80	0.4	0.9	0.15
80	0.35	0.9	0.2
80	0.28	0.9	0.3
80	0.22	0.9	0.4
80	0.54	1	0
80	0.46	1	0.05
80	0.41	1	0.1
80	0.36	1	0.15
80	0.32	1	0.2
80	0.25	1	0.3
80	0.2	1	0.4

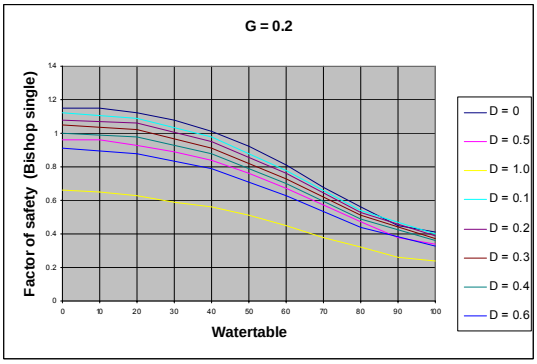
WT	F	D	G
90	0.79	0	0
90	0.68	0	0.05
90	0.59	0	0.1
90	0.51	0	0.15
90	0.45	0	0.2
90	0.35	0	0.3
90	0.27	0	0.4
90	0.77	0.1	0
90	0.66	0.1	0.05
90	0.57	0.1	0.1
90	0.5	0.1	0.15
90	0.44	0.1	0.2
90	0.34	0.1	0.3
90	0.26	0.1	0.4
90	0.74	0.2	0
90	0.64	0.2	0.05
90	0.55	0.2	0.1
90	0.48	0.2	0.15
90	0.42	0.2	0.2
90	0.33	0.2	0.3
90	0.25	0.2	0.4
90	0.72	0.3	0
90	0.62	0.3	0.05
90	0.54	0.3	0.1
90	0.47	0.3	0.15
90	0.41	0.3	0.2
90	0.32	0.3	0.3
90	0.25	0.3	0.4
90	0.69	0.4	0
90	0.59	0.4	0.05
90	0.51	0.4	0.1
90	0.45	0.4	0.15
90	0.39	0.4	0.2
90	0.3	0.4	0.3
90	0.24	0.4	0.4
90	0.66	0.5	0
90	0.57	0.5	0.05
90	0.49	0.5	0.1
90	0.43	0.5	0.15
90	0.38	0.5	0.2
90	0.29	0.5	0.3
90	0.23	0.5	0.4
90	0.62	0.6	0
90	0.54	0.6	0.05
90	0.47	0.6	0.1
90	0.41	0.6	0.15
90	0.36	0.6	0.2
90	0.27	0.6	0.3
90	0.21	0.6	0.4
90	0.59	0.7	0
90	0.51	0.7	0.05
90	0.44	0.7	0.1
90	0.38	0.7	0.15
90	0.33	0.7	0.2
90	0.26	0.7	0.3
90	0.2	0.7	0.4
90	0.55	0.8	0
90	0.47	0.8	0.05
90	0.41	0.8	0.1
90	0.36	0.8	0.15
90	0.31	0.8	0.2
90	0.24	0.8	0.3
90	0.19	0.8	0.4
90	0.5	0.9	0
90	0.43	0.9	0.05
90	0.37	0.9	0.1
90	0.33	0.9	0.15
90	0.29	0.9	0.2
90	0.22	0.9	0.3
90	0.17	0.9	0.4
90	0.45	1	0
90	0.39	1	0.05
90	0.33	1	0.1
90	0.29	1	0.15
90	0.26	1	0.2
90	0.2	1	0.3
90	0.15	1	0.4

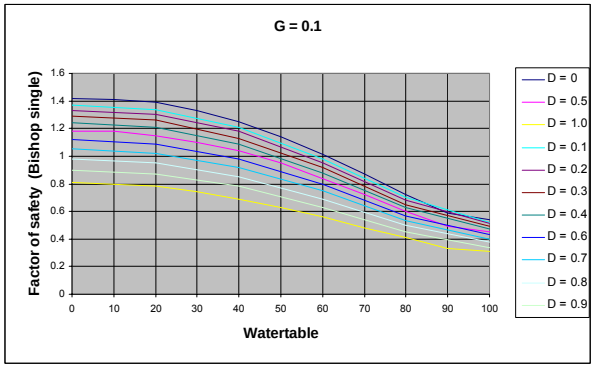
WT	F	D	G
100	0.73	0	0
100	0.63	0	0.05
100	0.54	0	0.1
100	0.47	0	0.15
100	0.41	0	0.2
100	0.31	0	0.3
100	0.24	0	0.4
100	0.71	0.1	0
100	0.61	0.1	0.05
100	0.52	0.1	0.1
100	0.46	0.1	0.15
100	0.4	0.1	0.2
100	0.3	0.1	0.3
100	0.23	0.1	0.4
100	0.69	0.2	0
100	0.59	0.2	0.05
100	0.51	0.2	0.1
100	0.44	0.2	0.15
100	0.39	0.2	0.2
100	0.29	0.2	0.3
100	0.23	0.2	0.4
100	0.66	0.3	0
100	0.57	0.3	0.05
100	0.49	0.3	0.1
100	0.43	0.3	0.15
100	0.37	0.3	0.2
100	0.28	0.3	0.3
100	0.22	0.3	0.4
100	0.64	0.4	0
100	0.55	0.4	0.05
100	0.47	0.4	0.1
100	0.41	0.4	0.15
100	0.36	0.4	0.2
100	0.27	0.4	0.3
100	0.21	0.4	0.4
100	0.61	0.5	0
100	0.52	0.5	0.05
100	0.45	0.5	0.1
100	0.39	0.5	0.15
100	0.34	0.5	0.2
100	0.26	0.5	0.3
100	0.2	0.5	0.4
100	0.58	0.6	0
100	0.5	0.6	0.05
100	0.43	0.6	0.1
100	0.37	0.6	0.15
100	0.33	0.6	0.2
100	0.25	0.6	0.3
100	0.19	0.6	0.4
100	0.54	0.7	0
100	0.47	0.7	0.05
100	0.4	0.7	0.1
100	0.35	0.7	0.15
100	0.31	0.7	0.2
100	0.23	0.7	0.3
100	0.18	0.7	0.4
100	0.51	0.8	0
100	0.44	0.8	0.05
100	0.38	0.8	0.1
100	0.33	0.8	0.15
100	0.29	0.8	0.2
100	0.22	0.8	0.3
100	0.17	0.8	0.4
100	0.47	0.9	0
100	0.4	0.9	0.05
100	0.34	0.9	0.1
100	0.3	0.9	0.15
100	0.26	0.9	0.2
100	0.2	0.9	0.3
100	0.15	0.9	0.4
100	0.42	1	0
100	0.36	1	0.05
100	0.31	1	0.1
100	0.27	1	0.15
100	0.24	1	0.2
100	0.18	1	0.3
100	0.14	1	0.4

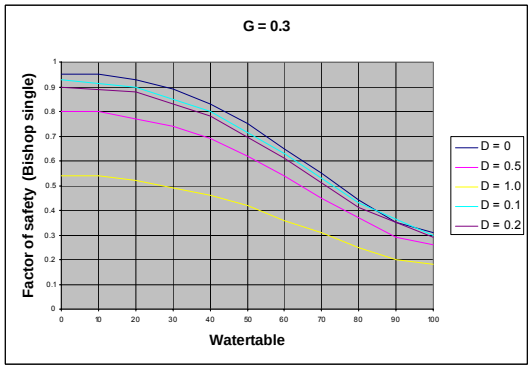

G = 0.0
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9

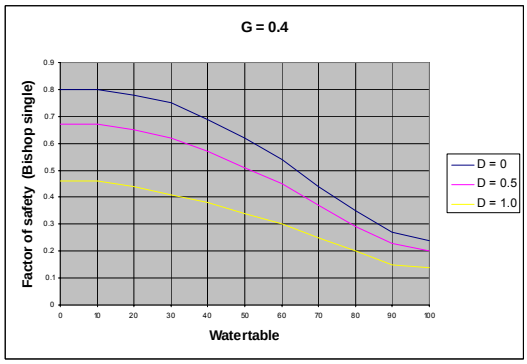

G = 0.15
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.05
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.2
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6


G = 0.1
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.3
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2


G = 0.4
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0

Slope profile 5

Analysis	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G
1	0	1.73	0	0	10	1.62	0	0	20	1.59	0	0	30	1.54	0	0	40	1.45	0	0	50	1.34	0	0
2	0	1.53	0	0.05	10	1.43	0	0.05	20	1.4	0	0.05	30	1.35	0	0.05	40	1.28	0	0.05	50	1.18	0	0.05
3	0	1.37	0	0.1	10	1.28	0	0.1	20	1.24	0	0.1	30	1.2	0	0.1	40	1.13	0	0.1	50	1.04	0	0.1
4	0	1.23	0	0.15	10	1.14	0	0.15	20	1.11	0	0.15	30	1.08	0	0.15	40	1.01	0	0.15	50	0.93	0	0.15
5	0	1.11	0	0.2	10	1.03	0	0.2	20	1	0	0.2	30	0.97	0	0.2	40	0.91	0	0.2	50	0.83	0	0.2
6	0	0.92	0	0.3	10	0.85	0	0.3	20	0.83	0	0.3	30	0.8	0	0.3	40	0.74	0	0.3	50	0.68	0	0.3
7	0	0.78	0	0.4	10	0.71	0	0.4	20	0.69	0	0.4	30	0.66	0	0.4	40	0.62	0	0.4	50	0.56	0	0.4
8	0	1.68	0.1	0	10	1.57	0.1	0	20	1.54	0.1	0	30	1.49	0.1	0	40	1.41	0.1	0	50	1.3	0.1	0
9	0	1.48	0.1	0.05	10	1.39	0.1	0.05	20	1.35	0.1	0.05	30	1.31	0.1	0.05	40	1.24	0.1	0.05	50	1.14	0.1	0.05
10	0	1.32	0.1	0.1	10	1.24	0.1	0.1	20	1.2	0.1	0.1	30	1.16	0.1	0.1	40	1.1	0.1	0.1	50	1.01	0.1	0.1
11	0	1.19	0.1	0.15	10	1.11	0.1	0.15	20	1.08	0.1	0.15	30	1.04	0.1	0.15	40	0.98	0.1	0.15	50	0.9	0.1	0.15
12	0	1.08	0.1	0.2	10	1	0.1	0.2	20	0.97	0.1	0.2	30	0.94	0.1	0.2	40	0.88	0.1	0.2	50	0.81	0.1	0.2
13	0	0.89	0.1	0.3	10	0.83	0.1	0.3	20	0.8	0.1	0.3	30	0.77	0.1	0.3	40	0.72	0.1	0.3	50	0.66	0.1	0.3
14	0	0.75	0.1	0.4	10	0.69	0.1	0.4	20	0.67	0.1	0.4	30	0.64	0.1	0.4	40	0.6	0.1	0.4	50	0.54	0.1	0.4
15	0	1.62	0.2	0	10	1.52	0.2	0	20	1.49	0.2	0	30	1.44	0.2	0	40	1.36	0.2	0	50	1.26	0.2	0
16	0	1.44	0.2	0.05	10	1.34	0.2	0.05	20	1.31	0.2	0.05	30	1.27	0.2	0.05	40	1.2	0.2	0.05	50	1.11	0.2	0.05
17	0	1.28	0.2	0.1	10	1.2	0.2	0.1	20	1.17	0.2	0.1	30	1.13	0.2	0.1	40	1.06	0.2	0.1	50	0.98	0.2	0.1
18	0	1.15	0.2	0.15	10	1.07	0.2	0.15	20	1.04	0.2	0.15	30	1.01	0.2	0.15	40	0.95	0.2	0.15	50	0.87	0.2	0.15
19	0	1.04	0.2	0.2	10	0.97	0.2	0.2	20	0.94	0.2	0.2	30	0.91	0.2	0.2	40	0.85	0.2	0.2	50	0.78	0.2	0.2
20	0	0.87	0.2	0.3	10	0.8	0.2	0.3	20	0.78	0.2	0.3	30	0.75	0.2	0.3	40	0.7	0.2	0.3	50	0.64	0.2	0.3
21	0	0.73	0.2	0.4	10	0.67	0.2	0.4	20	0.65	0.2	0.4	30	0.62	0.2	0.4	40	0.58	0.2	0.4	50	0.52	0.2	0.4
22	0	1.56	0.3	0	10	1.47	0.3	0	20	1.43	0.3	0	30	1.39	0.3	0	40	1.31	0.3	0	50	1.21	0.3	0
23	0	1.38	0.3	0.05	10	1.3	0.3	0.05	20	1.26	0.3	0.05	30	1.22	0.3	0.05	40	1.15	0.3	0.05	50	1.07	0.3	0.05
24	0	1.24	0.3	0.1	10	1.15	0.3	0.1	20	1.12	0.3	0.1	30	1.09	0.3	0.1	40	1.02	0.3	0.1	50	0.94	0.3	0.1
25	0	1.11	0.3	0.15	10	1.03	0.3	0.15	20	1.01	0.3	0.15	30	0.97	0.3	0.15	40	0.92	0.3	0.15	50	0.84	0.3	0.15
26	0	1	0.3	0.2	10	0.93	0.3	0.2	20	0.91	0.3	0.2	30	0.88	0.3	0.2	40	0.82	0.3	0.2	50	0.75	0.3	0.2
27	0	0.83	0.3	0.3	10	0.77	0.3	0.3	20	0.75	0.3	0.3	30	0.72	0.3	0.3	40	0.67	0.3	0.3	50	0.61	0.3	0.3
28	0	0.7	0.3	0.4	10	0.65	0.3	0.4	20	0.62	0.3	0.4	30	0.6	0.3	0.4	40	0.56	0.3	0.4	50	0.5	0.3	0.4
29	0	1.5	0.4	0	10	1.41	0.4	0	20	1.37	0.4	0	30	1.33	0.4	0	40	1.26	0.4	0	50	1.16	0.4	0
30	0	1.32	0.4	0.05	10	1.24	0.4	0.05	20	1.21	0.4	0.05	30	1.17	0.4	0.05	40	1.11	0.4	0.05	50	1.02	0.4	0.05
31	0	1.18	0.4	0.1	10	1.1	0.4	0.1	20	1.08	0.4	0.1	30	1.04	0.4	0.1	40	0.98	0.4	0.1	50	0.9	0.4	0.1
32	0	1.06	0.4	0.15	10	0.99	0.4	0.15	20	0.96	0.4	0.15	30	0.93	0.4	0.15	40	0.88	0.4	0.15	50	0.8	0.4	0.15
33	0	0.96	0.4	0.2	10	0.89	0.4	0.2	20	0.87	0.4	0.2	30	0.84	0.4	0.2	40	0.79	0.4	0.2	50	0.72	0.4	0.2
34	0	0.8	0.4	0.3	10	0.74	0.4	0.3	20	0.72	0.4	0.3	30	0.69	0.4	0.3	40	0.64	0.4	0.3	50	0.59	0.4	0.3
35	0	0.67	0.4	0.4	10	0.62	0.4	0.4	20	0.6	0.4	0.4	30	0.57	0.4	0.4	40	0.53	0.4	0.4	50	0.48	0.4	0.4
36	0	1.43	0.5	0	10	1.34	0.5	0	20	1.31	0.5	0	30	1.26	0.5	0	40	1.2	0.5	0	50	1.11	0.5	0
37	0	1.26	0.5	0.05	10	1.18	0.5	0.05	20	1.15	0.5	0.05	30	1.11	0.5	0.05	40	1.05	0.5	0.05	50	0.97	0.5	0.05
38	0	1.13	0.5	0.1	10	1.05	0.5	0.1	20	1.02	0.5	0.1	30	0.99	0.5	0.1	40	0.93	0.5	0.1	50	0.86	0.5	0.1
39	0	1.01	0.5	0.15	10	0.94	0.5	0.15	20	0.92	0.5	0.15	30	0.89	0.5	0.15	40	0.83	0.5	0.15	50	0.77	0.5	0.15
40	0	0.92	0.5	0.2	10	0.85	0.5	0.2	20	0.83	0.5	0.2	30	0.8	0.5	0.2	40	0.75	0.5	0.2	50	0.69	0.5	0.2
41	0	0.76	0.5	0.3	10	0.7	0.5	0.3	20	0.68	0.5	0.3	30	0.66	0.5	0.3	40	0.61	0.5	0.3	50	0.56	0.5	0.3
42	0	0.64	0.5	0.4	10	0.59	0.5	0.4	20	0.57	0.5	0.4	30	0.55	0.5	0.4	40	0.51	0.5	0.4	50	0.46	0.5	0.4
43	0	1.35	0.6	0	10	1.26	0.6	0	20	1.23	0.6	0	30	1.19	0.6	0	40	1.13	0.6	0	50	1.05	0.6	0
44	0	1.19	0.6	0.05	10	1.12	0.6	0.05	20	1.09	0.6	0.05	30	1.05	0.6	0.05	40	0.99	0.6	0.05	50	0.92	0.6	0.05
45	0	1.06	0.6	0.1	10	0.99	0.6	0.1	20	0.97	0.6	0.1	30	0.94	0.6	0.1	40	0.88	0.6	0.1	50	0.81	0.6	0.1
46	0	0.96	0.6	0.15	10	0.89	0.6	0.15	20	0.87	0.6	0.15	30	0.84	0.6	0.15	40	0.79	0.6	0.15	50	0.72	0.6	0.15
47	0	0.86	0.6	0.2	10	0.8	0.6	0.2	20	0.78	0.6	0.2	30	0.75	0.6	0.2	40	0.71	0.6	0.2	50	0.65	0.6	0.2
48	0	0.72	0.6	0.3	10	0.66	0.6	0.3	20	0.64	0.6	0.3	30	0.62	0.6	0.3	40	0.58	0.6	0.3	50	0.53	0.6	0.3
49	0	0.6	0.6	0.4	10	0.55	0.6	0.4	20	0.54	0.6	0.4	30	0.51	0.6	0.4	40	0.48	0.6	0.4	50	0.43	0.6	0.4
50	0	1.26	0.7	0	10	1.18	0.7	0	20	1.15	0.7	0	30	1.12	0.7	0	40	1.06	0.7	0	50	0.98	0.7	0
51	0	1.11	0.7	0.05	10	1.04	0.7	0.05	20	1.02	0.7	0.05	30	0.98	0.7	0.05	40	0.93	0.7	0.05	50	0.86	0.7	0.05
52	0	0.99	0.7	0.1	10	0.93	0.7	0.1	20	0.9	0.7	0.1	30	0.87	0.7	0.1	40	0.82	0.7	0.1	50	0.76	0.7	0.1
53	0	0.89	0.7	0.15	10	0.83	0.7	0.15	20	0.81	0.7	0.15	30	0.78	0.7	0.15	40	0.74	0.7	0.15	50	0.68	0.7	0.15
54	0	0.81	0.7	0.2	10	0.75	0.7	0.2	20	0.73	0.7	0.2	30	0.7	0.7	0.2	40	0.66	0.7	0.2	50	0.61	0.7	0.2
55	0	0.67	0.7	0.3	10	0.62	0.7	0.3	20	0.6	0.7	0.3	30	0.58	0.7	0.3	40	0.54	0.7	0.3	50	0.49	0.7	0.3
56	0	0.57	0.7	0.4	10	0.52	0.7	0.4	20	0.5	0.7	0.4	30	0.48	0.7	0.4	40	0.45	0.7	0.4	50	0.41	0.7	0.4
57	0	1.16	0.8	0	10	1.09	0.8	0	20	1.07	0.8	0	30	1.03	0.8	0	40	0.98	0.8	0	50	0.9	0.8	0
58	0	1.03	0.8	0.05	10	0.97	0.8	0.05	20	0.94	0.8	0.05	30	0.91	0.8	0.05	40	0.86	0.8	0.05	50	0.79	0.8	0.05
59	0	0.92	0.8	0.1	10	0.86	0.8	0.1	20	0.84	0.8	0.1	30	0.81	0.8	0.1	40	0.76	0.8	0.1	50	0.7	0.8	0.1
60	0	0.83	0.8	0.15	10	0.77	0.8	0.15	20	0.75	0.8	0.15	30	0.72	0.8	0.15	40	0.68	0.8	0.15	50	0.63	0.8	0.15
61	0	0.75	0.8	0.2	10	0.69	0.8	0.2	20	0.68	0.8	0.2	30	0.65	0.8	0.2	40	0.61	0.8	0.2	50	0.56	0.8	0.2
62	0	0.62	0.8	0.3	10	0.57	0.8	0.3	20	0.56	0.8	0.3	30	0.54	0.8	0.3	40	0.5	0.8	0.3	50	0.46	0.8	0.3
63	0	0.52	0.8	0.4	10	0.48	0.8	0.4	20	0.46	0.8	0.4	30	0.45	0.8	0.4	40	0.41	0.8	0.4	50	0.38	0.8	0.4
64	0	1.06	0.9	0	10	0.99	0.9	0	20	0.97	0.9	0	30	0.94	0.9	0	40	0.89	0.9	0	50	0.82	0.9	0
65	0	0.94	0.9	0.05	10	0.88	0.9	0.05	20	0.86	0.9	0.05	30	0.83	0.9	0.05	40	0.78	0.9	0.05	50	0.72	0.9	0.05
66	0	0.84	0.9	0.1	10	0.78	0.9	0.1	20	0.76	0.9	0.1	30	0.74	0.9	0.1	40	0.69	0.9	0.1	50	0.64	0.9	0.1
67	0	0.75	0.9	0.15	10	0.7	0.9	0.15	20	0.68	0.9	0.15	30	0.66	0.9	0.15	40	0.62	0.9	0.15	50	0.57	0.9	0.15
68	0	0.68	0.9	0.2	10	0.63	0.9	0.2	20	0.61	0.9	0.2	30	0.59	0.9	0.2	40	0.56	0.9	0.2	50	0.51	0.9	0.2
69	0	0.56	0.9	0.3	10	0.52	0.9	0.3	20	0.51	0.9	0.3	30	0.49	0.9	0.3	40	0.46	0.9	0.3	50	0.41	0.9	0.3
70	0	0.48	0.9	0.4	10	0.44	0.9	0.4	20	0.42	0.9	0.4	30	0.4	0.9	0.4	40	0.38	0.9	0.4	50	0.34	0.9	0.4
71	0	0.94	1	0	10	0.88	1	0	20	0.86	1	0	30	0.83	1	0	40	0.79	1	0	50	0.73	1	0
72	0	0.85	1	0.05	10	0.78	1	0.05	20	0.76	1	0.05	30	0.74	1	0.05	40	0.69	1	0.05	50	0.64	1	0.05
73	0	0.74	1	0.1	10	0.69	1	0.1	20	0.68	1	0.1	30	0.65	1	0.1	40	0.62	1	0.1	50	0.57	1	0.1
74	0	0.67	1	0.15	10	0.62	1	0.15	20	0.6	1	0.15	30	0.58	1	0.15	40	0.55	1	0.15	50	0.5	1	0.15
75	0	0.6	1	0.2	10	0.56	1	0.2	20	0.54	1	0.2	30	0.53	1	0.2	40	0.49	1	0.2	50	0.45	1	0.2
76	0	0.5	1	0.3	10	0.46	1	0.3	20	0.45	1	0.3	30	0.43	1	0.3	40	0.4	1	0.3	50	0.37	1	0.3
77	0	0.42	1	0.4	10	0.39	1	0.4	20	0.38	1	0.4	30	0.36	1	0.4	40	0.33	1	0.4	50	0.3	1	0.4

