

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Structures	Fossils	Facies	Photo No.	WO No.	Description
Ld	Aotea	0-90	Aotea Sandstone			S2			Vegetation (sl. coarsening upwards).
	Kihi								Lt. or. gr., mod. ind., sl.-glauc., calc f. sst. with small concret. or better cemented sst. Bioturbation evident throughout. Grades up to massive-ripply-bulbous profile. Finely banded at lower zone - irreg. shaped 'ripply' bands. Profile changes - oversteep, 'bulbous'.
LWh	Aotea	0-90	Aotea Sandstone			S1			Lt. or. gr., mod. ind., sl.-mod. calc., f. sst. with rare-some shell frags. Banded, uniform 12-15 cm thick bands.  1.5 m overhang. Erosional concavity.  Lt. or.-gr., wk. ind., sl.-mod. glauc., clc. f.m. (qtzose) sst. Leached zone.  Cross-bedded; 16° app. dip, foresets planar. Foresets preserved as alt. well/poorly cemented sets; 4-6 cm spacing.
	Hauturu					S1			Lt. or.-gr., wk. ind., sl. glauc., sl. calc., f-m sst. with shell frags enclosed by matrix of friable, shelly sand. Knobby; leached-unevenly distrib. Knobs 8-12 cm width. Matrix weath. back into outcrop up to 10-15 cm (banded app. becomes obv. up section).  Proportion of terrig. clastics increases. Pectinid frags. conspic.
	Aotea					L4			Br.gr., mod. ind., sl. glauc., v. calc. f.m. sst (-v. s. lst?) with shell frags. Dev. of inver. seams inc. upward, as does. irreg. Inverted seams. Lt. br., mod. ind., sl. glauc., v. calc. f. sst - v.s. lst. with conspic. shell frags. Seams (2 cm) more persistent laterally but wavy.
	Hauturu					S2			Lt. or., mod. ind., v.sl. glauc. sl. cryst., f.s. lst. Incip. flaggy, flags 3-8 cm, seams <1cm and wavy. Br-gr. (sl. Fe-staining), mod. ind., sl. glauc., calc. m.f. sst-fs. mst. Muddy lenses and up to grain sized shell fragments visible. Coarsening upwards discern. to incoming lst. above. Massive, fritt-incip. fine bedding.
	Glen Massey	0-90	Whaingaroa Silt			S6			Grassed. Bl./gr., wk. ind., sl. glauc., sl.f.s. calc. mst. with rare shell frags, serpulids. Massive, fritt. and exfoliated. Fe-stained joint traces. Active water seepage.  Grassed slope; occ. showings of above lith. 40° repose angle.  Basal contact not seen. WCM?
	Dunphail - Ahirau								

mud  
 clay  
 silt  
 sand  
 gravel





Stratigraphic Column No: S11

Grid Reference:

