

U960277

Prop # 180632

P29w/85

**Beca Carter Hollings & Ferner Ltd**Consulting Engineers
Auckland, Wellington, New Plymouth,
Tauranga, Orewa and ChristchurchPROJECT Clifford Bay Port and Ferry TerminalHOLE NO. BH 1

LOG OF DRILLHOLE

LOCATION Stirling Brook CO-ORDINATES N676533.E320927
Central Ridge of Quarry Site
ANGLE (from horizontal) 90° R.L. COLLAR 2547500
5938600

DESCRIPTION OF CORE WEATHERING, RELATIVE STRENGTH, COLOUR, NAME, DEFECT TYPE, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, cement etc) STRATIGRAPHIC UNIT	ROCK WEATHERING SW MW HW CW	RELATIVE STRENGTH VS S MS MW W VW	CORE LOSS % LIFT m	DEPTH H.A.D. Core size, casing m	GRAPHIC LOG	SPACING OF NATURAL DEFECTS (cm) m	DEFECT DESCRIPTION (JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY - altitude, spacing, continuity, roughness, infilling, etc.) SOIL DESCRIPTION (consistency, relative density, water content, plasticity, grading, group symbol etc.)	DATE/DEPTH R.O.D.	WATER LEVEL m	DRILL WATER LOSS %	DRILLING METHOD
Moderately strong grey moderately weathered GREYWACKE, minor silt, minor sand, trace clay. [TOPSOIL/ROCK FALL DEBRIS]				0.0			Block size of recovered core 10-80mm	0.0			OPEN BARREL CORING
Moderately strong grayish brown HW very thickly bedded GREYWACKE; thin wavy quartz veining, closely to very closely spaced fractures infilled with sandy fine gravel, minor silt, trace clay. [TORLESSE GREYWACKE]				1.0			Joints: very closely-closely spaced (20-200mm), moderately inclined to sub-vertical (20-85°), undulating smooth to slickensided, oxide coated some greasy, tight to open.	1.0			
clay absent in drilling water, some slightly weathered cores.				1.5			block size: 5-100mm Joint sets: 20-30°, 50-70°, 80-90°	1.5			
				2.0			crush zone 50mm thick, blocks 2-8mm wide	2.0			
				2.4			joints: predominately steeply inclined planar smooth-slickensided, partially open	2.4			
				2.7			block size: 100-200mm	2.7			
				3.5			crush zone for 100mm, blocks <10mm wide minor clay on joints.	3.5			
				4.2			extremely closely spaced joints for 100mm some undulating rough surfaces	4.2			
				4.3			block size 10-200mm	4.3			
				6.0			some voids in quartz veins joints: predominately undulating smooth, iron stained, some slickensided	6.0			
				7.6			block size 70-100mm	7.6			
				7.6			joint set: very closely spaced sub-vertical, undulating rough surface, tight	7.6			
Strong bluish grey slightly weathered very thickly bedded GREYWACKE; closely spaced thin wavy calcite, zeolite veins predominate, closely to moderately widely spaced fractures. [TORLESSE GREYWACKE]				9.1			crush zone for 80mm between steep joints	9.1			TRIPLE TUBE CORING
				10.6			crush zone for 40mm, minor clay on surfaces	10.6			
				12.2			5 Joint sets: 2 x steep (45-60°) predominate 1 x very steep (60-75°) sub-ordinate 1 x subvertical (85°) widely spaced 1 x moderately inclined (25-30°) very wide	12.2			
				12.2			spacing of steep joint sets: 1 x close-moderately widely (150-550mm) 1 x close-widely (150mm-2m) very steep joint close-widely spaced (150mm-2m)	12.2			
some fresh cores							joints: undulating smooth surfaces predominate, undulating rough surface on sub-vertical joints. blocks 200-370mm X 500-600mm				
extremely closely spaced veins, enclosing angular greywacke rock fragments, moderately strong stained brown for 100mm [BRECCIA ZONE]							blocks 60-150mm				
							veins: extremely closely spaced, tight closed, weakly cemented breccia zone				

DRILLER:

..Alton

STARTED:

..2/5/96

FINISHED:

..6/5/96

DRILL:

..Mindill

WEATHERING

UW - Unweathered
SW - Slightly weathered
MW - Moderately weathered
HW - Highly weathered
CW - Completely weathered

RELATIVE STRENGTH

VS - Very Strong
S - Strong
MS - Moderately strong
MW - Moderately weak
W - Weak
VW - Very weak

DEFECT LOG

(cm)

Spacing of
natural
defects.