WT = watertable elevation

F = factor of safety

D = disturbance factor

G = earthquake force

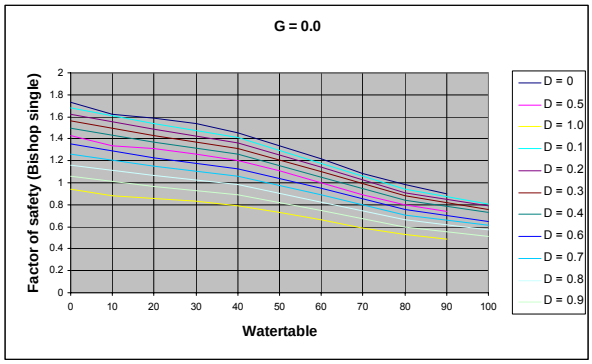
WT	F	D	G
60	1.22	0	0
60	1.06	0	0.05
60	0.94	0	0.1
60	0.83	0	0.15
60	0.74	0	0.2
60	0.6	0	0.3
60	0.49	0	0.4
60	1.18	0.1	0
60	1.03	0.1	0.05
60	0.91	0.1	0.1
60	0.81	0.1	0.15
60	0.72	0.1	0.2
60	0.58	0.1	0.3
60	0.48	0.1	0.4
60	1.14	0.2	0
60	1	0.2	0.05
60	0.88	0.2	0.1
60	0.78	0.2	0.15
60	0.7	0.2	0.2
60	0.56	0.2	0.3
60	0.46	0.2	0.4
60	1.1	0.3	0
60	0.96	0.3	0.05
60	0.85	0.3	0.1
60	0.75	0.3	0.15
60	0.67	0.3	0.2
60	0.54	0.3	0.3
60	0.44	0.3	0.4
60	1.05	0.4	0
60	0.92	0.4	0.05
60	0.81	0.4	0.1
60	0.72	0.4	0.15
60	0.64	0.4	0.2
60	0.52	0.4	0.3
60	0.43	0.4	0.4
60	1	0.5	0
60	0.88	0.5	0.05
60	0.77	0.5	0.1
60	0.69	0.5	0.15
60	0.61	0.5	0.2
60	0.49	0.5	0.3
60	0.4	0.5	0.4
60	0.95	0.6	0
60	0.83	0.6	0.05
60	0.73	0.6	0.1
60	0.65	0.6	0.15
60	0.58	0.6	0.2
60	0.47	0.6	0.3
60	0.39	0.6	0.4
60	0.89	0.7	0
60	0.77	0.7	0.05
60	0.68	0.7	0.1
60	0.61	0.7	0.15
60	0.54	0.7	0.2
60	0.44	0.7	0.3
60	0.36	0.7	0.4
60	0.82	0.8	0
60	0.72	0.8	0.05
60	0.63	0.8	0.1
60	0.56	0.8	0.15
60	0.5	0.8	0.2
60	0.4	0.8	0.3
60	0.33	0.8	0.4
60	0.75	0.9	0
60	0.65	0.9	0.05
60	0.57	0.9	0.1
60	0.51	0.9	0.15
60	0.46	0.9	0.2
60	0.37	0.9	0.3
60	0.3	0.9	0.4
60	0.66	1	0
60	0.58	1	0.05
60	0.51	1	0.1
60	0.45	1	0.15
60	0.4	1	0.2
60	0.33	1	0.3
60	0.27	1	0.4

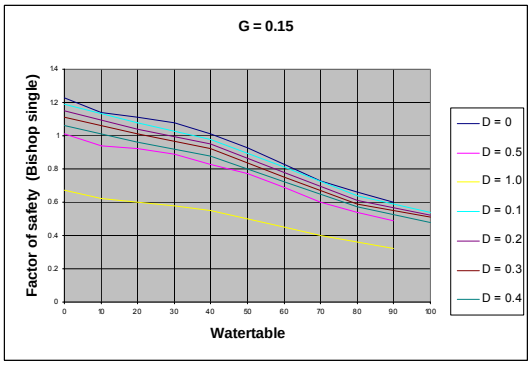
WT	F	D	G
70	1.08	0	0
70	0.94	0	0.05
70	0.82	0	0.1
70	0.73	0	0.15
70	0.65	0	0.2
70	0.52	0	0.3
70	0.42	0	0.4
70	1.04	0.1	0
70	0.91	0.1	0.05
70	0.8	0.1	0.1
70	0.71	0.1	0.15
70	0.63	0.1	0.2
70	0.5	0.1	0.3
70	0.41	0.1	0.4
70	1.01	0.2	0
70	0.88	0.2	0.05
70	0.77	0.2	0.1
70	0.68	0.2	0.15
70	0.61	0.2	0.2
70	0.49	0.2	0.3
70	0.39	0.2	0.4
70	0.97	0.3	0
70	0.85	0.3	0.05
70	0.75	0.3	0.1
70	0.66	0.3	0.15
70	0.59	0.3	0.2
70	0.47	0.3	0.3
70	0.38	0.3	0.4
70	0.93	0.4	0
70	0.81	0.4	0.05
70	0.71	0.4	0.1
70	0.63	0.4	0.15
70	0.56	0.4	0.2
70	0.45	0.4	0.3
70	0.36	0.4	0.4
70	0.89	0.5	0
70	0.77	0.5	0.05
70	0.68	0.5	0.1
70	0.6	0.5	0.15
70	0.53	0.5	0.2
70	0.43	0.5	0.3
70	0.35	0.5	0.4
70	0.84	0.6	0
70	0.73	0.6	0.05
70	0.64	0.6	0.1
70	0.57	0.6	0.15
70	0.5	0.6	0.2
70	0.4	0.6	0.3
70	0.33	0.6	0.4
70	0.78	0.7	0
70	0.68	0.7	0.05
70	0.6	0.7	0.1
70	0.53	0.7	0.15
70	0.47	0.7	0.2
70	0.38	0.7	0.3
70	0.31	0.7	0.4
70	0.73	0.8	0
70	0.63	0.8	0.05
70	0.56	0.8	0.1
70	0.49	0.8	0.15
70	0.44	0.8	0.2
70	0.35	0.8	0.3
70	0.28	0.8	0.4
70	0.66	0.9	0
70	0.57	0.9	0.05
70	0.51	0.9	0.1
70	0.45	0.9	0.15
70	0.4	0.9	0.2
70	0.32	0.9	0.3
70	0.26	0.9	0.4
70	0.59	1	0
70	0.51	1	0.05
70	0.45	1	0.1
70	0.4	1	0.15
70	0.35	1	0.2
70	0.28	1	0.3
70	0.23	1	0.4

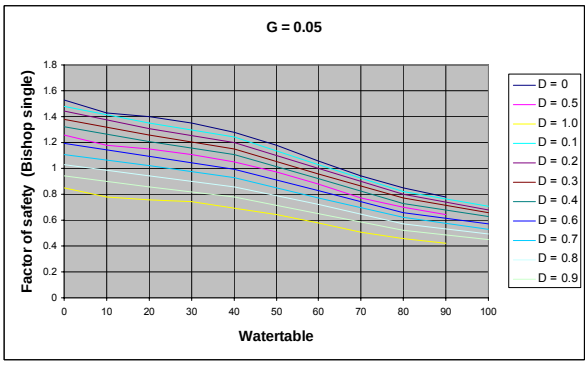
WT	F	D	G
80	0.98	0	0
80	0.85	0	0.05
80	0.74	0	0.1
80	0.66	0	0.15
80	0.58	0	0.2
80	0.46	0	0.3
80	0.37	0	0.4
80	0.94	0.1	0
80	0.82	0.1	0.05
80	0.72	0.1	0.1
80	0.64	0.1	0.15
80	0.56	0.1	0.2
80	0.45	0.1	0.3
80	0.36	0.1	0.4
80	0.91	0.2	0
80	0.8	0.2	0.05
80	0.7	0.2	0.1
80	0.61	0.2	0.15
80	0.54	0.2	0.2
80	0.43	0.2	0.3
80	0.35	0.2	0.4
80	0.88	0.3	0
80	0.77	0.3	0.05
80	0.67	0.3	0.1
80	0.59	0.3	0.15
80	0.53	0.3	0.2
80	0.42	0.3	0.3
80	0.34	0.3	0.4
80	0.84	0.4	0
80	0.73	0.4	0.05
80	0.64	0.4	0.1
80	0.57	0.4	0.15
80	0.5	0.4	0.2
80	0.4	0.4	0.3
80	0.32	0.4	0.4
80	0.8	0.5	0
80	0.7	0.5	0.05
80	0.61	0.5	0.1
80	0.54	0.5	0.15
80	0.48	0.5	0.2
80	0.38	0.5	0.3
80	0.31	0.5	0.4
80	0.76	0.6	0
80	0.66	0.6	0.05
80	0.58	0.6	0.1
80	0.51	0.6	0.15
80	0.45	0.6	0.2
80	0.36	0.6	0.3
80	0.29	0.6	0.4
80	0.71	0.7	0
80	0.62	0.7	0.05
80	0.54	0.7	0.1
80	0.48	0.7	0.15
80	0.42	0.7	0.2
80	0.34	0.7	0.3
80	0.27	0.7	0.4
80	0.66	0.8	0
80	0.57	0.8	0.05
80	0.5	0.8	0.1
80	0.44	0.8	0.15
80	0.39	0.8	0.2
80	0.31	0.8	0.3
80	0.25	0.8	0.4
80	0.6	0.9	0
80	0.52	0.9	0.05
80	0.46	0.9	0.1
80	0.4	0.9	0.15
80	0.36	0.9	0.2
80	0.28	0.9	0.3
80	0.23	0.9	0.4
80	0.53	1	0
80	0.46	1	0.05
80	0.4	1	0.1
80	0.36	1	0.15
80	0.32	1	0.2
80	0.25	1	0.3
80	0.2	1	0.4

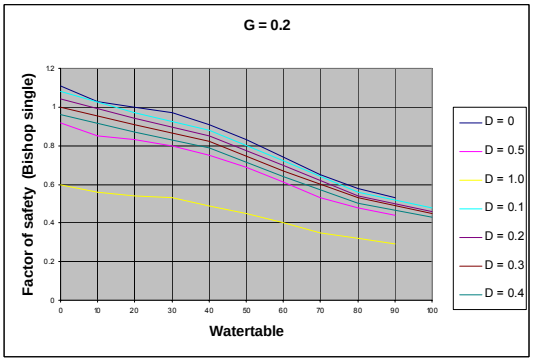
WT	F	D	G
90	0.9	0	0
90	0.78	0	0.05
90	0.68	0	0.1
90	0.6	0	0.15
90	0.53	0	0.2
90	0.42	0	0.3
90	0.33	0	0.4
90	0.87	0.1	0
90	0.78	0.1	0.05
90	0.66	0.1	0.1
90	0.58	0.1	0.15
90	0.51	0.1	0.2
90	0.41	0.1	0.3
90	0.32	0.1	0.4
90	0.84	0.2	0
90	0.73	0.2	0.05
90	0.64	0.2	0.1
90	0.56	0.2	0.15
90	0.5	0.2	0.2
90	0.39	0.2	0.3
90	0.31	0.2	0.4
90	0.81	0.3	0
90	0.7	0.3	0.05
90	0.61	0.3	0.1
90	0.54	0.3	0.15
90	0.48	0.3	0.2
90	0.38	0.3	0.3
90	0.3	0.3	0.4
90	0.77	0.4	0
90	0.67	0.4	0.05
90	0.59	0.4	0.1
90	0.52	0.4	0.15
90	0.46	0.4	0.2
90	0.36	0.4	0.3
90	0.29	0.4	0.4
90	0.74	0.5	0
90	0.64	0.5	0.05
90	0.56	0.5	0.1
90	0.49	0.5	0.15
90	0.44	0.5	0.2
90	0.34	0.5	0.3
90	0.28	0.5	0.4
90	0.7	0.6	0
90	0.6	0.6	0.05
90	0.53	0.6	0.1
90	0.46	0.6	0.15
90	0.41	0.6	0.2
90	0.33	0.6	0.3
90	0.26	0.6	0.4
90	0.65	0.7	0
90	0.57	0.7	0.05
90	0.49	0.7	0.1
90	0.43	0.7	0.15
90	0.38	0.7	0.2
90	0.3	0.7	0.3
90	0.24	0.7	0.4
90	0.6	0.8	0
90	0.52	0.8	0.05
90	0.46	0.8	0.1
90	0.4	0.8	0.15
90	0.36	0.8	0.2
90	0.28	0.8	0.3
90	0.22	0.8	0.4
90	0.55	0.9	0
90	0.48	0.9	0.05
90	0.42	0.9	0.1
90	0.37	0.9	0.15
90	0.32	0.9	0.2
90	0.26	0.9	0.3
90	0.2	0.9	0.4
90	0.49	1	0
90	0.42	1	0.05
90	0.37	1	0.1
90	0.32	1	0.15
90	0.29	1	0.2
90	0.23	1	0.3
90	0.18	1	0.4