NZMS 260 R16

Region: Aotea - Kawhia

E: 2675500 - 2675339

Location: ca. 2km south of Pukenoii

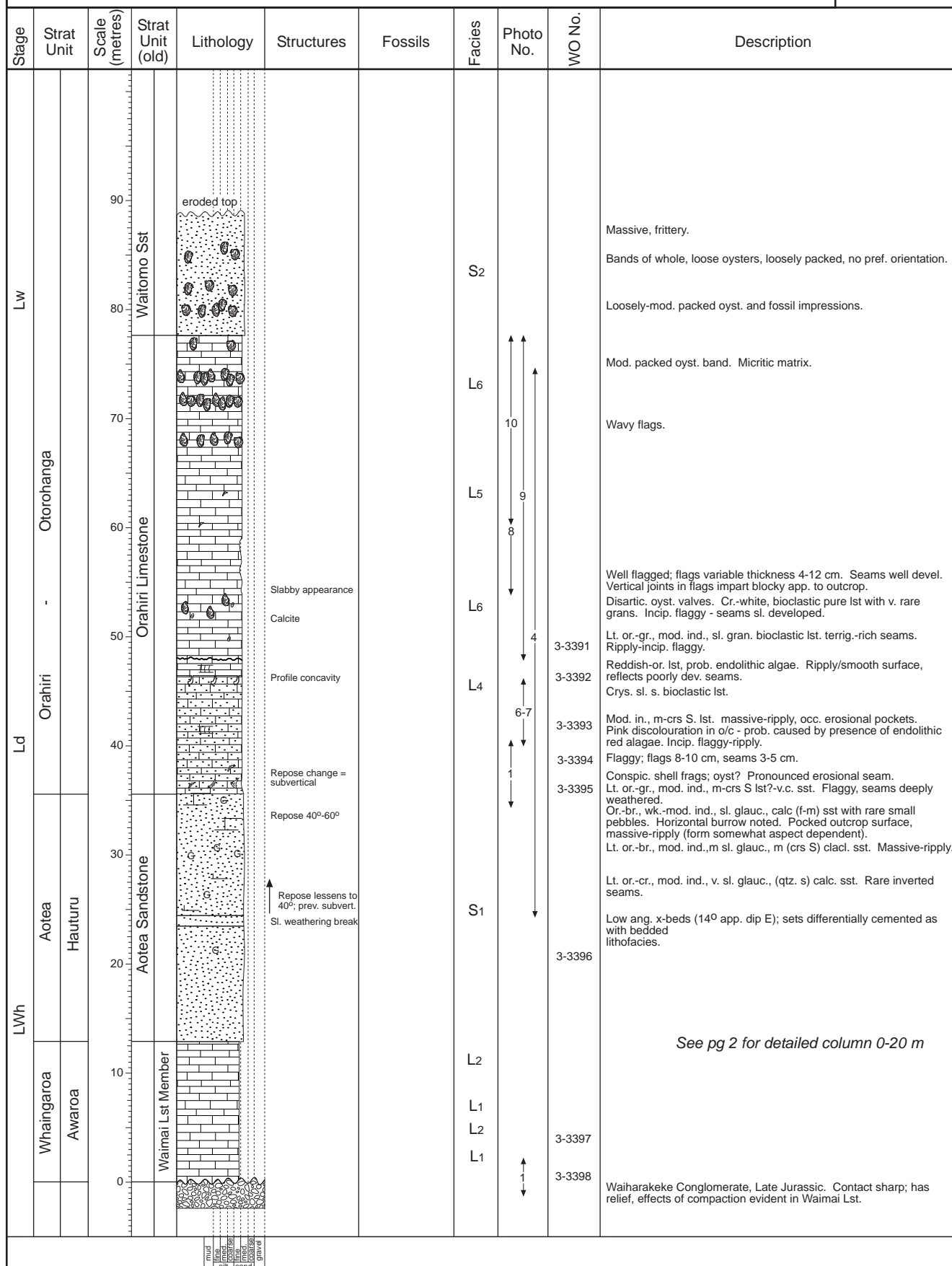
N: 6337900 - 6337911

**S-11**

NZMS 260 Sheet: R16/ 755379

Page 1 of 4 Author: D. Fergusson

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Stratigraphic Column No: S11

Grid Reference:

Region: Aotea - Kawhia

E: 2675500 - 2675339

Location: ca. 2km south of Pukenoio

N: 6337900 - 6337911

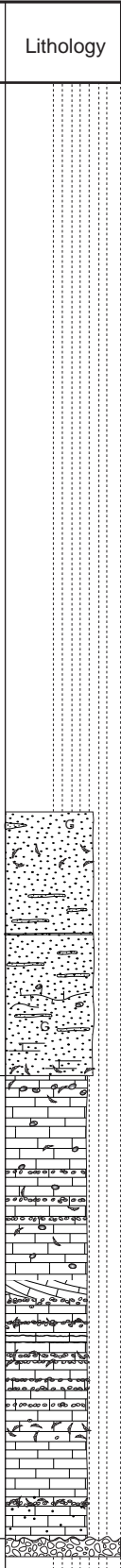
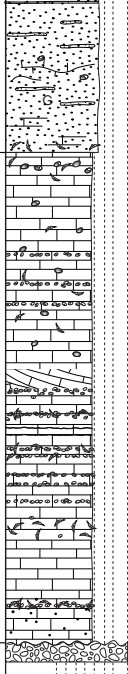
NZMS 260 Sheet: R16

Page 2 of 4 Author: D. Fergusson

NZMS 260 R16

**S-11**

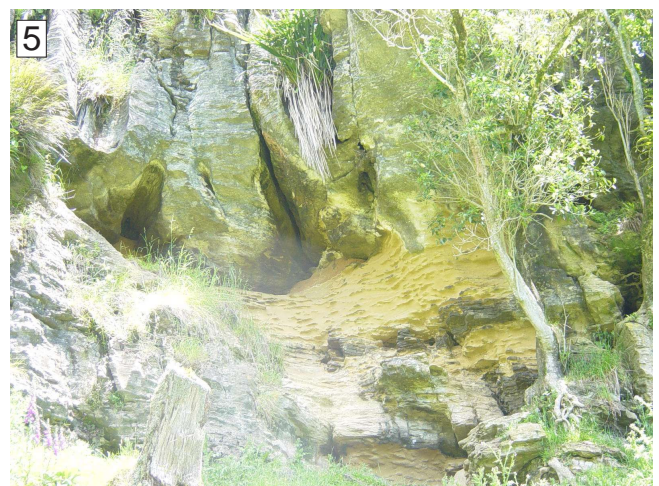
2 of 4

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
LWh	Aotea	0 to 22	Aotea Sandstone				S1			Yellow gr., mod. ind., v. sl. glauc., c. sst. massive - ripply. Oyster frags.
	Hauturu									Poorly developed (= greatly weath?) bands.
Whaingaroa	Awaroa	0 to 12	Waimai Lst Member				L2 L3 L3	↑ 3 ↓		Scattered m. pbls., ripply s. lst-c sst. Massive. Band: yell. gr., mod. ind., v. sl. glauc., f.s. lst - v. calc. sst, otherwise leached c. sst. Knobbly-banded. Seams av. 13 cm well dev. 162.5-165.6 m. Seams av. 8 cm, freq. anastomose. Scattered pbls., rare oyst. frags. ripply, seams < 1 cm, beds 2-3 cm Pectinid frags., crs S. and shell frags. Weathering break.
										Seams < 1 cm, spaced 2-3 cm. Thinly flagged-ripply.
							L1 L1 L1 L2 L1	↑ 2 ↓		Gr.-cr., well ind., gran.-pebbly lst. with rare sharks teeth, oyster frags. Occ. pebble lenses. Low ang. x-beds (12-16° (app.) dip, NE). Beds of grans.-sm./med. pbl. interbedded with mod. pbl. creamy cryst. lst. L. or-cr., mod. ind., pbl. band (cobbles-grans.) with lst matrix cementing clasts. Largest clast = 12x15 cm. Very thin, sl. inverted shallow seams. Ol. gr., well ind., f-m s. lst, with conspic. shell frags. and rare SRF grains. Massive-ripply appearance. Sm.-med.pebb. band; gran's., oyst. frags. Lenses out laterally. Pebble band weath. pref. - sl. profile concavity. Lt. ol. gr., well ind., slightly gravelly-pebbly sandy lst