Defects/
m of core

1 2 3 4 5 6 7 8 9 10 11 12

TRANS RAIL

PROJECT: 1206621

HOLE NO: BH 1

LENGTH: 0.0 - 12.2m

CORE BOXES: 1-4

ORIGINAL SCALE

A3 1:50

SHEET 1 OF 5

DRG NO. 1206621/20

LOGGED: S. Tisley

DATE: 3/5/96

TRACED: S. Tisley

CHECKED: M. W.

EXPLANATION

Block size = length of intact core recovered



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PROJECT Clifford Bay Port and Ferry Terminal

HOLE NO. BH 1

LOCATION Stirling Brook CO-ORDINATES N676533.E320927

Central Ridge of Quarry Site

LOG OF DRILLHOLE

ANGLE (from horizontal) 90° R.L. COLLAR _____

DESCRIPTION OF CORE WEATHERING, RELATIVE STRENGTH, COLOUR, NAME, DEFECT TYPE, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, cement etc) STRATIGRAPHIC UNIT	ROCK WEATHERING SW MW HW CW	RELATIVE STRENGTH VS S MS MW W VW	CORE LOSS/ LIFT % 5 10 50	DEPTH H.A.D. Core size, casing m	GRAPHIC LOG	SPACING OF NATURAL DEFECTS (cm) 50 10 5	DEFECT DESCRIPTION (JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY — altitude, spacing, continuity, roughness, infilling, etc.) SOIL DESCRIPTION (consistency, relative density, water content, plasticity, grading, group symbol etc.)	DATE/DEPTH R.O.D.	WATER LEVEL Date	DRILL WATER LOSS %	DAILING METHOD
Moderately weak light grey SW GREYWACKE; extremely closely spaced calcite, zeolite veins. enclosing angular greywacke rock fragments [BRECCIA ZONE 12.1-2.75m]				12.2			veins: extremely closely spaced, tight closed, weakly cemented breccia zone	4/5/96			
Strong bluish grey SW very thickly bedded GREYWACKE: closely spaced sub vertical veining. [TORLESSE GREYWACKE]			100%	12.2			Joints closely to moderately widely spaced blocks 130-250mm x 500mm	85%			
some fresh cores (40%)				13.6			one joint set for 1m blocks 100-400mm	86%			
extremely closely spaced sub-vertical veins for 150mm, some brown staining. [BRECCIA ZONE]			100%	14.0							
mostly fresh cores (>70%). Closely spaced wavy veins.				14.95			extremely closely spaced veins for 150mm	96.7%			
steep to sub-vertical calcite veining (30-80 degrees)			100%	15.1			Two joint sets predominate steep (45°) 150-500mm spacing very steep (70°) 500-600 mm spacing undulating smooth, minor stepped rough blocks 150-500mm	89%			
discolouration on joints for 70mm			95%	16.6			slay coating on very steep joint blocks 50-200mm	93%			
very steep to sub-vertical veins (70-85 degrees)			93%	17.0			4 joint sets: 2 x steep closely spaced (50-300mm) 1 x moderately inclined 350mm-1m spaced 1 x sub-vertical 0.5-2m spaced undulating smooth surfaces, iron oxide stained	83%			
			93%	19.6			2 joints sets both steep (30-60°) 1 x closely-widely spaced (150-450mm) 1 x smooth planar surfaces block 660mm in length	71%			
			100%	20			crush zone for 80mm, 2-15mm blocks moderately to widely spaced joints (0.2-1m) 1 x steep joint set 0.44-1.0m 1 x steep joint set 0.2-0.86m block 0.86m in length	84%			
			100%	21.1			crush zone for 100mm, 5-50mm blocks	73%			
			100%	22.1			blocks: 200, 230, 350mm	5/5/96			
			100%	22.6			striations on veins, some undulating, iron stained joints				
			100%	24.1			wavy surfaces on fractures along intersecting joints, possibly drilling induced				