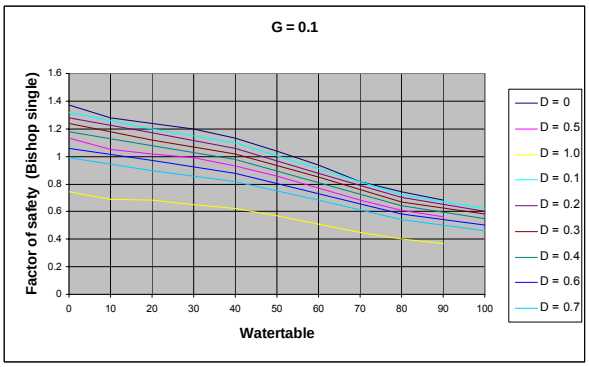
WT	F	D	G
100	0.84	0	0
100	0.73	0	0.05
100	0.64	0	0.1
100	0.56	0	0.15
100	0.49	0	0.2
100	0.39	0	0.3
100	0.31	0	0.4
100	0.81	0.1	0
100	0.71	0.1	0.05
100	0.62	0.1	0.1
100	0.54	0.1	0.15
100	0.48	0.1	0.2
100	0.38	0.1	0.3
100	0.3	0.1	0.4
100	0.79	0.2	0
100	0.68	0.2	0.05
100	0.6	0.2	0.1
100	0.52	0.2	0.15
100	0.46	0.2	0.2
100	0.37	0.2	0.3
100	0.29	0.2	0.4
100	0.76	0.3	0
100	0.66	0.3	0.05
100	0.58	0.3	0.1
100	0.51	0.3	0.15
100	0.45	0.3	0.2
100	0.35	0.3	0.3
100	0.28	0.3	0.4
100	0.73	0.4	0
100	0.63	0.4	0.05
100	0.55	0.4	0.1
100	0.48	0.4	0.15
100	0.43	0.4	0.2
100	0.34	0.4	0.3
100	0.27	0.4	0.4
100	0.69	0.5	0
100	0.6	0.5	0.05
100	0.52	0.5	0.1
100	0.46	0.5	0.15
100	0.41	0.5	0.2
100	0.32	0.5	0.3
100	0.26	0.5	0.4
100	0.65	0.6	0
100	0.57	0.6	0.05
100	0.5	0.6	0.1
100	0.43	0.6	0.15
100	0.38	0.6	0.2
100	0.3	0.6	0.3
100	0.24	0.6	0.4
100	0.61	0.7	0
100	0.53	0.7	0.05
100	0.46	0.7	0.1
100	0.41	0.7	0.15
100	0.36	0.7	0.2
100	0.28	0.7	0.3
100	0.23	0.7	0.4
100	0.57	0.8	0
100	0.49	0.8	0.05
100	0.43	0.8	0.1
100	0.38	0.8	0.15
100	0.33	0.8	0.2
100	0.26	0.8	0.3
100	0.21	0.8	0.4
100	0.51	0.9	0
100	0.45	0.9	0.05
100	0.39	0.9	0.1
100	0.34	0.9	0.15
100	0.3	0.9	0.2
100	0.24	0.9	0.3
100	0.19	0.9	0.4
100	0.46	1	0
100	0.4	1	0.05
100	0.35	1	0.1
100	0.3	1	0.15
100	0.27	1	0.2
100	0.21	1	0.3
100	0.17	1	0.4

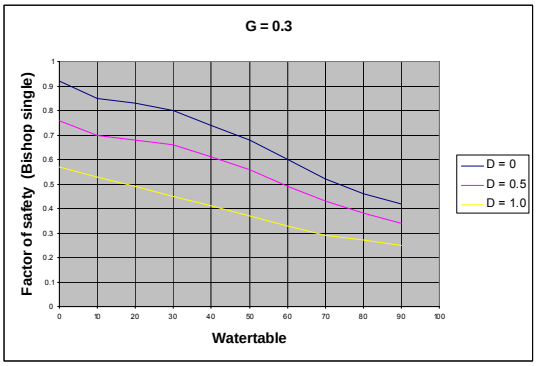

G = 0.0
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9

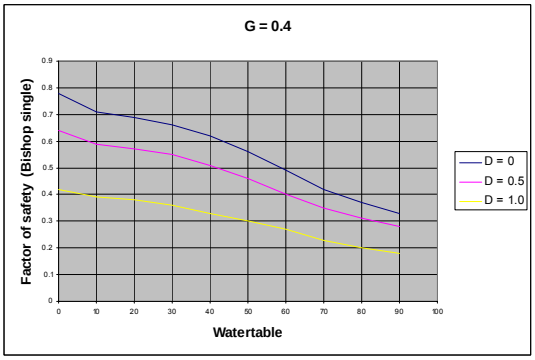

G = 0.15
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4


G = 0.05
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.2
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4


G = 0.1
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7


G = 0.3
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0


G = 0.4
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0

Slope profile 5a

Analysis	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G
1	0	1.78	0	0	10	1.71	0	0	20	1.62	0	0	30	1.5	0	0	40	1.37	0	0	50	1.24	0	0
2	0	1.59	0	0.05	10	1.52	0	0.05	20	1.43	0	0.05	30	1.32	0	0.05	40	1.21	0	0.05	50	1.09	0	0.05
3	0	1.43	0	0.1	10	1.36	0	0.1	20	1.28	0	0.1	30	1.18	0	0.1	40	1.08	0	0.1	50	0.97	0	0.1
4	0	1.29	0	0.15	10	1.23	0	0.15	20	1.16	0	0.15	30	1.06	0	0.15	40	0.96	0	0.15	50	0.87	0	0.15
5	0	1.18	0	0.2	10	1.12	0	0.2	20	1.05	0	0.2	30	0.96	0	0.2	40	0.87	0	0.2	50	0.78	0	0.2
6	0	0.99	0	0.3	10	0.93	0	0.3	20	0.87	0	0.3	30	0.79	0	0.3	40	0.71	0	0.3	50	0.63	0	0.3
7	0	0.84	0	0.4	10	0.79	0	0.4	20	0.74	0	0.4	30	0.67	0	0.4	40	0.59	0	0.4	50	0.52	0	0.4
8	0	1.73	0.1	0	10	1.66	0.1	0	20	1.57	0.1	0	30	1.45	0.1	0	40	1.33	0.1	0	50	1.2	0.1	0
9	0	1.54	0.1	0.05	10	1.47	0.1	0.05	20	1.39	0.1	0.05	30	1.28	0.1	0.05	40	1.17	0.1	0.05	50	1.06	0.1	0.05
10	0	1.39	0.1	0.1	10	1.32	0.1	0.1	20	1.24	0.1	0.1	30	1.15	0.1	0.1	40	1.04	0.1	0.1	50	0.94	0.1	0.1
11	0	1.25	0.1	0.15	10	1.19	0.1	0.15	20	1.12	0.1	0.15	30	1.03	0.1	0.15	40	0.94	0.1	0.15	50	0.84	0.1	0.15
12	0	1.14	0.1	0.2	10	1.08	0.1	0.2	20	1.02	0.1	0.2	30	0.93	0.1	0.2	40	0.84	0.1	0.2	50	0.75	0.1	0.2
13	0	0.96	0.1	0.3	10	0.91	0.1	0.3	20	0.85	0.1	0.3	30	0.77	0.1	0.3	40	0.69	0.1	0.3	50	0.62	0.1	0.3
14	0	0.82	0.1	0.4	10	0.77	0.1	0.4	20	0.71	0.1	0.4	30	0.65	0.1	0.4	40	0.58	0.1	0.4	50	0.51	0.1	0.4
15	0	1.68	0.2	0	10	1.61	0.2	0	20	1.52	0.2	0	30	1.41	0.2	0	40	1.29	0.2	0	50	1.17	0.2	0
16	0	1.5	0.2	0.05	10	1.43	0.2	0.05	20	1.35	0.2	0.05	30	1.24	0.2	0.05	40	1.14	0.2	0.05	50	1.03	0.2	0.05
17	0	1.35	0.2	0.1	10	1.28	0.2	0.1	20	1.21	0.2	0.1	30	1.11	0.2	0.1	40	1.01	0.2	0.1	50	0.91	0.2	0.1
18	0	1.22	0.2	0.15	10	1.16	0.2	0.15	20	1.09	0.2	0.15	30	1	0.2	0.15	40	0.91	0.2	0.15	50	0.81	0.2	0.15
19	0	1.11	0.2	0.2	10	1.05	0.2	0.2	20	0.98	0.2	0.2	30	0.9	0.2	0.2	40	0.82	0.2	0.2	50	0.73	0.2	0.2
20	0	0.93	0.2	0.3	10	0.88	0.2	0.3	20	0.82	0.2	0.3	30	0.75	0.2	0.3	40	0.67	0.2	0.3	50	0.6	0.2	0.3
21	0	0.79	0.2	0.4	10	0.75	0.2	0.4	20	0.69	0.2	0.4	30	0.63	0.2	0.4	40	0.56	0.2	0.4	50	0.49	0.2	0.4
22	0	1.62	0.3	0	10	1.55	0.3	0	20	1.47	0.3	0	30	1.36	0.3	0	40	1.24	0.3	0	50	1.13	0.3	0
23	0	1.45	0.3	0.05	10	1.38	0.3	0.05	20	1.3	0.3	0.05	30	1.2	0.3	0.05	40	1.1	0.3	0.05	50	0.99	0.3	0.05
24	0	1.3	0.3	0.1	10	1.24	0.3	0.1	20	1.16	0.3	0.1	30	1.07	0.3	0.1	40	0.98	0.3	0.1	50	0.88	0.3	0.1
25	0	1.18	0.3	0.15	10	1.12	0.3	0.15	20	1.05	0.3	0.15	30	0.96	0.3	0.15	40	0.88	0.3	0.15	50	0.79	0.3	0.15
26	0	1.07	0.3	0.2	10	1.01	0.3	0.2	20	0.95	0.3	0.2	30	0.87	0.3	0.2	40	0.79	0.3	0.2	50	0.71	0.3	0.2
27	0	0.9	0.3	0.3	10	0.85	0.3	0.3	20	0.79	0.3	0.3	30	0.72	0.3	0.3	40	0.67	0.3	0.3	50	0.58	0.3	0.3
28	0	0.77	0.3	0.4	10	0.72	0.3	0.4	20	0.67	0.3	0.4	30	0.6	0.3	0.4	40	0.54	0.3	0.4	50	0.48	0.3	0.4
29	0	1.56	0.4	0	10	1.49	0.4	0	20	1.4	0.4	0	30	1.3	0.4	0	40	1.19	0.4	0	50	1.08	0.4	0
30	0	1.39	0.4	0.05	10	1.32	0.4	0.05	20	1.25	0.4	0.05	30	1.15	0.4	0.05	40	1.05	0.4	0.05	50	0.95	0.4	0.05
31	0	1.25	0.4	0.1	10	1.19	0.4	0.1	20	1.12	0.4	0.1	30	1.03	0.4	0.1	40	0.94	0.4	0.1	50	0.85	0.4	0.1
32	0	1.13	0.4	0.15	10	1.07	0.4	0.15	20	1.01	0.4	0.15	30	0.92	0.4	0.15	40	0.84	0.4	0.15	50	0.76	0.4	0.15
33	0	1.03	0.4	0.2	10	0.97	0.4	0.2	20	0.91	0.4	0.2	30	0.84	0.4	0.2	40	0.76	0.4	0.2	50	0.68	0.4	0.2
34	0	0.86	0.4	0.3	10	0.81	0.4	0.3	20	0.76	0.4	0.3	30	0.69	0.4	0.3	40	0.62	0.4	0.3	50	0.55	0.4	0.3
35	0	0.74	0.4	0.4	10	0.69	0.4	0.4	20	0.64	0.4	0.4	30	0.58	0.4	0.4	40	0.52	0.4	0.4	50	0.46	0.4	0.4
36	0	1.49	0.5	0	10	1.42	0.5	0	20	1.34	0.5	0	30	1.24	0.5	0	40	1.14	0.5	0	50	1.03	0.5	0
37	0	1.33	0.5	0.05	10	1.26	0.5	0.05	20	1.19	0.5	0.05	30	1.1	0.5	0.05	40	1.01	0.5	0.05	50	0.91	0.5	0.05
38	0	1.19	0.5	0.1	10	1.13	0.5	0.1	20	1.07	0.5	0.1	30	0.98	0.5	0.1	40	0.9	0.5	0.1	50	0.81	0.5	0.1
39	0	1.08	0.5	0.15	10	1.02	0.5	0.15	20	0.96	0.5	0.15	30	0.88	0.5	0.15	40	0.8	0.5	0.15	50	0.72	0.5	0.15
40	0	0.98	0.5	0.2	10	0.93	0.5	0.2	20	0.87	0.5	0.2	30	0.8	0.5	0.2	40	0.72	0.5	0.2	50	0.65	0.5	0.2
41	0	0.83	0.5	0.3	10	0.78	0.5	0.3	20	0.72	0.5	0.3	30	0.66	0.5	0.3	40	0.6	0.5	0.3	50	0.53	0.5	0.3
42	0	0.71	0.5	0.4	10	0.66	0.5	0.4	20	0.61	0.5	0.4	30	0.55	0.5	0.4	40	0.5	0.5	0.4	50	0.44	0.5	0.4
43	0	1.41	0.6	0	10	1.34	0.6	0	20	1.27	0.6	0	30	1.18	0.6	0	40	1.08	0.6	0	50	0.98	0.6	0
44	0	1.26	0.6	0.05	10	1.19	0.6	0.05	20	1.13	0.6	0.05	30	1.04	0.6	0.05	40	0.95	0.6	0.05	50	0.86	0.6	0.05
45	0	1.13	0.6	0.1	10	1.07	0.6	0.1	20	1.01	0.6	0.1	30	0.93	0.6	0.1	40	0.85	0.6	0.1	50	0.77	0.6	0.1
46	0	1.02	0.6	0.15	10	0.97	0.6	0.15	20	0.91	0.6	0.15	30	0.84	0.6	0.15	40	0.76	0.6	0.15	50	0.68	0.6	0.15
47	0	0.93	0.6	0.2	10	0.88	0.6	0.2	20	0.82	0.6	0.2	30	0.76	0.6	0.2	40	0.69	0.6	0.2	50	0.62	0.6	0.2
48	0	0.79	0.6	0.3	10	0.74	0.6	0.3	20	0.69	0.6	0.3	30	0.63	0.6	0.3	40	0.56	0.6	0.3	50	0.5	0.6	0.3
49	0	0.67	0.6	0.4	10	0.63	0.6	0.4	20	0.58	0.6	0.4	30	0.53	0.6	0.4	40	0.47	0.6	0.4	50	0.42	0.6	0.4
50	0	1.33	0.7	0	10	1.26	0.7	0	20	1.19	0.7	0	30	1.1	0.7	0	40	1.01	0.7	0	50	0.92	0.7	0
51	0	1.18	0.7	0.05	10	1.12	0.7	0.05	20	1.06	0.7	0.05	30	0.98	0.7	0.05	40	0.89	0.7	0.05	50	0.81	0.7	0.05
52	0	1.06	0.7	0.1	10	1.01	0.7	0.1	20	0.95	0.7	0.1	30	0.87	0.7	0.1	40	0.8	0.7	0.1	50	0.72	0.7	0.1
53	0	0.96	0.7	0.15	10	0.91	0.7	0.15	20	0.85	0.7	0.15	30	0.79	0.7	0.15	40	0.71	0.7	0.15	50	0.64	0.7	0.15
54	0	0.88	0.7	0.2	10	0.83	0.7	0.2	20	0.77	0.7	0.2	30	0.71	0.7	0.2	40	0.64	0.7	0.2	50	0.58	0.7	0.2
55	0	0.74	0.7	0.3	10	0.69	0.7	0.3	20	0.64	0.7	0.3	30	0.59	0.7	0.3	40	0.53	0.7	0.3	50	0.47	0.7	0.3
56	0	0.63	0.7	0.4	10	0.59	0.7	0.4	20	0.54	0.7	0.4	30	0.49	0.7	0.4	40	0.44	0.7	0.4	50	0.39	0.7	0.4
57	0	1.23	0.8	0	10	1.17	0.8	0	20	1.1	0.8	0	30	1.02	0.8	0	40	0.94	0.8	0	50	0.86	0.8	0
58	0	1.1	0.8	0.05	10	1.04	0.8	0.05	20	0.98	0.8	0.05	30	0.91	0.8	0.05	40	0.83	0.8	0.05	50	0.75	0.8	0.05
59	0	0.99	0.8	0.1	10	0.94	0.8	0.1	20	0.88	0.8	0.1	30	0.81	0.8	0.1	40	0.74	0.8	0.1	50	0.67	0.8	0.1
60	0	0.9	0.8	0.15	10	0.85	0.8	0.15	20	0.79	0.8	0.15	30	0.73	0.8	0.15	40	0.66	0.8	0.15	50	0.6	0.8	0.15
61	0	0.82	0.8	0.2	10	0.77	0.8	0.2	20	0.72	0.8	0.2	30	0.66	0.8	0.2	40	0.6	0.8	0.2	50	0.54	0.8	0.2
62	0	0.69	0.8	0.3	10	0.64	0.8	0.3	20	0.6	0.8	0.3	30	0.55	0.8	0.3	40	0.49	0.8	0.3	50	0.44	0.8	0.3
63	0	0.59	0.8	0.4	10	0.55	0.8	0.4	20	0.51	0.8	0.4	30	0.46	0.8	0.4	40	0.41	0.8	0.4	50	0.37	0.8	0.4
64	0	1.13	0.9	0	10	1.07	0.9	0	20	1.01	0.9	0	30	0.94	0.9	0	40	0.86	0.9	0	50	0.78	0.9	0
65	0	1.01	0.9	0.05	10	0.95	0.9	0.05	20	0.9	0.9	0.05	30	0.83	0.9	0.05	40	0.76	0.9	0.05	50	0.69	0.9	0.05
66	0	0.91	0.9	0.1	10	0.86	0.9	0.1	20	0.8	0.9	0.1	30	0.74	0.9	0.1	40	0.68	0.9	0.1	50	0.61	0.9	0.1
67	0	0.82	0.9	0.15	10	0.77	0.9	0.15	20	0.73	0.9	0.15	30	0.67	0.9	0.15	40	0.61	0.9	0.15	50	0.55	0.9	0.15
68	0	0.75	0.9	0.2	10	0.7	0.9	0.2	20	0.66	0.9	0.2	30	0.6	0.9	0.2	40	0.55	0.9	0.2	50	0.49	0.9	0.2
69	0	0.63	0.9	0.3	10	0.59	0.9	0.3	20	0.55	0.9	0.3	30	0.5	0.9	0.3	40	0.45	0.9	0.3	50	0.41	0.9	0.3
70	0	0.54	0.9	0.4	10	0.5	0.9	0.4	20	0.46	0.9	0.4	30	0.42	0.9	0.4	40	0.38	0.9	0.4	50	0.34	0.9	0.4
71	0	1.02	1	0	10	0.96	1	0	20	0.9	1	0	30	0.84	1	0	40	0.77	1	0	50	0.7	1	0
72	0	0.91	1	0.05	10	0.85	1	0.05	20	0.8	1	0.05	30	0.74	1	0.05	40	0.68	1	0.05	50	0.62	1	0.05
73	0	0.82	1	0.1	10	0.77	1	0.1	20	0.72	1	0.1	30	0.66	1	0.1	40	0.61	1	0.1	50	0.55	1	0.1
74	0	0.74	1	0.15	10	0.69	1	0.15	20	0.65	1	0.15	30	0.6	1	0.15	40	0.55	1	0.15	50	0.49	1	0.15
75	0	0.68	1	0.2	10	0.63	1	0.2	20	0.59	1	0.2	30	0.54	1	0.2	40	0.49	1	0.2	50	0.44	1	0.2
76	0	0.57	1	0.3	10	0.53	1	0.3	20	0.49	1	0.3	30	0.45	1	0.3	40	0.41	1	0.3	50	0.37	1	0.3
77	0	0.49	1	0.4	10	0.45	1	0.4	20	0.42	1	0.4	30	0.38	1	0.4	40	0.34	1	0.4	50	0.3	1	0.4