mud  
lime  
silt  
sand  
gravel

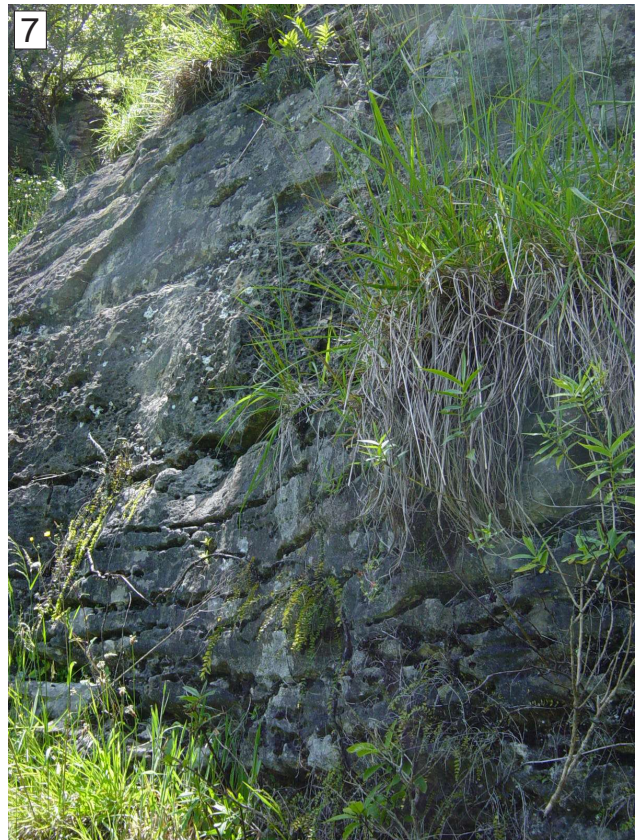
# S-11

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**S-11**

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**Stratigraphic Column No: C-8**

**Grid Reference:**

**NZMS 260 R16**

**Region:** King Country/Waitomo

**E:** 2683738 - 2683548

**Location:** Paparoa Stream, Kaimango Road

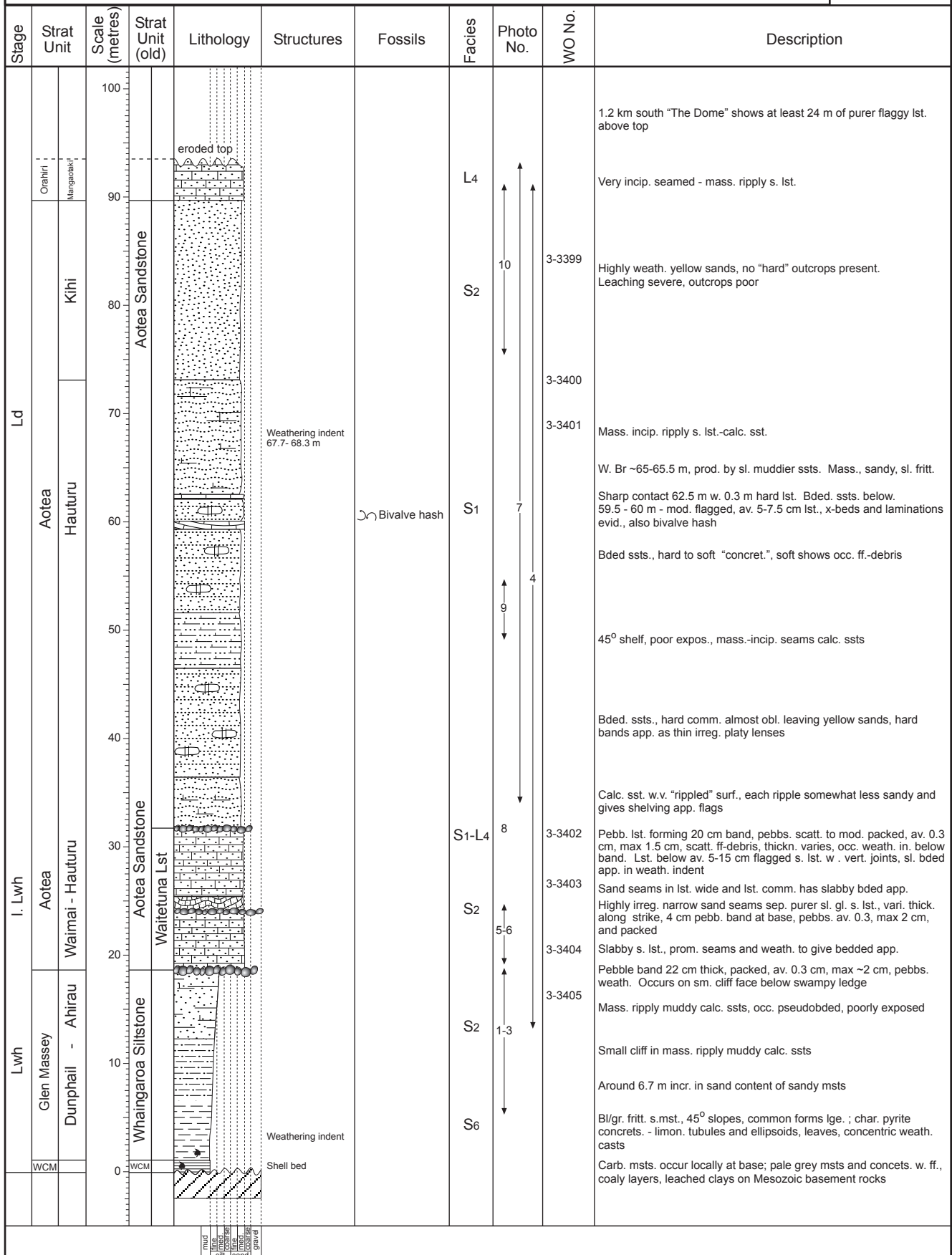
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**C-8**