DRILLER: Alton Drillers

STARTED: 2/5/96

FINISHED: 6/5/96

DRILL: Mindrill

WEATHERING
UW — Unweathered
SW — Slightly weathered
MW — Moderately weathered
HW — Highly weathered
CW — Completely weathered

RELATIVE STRENGTH
VS — Very Strong
S — Strong
MS — Moderately strong
MW — Moderately weak
W — Weak
VW — Very weak

DEFECT LOG
(cm)
50
10
5
Spacing of natural defects.
Defects/
m of core

TRANZ RAIL
PROJECT: _____
HOLE NO: BH1
LENGTH: 12.2 - 24.1m
CORE BOXES: 5-8

LOGGED: S. Tilsley
DATE: 4/5/96
TRACED: S. Tilsley
CHECKED: AW
ORIGINAL SCALE: A3
1:50

EXPLANATION
Water level > 20.0m on 7/5/96
Hole collapsed 20.0m

SHEET 2 OF 5 DRG NO. 1206621/20

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Central Ridge of Quarry Site

LOG OF DRILLHOLE

ANGLE (from horizontal) 90° R.L. COLLAR _____

DESCRIPTION OF CORE WEATHERING, RELATIVE STRENGTH, COLOUR, NAME, DEFECT TYPE, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, cement etc) STRATIGRAPHIC UNIT	ROCK WEATHERING SW MW HW CW	RELATIVE STRENGTH VS S MS MW W VW	TEST RESULT (Reg. No.) 5 10 50	CORE LOSS/ LIFT % 5 10 50	DEPTH H.A.D. Core size, casing m	GRAPHIC LOG	SPACING OF NATURAL DEFECTS (cm) 50 10 5	DEFECT DESCRIPTION (JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY — altitude, spacing, continuity, roughness, infilling, etc.) SOIL DESCRIPTION (consistency, relative density, water content, plasticity, grading, group symbol etc.)	DATE/DEPTH R.Q.D. %	WATER LEVEL Date	DRILL WATER LOSS %	DRILLING METHOD	
Strong bluish grey SW very thickly bedded GREYWACKE; closely to moderately widely spaced calcite & zeolite veins & joints, discolouration <10mm on joints. (TORLESSE GREYWACKE)					24.1			Two joint sets both steep (40-65%) 1 x closely spaced (70-220mm) 1 x moderately widely spaced (400-500mm) undulating rough iron stained surfaces block size 70-230mm.					
calcite veins predominate, 1-4mm thick.					25.6			- joint sets closely to moderately widely spaced Block size 100-250mm	70%				
calcite veins 0.5-1mm thick					26.6				84%				
					27.1				51%				
					28.6			4 joint sets: steep closely spaced (100-100mm); steep moderately widely spaced (500-600mm); very steep close-moderately widely spaced (100-600mm); sub-vertical widely spaced (1-1.5m). block size 80-250mm block size 150-400mm	77%				
discolouration around joints absent, staining on few joint surfaces SW-UW					30.1				67%				
					31.6			striations along very steep (60%) joint	77%				
striations on some partially open veins					32.2			1 joint sets (sub-vertical absent), spacing: very steep-widely (1-2m); 1 x steep-becoming widely (500-800mm); 1 x steep-close to moderately widely (100-400mm)	87%				
extremely closely spaced veins for 100mm enclosing angular greywacke rock fragments (BRECCIA ZONE)					33.1			block size 400-600mm zeolite & calcite infilling on most joints very steep joint set: closely-moderately closely spaced (200-300mm) steep joint sets: moderately to widely spaced (400-600mm, 0.5-1m)	77%				
fresh cores black (carbonaceous) infilling in some veins					34.0			block size 200-400mm, wavy sub-horizontal drilling induced joints.	80%				
					34.6			steep joint sets closely to moderately widely spaced (100-600mm); very steep set very widely spaced (>2m).					
					36.1								