WT = watertable elevation

F = factor of safety

D = disturbance factor

G = earthquake force

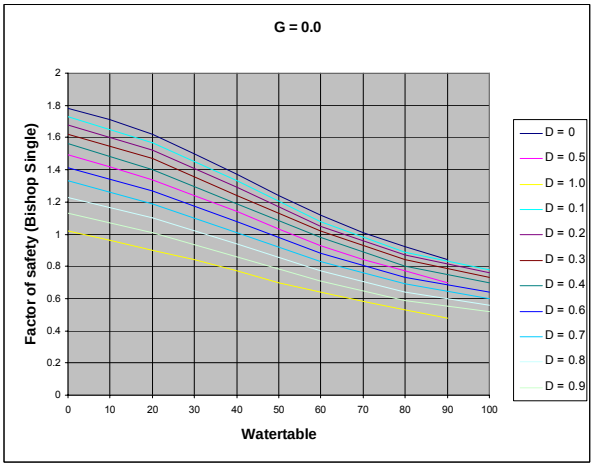
WT	F	D	G
60	1.12	0	0
60	0.98	0	0.05
60	0.87	0	0.1
60	0.77	0	0.15
60	0.69	0	0.2
60	0.56	0	0.3
60	0.46	0	0.4
60	1.08	0.1	0
60	0.95	0.1	0.05
60	0.84	0.1	0.1
60	0.75	0.1	0.15
60	0.67	0.1	0.2
60	0.54	0.1	0.3
60	0.45	0.1	0.4
60	1.05	0.2	0
60	0.92	0.2	0.05
60	0.82	0.2	0.1
60	0.73	0.2	0.15
60	0.65	0.2	0.2
60	0.53	0.2	0.3
60	0.44	0.2	0.4
60	1.02	0.3	0
60	0.89	0.3	0.05
60	0.79	0.3	0.1
60	0.7	0.3	0.15
60	0.63	0.3	0.2
60	0.51	0.3	0.3
60	0.42	0.3	0.4
60	0.98	0.4	0
60	0.86	0.4	0.05
60	0.76	0.4	0.1
60	0.68	0.4	0.15
60	0.61	0.4	0.2
60	0.49	0.4	0.3
60	0.41	0.4	0.4
60	0.93	0.5	0
60	0.82	0.5	0.05
60	0.73	0.5	0.1
60	0.65	0.5	0.15
60	0.58	0.5	0.2
60	0.47	0.5	0.3
60	0.39	0.5	0.4
60	0.88	0.6	0
60	0.78	0.6	0.05
60	0.69	0.6	0.1
60	0.61	0.6	0.15
60	0.55	0.6	0.2
60	0.45	0.6	0.3
60	0.37	0.6	0.4
60	0.83	0.7	0
60	0.73	0.7	0.05
60	0.65	0.7	0.1
60	0.58	0.7	0.15
60	0.52	0.7	0.2
60	0.52	0.7	0.3
60	0.35	0.7	0.4
60	0.77	0.8	0
60	0.68	0.8	0.05
60	0.6	0.8	0.1
60	0.54	0.8	0.15
60	0.48	0.8	0.2
60	0.39	0.8	0.3
60	0.33	0.8	0.4
60	0.71	0.9	0
60	0.62	0.9	0.05
60	0.55	0.9	0.1
60	0.49	0.9	0.15
60	0.44	0.9	0.2
60	0.36	0.9	0.3
60	0.3	0.9	0.4
60	0.64	1	0
60	0.56	1	0.05
60	0.5	1	0.1
60	0.44	1	0.15
60	0.4	1	0.2
60	0.33	1	0.3
60	0.27	1	0.4

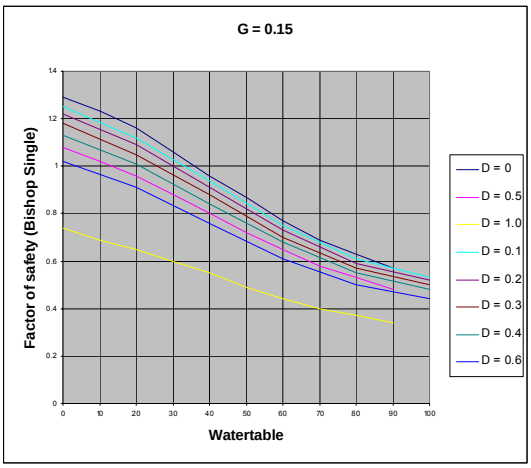
WT	F	D	G
70	1.01	0	0
70	0.88	0	0.05
70	0.78	0	0.1
70	0.69	0	0.15
70	0.62	0	0.2
70	0.5	0	0.3
70	0.41	0	0.4
70	0.98	0.1	0
70	0.86	0.1	0.05
70	0.76	0.1	0.1
70	0.67	0.1	0.15
70	0.6	0.1	0.2
70	0.48	0.1	0.3
70	0.4	0.1	0.4
70	0.95	0.2	0
70	0.83	0.2	0.05
70	0.73	0.2	0.1
70	0.65	0.2	0.15
70	0.58	0.2	0.2
70	0.47	0.2	0.3
70	0.39	0.2	0.4
70	0.92	0.3	0
70	0.8	0.3	0.05
70	0.71	0.3	0.1
70	0.63	0.3	0.15
70	0.56	0.3	0.2
70	0.46	0.3	0.3
70	0.37	0.3	0.4
70	0.88	0.4	0
70	0.77	0.4	0.05
70	0.68	0.4	0.1
70	0.61	0.4	0.15
70	0.54	0.4	0.2
70	0.44	0.4	0.3
70	0.36	0.4	0.4
70	0.84	0.5	0
70	0.74	0.5	0.05
70	0.65	0.5	0.1
70	0.58	0.5	0.15
70	0.52	0.5	0.2
70	0.42	0.5	0.3
70	0.34	0.5	0.4
70	0.8	0.6	0
70	0.7	0.6	0.05
70	0.62	0.6	0.1
70	0.55	0.6	0.15
70	0.49	0.6	0.2
70	0.4	0.6	0.3
70	0.33	0.6	0.4
70	0.75	0.7	0
70	0.66	0.7	0.05
70	0.58	0.7	0.1
70	0.52	0.7	0.15
70	0.46	0.7	0.2
70	0.38	0.7	0.3
70	0.31	0.7	0.4
70	0.7	0.8	0
70	0.61	0.8	0.05
70	0.54	0.8	0.1
70	0.48	0.8	0.15
70	0.43	0.8	0.2
70	0.35	0.8	0.3
70	0.29	0.8	0.4
70	0.64	0.9	0
70	0.56	0.9	0.05
70	0.5	0.9	0.1
70	0.44	0.9	0.15
70	0.4	0.9	0.2
70	0.32	0.9	0.3
70	0.27	0.9	0.4
70	0.58	1	0
70	0.51	1	0.05
70	0.45	1	0.1
70	0.4	1	0.15
70	0.36	1	0.2
70	0.29	1	0.3
70	0.24	1	0.4

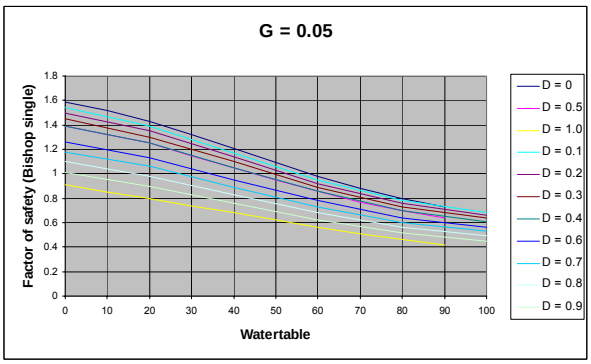
WT	F	D	G
80	0.92	0	0
80	0.8	0	0.05
80	0.71	0	0.1
80	0.63	0	0.15
80	0.56	0	0.2
80	0.45	0	0.3
80	0.37	0	0.4
80	0.89	0.1	0
80	0.78	0.1	0.05
80	0.69	0.1	0.1
80	0.61	0.1	0.15
80	0.54	0.1	0.2
80	0.44	0.1	0.3
80	0.36	0.1	0.4
80	0.87	0.2	0
80	0.76	0.2	0.05
80	0.67	0.2	0.1
80	0.59	0.2	0.15
80	0.53	0.2	0.2
80	0.43	0.2	0.3
80	0.35	0.2	0.4
80	0.84	0.3	0
80	0.73	0.3	0.05
80	0.65	0.3	0.1
80	0.57	0.3	0.15
80	0.51	0.3	0.2
80	0.41	0.3	0.3
80	0.34	0.3	0.4
80	0.8	0.4	0
80	0.7	0.4	0.05
80	0.62	0.4	0.1
80	0.55	0.4	0.15
80	0.49	0.4	0.2
80	0.4	0.4	0.3
80	0.33	0.4	0.4
80	0.77	0.5	0
80	0.67	0.5	0.05
80	0.59	0.5	0.1
80	0.53	0.5	0.15
80	0.47	0.5	0.2
80	0.38	0.5	0.3
80	0.31	0.5	0.4
80	0.73	0.6	0
80	0.64	0.6	0.05
80	0.56	0.6	0.1
80	0.5	0.6	0.15
80	0.45	0.6	0.2
80	0.36	0.6	0.3
80	0.3	0.6	0.4
80	0.69	0.7	0
80	0.6	0.7	0.05
80	0.53	0.7	0.1
80	0.47	0.7	0.15
80	0.42	0.7	0.2
80	0.34	0.7	0.3
80	0.28	0.7	0.4
80	0.64	0.8	0
80	0.56	0.8	0.05
80	0.5	0.8	0.1
80	0.44	0.8	0.15
80	0.39	0.8	0.2
80	0.32	0.8	0.3
80	0.26	0.8	0.4
80	0.59	0.9	0
80	0.52	0.9	0.05
80	0.46	0.9	0.1
80	0.41	0.9	0.15
80	0.36	0.9	0.2
80	0.3	0.9	0.3
80	0.25	0.9	0.4
80	0.53	1	0
80	0.46	1	0.05
80	0.41	1	0.1
80	0.37	1	0.15
80	0.33	1	0.2
80	0.27	1	0.3
80	0.22	1	0.4

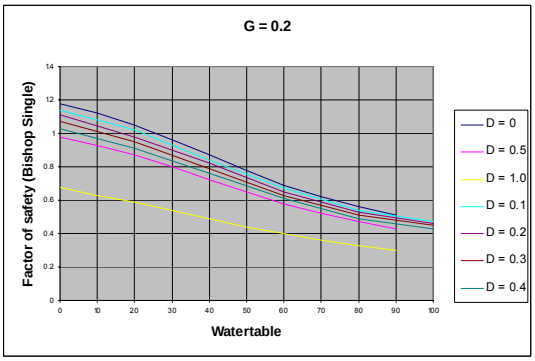
WT	F	D	G
90	0.84	0	0
90	0.73	0	0.05
90	0.64	0	0.1
90	0.57	0	0.15
90	0.51	0	0.2
90	0.41	0	0.3
90	0.33	0	0.4
90	0.81	0.1	0
90	0.71	0.1	0.05
90	0.62	0.1	0.1
90	0.55	0.1	0.15
90	0.49	0.1	0.2
90	0.4	0.1	0.3
90	0.32	0.1	0.4
90	0.79	0.2	0
90	0.69	0.2	0.05
90	0.61	0.2	0.1
90	0.54	0.2	0.15
90	0.48	0.2	0.2
90	0.39	0.2	0.3
90	0.32	0.2	0.4
90	0.76	0.3	0
90	0.67	0.3	0.05
90	0.59	0.3	0.1
90	0.52	0.3	0.15
90	0.46	0.3	0.2
90	0.37	0.3	0.3
90	0.31	0.3	0.4
90	0.73	0.4	0
90	0.64	0.4	0.05
90	0.56	0.4	0.1
90	0.5	0.4	0.15
90	0.45	0.4	0.2
90	0.36	0.4	0.3
90	0.3	0.4	0.4
90	0.7	0.5	0
90	0.61	0.5	0.05
90	0.54	0.5	0.1
90	0.48	0.5	0.15
90	0.43	0.5	0.2
90	0.35	0.5	0.3
90	0.28	0.5	0.4
90	0.66	0.6	0
90	0.58	0.6	0.05
90	0.51	0.6	0.1
90	0.45	0.6	0.15
90	0.41	0.6	0.2
90	0.33	0.6	0.3
90	0.27	0.6	0.4
90	0.62	0.7	0
90	0.55	0.7	0.05
90	0.48	0.7	0.1
90	0.43	0.7	0.15
90	0.38	0.7	0.2
90	0.31	0.7	0.3
90	0.26	0.7	0.4
90	0.58	0.8	0
90	0.51	0.8	0.05
90	0.45	0.8	0.1
90	0.4	0.8	0.15
90	0.36	0.8	0.2
90	0.29	0.8	0.3
90	0.24	0.8	0.4
90	0.54	0.9	0
90	0.47	0.9	0.05
90	0.42	0.9	0.1
90	0.37	0.9	0.15
90	0.33	0.9	0.2
90	0.27	0.9	0.3
90	0.22	0.9	0.4
90	0.48	1	0
90	0.42	1	0.05
90	0.38	1	0.1
90	0.34	1	0.15
90	0.3	1	0.2
90	0.25	1	0.3
90	0.21	1	0.4