**NZMS 1 Sheet:** R16

**Page 1 of 1** **Author:** C. Nelson  
**Modified:** A. Tripathi

**1 of 3**



**C-8**

2 of 3

1



2



3



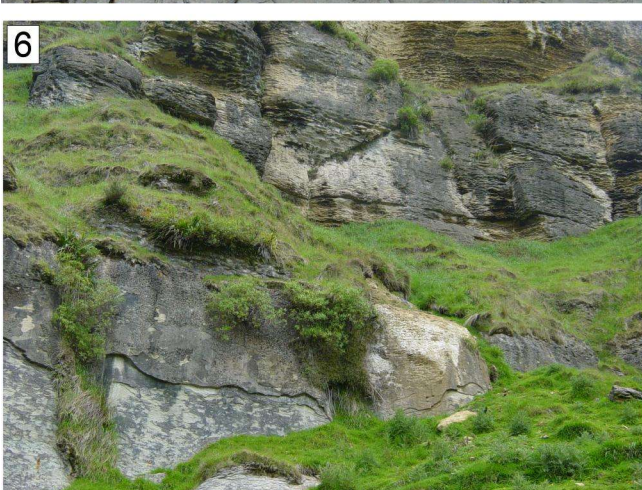
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5



6



**C-8**

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7



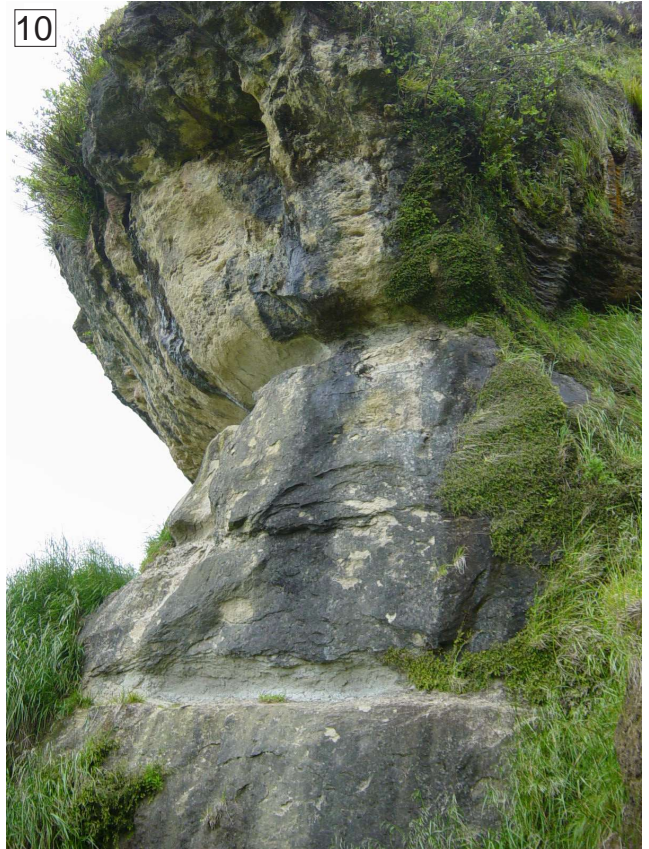
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9



10



Stratigraphic Column No: C14

Grid Reference: R16

NZMS 260 R16

Region: Aotea - Kawhia

E: 2668750

Location: Te Waitere Road, south of Kawhia

N: 6334800

C-14

NZMS 260 Sheet: R16/687348

Page 1 of 1

Author: C. Nelson

Modified: A. Tripathi

1 of 1

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
	Glen Massey	0 10 20 30 40								<p>Calcareous siltstone: Massive, blue grey</p> <p>Calcareous Sandstone: Massive, gritty with occas. pebble (0.3 cm), glauconitic</p> <p>Pebbly Limestone: 2.5-5 cm flags, ripply, pebbles av.0.3-0.5 cm, 22-30 cm thick basal conglomerate with pebble supported framework</p>
	Elgood - Dunphail		Whaingaroa SLST							

gravel  
 pebbly limestone  
 calcareous sandstone  
 calcareous siltstone

Stratigraphic Column No: C17

Grid Reference: R16

NZMS 260 R16

Region: Aotea - Kawhia

E: 2666300

Location: Taharoa Road, south of Kawhia

N: 6331700

C-17

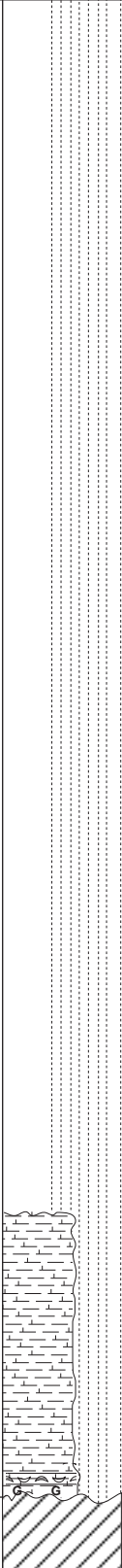
NZMS 260 Sheet: R16/663317

Page 1 of 1

Author: C. Nelson

Modified: A. Tripathi

1 of 1

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
	Glen Massey Dunphail	0 10 20 30 40	Whaingaroa Silt Stone		Eroded	Fossiliferous (Shark teeth)	S6 S1			Calcareous Siltstone: Blue grey, calcareous, friable mudstone, occas better cemented bands throughout.  Pebbly Siltstone: Basal 0.90 cm thick slightly glauconitic siltstone with black pebbles 0.65-1.95 cm size scattered pebbles, occas fossiliferous.
				<small>mud silt sand gravel</small>						