DRILLER:
Alton Drillers

STARTED:
2/5/96

FINISHED:
6/5/96

DRILL:
Mindrill

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RELATIVE STRENGTH
VS — Very Strong
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MW — Moderately weak
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VW — Very weak

DEFECT LOG

Spacing of
natural
defects,
Defects/
m of core

EXPLANATION

TRANZ RAIL
PROJECT:
HOLE NO: BH1
LENGTH: 24.1 - 36.1
CORE BOXES: 9-12

LOGGED: S. Tilsley
DATE: 5/5/96
TRACED: S. Tilsley
CHECKED: AW
ORIGINAL SCALE: A3
1:50

SHEET 3 OF 5 DRG NO 1206621/20

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Central Ridge of Quarry Site

LOG OF DRILLHOLE

ANGLE (from horizontal) 90° R.L. COLLAR _____

DESCRIPTION OF CORE WEATHERING, RELATIVE STRENGTH, COLOUR, NAME, DEFECT TYPE, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, cement etc) STRATIGRAPHIC UNIT	ROCK WEATHERING SW MW HW	RELATIVE STRENGTH VS S MS MW W VW	TEST RESULT RECOVERY % -5 -10 -50	CORE LOSS/ cm -5 -10 -50	DEPTH H.A.D. Core size, casing m	GRAPHIC LOG	SPACING OF NATURAL DEFECTS cm 50 10 5 1	DEFECT DESCRIPTION (JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY - altitude, spacing, continuity, roughness, infilling, etc.) SOIL DESCRIPTION (consistency, relative density, water content, plasticity, grading, group symbol etc.)	DATE/DEPTH R.O.D.	WATER LEVEL	ORILL WATER LOSS %	DRILLING METHOD
Strong bluish grey (M faintly bedded) GREYWACKE calcite, zeolite & carbonaceous infilling of joints. Moderately to widely spaced joints					36.1			Two steep joint sets, spacing moderately to widely (200-800mm) planar smooth surfaces, some polished surfaces on carbonaceous beds.				
carbonaceous band 200mm thick					37.3			block size 200-600mm				
					37.6			one predominant steep joint set closely to widely spaced (50-880mm); other steep joints very widely spaced (1.5-2m).				
					37.7			block size 880mm				
carbonaceous material absent					37.7			steep joint sets both closely to moderately widely spaced (100-600mm). Block size 50-450mm.				
					40.6							
moderately strong, extremely closely spaced veins, enclosing angular greywacke rock fragments for 900mm. (BRECCIA ZONE)					41.2			5 joint sets: 2 x steep very closely-closely spaced (20-100mm); 2 x very steep closely- moderately widely spaced (60-250mm); sub-vertical widely-very widely spaced (1-2m).				
striations along some partially open veins					42.7			block size 20-100mm undulating rough surfaces predominate				
moderately strong, extremely closely spaced veins enclosing angular greywacke rock fragments for 200mm (BRECCIA ZONE)					42.6							
					43.6							
					45.1			very steep joint sets moderately-widely spaced (450-850mm). Block size 150-450mm				
very closely spaced veins for 100mm closely spaced joints					46.6							
					48.1			very steep joint sets widely spaced (650-750mm) steep joint sets closely-moderately widely spaced (150-600mm) blocks 20-200mm				

DRILLER:
Alton Drillers

STARTED:
2/5/96

FINISHED:
6/5/96

DRILL:
Mindrill

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RELATIVE STRENGTH
VS - Very Strong
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MW - Moderately weak
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VW - Very weak