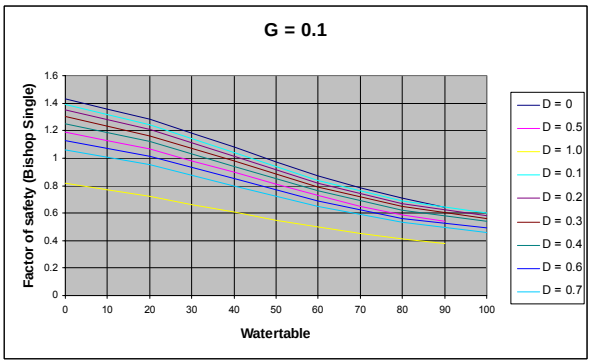
WT	F	D	G
100	0.8	0	0
100	0.7	0	0.05
100	0.62	0	0.1
100	0.55	0	0.15
100	0.49	0	0.2
100	0.39	0	0.3
100	0.32	0	0.4
100	0.78	0.1	0
100	0.68	0.1	0.05
100	0.6	0.1	0.1
100	0.53	0.1	0.15
100	0.47	0.1	0.2
100	0.38	0.1	0.3
100	0.31	0.1	0.4
100	0.76	0.2	0
100	0.66	0.2	0.05
100	0.58	0.2	0.1
100	0.52	0.2	0.15
100	0.46	0.2	0.2
100	0.37	0.2	0.3
100	0.3	0.2	0.4
100	0.73	0.3	0
100	0.64	0.3	0.05
100	0.56	0.3	0.1
100	0.5	0.3	0.15
100	0.45	0.3	0.2
100	0.36	0.3	0.3
100	0.29	0.3	0.4
100	0.7	0.4	0
100	0.61	0.4	0.05
100	0.54	0.4	0.1
100	0.48	0.4	0.15
100	0.43	0.4	0.2
100	0.35	0.4	0.3
100	0.28	0.4	0.4
100	0.67	0.5	0
100	0.59	0.5	0.05
100	0.52	0.5	0.1
100	0.46	0.5	0.15
100	0.41	0.5	0.2
100	0.33	0.5	0.3
100	0.27	0.5	0.4
100	0.64	0.6	0
100	0.56	0.6	0.05
100	0.49	0.6	0.1
100	0.44	0.6	0.15
100	0.39	0.6	0.2
100	0.32	0.6	0.3
100	0.26	0.6	0.4
100	0.6	0.7	0
100	0.53	0.7	0.05
100	0.46	0.7	0.1
100	0.41	0.7	0.15
100	0.37	0.7	0.2
100	0.3	0.7	0.3
100	0.25	0.7	0.4
100	0.56	0.8	0
100	0.49	0.8	0.05
100	0.43	0.8	0.1
100	0.39	0.8	0.15
100	0.35	0.8	0.2
100	0.28	0.8	0.3
100	0.23	0.8	0.4
100	0.52	0.9	0
100	0.45	0.9	0.05
100	0.4	0.9	0.1
100	0.36	0.9	0.15
100	0.32	0.9	0.2
100	0.26	0.9	0.3
100	0.22	0.9	0.4
100	0.46	1	0
100	0.41	1	0.05
100	0.36	1	0.1
100	0.32	1	0.15
100	0.29	1	0.2
100	0.24	1	0.3
100	0.2	1	0.4

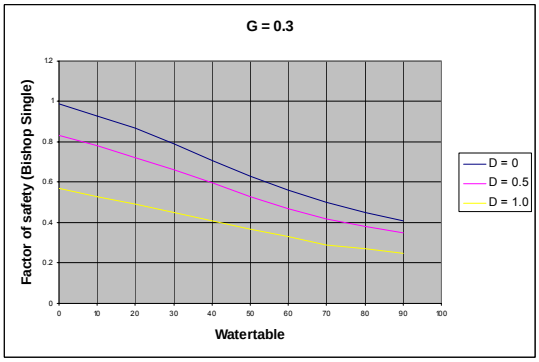

G = 0.0
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9

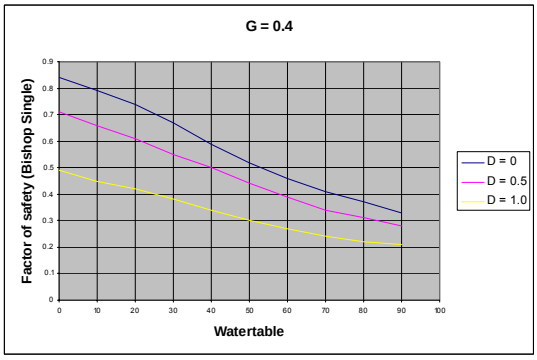

G = 0.15
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6


G = 0.05
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.2
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4


G = 0.1
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7


G = 0.3
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0


G = 0.4
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0

Slope profile 6

Analysis	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G
1	0	1.75	0	0	10	1.69	0	0	20	1.63	0	0	30	1.58	0	0	40	1.49	0	0	50	1.38	0	0
2	0	1.55	0	0.05	10	1.5	0	0.05	20	1.45	0	0.05	30	1.39	0	0.05	40	1.32	0	0.05	50	1.22	0	0.05
3	0	1.39	0	0.1	10	1.34	0	0.1	20	1.29	0	0.1	30	1.24	0	0.1	40	1.17	0	0.1	50	1.08	0	0.1
4	0	1.25	0	0.15	10	1.2	0	0.15	20	1.16	0	0.15	30	1.12	0	0.15	40	1.05	0	0.15	50	0.96	0	0.15
5	0	1.13	0	0.2	10	1.09	0	0.2	20	1.05	0	0.2	30	1.01	0	0.2	40	0.95	0	0.2	50	0.87	0	0.2
6	0	0.95	0	0.3	10	0.91	0	0.3	20	0.87	0	0.3	30	0.83	0	0.3	40	0.78	0	0.3	50	0.71	0	0.3
7	0	0.8	0	0.4	10	0.76	0	0.4	20	0.73	0	0.4	30	0.7	0	0.4	40	0.65	0	0.4	50	0.59	0	0.4
8	0	1.7	0.1	0	10	1.64	0.1	0	20	1.58	0.1	0	30	1.53	0.1	0	40	1.45	0.1	0	50	1.34	0.1	0
9	0	1.51	0.1	0.05	10	1.45	0.1	0.05	20	1.4	0.1	0.05	30	1.35	0.1	0.05	40	1.28	0.1	0.05	50	1.18	0.1	0.05
10	0	1.35	0.1	0.1	10	1.3	0.1	0.1	20	1.25	0.1	0.1	30	1.21	0.1	0.1	40	1.14	0.1	0.1	50	1.05	0.1	0.1
11	0	1.22	0.1	0.15	10	1.17	0.1	0.15	20	1.13	0.1	0.15	30	1.08	0.1	0.15	40	1.02	0.1	0.15	50	0.94	0.1	0.15
12	0	1.1	0.1	0.2	10	1.06	0.1	0.2	20	1.02	0.1	0.2	30	0.98	0.1	0.2	40	0.92	0.1	0.2	50	0.84	0.1	0.2
13	0	0.92	0.1	0.3	10	0.88	0.1	0.3	20	0.84	0.1	0.3	30	0.81	0.1	0.3	40	0.76	0.1	0.3	50	0.69	0.1	0.3
14	0	0.78	0.1	0.4	10	0.74	0.1	0.4	20	0.71	0.1	0.4	30	0.68	0.1	0.4	40	0.63	0.1	0.4	50	0.57	0.1	0.4
15	0	1.65	0.2	0	10	1.59	0.2	0	20	1.54	0.2	0	30	1.48	0.2	0	40	1.4	0.2	0	50	1.3	0.2	0
16	0	1.47	0.2	0.05	10	1.41	0.2	0.05	20	1.36	0.2	0.05	30	1.31	0.2	0.05	40	1.24	0.2	0.05	50	1.14	0.2	0.05
17	0	1.31	0.2	0.1	10	1.26	0.2	0.1	20	1.21	0.2	0.1	30	1.17	0.2	0.1	40	1.1	0.2	0.1	50	1.02	0.2	0.1
18	0	1.18	0.2	0.15	10	1.14	0.2	0.15	20	1.09	0.2	0.15	30	1.05	0.2	0.15	40	0.99	0.2	0.15	50	0.91	0.2	0.15
19	0	1.07	0.2	0.2	10	1.03	0.2	0.2	20	0.99	0.2	0.2	30	0.95	0.2	0.2	40	0.89	0.2	0.2	50	0.82	0.2	0.2
20	0	0.89	0.2	0.3	10	0.85	0.2	0.3	20	0.82	0.2	0.3	30	0.78	0.2	0.3	40	0.73	0.2	0.3	50	0.67	0.2	0.3
21	0	0.76	0.2	0.4	10	0.72	0.2	0.4	20	0.69	0.2	0.4	30	0.66	0.2	0.4	40	0.61	0.2	0.4	50	0.55	0.2	0.4
22	0	1.6	0.3	0	10	1.54	0.3	0	20	1.48	0.3	0	30	1.43	0.3	0	40	1.36	0.3	0	50	1.26	0.3	0
23	0	1.42	0.3	0.05	10	1.37	0.3	0.05	20	1.31	0.3	0.05	30	1.27	0.3	0.05	40	1.2	0.3	0.05	50	1.11	0.3	0.05
24	0	1.27	0.3	0.1	10	1.22	0.3	0.1	20	1.17	0.3	0.1	30	1.13	0.3	0.1	40	1.07	0.3	0.1	50	0.98	0.3	0.1
25	0	1.15	0.3	0.15	10	1.1	0.3	0.15	20	1.06	0.3	0.15	30	1.02	0.3	0.15	40	0.96	0.3	0.15	50	0.88	0.3	0.15
26	0	1.04	0.3	0.2	10	1	0.3	0.2	20	0.95	0.3	0.2	30	0.92	0.3	0.2	40	0.86	0.3	0.2	50	0.79	0.3	0.2
27	0	0.87	0.3	0.3	10	0.83	0.3	0.3	20	0.79	0.3	0.3	30	0.76	0.3	0.3	40	0.71	0.3	0.3	50	0.65	0.3	0.3
28	0	0.73	0.3	0.4	10	0.7	0.3	0.4	20	0.66	0.3	0.4	30	0.64	0.3	0.4	40	0.59	0.3	0.4	50	0.54	0.3	0.4
29	0	1.54	0.4	0	10	1.48	0.4	0	20	1.42	0.4	0	30	1.38	0.4	0	40	1.3	0.4	0	50	1.21	0.4	0
30	0	1.37	0.4	0.05	10	1.36	0.4	0.05	20	1.26	0.4	0.05	30	1.22	0.4	0.05	40	1.15	0.4	0.05	50	1.06	0.4	0.05
31	0	1.22	0.4	0.1	10	1.17	0.4	0.1	20	1.13	0.4	0.1	30	1.09	0.4	0.1	40	1.02	0.4	0.1	50	0.94	0.4	0.1
32	0	1.1	0.4	0.15	10	1.06	0.4	0.15	20	1.01	0.4	0.15	30	0.98	0.4	0.15	40	0.92	0.4	0.15	50	0.84	0.4	0.15
33	0	1	0.4	0.2	10	0.96	0.4	0.2	20	0.92	0.4	0.2	30	0.88	0.4	0.2	40	0.83	0.4	0.2	50	0.76	0.4	0.2
34	0	0.84	0.4	0.3	10	0.8	0.4	0.3	20	0.76	0.4	0.3	30	0.73	0.4	0.3	40	0.68	0.4	0.3	50	0.62	0.4	0.3
35	0	0.71	0.4	0.4	10	0.67	0.4	0.4	20	0.64	0.4	0.4	30	0.61	0.4	0.4	40	0.57	0.4	0.4	50	0.51	0.4	0.4
36	0	1.48	0.5	0	10	1.42	0.5	0	20	1.36	0.5	0	30	1.31	0.5	0	40	1.24	0.5	0	50	1.15	0.5	0
37	0	1.31	0.5	0.05	10	1.26	0.5	0.05	20	1.21	0.5	0.05	30	1.16	0.5	0.05	40	1.1	0.5	0.05	50	1.02	0.5	0.05
38	0	1.17	0.5	0.1	10	1.12	0.5	0.1	20	1.08	0.5	0.1	30	1.04	0.5	0.1	40	0.98	0.5	0.1	50	0.9	0.5	0.1
39	0	1.06	0.5	0.15	10	1.01	0.5	0.15	20	0.97	0.5	0.15	30	0.93	0.5	0.15	40	0.88	0.5	0.15	50	0.81	0.5	0.15
40	0	0.96	0.5	0.2	10	0.92	0.5	0.2	20	0.88	0.5	0.2	30	0.84	0.5	0.2	40	0.79	0.5	0.2	50	0.73	0.5	0.2
41	0	0.8	0.5	0.3	10	0.76	0.5	0.3	20	0.73	0.5	0.3	30	0.7	0.5	0.3	40	0.65	0.5	0.3	50	0.59	0.5	0.3
42	0	0.68	0.5	0.4	10	0.64	0.5	0.4	20	0.63	0.5	0.4	30	0.58	0.5	0.4	40	0.54	0.5	0.4	50	0.49	0.5	0.4
43	0	1.4	0.6	0	10	1.35	0.6	0	20	1.29	0.6	0	30	1.25	0.6	0	40	1.18	0.6	0	50	1.09	0.6	0
44	0	1.25	0.6	0.05	10	1.19	0.6	0.05	20	1.14	0.6	0.05	30	1.1	0.6	0.05	40	1.04	0.6	0.05	50	0.96	0.6	0.05
45	0	1.12	0.6	0.1	10	1.07	0.6	0.1	20	1.02	0.6	0.1	30	0.98	0.6	0.1	40	0.93	0.6	0.1	50	0.86	0.6	0.1
46	0	1.01	0.6	0.15	10	0.96	0.6	0.15	20	0.92	0.6	0.15	30	0.88	0.6	0.15	40	0.83	0.6	0.15	50	0.77	0.6	0.15
47	0	0.91	0.6	0.2	10	0.87	0.6	0.2	20	0.83	0.6	0.2	30	0.8	0.6	0.2	40	0.75	0.6	0.2	50	0.69	0.6	0.2
48	0	0.76	0.6	0.3	10	0.72	0.6	0.3	20	0.69	0.6	0.3	30	0.66	0.6	0.3	40	0.62	0.6	0.3	50	0.56	0.6	0.3
49	0	0.65	0.6	0.4	10	0.61	0.6	0.4	20	0.58	0.6	0.4	30	0.55	0.6	0.4	40	0.52	0.6	0.4	50	0.47	0.6	0.4
50	0	1.33	0.7	0	10	1.27	0.7	0	20	1.21	0.7	0	30	1.17	0.7	0	40	1.11	0.7	0	50	1.03	0.7	0
51	0	1.18	0.7	0.05	10	1.12	0.7	0.05	20	1.07	0.7	0.05	30	1.04	0.7	0.05	40	0.98	0.7	0.05	50	0.91	0.7	0.05
52	0	1.05	0.7	0.1	10	1.01	0.7	0.1	20	0.96	0.7	0.1	30	0.92	0.7	0.1	40	0.87	0.7	0.1	50	0.81	0.7	0.1
53	0	0.95	0.7	0.15	10	0.91	0.7	0.15	20	0.86	0.7	0.15	30	0.83	0.7	0.15	40	0.78	0.7	0.15	50	0.72	0.7	0.15
54	0	0.86	0.7	0.2	10	0.82	0.7	0.2	20	0.78	0.7	0.2	30	0.75	0.7	0.2	40	0.71	0.7	0.2	50	0.65	0.7	0.2
55	0	0.72	0.7	0.3	10	0.68	0.7	0.3	20	0.65	0.7	0.3	30	0.62	0.7	0.3	40	0.58	0.7	0.3	50	0.53	0.7	0.3
56	0	0.61	0.7	0.4	10	0.58	0.7	0.4	20	0.55	0.7	0.4	30	0.52	0.7	0.4	40	0.49	0.7	0.4	50	0.44	0.7	0.4
57	0	1.24	0.8	0	10	1.18	0.8	0	20	1.13	0.8	0	30	1.09	0.8	0	40	1.03	0.8	0	50	0.96	0.8	0
58	0	1.1	0.8	0.05	10	1.05	0.8	0.05	20	1	0.8	0.05	30	0.96	0.8	0.05	40	0.91	0.8	0.05	50	0.84	0.8	0.05
59	0	0.99	0.8	0.1	10	0.94	0.8	0.1	20	0.89	0.8	0.1	30	0.86	0.8	0.1	40	0.81	0.8	0.1	50	0.75	0.8	0.1
60	0	0.89	0.8	0.15	10	0.85	0.8	0.15	20	0.8	0.8	0.15	30	0.77	0.8	0.15	40	0.73	0.8	0.15	50	0.67	0.8	0.15
61	0	0.81	0.8	0.2	10	0.77	0.8	0.2	20	0.73	0.8	0.2	30	0.7	0.8	0.2	40	0.66	0.8	0.2	50	0.6	0.8	0.2
62	0	0.68	0.8	0.3	10	0.64	0.8	0.3	20	0.6	0.8	0.3	30	0.58	0.8	0.3	40	0.54	0.8	0.3	50	0.5	0.8	0.3
63	0	0.57	0.8	0.4	10	0.54	0.8	0.4	20	0.51	0.8	0.4	30	0.49	0.8	0.4	40	0.45	0.8	0.4	50	0.41	0.8	0.4
64	0	1.15	0.9	0	10	1.09	0.9	0	20	1.04	0.9	0	30	1	0.9	0	40	0.95	0.9	0	50	0.88	0.9	0
65	0	1.02	0.9	0.05	10	0.97	0.9	0.05	20	0.92	0.9	0.05	30	0.88	0.9	0.05	40	0.84	0.9	0.05	50	0.78	0.9	0.05
66	0	0.91	0.9	0.1	10	0.86	0.9	0.1	20	0.82	0.9	0.1	30	0.79	0.9	0.1	40	0.75	0.9	0.1	50	0.69	0.9	0.1
67	0	0.82	0.9	0.15	10	0.78	0.9	0.15	20	0.74	0.9	0.15	30	0.71	0.9	0.15	40	0.67	0.9	0.15	50	0.62	0.9	0.15
68	0	0.75	0.9	0.2	10	0.71	0.9	0.2	20	0.67	0.9	0.2	30	0.64	0.9	0.2	40	0.6	0.9	0.2	50	0.56	0.9	0.2
69	0	0.63	0.9	0.3	10	0.59	0.9	0.3	20	0.55	0.9	0.3	30	0.53	0.9	0.3	40	0.5	0.9	0.3	50	0.46	0.9	0.3
70	0	0.53	0.9	0.4	10	0.5	0.9	0.4	20	0.47	0.9	0.4	30	0.45	0.9	0.4	40	0.42	0.9	0.4	50	0.38	0.9	0.4
71	0	1.04	1	0	10	0.98	1	0	20	0.93	1	0	30	0.9	1	0	40	0.85	1	0	50	0.79	1	0
72	0	0.92	1	0.05	10	0.87	1	0.05	20	0.82	1	0.05	30	0.79	1	0.05	40	0.75	1	0.05	50	0.7	1	0.05
73	0	0.83	1	0.1	10	0.78	1	0.1	20	0.74	1	0.1	30	0.71	1	0.1	40	0.67	1	0.1	50	0.62	1	0.1
74	0	0.75	1	0.15	10	0.7	1	0.15	20	0.66	1	0.15	30	0.64	1	0.15	40	0.6	1	0.15	50	0.55	1	0.15
75	0	0.68	1	0.2	10	0.64	1	0.2	20	0.6	1	0.2	30	0.58	1	0.2	40	0.54	1	0.2	50	0.5	1	0.2
76	0	0.57	1	0.3	10	0.53	1	0.3	20	0.5	1	0.3	30	0.48	1	0.3	40	0.45	1	0.3	50	0.41	1	0.3
77	0	0.48	1	0.4	10	0.45	1	0.4	20	0.42	1	0.4	30	0.4	1	0.4	40	0.38	1	0.4	50	0.34	1	0.4