**Stratigraphic Column No:** C-24

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2686462 - 2686282

**Location:** Mahoe Road, Southwest of Honikiwi

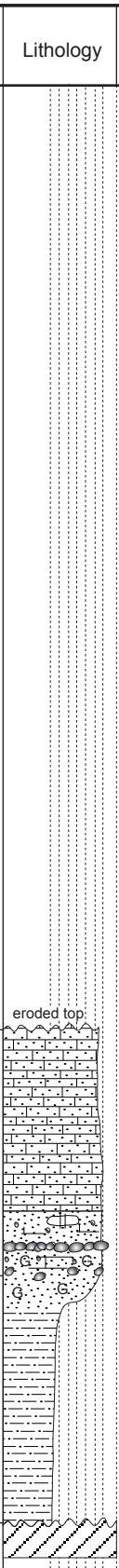
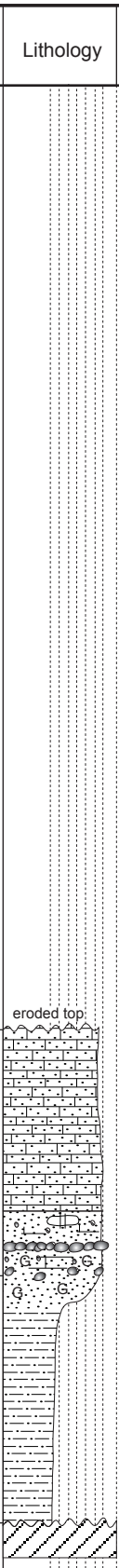
**N:** 6333138 - 6333144

**C-24**

**NZMS 1 Sheet:** R16

Page 1 of 1 **Author:** C. Nelson  
**Modified:** A. Tripathi

1 of 2

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
Lwh	Glen Massey	0 to 40	Whaingaroa Silt			<p>occ. bivalves</p> <p>Fossil hash</p>				<p>Swamp</p> <p>Mesozoic basement rocks, paleorelief char. irreg. in area.</p>
	Dunphail - Ahirau									
Ld	Aotea	0 to 40	Aotea Sandstone			<p>Fossil hash</p>				<p>Blue/grey sandy msts.</p> <p>Mass.-incip. ripply s. lst. 22.2-35 m; prom. nose-like cliff 22.2-30 m. Certain horizon app. calc. ssts. This face forms char. outcrop north to Omarama trig in bushed country.</p> <p>Pseudobeded - bedded sst., beneath vegetn. free, damp overhangs. Scattered pebbles in burrowed calc. sst.</p>
	Kihi									
										<p>At 19.8 m packed pebb. band 0-30.5 cm thick, pebb. av. 1.2 cm, max 3.1 cm, eroded. Well weath. pebb. &gt; matrix; pebb. fill pocket incr. width of band to 30.5 cm. Rel. sharp top and bottom, v. occ. bivalve debris.</p> <p>18.3-19.8 m mass. gritty-v.f. pebbly sandy glauc. lst. or grit. occ. borings plus scatt. pebb. near top, v. weath and much ff. debris.</p> <p>17.6-18.3 m scatt. pebb. calc. sst. pebb. av. 0.3 cm, max. 2 cm, occ. fine ff. mat. and borings, poss. intraclasts.</p> <p>Below 17.6 m coarse fritti calc. glauc. sst., occ. bivalves and borings passing by 15.2 m down into mass. fritti. blue-grey s. msts.</p>

mud  
loam  
silt  
clay  
sand  
gravel

C-24

1



2



3



4



5



6



**Stratigraphic Column No:** C-40

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2681942 - 2682577

**Location:** Kokakaroa Road, west of Waitomo

**N:** 6325309 - 6325108

**C-40**

**NZMS 1 Sheet:** R16

Page 1 of 2 **Author:** C. Nelson  
**Modified:** A. Tripathi

1 of 3

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
Ld	Orahiri	100 90 80 70 60 50 40 30 20 10 0	Orahiri Limestone	Cont. on pg 2	Prominent weath. indent. Weathering break		L3-L6	4		Mod. oyst. bands, oysts. par. bed., re. mass.-inv. seams, av. 2.5-5 cm apart. Invisibile seams below and characteristic. Mass.-incip. seams, sl. ripply lst., v. occ. oysts. 93.3 m.  Incip. seams, 2.5 cm apart, scatt. oysters.  Succession of oyster bands showing mod.-well packed oysts., incip. sl. irreg. seams, freq. invisible.
	Te Anga			Te Anga Lst			L4-L6			Incip. irregular seams, scatt.-mod. oysts., scatt. pebbs. av. 0.95 cm, max. 10 cm with pebbly horizon immed. below 82.3 m, oysters artic. and disartic.  Incip. flagged slightly sandy lst.  Crossbeds, complex sets, dip as gt. as 19o between N-NE, only vaguely defined by incipient dev. seams in slightly sandy lst.
Lwh	Orahiri	60 50 40 30 20 10 0	Orahiri Limestone	OrA	W. Indent. Weathering indent		L2-L4	2		Mass. ripply sandy lst., incip. seams 2.5-5 cm apart, main cliff above 65.2 m.  Mass.-incipient ripply sandy lst., smooth surface.
	Mangaotaki						S1			1
Lwh	Aotea	30 20 10 0	Aotea Sandstone	Hauturu	Unseen		S1			Near base becomes muddier, bl/gr., weathered fritt., calc. muddy fine ssts.
	Hauturu									