DEFECT LOG
Spacing of
natural
defects.
Defects/
m of core

TRANZ RAIL
PROJECT:.....
HOLE NO: BH1
LENGTH: 36.1 - 48.1
CORE BOXES:
13-15

S.Tilsley
LOGGED:.....
DATE: 5/5/96
TRACED: S.Tilsley
CHECKED: Alton
ORIGINAL SCALE: A3
1:50

SHEET 4 OF 5 DRG NO. 1206621/20

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Central Ridge of Quarry Site

LOG OF DRILLHOLE

ANGLE (from horizontal) 90° R.L. COLLAR _____

DESCRIPTION OF CORE WEATHERING, RELATIVE STRENGTH, COLOUR, NAME, DEFECT TYPE, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, cement etc) STRATIGRAPHIC UNIT	ROCK WEATHERING SW UW MW HW CW	RELATIVE STRENGTH VS S MS MW W VW	CORE LOSS/LIFT Recovery % 5 10 50	DEPTH H.A.D. Core size, casing m	GRAPHIC LOG	SPACING OF NATURAL DEFECTS (cm) 50 10 5 1	DEFECT DESCRIPTION (JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY - attitude, spacing, continuity, roughness, infilling, etc.) SOIL DESCRIPTION (consistency, relative density, water content, plasticity, grading, group symbol etc.)	DATE R.Q.D.	DEPTH m	WATER LEVEL Date	DRILL WATER LOSS % 0-100	DRILLING METHOD	
Strong bluish grey-grey LM very thickly bedded GREYWACKE; very close-closely spaced calcite veins; closely to moderately widely spaced joints. (TORLESSE GREYWACKE)			100%	48.1			3 joint sets, spacing: 1 x steep close-moderately wide (150-500mm) 1 x steep widely spaced (1-1.5m) 1 x very steep widely spaced (0.6-1m)		80%				TRIPLE TUBE CORING
veins: closely-moderately widely spaced (50-300mm) joints: moderate-widely spaced (500-1250mm)			100%	49.6			1 predominate joint set: steep widely spaced (0.5-1.25m) other joints very widely spaced (>2m) block size 0.86m block size 0.6m block size 0.5m		100%				
veins up to 500mm spacing; slower drilling			100%	51.2			sub-horizontal zeolite coated joint block size 1.25m		100%				
veins: very closely to closely spaced Some dark grey staining for 750mm.			100%	52.0			very steep calcite infilled tight closed vein block size 0.8m		93%				
joints: closely to moderately widely spaced (60-660mm)			100%	53.5			3 joint sets: steep-moderately widely spaced (180-600mm) steep-moderately to widely spaced (0.5-1.5m) very steep-widely to very widely spaced (1-2m)		100%				
veins: closely spaced (80-100mm)			100%	54.5			block size 180-660mm		100%				
veins: very closely spaced for 100mm			100%	55.1			4 joint sets, 2 x very steep (2m spacing) steep joint set becoming closely to moderately widely spaced (100-400mm)		90%				
no veining for 500mm			100%	57.0					77%				
			100%	57.4									
			100%	58.0									
END OF BOREHOLE 1, 58.50m BELOW GROUND SURFACE			100%	58.5									

DRILLER: Alton Drillers	WEATHERING UW - Unweathered SW - Slightly weathered MW - Moderately weathered HW - Highly weathered CW - Completely weathered	RELATIVE STRENGTH VS - Very Strong S - Strong MS - Moderately strong MW - Moderately weak W - Weak VW - Very weak	DEFECT LOG Spacing of natural defects, Defects/m of core	TRANZ RAIL PROJECT: HOLE NO: <u>BH1</u> LENGTH: <u>48.1 - 58.5m</u> CORE BOXES: <u>16-18</u>	S. Tilsley LOGGED: DATE: <u>6/5/96</u> TRACED: <u>S. Tilsley</u> CHECKED: <u>ALW</u> ORIGINAL SCALE <u>A3</u> <u>1:50</u>
STARTED: <u>2/5/96</u>	EXPLANATION			SHEET <u>5</u> OF <u>5</u> , DRG NO <u>1206621/20</u>	
FINISHED: <u>6/5/96</u>					
DRILL: Mindrill					