WT = watertable elevation

F = factor of safety

D = disturbance factor

G = earthquake force

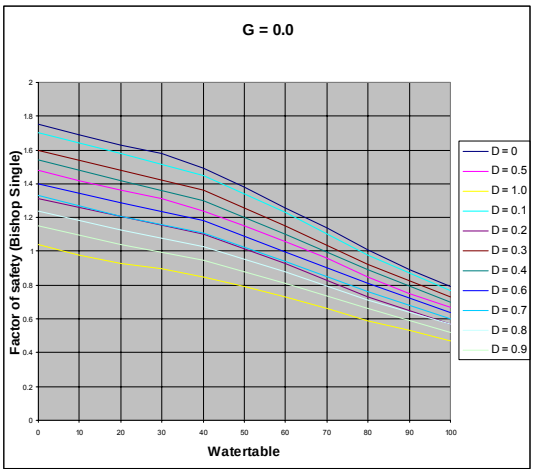
WT	F	D	G
60	1.26	0	0
60	1.11	0	0.05
60	0.98	0	0.1
60	0.88	0	0.15
60	0.78	0	0.2
60	0.64	0	0.3
60	0.52	0	0.4
60	1.23	0.1	0
60	1.08	0.1	0.05
60	0.95	0.1	0.1
60	0.85	0.1	0.15
60	0.76	0.1	0.2
60	0.62	0.1	0.3
60	0.51	0.1	0.4
60	1.19	0.2	0
60	1.04	0.2	0.05
60	0.93	0.2	0.1
60	0.82	0.2	0.15
60	0.74	0.2	0.2
60	0.6	0.2	0.3
60	0.49	0.2	0.4
60	1.15	0.3	0
60	1.01	0.3	0.05
60	0.9	0.3	0.1
60	0.8	0.3	0.15
60	0.72	0.3	0.2
60	0.58	0.3	0.3
60	0.48	0.3	0.4
60	1.1	0.4	0
60	0.97	0.4	0.05
60	0.86	0.4	0.1
60	0.77	0.4	0.15
60	0.69	0.4	0.2
60	0.56	0.4	0.3
60	0.46	0.4	0.4
60	1.06	0.5	0
60	0.93	0.5	0.05
60	0.82	0.5	0.1
60	0.73	0.5	0.15
60	0.66	0.5	0.2
60	0.53	0.5	0.3
60	0.44	0.5	0.4
60	1	0.6	0
60	0.88	0.6	0.05
60	0.78	0.6	0.1
60	0.7	0.6	0.15
60	0.62	0.6	0.2
60	0.51	0.6	0.3
60	0.42	0.6	0.4
60	0.94	0.7	0
60	0.83	0.7	0.05
60	0.74	0.7	0.1
60	0.66	0.7	0.15
60	0.59	0.7	0.2
60	0.48	0.7	0.3
60	0.4	0.7	0.4
60	0.88	0.8	0
60	0.77	0.8	0.05
60	0.69	0.8	0.1
60	0.61	0.8	0.15
60	0.55	0.8	0.2
60	0.45	0.8	0.3
60	0.37	0.8	0.4
60	0.81	0.9	0
60	0.71	0.9	0.05
60	0.63	0.9	0.1
60	0.56	0.9	0.15
60	0.51	0.9	0.2
60	0.41	0.9	0.3
60	0.34	0.9	0.4
60	0.73	1	0
60	0.64	1	0.05
60	0.57	1	0.1
60	0.51	1	0.15
60	0.46	1	0.2
60	0.37	1	0.3
60	0.31	1	0.4

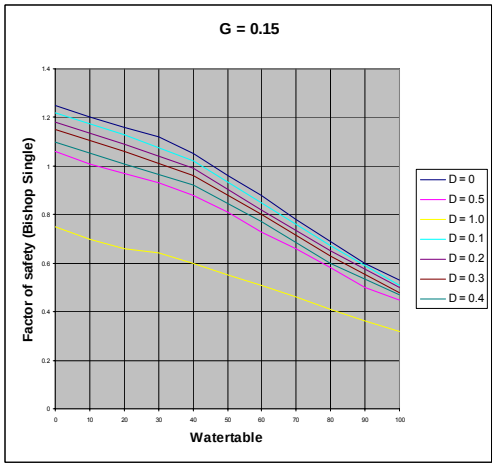
WT	F	D	G
70	1.14	0	0
70	1	0	0.05
70	0.88	0	0.1
70	0.78	0	0.15
70	0.7	0	0.2
70	0.56	0	0.3
70	0.46	0	0.4
70	1.11	0.1	0
70	0.97	0.1	0.05
70	0.86	0.1	0.1
70	0.76	0.1	0.15
70	0.68	0.1	0.2
70	0.55	0.1	0.3
70	0.45	0.1	0.4
70	1.07	0.2	0
70	0.94	0.2	0.05
70	0.83	0.2	0.1
70	0.74	0.2	0.15
70	0.66	0.2	0.2
70	0.53	0.2	0.3
70	0.43	0.2	0.4
70	1.04	0.3	0
70	0.91	0.3	0.05
70	0.8	0.3	0.1
70	0.71	0.3	0.15
70	0.64	0.3	0.2
70	0.51	0.3	0.3
70	0.42	0.3	0.4
70	1	0.4	0
70	0.87	0.4	0.05
70	0.77	0.4	0.1
70	0.69	0.4	0.15
70	0.61	0.4	0.2
70	0.49	0.4	0.3
70	0.4	0.4	0.4
70	0.96	0.5	0
70	0.84	0.5	0.05
70	0.74	0.5	0.1
70	0.66	0.5	0.15
70	0.59	0.5	0.2
70	0.47	0.5	0.3
70	0.39	0.5	0.4
70	0.91	0.6	0
70	0.8	0.6	0.05
70	0.7	0.6	0.1
70	0.62	0.6	0.15
70	0.56	0.6	0.2
70	0.45	0.6	0.3
70	0.37	0.6	0.4
70	0.85	0.7	0
70	0.75	0.7	0.05
70	0.66	0.7	0.1
70	0.59	0.7	0.15
70	0.53	0.7	0.2
70	0.42	0.7	0.3
70	0.35	0.7	0.4
70	0.8	0.8	0
70	0.7	0.8	0.05
70	0.62	0.8	0.1
70	0.55	0.8	0.15
70	0.49	0.8	0.2
70	0.4	0.8	0.3
70	0.33	0.8	0.4
70	0.73	0.9	0
70	0.64	0.9	0.05
70	0.57	0.9	0.1
70	0.51	0.9	0.15
70	0.45	0.9	0.2
70	0.37	0.9	0.3
70	0.3	0.9	0.4
70	0.66	1	0
70	0.58	1	0.05
70	0.51	1	0.1
70	0.46	1	0.15
70	0.41	1	0.2
70	0.33	1	0.3
70	0.27	1	0.4

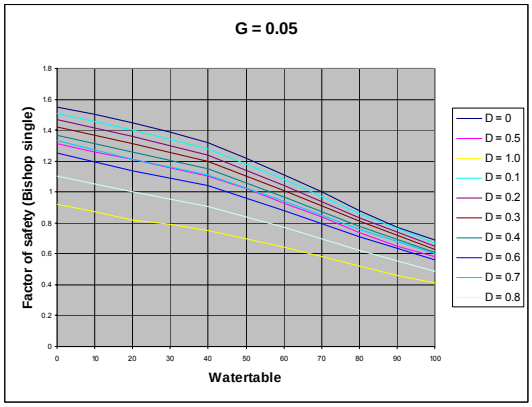
WT	F	D	G
80	1.01	0	0
80	0.88	0	0.05
80	0.78	0	0.1
80	0.69	0	0.15
80	0.61	0	0.2
80	0.49	0	0.3
80	0.39	0	0.4
80	0.98	0.1	0
80	0.86	0.1	0.05
80	0.75	0.1	0.1
80	0.67	0.1	0.15
80	0.59	0.1	0.2
80	0.47	0.1	0.3
80	0.38	0.1	0.4
80	0.96	0.2	0
80	0.83	0.2	0.05
80	0.73	0.2	0.1
80	0.65	0.2	0.15
80	0.58	0.2	0.2
80	0.46	0.2	0.3
80	0.37	0.2	0.4
80	0.92	0.3	0
80	0.81	0.3	0.05
80	0.71	0.3	0.1
80	0.63	0.3	0.15
80	0.56	0.3	0.2
80	0.45	0.3	0.3
80	0.36	0.3	0.4
80	0.89	0.4	0
80	0.78	0.4	0.05
80	0.68	0.4	0.1
80	0.6	0.4	0.15
80	0.54	0.4	0.2
80	0.43	0.4	0.3
80	0.35	0.4	0.4
80	0.85	0.5	0
80	0.74	0.5	0.05
80	0.65	0.5	0.1
80	0.58	0.5	0.15
80	0.51	0.5	0.2
80	0.41	0.5	0.3
80	0.33	0.5	0.4
80	0.81	0.6	0
80	0.71	0.6	0.05
80	0.62	0.6	0.1
80	0.55	0.6	0.15
80	0.49	0.6	0.2
80	0.39	0.6	0.3
80	0.32	0.6	0.4
80	0.76	0.7	0
80	0.67	0.7	0.05
80	0.59	0.7	0.1
80	0.52	0.7	0.15
80	0.46	0.7	0.2
80	0.37	0.7	0.3
80	0.3	0.7	0.4
80	0.71	0.8	0
80	0.62	0.8	0.05
80	0.55	0.8	0.1
80	0.49	0.8	0.15
80	0.43	0.8	0.2
80	0.35	0.8	0.3
80	0.28	0.8	0.4
80	0.66	0.9	0
80	0.57	0.9	0.05
80	0.51	0.9	0.1
80	0.45	0.9	0.15
80	0.4	0.9	0.2
80	0.32	0.9	0.3
80	0.26	0.9	0.4
80	0.59	1	0
80	0.52	1	0.05
80	0.46	1	0.1
80	0.41	1	0.15
80	0.36	1	0.2
80	0.29	1	0.3
80	0.24	1	0.4

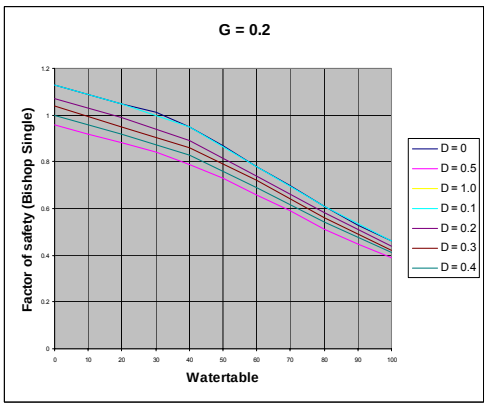
WT	F	D	G
90	0.89	0	0
90	0.77	0	0.05
90	0.68	0	0.1
90	0.6	0	0.15
90	0.53	0	0.2
90	0.42	0	0.3
90	0.33	0	0.4
90	0.87	0.1	0
90	0.75	0.1	0.05
90	0.66	0.1	0.1
90	0.58	0.1	0.15
90	0.51	0.1	0.2
90	0.41	0.1	0.3
90	0.32	0.1	0.4
90	0.84	0.2	0
90	0.73	0.2	0.05
90	0.64	0.2	0.1
90	0.56	0.2	0.15
90	0.5	0.2	0.2
90	0.39	0.2	0.3
90	0.31	0.2	0.4
90	0.81	0.3	0
90	0.71	0.3	0.05
90	0.62	0.3	0.1
90	0.55	0.3	0.15
90	0.48	0.3	0.2
90	0.38	0.3	0.3
90	0.31	0.3	0.4
90	0.78	0.4	0
90	0.68	0.4	0.05
90	0.6	0.4	0.1
90	0.53	0.4	0.15
90	0.47	0.4	0.2
90	0.37	0.4	0.3
90	0.29	0.4	0.4
90	0.75	0.5	0
90	0.65	0.5	0.05
90	0.57	0.5	0.1
90	0.5	0.5	0.15
90	0.45	0.5	0.2
90	0.36	0.5	0.3
90	0.28	0.5	0.4
90	0.71	0.6	0
90	0.62	0.6	0.05
90	0.55	0.6	0.1
90	0.48	0.6	0.15
90	0.43	0.6	0.2
90	0.34	0.6	0.3
90	0.27	0.6	0.4
90	0.67	0.7	0
90	0.59	0.7	0.05
90	0.52	0.7	0.1
90	0.45	0.7	0.15
90	0.4	0.7	0.2
90	0.32	0.7	0.3
90	0.26	0.7	0.4
90	0.63	0.8	0
90	0.55	0.8	0.05
90	0.48	0.8	0.1
90	0.43	0.8	0.15
90	0.38	0.8	0.2
90	0.3	0.8	0.3
90	0.24	0.8	0.4
90	0.58	0.9	0
90	0.51	0.9	0.05
90	0.45	0.9	0.1
90	0.39	0.9	0.15
90	0.35	0.9	0.2
90	0.28	0.9	0.3
90	0.22	0.9	0.4
90	0.53	1	0
90	0.46	1	0.05
90	0.4	1	0.1
90	0.36	1	0.15
90	0.32	1	0.2
90	0.25	1	0.3
90	0.2	1	0.4

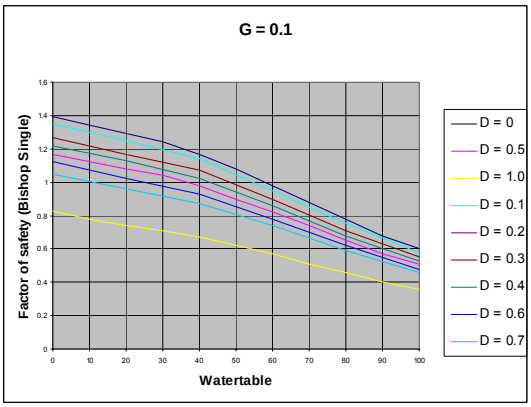
WT	F	D	G
100	0.79	0	0
100	0.69	0	0.05
100	0.6	0	0.1
100	0.53	0	0.15
100	0.46	0	0.2
100	0.36	0	0.3
100	0.29	0	0.4
100	0.77	0.1	0
100	0.67	0.1	0.05
100	0.58	0.1	0.1
100	0.51	0.1	0.15
100	0.45	0.1	0.2
100	0.35	0.1	0.3
100	0.28	0.1	0.4
100	0.75	0.2	0
100	0.65	0.2	0.05
100	0.57	0.2	0.1
100	0.5	0.2	0.15
100	0.44	0.2	0.2
100	0.34	0.2	0.3
100	0.27	0.2	0.4
100	0.73	0.3	0
100	0.63	0.3	0.05
100	0.55	0.3	0.1
100	0.48	0.3	0.15
100	0.42	0.3	0.2
100	0.33	0.3	0.3
100	0.26	0.3	0.4
100	0.7	0.4	0
100	0.61	0.4	0.05
100	0.53	0.4	0.1
100	0.47	0.4	0.15
100	0.41	0.4	0.2
100	0.32	0.4	0.3
100	0.26	0.4	0.4
100	0.67	0.5	0
100	0.58	0.5	0.05
100	0.51	0.5	0.1
100	0.45	0.5	0.15
100	0.39	0.5	0.2
100	0.31	0.5	0.3
100	0.25	0.5	0.4
100	0.64	0.6	0
100	0.56	0.6	0.05
100	0.48	0.6	0.1
100	0.43	0.6	0.15
100	0.38	0.6	0.2
100	0.3	0.6	0.3
100	0.24	0.6	0.4
100	0.6	0.7	0
100	0.53	0.7	0.05
100	0.46	0.7	0.1
100	0.4	0.7	0.15
100	0.36	0.7	0.2
100	0.28	0.7	0.3
100	0.22	0.7	0.4
100	0.57	0.8	0
100	0.49	0.8	0.05
100	0.43	0.8	0.1
100	0.38	0.8	0.15
100	0.33	0.8	0.2
100	0.26	0.8	0.3
100	0.21	0.8	0.4
100	0.52	0.9	0
100	0.46	0.9	0.05
100	0.4	0.9	0.1
100	0.35	0.9	0.15
100	0.31	0.9	0.2
100	0.25	0.9	0.3
100	0.2	0.9	0.4
100	0.47	1	0
100	0.41	1	0.05
100	0.36	1	0.1
100	0.32	1	0.15
100	0.28	1	0.2
100	0.22	1	0.3
100	0.18	1	0.4

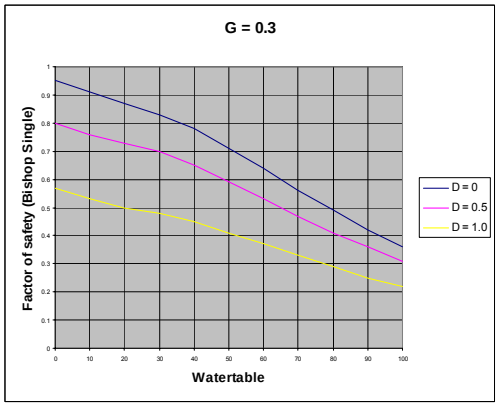

G = 0.0
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9

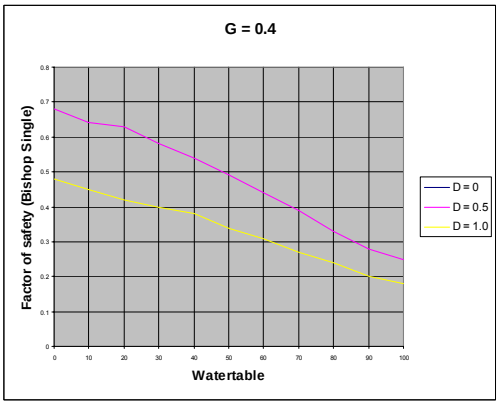

G = 0.15
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4


G = 0.05
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8


G = 0.2
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4


G = 0.1
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7


G = 0.3
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0


G = 0.4
Factor of safety (Bishop Single)
Watertable
D = 0
D = 0.5
D = 1.0

Slope profile 6a.