mud  
 silt  
 clay  
 sand  
 gravel

**Stratigraphic Column No:** C-40

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2681942 - 2682577

**Location:** Kokakaroa Road, west of Waitomo

**N:** 6325309 - 6325108

**C-40**

**NZMS 1 Sheet:** R16

Page 2 of 2 **Author:** C. Nelson  
**Modified:** A. Tripathi

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Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
Lw	Otorohanga		Otorohanga Lst							
	Te Anga Lst		Te Anga Lst							
			Orahiri Lst				L3			Well flagged, av. 15-18 cm smooth lst.
			Te Anga Lst				L5			Incipient very irregular seams, v.c. lst., char. vert. joints, semi-knobblly.
							L3			Well flagged, av. 5-7 cm smooth pure lst., slightly irregular seams.
										Narrow flags av. 2.5 cm, irregular seams, very occ. oysters par. seams.
										Mod. well dev. flags, av. 5 cm, sl. wavy
										Highly irregular incipient seams, scatt. pebbs. av. 0.63 cm.
										Reg. seams, flags av. 5 cm
										Ff.-hash zone, scatt. pebbs. av. 0.3 max 1.2 cm, occ. oysts., highly irregular seams 2.5-5cm.
										Reg. seams, av. 5 cm apart, commonly invisible.
							L3-L6			Incipient oyster horizon.




mud  
clay  
silt  
sand  
gravel

Fossil hash

**C-40**

3 of 3



Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
Ld	Otorohanga	90 80 70 60 50 40 30 20 10 0	Orahiri Limestone Te Anga Limestone	L6		 Occas oyster				Semi knobby Lst at top, incipient irregular seams, leaching of seam material evident Semi knobby occas vertical joints, incipient mod seams, irregular 1.25-5 cm apart, sand conc on some seams, occas oyster.
	L3									Flaggy 2.5-5 cm, seams wavy, more prominent wider flags, wide incipient seams between, sand concentrated on flag surface, occas veining  Well flagged 2.5-5 cm Lst
Lwh	Orahiri	60 50 40 30 20 10 0	Whaingaroa Siltstone	L4		 Pecten, bryozoan, shark teeth				Very irregular seamed, extremely coarse sandy gritty Lst  Pebble band variable width to 15 cm, pebbles 5 cm av 0.9 cm of yellow Mst + greywacke, fossil debris, esp pectinids, bryozoans, sharks teeth, concentration on seams, scoured surface, pebbles scattered Ripply-massive sandy Lst, sandier at base
	L1				Pebble band					
	Ahirau	50 40 30 20 10 0	Whaingaroa Siltstone	S2						Massive incipient ripply sandy Lst- calc Sst, burrowed, occas. laminated, honeycombed weathering seen, occas irregular incipient seams.
	Glen Massey	30 20 10 0	Whaingaroa Siltstone	S6						Monotonous sequence of massive blue grey calcareous mudstone, frittery weathering surface, commonly slumps and covers lower Lst, incipient bedding sometimes evident in upper part.
	Dunphail	10 0	Whaingaroa Siltstone	L5		 Calc algae, rhodoliths				15-20 cm mod flagged, av 5 cm smooth Lst grading down through Lithothamnium rich Lst into scattered pebbly horizon, pebbles to 12 cm av, 2 cm algal heads common, the down to very massive, incipient-mod flags at times massive-microhoneycombed incipient highly irregular seamed Lst, very occas 0.3 cm pebbles 35-45 cm soft and hard algal mat Lst, occas fossiliferous mat and carb. mat, frittery appearance, below 35 cm irregular incipient seams, occas joints, algal Lst to 30 cm with 30 cm massive band below 1.5-3 m frittery blue gray muddy calcareous fine Sst with unseen interval.
	Elgood	0	Whaingaroa Siltstone	L1						

mod  
 fine  
 med  
 coarse  
 sand  
 gravel

Stratigraphic Column No: C-50  
 Region: Te Kuiti  
 Location: Southeast of Awamarino

Grid Reference: Top Bottom  
 E: 2668419  
 N: 6322490

NZMS 260 R16

**C-50**

NZMS 1 Sheet: R16

Page 1 of 3 Author: C. Nelson  
 Modified: A. Tripathi

1 of 3

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
Lw	Otorohanga	130 120 110 100 90		Eroded top		Scattered oysters	L6			OYSTER LIMESTONE: Light greyish to creamish white, irregularly flagged, scattered pebbles, whole oysters.
				Well flagged pure limestone			L3		FLAGGY LIMESTONE: Light greyish white, well flagged, medium to coarse skeletal grainstone.	
Ld	Orahiri Mangaotaki	100 90 80 70		Massive, smooth surface, thin pressure solution seams			L4	11-12		
				Sandy seams varying from regular to highly irregular gently inclining	Bivalve fragments	L4	9-10	SANDY LIMESTONE: Greyish to brownish white, massive to medium flaggy, with abundant medium to coarse quartzose sand and grit often visible on surface, occasional floating rounded-subrounded pebble granule.		
Lwh	Glen Massey Ahirau	70 60 50 40 30 20 10 0		Scoured contact, pebble band			L1	7-8		
				Ripply surface			S2	6	CALCAREOUS SANDSTONE: Light brownish grey, very calcareous fine calcareous silty sandstone, lapiez weathering, bluffy, bioturbated, in places burrows visible on surface.	
Lwh	Glen Massey Dumphail	50 40 30 20 10 0		Vertical fluting on steep faces		Rare pecten	S6	5		CALCAREOUS SILTSTONE: Light bluish grey, massive with common frittered weathering surface, prominent ellipsoidal concretion near its upper gradational transition to calcareous sandstone.
				Break in profile, becoming steeper upsection						
Lwh	Glen Massey Elgood	30 20 10 0		Ellipsoidal to irregular shaped concretions, very frittered surface						
				Massive, common frittered weathering surface, steep profile						
Lwh	Glen Massey Elgood	10 0		Flags av 10-15 cm, sandy recessive seams			L4-L5			MEDIUM FLAGGY SANDY LIMESTONE: Light brownish grey, medium flaggy, prominent recessive sandy seams, scattered pebble granule, common bivalve cast and mold, sandy packstone-grainstone.
				Cavernous weath., prominent horizontal partings		Pecten and other large bivalves, abundant rhodoliths	L2	2		
Lwh	Glen Massey Elgood	0		Basal conglomerate			L1	3-4		PEBBLY CALCAREOUS SANDSTONE: Dull brownish grey, mod. well cemented, massive to becoming faintly horizontally bedded, scattered rounded-subrounded pebbles, large algal heads and scattered bivalve fragments.
								1		