F	D	G
2.49	0	0
2.14	0	0.05
1.87	0	0.1
1.66	0	0.15
1.48	0	0.2
1.22	0	0.3
1.02	0	0.4
2.41	0.1	0
2.07	0.1	0.05
1.81	0.1	0.1
1.6	0.1	0.15
1.44	0.1	0.2
1.18	0.1	0.3
0.99	0.1	0.4
2.33	0.2	0
2	0.2	0.05
1.75	0.2	0.1
1.55	0.2	0.15
1.39	0.2	0.2
1.14	0.2	0.3
0.96	0.2	0.4
2.24	0.3	0
1.93	0.3	0.05
1.69	0.3	0.1
1.5	0.3	0.15
1.34	0.3	0.2
1.1	0.3	0.3
0.92	0.3	0.4
2.15	0.4	0
1.85	0.4	0.05
1.62	0.4	0.1
1.43	0.4	0.15
1.28	0.4	0.2
1.05	0.4	0.3
0.88	0.4	0.4
2.04	0.5	0
1.76	0.5	0.05
1.54	0.5	0.1
1.36	0.5	0.15
1.22	0.5	0.2
1	0.5	0.3
0.84	0.5	0.4
1.93	0.6	0
1.66	0.6	0.05
1.45	0.6	0.1
1.29	0.6	0.15
1.15	0.6	0.2
0.94	0.6	0.3
0.79	0.6	0.4
1.8	0.7	0
1.55	0.7	0.05
1.36	0.7	0.1
1.2	0.7	0.15
1.07	0.7	0.2
0.88	0.7	0.3
0.74	0.7	0.4
1.67	0.8	0
1.43	0.8	0.05
1.25	0.8	0.1
1.11	0.8	0.15
0.99	0.8	0.2
0.82	0.8	0.3
0.68	0.8	0.4
1.51	0.9	0
1.3	0.9	0.05
1.14	0.9	0.1
1.01	0.9	0.15
0.9	0.9	0.2
0.74	0.9	0.3
0.62	0.9	0.4
1.34	1	0
1.15	1	0.05
1.01	1	0.1
0.89	1	0.15
0.8	1	0.2
0.66	1	0.3
0.55	1	0.4

WT	F	D	G
10	2.49	0	0
10	2.14	0	0.05
10	1.87	0	0.1
10	1.66	0	0.15
10	1.48	0	0.2
10	1.22	0	0.3
10	1.02	0	0.4
10	2.41	0.1	0
10	2.07	0.1	0.05
10	1.81	0.1	0.1
10	1.6	0.1	0.15
10	1.44	0.1	0.2
10	1.18	0.1	0.3
10	0.99	0.1	0.4
10	2.33	0.2	0
10	2	0.2	0.05
10	1.75	0.2	0.1
10	1.55	0.2	0.15
10	1.39	0.2	0.2
10	1.14	0.2	0.3
10	0.96	0.2	0.4
10	2.24	0.3	0
10	1.93	0.3	0.05
10	1.69	0.3	0.1
10	1.5	0.3	0.15
10	1.34	0.3	0.2
10	1.1	0.3	0.3
10	0.92	0.3	0.4
10	2.15	0.4	0
10	1.85	0.4	0.05
10	1.62	0.4	0.1
10	1.43	0.4	0.15
10	1.28	0.4	0.2
10	1.05	0.4	0.3
10	0.88	0.4	0.4
10	2.04	0.5	0
10	1.76	0.5	0.05
10	1.54	0.5	0.1
10	1.36	0.5	0.15
10	1.22	0.5	0.2
10	1	0.5	0.3
10	0.84	0.5	0.4
10	1.93	0.6	0
10	1.66	0.6	0.05
10	1.45	0.6	0.1
10	1.29	0.6	0.15
10	1.15	0.6	0.2
10	0.94	0.6	0.3
10	0.79	0.6	0.4
10	1.8	0.7	0
10	1.55	0.7	0.05
10	1.36	0.7	0.1
10	1.2	0.7	0.15
10	1.07	0.7	0.2
10	0.88	0.7	0.3
10	0.74	0.7	0.4
10	1.67	0.8	0
10	1.43	0.8	0.05
10	1.25	0.8	0.1
10	1.11	0.8	0.15
10	0.99	0.8	0.2
10	0.82	0.8	0.3
10	0.68	0.8	0.4
10	1.51	0.9	0
10	1.3	0.9	0.05
10	1.14	0.9	0.1
10	1.01	0.9	0.15
10	0.9	0.9	0.2
10	0.74	0.9	0.3
10	0.62	0.9	0.4
10	1.34	1	0
10	1.15	1	0.05
10	1.01	1	0.1
10	0.89	1	0.15
10	0.8	1	0.2
10	0.66	1	0.3
10	0.55	1	0.4

WT	F	D	G
20	2.49	0	0
20	2.14	0	0.05
20	1.87	0	0.1
20	1.66	0	0.15
20	1.48	0	0.2
20	1.22	0	0.3
20	1.02	0	0.4
20	2.41	0.1	0
20	2.07	0.1	0.05
20	1.81	0.1	0.1
20	1.6	0.1	0.15
20	1.44	0.1	0.2
20	1.18	0.1	0.3
20	0.99	0.1	0.4
20	2.33	0.2	0
20	2	0.2	0.05
20	1.75	0.2	0.1
20	1.55	0.2	0.15
20	1.39	0.2	0.2
20	1.14	0.2	0.3
20	0.96	0.2	0.4
20	2.24	0.3	0
20	1.93	0.3	0.05
20	1.69	0.3	0.1
20	1.5	0.3	0.15
20	1.34	0.3	0.2
20	1.1	0.3	0.3
20	0.92	0.3	0.4
20	2.15	0.4	0
20	1.85	0.4	0.05
20	1.62	0.4	0.1
20	1.43	0.4	0.15
20	1.28	0.4	0.2
20	1.05	0.4	0.3
20	0.88	0.4	0.4
20	2.04	0.5	0
20	1.76	0.5	0.05
20	1.54	0.5	0.1
20	1.36	0.5	0.15
20	1.22	0.5	0.2
20	1	0.5	0.3
20	0.84	0.5	0.4
20	1.93	0.6	0
20	1.66	0.6	0.05
20	1.45	0.6	0.1
20	1.29	0.6	0.15
20	1.15	0.6	0.2
20	0.94	0.6	0.3
20	0.79	0.6	0.4
20	1.8	0.7	0
20	1.55	0.7	0.05
20	1.36	0.7	0.1
20	1.2	0.7	0.15
20	1.07	0.7	0.2
20	0.88	0.7	0.3
20	0.74	0.7	0.4
20	1.67	0.8	0
20	1.43	0.8	0.05
20	1.25	0.8	0.1
20	1.11	0.8	0.15
20	0.99	0.8	0.2
20	0.82	0.8	0.3
20	0.68	0.8	0.4
20	1.51	0.9	0
20	1.3	0.9	0.05
20	1.14	0.9	0.1
20	1.01	0.9	0.15
20	0.9	0.9	0.2
20	0.74	0.9	0.3
20	0.62	0.9	0.4
20	1.34	1	0
20	1.15	1	0.05
20	1.01	1	0.1
20	0.89	1	0.15
20	0.8	1	0.2
20	0.66	1	0.3
20	0.55	1	0.4

WT	F	D	G
30	2.47	0	0
30	2.13	0	0.05
30	1.86	0	0.1
30	1.65	0	0.15
30	1.47	0	0.2
30	1.21	0	0.3
30	1.01	0	0.4
30	2.39	0.1	0
30	2.06	0.1	0.05
30	1.8	0.1	0.1
30	1.6	0.1	0.15
30	1.43	0.1	0.2
30	1.17	0.1	0.3
30	0.98	0.1	0.4
30	2.32	0.2	0
30	1.99	0.2	0.05
30	1.74	0.2	0.1
30	1.54	0.2	0.15
30	1.38	0.2	0.2
30	1.13	0.2	0.3
30	0.95	0.2	0.4
30	2.23	0.3	0
30	1.92	0.3	0.05
30	1.68	0.3	0.1
30	1.49	0.3	0.15
30	1.33	0.3	0.2
30	1.09	0.3	0.3
30	0.92	0.3	0.4
30	2.13	0.4	0
30	1.84	0.4	0.05
30	1.61	0.4	0.1
30	1.42	0.4	0.15
30	1.27	0.4	0.2
30	1.04	0.4	0.3
30	0.88	0.4	0.4
30	1.95	0.5	0
30	1.75	0.5	0.05
30	1.53	0.5	0.1
30	1.35	0.5	0.15
30	1.21	0.5	0.2
30	0.99	0.5	0.3
30	0.83	0.5	0.4
30	1.92	0.6	0
30	1.65	0.6	0.05
30	1.44	0.6	0.1
30	1.28	0.6	0.15
30	1.14	0.6	0.2
30	0.94	0.6	0.3
30	0.79	0.6	0.4
30	1.79	0.7	0
30	1.54	0.7	0.05
30	1.35	0.7	0.1
30	1.19	0.7	0.15
30	1.07	0.7	0.2
30	0.88	0.7	0.3
30	0.74	0.7	0.4
30	1.66	0.8	0
30	1.43	0.8	0.05
30	1.25	0.8	0.1
30	1.1	0.8	0.15
30	0.99	0.8	0.2
30	0.81	0.8	0.3
30	0.68	0.8	0.4
30	1.51	0.9	0
30	1.3	0.9	0.05
30	1.13	0.9	0.1
30	1	0.9	0.15
30	0.9	0.9	0.2
30	0.74	0.9	0.3
30	0.62	0.9	0.4
30	1.33	1	0
30	1.15	1	0.05
30	1	1	0.1
30	0.89	1	0.15
30	0.8	1	0.2
30	0.65	1	0.3
30	0.55	1	0.4

WT	F	D	G
40	2.16	0	0
40	1.86	0	0.05
40	1.62	0	0.1
40	1.43	0	0.15
40	1.27	0	0.2
40	1.03	0	0.3
40	0.86	0	0.4
40	2.1	0.1	0
40	1.8	0.1	0.05
40	1.56	0.1	0.1
40	1.38	0.1	0.15
40	1.23	0.1	0.2
40	1	0.1	0.3
40	0.83	0.1	0.4
40	2.03	0.2	0
40	1.74	0.2	0.05
40	1.51	0.2	0.1
40	1.34	0.2	0.15
40	1.19	0.2	0.2
40	0.97	0.2	0.3
40	0.81	0.2	0.4
40	1.95	0.3	0
40	1.68	0.3	0.05
40	1.46	0.3	0.1
40	1.29	0.3	0.15
40	1.15	0.3	0.2
40	0.93	0.3	0.3
40	0.78	0.3	0.4
40	1.87	0.4	0
40	1.6	0.4	0.05
40	1.4	0.4	0.1
40	1.23	0.4	0.15
40	1.1	0.4	0.2
40	0.89	0.4	0.3
40	0.74	0.4	0.4
40	1.78	0.5	0
40	1.53	0.5	0.05
40	1.33	0.5	0.1
40	1.17	0.5	0.15
40	1.04	0.5	0.2
40	0.85	0.5	0.3
40	0.71	0.5	0.4
40	1.68	0.6	0
40	1.44	0.6	0.05
40	1.25	0.6	0.1
40	1.11	0.6	0.15
40	0.99	0.6	0.2
40	0.8	0.6	0.3
40	0.67	0.6	0.4
40	1.57	0.7	0
40	1.34	0.7	0.05
40	1.17	0.7	0.1
40	1.03	0.7	0.15
40	0.92	0.7	0.2
40	0.75	0.7	0.3
40	0.62	0.7	0.4
40	1.45	0.8	0
40	1.24	0.8	0.05
40	1.08	0.8	0.1
40	0.96	0.8	0.15
40	0.85	0.8	0.2
40	0.69	0.8	0.3
40	0.58	0.8	0.4
40	1.32	0.9	0
40	1.13	0.9	0.05
40	0.98	0.9	0.1
40	0.87	0.9	0.15
40	0.77	0.9	0.2
40	0.63	0.9	0.3
40	0.52	0.9	0.4
40	1.17	1	0
40	1	1	0.05
40	0.87	1	0.1
40	0.77	1	0.15
40	0.69	1	0.2
40	0.56	1	0.3
40	0.46	1	0.4

WT	F	D	G
50	1.88	0	0
50	1.6	0	0.05
50	1.39	0	0.1
50	1.22	0	0.15
50	1.09	0	0.2
50	0.88	0	0.3
50	0.72	0	0.4
50	1.82	0.1	0
50	1.55	0.1	0.05
50	1.35	0.1	0.1
50	1.18	0.1	0.15
50	1.05	0.1	0.2
50	0.85	0.1	0.3
50	0.7	0.1	0.4
50	1.76	0.2	0
50	1.5	0.2	0.05
50	1.3	0.2	0.1
50	1.15	0.2	0.15
50	1.02	0.2	0.2
50	0.82	0.2	0.3
50	0.68	0.2	0.4
50	1.7	0.3	0
50	1.45	0.3	0.05
50	1.26	0.3	0.1
50	1.1	0.3	0.15
50	0.98	0.3	0.2
50	0.79	0.3	0.3
50	0.65	0.3	0.4
50	1.62	0.4	0
50	1.39	0.4	0.05
50	1.2	0.4	0.1
50	1.06	0.4	0.15
50	0.94	0.4	0.2
50	0.76	0.4	0.3
50	0.62	0.4	0.4
50	1.54	0.5	0
50	1.32	0.5	0.05
50	1.14	0.5	0.1
50	1.01	0.5	0.15
50	0.89	0.5	0.2
50	0.72	0.5	0.3
50	0.59	0.5	0.4
50	1.46	0.6	0
50	1.24	0.6	0.05
50	1.08	0.6	0.1
50	0.95	0.6	0.15
50	0.84	0.6	0.2
50	0.68	0.6	0.3
50	0.56	0.6	0.4
50	1.36	0.7	0
50	1.16	0.7	0.05
50	1.01	0.7	0.1
50	0.89	0.7	0.15
50	0.79	0.7	0.2
50	0.64	0.7	0.3
50	0.52	0.7	0.4
50	1.26	0.8	0
50	1.07	0.8	0.05
50	0.93	0.8	0.1
50	0.82	0.8	0.15
50	0.73	0.8	0.2
50	0.59	0.8	0.3
50	0.48	0.8	0.4
50	1.14	0.9	0
50	0.98	0.9	0.05
50	0.85	0.9	0.1
50	0.75	0.9	0.15
50	0.66	0.9	0.2
50	0.53	0.9	0.3
50	0.44	0.9	0.4
50	1.01	1	0
50	0.87	1	0.05
50	0.75	1	0.1
50	0.66	1	0.15
50	0.59	1	0.2
50	0.47	1	0.3
50	0.39	1	0.4