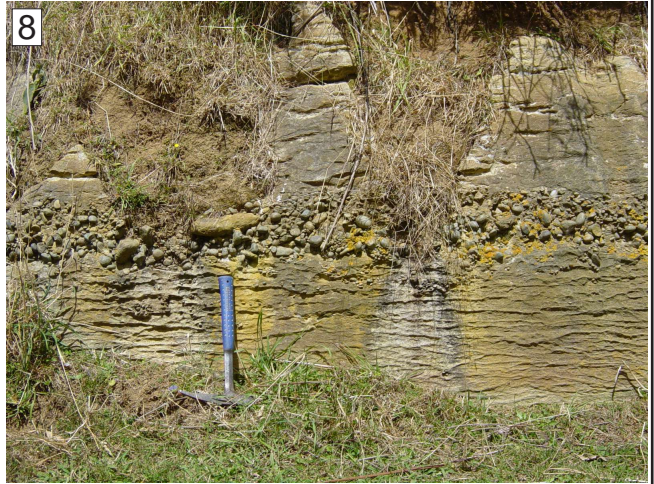
# C-50

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**C-50**

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**Stratigraphic Column No: C-51**

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2667777 - 2668359

**Location:** Kairimu Road, south of Awamarino

**N:** 6319216 - 6320388

**C-51**

**NZMS 1 Sheet:** R16

Page 1 of 2 **Author:** C. Nelson  
**Modified:** A. Tripathi

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Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description	
e. Lwh	Orahiri	100 90 80 70 60 50 40 30 20 10 0	Orahiri Limestone	Cont. on pg 2			L4	9-11	3-3465	Scatt. pebbles in well flagged 2.5-5 cm lst.	
									3-3464		
	Glen Massey		Mangaotaki - Te Anga	Orahiri Limestone	Te Anga Lst			S2	7	3-3463	Irreg. seams prod. pseudoknobby pure lst., irreg. weathering; below 2.5-5 cm flags sep. by sandy pebbly seams, very incip. pebble band at 89.3 m, pebbles av. 0.95 cm, max. 2.5 cm, abundant coarse sand. Below typical sand-pebb. layers, streaks, ellipses, circles (?borings) between and within slightly sandy lst. flags, av. 2.5-5 cm occ. molluscs and pebbles.
										3-3462	
	Glen Massey		Ahirau	Whaingaroa Siltstone				S6	6 & 8	3-3461	Top of Wh. Slst. seen as deep weathering indent in sandy-silty lst., sl. fritt., occ. borings throughout, overlain by 25 cm of highly burrowed calc. sst. with mod. abund. pebbles at top, av. 1.3 cm, max 3.2 cm, occ. pebbles within borings, pebble unit little thickness, borings 0.6 cm - 1.8 cm diam., ellipt., horizontal orientation. & better cem., below about 15.25 m of mass. silty-s.lst., m grad. into some 53.4 m of mst.
										3-3460	
	Glen Massey		Dunpahil	Whaingaroa Siltstone				S6	5	3-3459	(Gap of 52 m, upper 12m of silty-s. lst., remain. bl/gr. mst)
										3-3458	
	Glen Massey		Dunpahil	Whaingaroa Siltstone				C5	4	3-3457	Massive blue-grey calc. mst., frittered weathered surface.
										3-3456	
Glen Massey	Elgood	Whaingaroa Siltstone	Awamarino Limestone			L5	2-3	3-3455	7.5 cm massive calc. sst., slightly weathered, mod. sharp lower boundary. Rel. massive, slightly irregular surface sandy lst., echinoids seen.		
								3-3454			
Glen Massey	Waikaretu	Whaingaroa Siltstone				L2	1	3-3453	Mass. incip. ripply, pseudoflags, typically wide av. 12.7 cm. Bivalve debris comm., echinoids, incip. sl. sandy seams, sl. sandier downwards.		
								3-3452			
Glen Massey	Mangakotuku	Whaingaroa Siltstone				L2	1	3-3451	Massive calc. ssts., common borings. Massive calc. ssts., occ. harder parts, borings common. Soft, w., tending fritt. calc. sst., borings typical and abund. ff-hash debris, occ. harder concret. borings better cem., prolific borings immed. below 7 m.		
								3-3451			
										Mesozoic basement rocks (slst).	

Echinoid frags. bivalve frags.

Fossiliferous hash

Weathering break  
Weathering break  
Unseen

mod  
fine  
silt  
sand  
coarse  
gravel

**Stratigraphic Column No: C-51**

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2667777 - 2668359

**Location:** Kairimu Road, south of Awamarino

**N:** 6319216 - 6320388

**C-51**

**NZMS 1 Sheet:** R16

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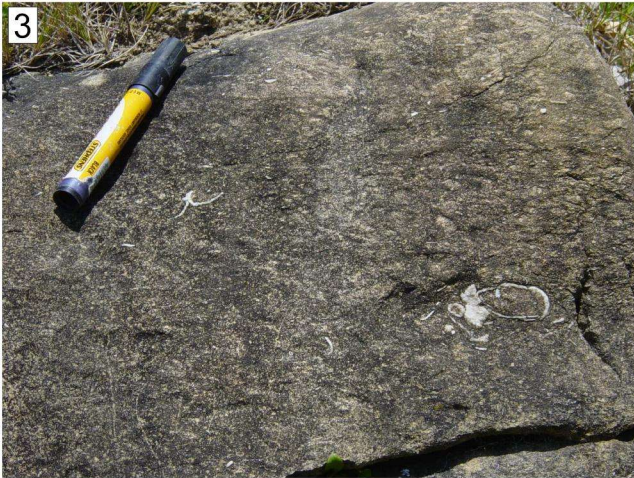
**Author:** C. Nelson  
**Modified:** A. Tripathi