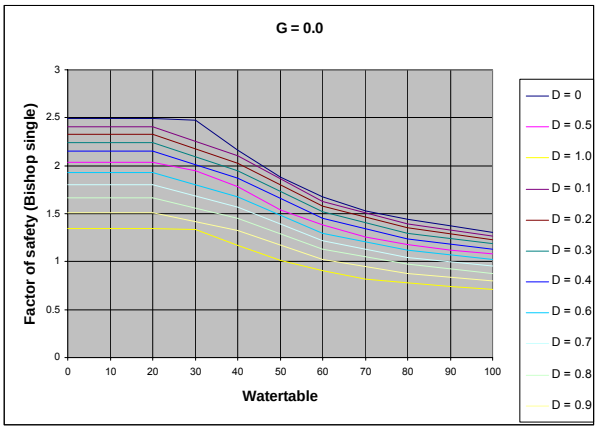
WT = watertable elevation

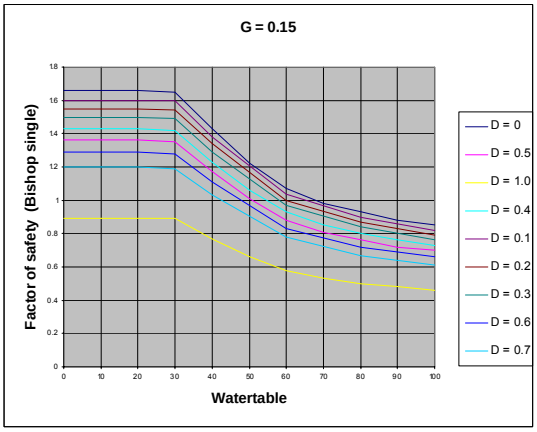
F = factor of safety

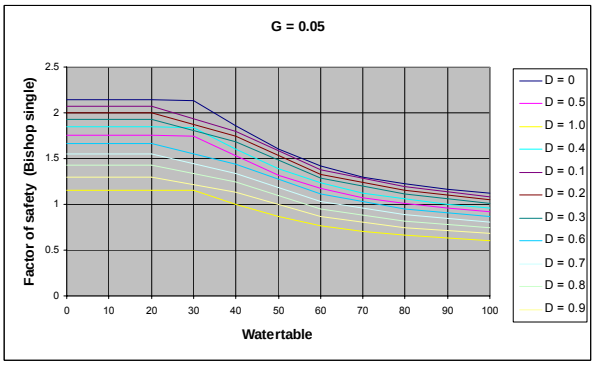
D = disturbance factor

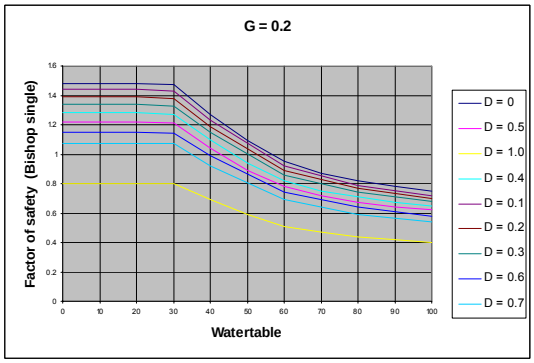
G = earthquake force

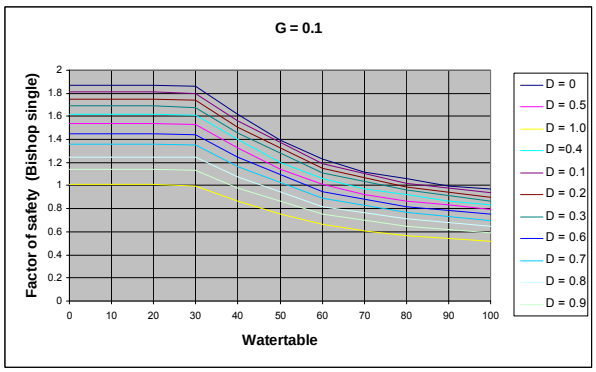
WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G	WT	F	D	G
60	1.68	0	0	70	1.53	0	0	80	1.44	0	0	90	1.37	0	0	100	1.31	0	0
60	1.42	0	0.05	70	1.3	0	0.05	80	1.22	0	0.05	90	1.16	0	0.05	100	1.12	0	0.05
60	1.23	0	0.1	70	1.12	0	0.1	80	1.06	0	0.1	90	1	0	0.1	100	0.97	0	0.1
60	1.07	0	0.15	70	0.98	0	0.15	80	0.93	0	0.15	90	0.88	0	0.15	100	0.85	0	0.15
60	0.95	0	0.2	70	0.87	0	0.2	80	0.82	0	0.2	90	0.78	0	0.2	100	0.75	0	0.2
60	0.76	0	0.3	70	0.7	0	0.3	80	0.66	0	0.3	90	0.62	0	0.3	100	0.6	0	0.3
60	0.62	0	0.4	70	0.57	0	0.4	80	0.54	0	0.4	90	0.51	0	0.4	100	0.49	0	0.4
60	1.63	0.1	0	70	1.48	0.1	0	80	1.39	0.1	0	90	1.32	0.1	0	100	1.27	0.1	0
60	1.38	0.1	0.05	70	1.26	0.1	0.05	80	1.19	0.1	0.05	90	1.13	0.1	0.05	100	1.08	0.1	0.05
60	1.19	0.1	0.1	70	1.09	0.1	0.1	80	1.02	0.1	0.1	90	0.97	0.1	0.1	100	0.94	0.1	0.1
60	1.04	0.1	0.15	70	0.95	0.1	0.15	80	0.9	0.1	0.15	90	0.85	0.1	0.15	100	0.82	0.1	0.15
60	0.92	0.1	0.2	70	0.84	0.1	0.2	80	0.79	0.1	0.2	90	0.75	0.1	0.2	100	0.72	0.1	0.2
60	0.73	0.1	0.3	70	0.68	0.1	0.3	80	0.64	0.1	0.3	90	0.6	0.1	0.3	100	0.58	0.1	0.3
60	0.6	0.1	0.4	70	0.55	0.1	0.4	80	0.52	0.1	0.4	90	0.5	0.1	0.4	100	0.48	0.1	0.4
60	1.58	0.2	0	70	1.43	0.2	0	80	1.35	0.2	0	90	1.28	0.2	0	100	1.23	0.2	0
60	1.33	0.2	0.05	70	1.22	0.2	0.05	80	1.15	0.2	0.05	90	1.09	0.2	0.05	100	1.05	0.2	0.05
60	1.15	0.2	0.1	70	1.05	0.2	0.1	80	0.99	0.2	0.1	90	0.94	0.2	0.1	100	0.9	0.2	0.1
60	1	0.2	0.15	70	0.92	0.2	0.15	80	0.87	0.2	0.15	90	0.82	0.2	0.15	100	0.79	0.2	0.15
60	0.89	0.2	0.2	70	0.82	0.2	0.2	80	0.77	0.2	0.2	90	0.73	0.2	0.2	100	0.7	0.2	0.2
60	0.71	0.2	0.3	70	0.65	0.2	0.3	80	0.62	0.2	0.3	90	0.58	0.2	0.3	100	0.56	0.2	0.3
60	0.58	0.2	0.4	70	0.54	0.2	0.4	80	0.51	0.2	0.4	90	0.48	0.2	0.4	100	0.46	0.2	0.4
60	1.52	0.3	0	70	1.38	0.3	0	80	1.3	0.3	0	90	1.23	0.3	0	100	1.19	0.3	0
60	1.29	0.3	0.05	70	1.17	0.3	0.05	80	1.11	0.3	0.05	90	1.05	0.3	0.05	100	1.01	0.3	0.05
60	1.11	0.3	0.1	70	1.01	0.3	0.1	80	0.96	0.3	0.1	90	0.91	0.3	0.1	100	0.87	0.3	0.1
60	0.97	0.3	0.15	70	0.89	0.3	0.15	80	0.84	0.3	0.15	90	0.79	0.3	0.15	100	0.76	0.3	0.15
60	0.86	0.3	0.2	70	0.79	0.3	0.2	80	0.74	0.3	0.2	90	0.7	0.3	0.2	100	0.68	0.3	0.2
60	0.68	0.3	0.3	70	0.63	0.3	0.3	80	0.59	0.3	0.3	90	0.56	0.3	0.3	100	0.54	0.3	0.3
60	0.56	0.3	0.4	70	0.52	0.3	0.4	80	0.49	0.3	0.4	90	0.46	0.3	0.4	100	0.45	0.3	0.4
60	1.45	0.4	0	70	1.32	0.4	0	80	1.24	0.4	0	90	1.18	0.4	0	100	1.13	0.4	0
60	1.23	0.4	0.05	70	1.12	0.4	0.05	80	1.06	0.4	0.05	90	1	0.4	0.05	100	0.96	0.4	0.05
60	1.06	0.4	0.1	70	0.97	0.4	0.1	80	0.92	0.4	0.1	90	0.87	0.4	0.1	100	0.83	0.4	0.1
60	0.93	0.4	0.15	70	0.85	0.4	0.15	80	0.8	0.4	0.15	90	0.76	0.4	0.15	100	0.73	0.4	0.15
60	0.82	0.4	0.2	70	0.75	0.4	0.2	80	0.71	0.4	0.2	90	0.67	0.4	0.2	100	0.65	0.4	0.2
60	0.65	0.4	0.3	70	0.6	0.4	0.3	80	0.57	0.4	0.3	90	0.54	0.4	0.3	100	0.52	0.4	0.3
60	0.54	0.4	0.4	70	0.49	0.4	0.4	80	0.47	0.4	0.4	90	0.44	0.4	0.4	100	0.43	0.4	0.4
60	1.38	0.5	0	70	1.26	0.5	0	80	1.18	0.5	0	90	1.12	0.5	0	100	1.08	0.5	0
60	1.17	0.5	0.05	70	1.07	0.5	0.05	80	1.01	0.5	0.05	90	0.96	0.5	0.05	100	0.92	0.5	0.05
60	1.01	0.5	0.1	70	0.92	0.5	0.1	80	0.87	0.5	0.1	90	0.83	0.5	0.1	100	0.79	0.5	0.1
60	0.88	0.5	0.15	70	0.81	0.5	0.15	80	0.76	0.5	0.15	90	0.72	0.5	0.15	100	0.7	0.5	0.15
60	0.78	0.5	0.2	70	0.72	0.5	0.2	80	0.67	0.5	0.2	90	0.64	0.5	0.2	100	0.62	0.5	0.2
60	0.62	0.5	0.3	70	0.57	0.5	0.3	80	0.54	0.5	0.3	90	0.51	0.5	0.3	100	0.49	0.5	0.3
60	0.51	0.5	0.4	70	0.47	0.5	0.4	80	0.44	0.5	0.4	90	0.42	0.5	0.4	100	0.41	0.5	0.4
60	1.3	0.6	0	70	1.18	0.6	0	80	1.12	0.6	0	90	1.06	0.6	0	100	1.02	0.6	0
60	1.11	0.6	0.05	70	1.01	0.6	0.05	80	0.95	0.6	0.05	90	0.9	0.6	0.05	100	0.87	0.6	0.05
60	0.95	0.6	0.1	70	0.87	0.6	0.1	80	0.82	0.6	0.1	90	0.78	0.6	0.1	100	0.75	0.6	0.1
60	0.83	0.6	0.15	70	0.76	0.6	0.15	80	0.72	0.6	0.15	90	0.68	0.6	0.15	100	0.66	0.6	0.15
60	0.74	0.6	0.2	70	0.68	0.6	0.2	80	0.64	0.6	0.2	90	0.6	0.6	0.2	100	0.58	0.6	0.2
60	0.59	0.6	0.3	70	0.54	0.6	0.3	80	0.51	0.6	0.3	90	0.48	0.6	0.3	100	0.47	0.6	0.3
60	0.48	0.6	0.4	70	0.44	0.6	0.4	80	0.42	0.6	0.4	90	0.4	0.6	0.4	100	0.38	0.6	0.4
60	1.22	0.7	0	70	1.11	0.7	0	80	1.04	0.7	0	90	0.99	0.7	0	100	0.95	0.7	0
60	1.03	0.7	0.05	70	0.94	0.7	0.05	80	0.89	0.7	0.05	90	0.84	0.7	0.05	100	0.81	0.7	0.05
60	0.89	0.7	0.1	70	0.81	0.7	0.1	80	0.77	0.7	0.1	90	0.73	0.7	0.1	100	0.7	0.7	0.1
60	0.78	0.7	0.15	70	0.71	0.7	0.15	80	0.67	0.7	0.15	90	0.64	0.7	0.15	100	0.61	0.7	0.15
60	0.69	0.7	0.2	70	0.63	0.7	0.2	80	0.59	0.7	0.2	90	0.56	0.7	0.2	100	0.54	0.7	0.2
60	0.55	0.7	0.3	70	0.51	0.7	0.3	80	0.48	0.7	0.3	90	0.45	0.7	0.3	100	0.44	0.7	0.3
60	0.45	0.7	0.4	70	0.42	0.7	0.4	80	0.39	0.7	0.4	90	0.37	0.7	0.4	100	0.36	0.7	0.4
60	1.13	0.8	0	70	1.02	0.8	0	80	0.97	0.8	0	90	0.92	0.8	0	100	0.88	0.8	0
60	0.95	0.8	0.05	70	0.87	0.8	0.05	80	0.82	0.8	0.05	90	0.78	0.8	0.05	100	0.75	0.8	0.05
60	0.82	0.8	0.1	70	0.75	0.8	0.1	80	0.71	0.8	0.1	90	0.67	0.8	0.1	100	0.65	0.8	0.1
60	0.72	0.8	0.15	70	0.66	0.8	0.15	80	0.62	0.8	0.15	90	0.59	0.8	0.15	100	0.57	0.8	0.15
60	0.64	0.8	0.2	70	0.58	0.8	0.2	80	0.55	0.8	0.2	90	0.52	0.8	0.2	100	0.5	0.8	0.2
60	0.51	0.8	0.3	70	0.47	0.8	0.3	80	0.44	0.8	0.3	90	0.42	0.8	0.3	100	0.4	0.8	0.3
60	0.42	0.8	0.4	70	0.38	0.8	0.4	80	0.36	0.8	0.4	90	0.34	0.8	0.4	100	0.33	0.8	0.4
60	1.02	0.9	0	70	0.93	0.9	0	80	0.88	0.9	0	90	0.83	0.9	0	100	0.8	0.9	0
60	0.87	0.9	0.05	70	0.79	0.9	0.05	80	0.75	0.9	0.05	90	0.71	0.9	0.05	100	0.68	0.9	0.05
60	0.75	0.9	0.1	70	0.68	0.9	0.1	80	0.65	0.9	0.1	90	0.61	0.9	0.1	100	0.59	0.9	0.1
60	0.65	0.9	0.15	70	0.6	0.9	0.15	80	0.56	0.9	0.15	90	0.54	0.9	0.15	100	0.52	0.9	0.15
60	0.58	0.9	0.2	70	0.53	0.9	0.2	80	0.5	0.9	0.2	90	0.47	0.9	0.2	100	0.46	0.9	0.2
60	0.46	0.9	0.3	70	0.42	0.9	0.3	80	0.4	0.9	0.3	90	0.38	0.9	0.3	100	0.37	0.9	0.3
60	0.38	0.9	0.4	70	0.35	0.9	0.4	80	0.33	0.9	0.4	90	0.31	0.9	0.4	100	0.3	0.9	0.4
60	0.91	1	0	70	0.82	1	0	80	0.78	1	0	90	0.74	1	0	100	0.71	1	0
60	0.77	1	0.05	70	0.7	1	0.05	80	0.66	1	0.05	90	0.63	1	0.05	100	0.6	1	0.05
60	0.66	1	0.1	70	0.61	1	0.1	80	0.57	1	0.1	90	0.54	1	0.1	100	0.52	1	0.1
60	0.58	1	0.15	70	0.53	1	0.15	80	0.5	1	0.15	90	0.48	1	0.15	100	0.46	1	0.15
60	0.51	1	0.2	70	0.47	1	0.2	80	0.44	1	0.2	90	0.42	1	0.2	100	0.4	1	0.2
60	0.41	1	0.3	70	0.38	1	0.3	80	0.35	1	0.3	90	0.34	1	0.3	100	0.32	1	0.3
60	0.33	1	0.4	70	0.31	1	0.4	80	0.29	1	0.4	90	0.28	1	0.4	100	0.27	1	0.4

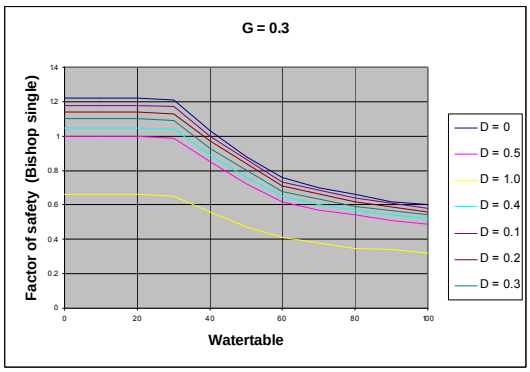

G = 0.0
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.1
D = 0.2
D = 0.3
D = 0.4
D = 0.6
D = 0.7
D = 0.8
D = 0.9

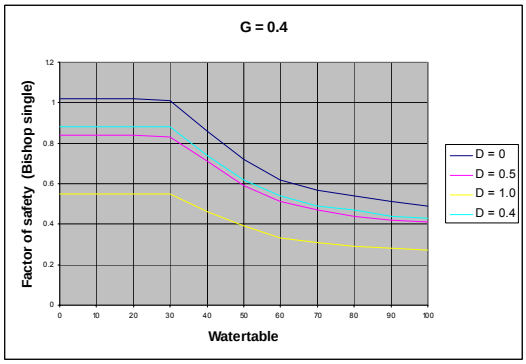

G = 0.15
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.4
D = 0.1
D = 0.2
D = 0.3
D = 0.6
D = 0.7


G = 0.05
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.4
D = 0.1
D = 0.2
D = 0.3
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.2
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.4
D = 0.1
D = 0.2
D = 0.3
D = 0.6
D = 0.7


G = 0.1
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D =0.4
D = 0.1
D = 0.2
D = 0.3
D = 0.6
D = 0.7
D = 0.8
D = 0.9


G = 0.3
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.4
D = 0.1
D = 0.2
D = 0.3


G = 0.4
Factor of safety (Bishop single)
Watertable
D = 0
D = 0.5
D = 1.0
D = 0.4