2 of 4

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
Ld	Orahiri - Otorohanga Mangaotaki - Te Anga	130 120 110	Orahiri Limestone Te Anga Limestone				L3-L4 L4	9-11	3-3466	<p>V. weath. s. lst., mass. with microripply surf., packed with bryozoans, 15.2-23 cm band of mass. hard. slightly glauconitic lst at base.</p> <p>Oyst. bands near top, mid and bott. of unit, unorient., artic. and disartic., some iron-staining, incip.-mod. irreg. seams av. 2.5-5 cm. below 121.6 m pure, mod.-well dev. seams, down into jointed lst., in turn foll. by 0.9 m of mass, s. gritty lst.</p> <p>V. white pure, mod. flagged, av. 5 cm seams shelve, gritty at base where mod.-well dev. flags, av. 2.5-5 cm.</p> <p>Scatt. oysters and pebbles, av. 0.6, max 2.5 cm, oysts. unorient., disartic., incipient irregular seams, av. 5 cm apart.</p> <p>116.2-116.8 m massive-incipient flags, vert. joints, pure, semiknobby app.</p> <p>Incip.-mod. flags 2.5-5 cm w. scatt. pebbs. av. 0.6 cm, oysters common, artic. and disartic., haphaz., bryoz., seams less obvious downwards, pebbles not abund., yellow mst. liths. in compos. occ., oysters disappear by 112.2 m. Below 7.6 cm irreg. seams, av. 7.6-10 cm apart, micritic.</p> <p>Mod.-well flagged 2.5-5 cm lst., occ. veining, scatt. grit 110-111 m, featureless flaggy lst., flagginess better developed below 103.7 m.</p> <p>2.5-5 cm flaggy lst. with quartz grains etched on lst. surface, only sl. sandy lst. however.</p>

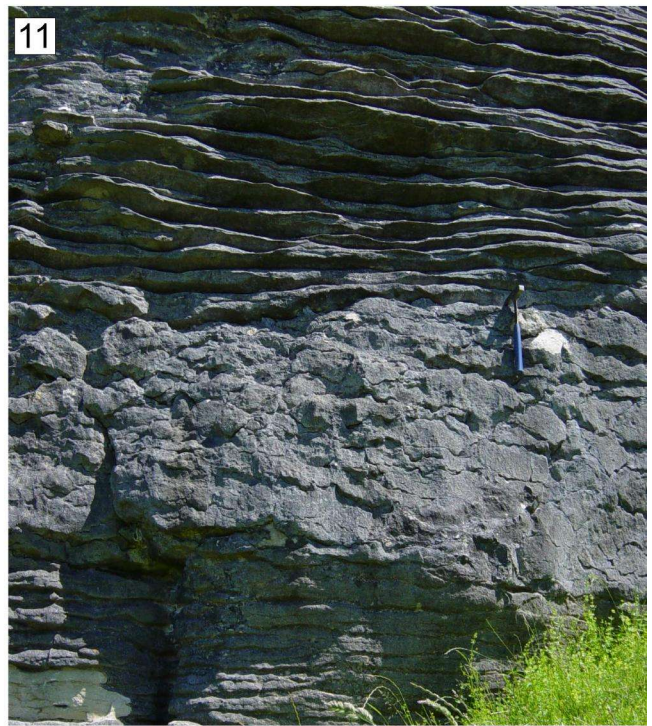
# C-51

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**C-51**

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**Stratigraphic Column No: C-56**

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2674344 - 2675224

**Location:** Mangaohoe Stream

**N:** - 6317359

**C-56**

**NZMS 1 Sheet:** R16

Page 1 of 2

**Author:** C. Nelson

**Modified:** A. Tripathi

1 of 4

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
Ld	Orahiri	100	Te Anga Lst	Cont. on pg 2	Weathering break		L6	6-8	3-3442	Red iron-staining above 97.3 m, mass. sandy lst. dev. incip.-mod. flags upwards, sl. glauc.
										Oysters > matrix. Incip. flagged 2.5-5 cm oyster scatt. throughout, occ. prolific, gen. disartic., oyster clusters, very occ. pebbles. Scatt. pebbles, max 2, av. 1.6 cm, more conc. immed. below 92.4 m where to 2.5 cm, micritic lst. 91.8-92.1 m - oyster band, matrix > oysters gen., disartic., intradasts present. Mass.-very incipient seams, irreg., sandy lst.
Ld	Orahiri	90	Mangaotaki Limestone		Weathering break		L4	5	3-3441	Incip. seams - ripply, 2.5 cm apart.
										Red iron-stained zone, v. incip. seams-rippy, v. thin yellow zone above Ripply surf. lst., ripples av. 2.5 cm. 'Honeycomb' weath., sl. more mass., bimodal terrig. grain sizes evident. Ripple surf. s. lst. (calc. sst). 'Honeycomb' weathering unit.
Ld	Mangaotaki	80							3-3440	Mass. ripply s. lst., ripples app. as inv. seams av. 2.5 cm apart.
										Mass. ripply s. lst., ripples app. as inv. seams av. 2.5 cm apart.
Ld	Aotea	70	Hauturu				S1-S2	4	3-3439	Mass.-inv. ripply s. lst.
										Mass.-incip. ripply calc. f. ssts.
Lwh	Aotea	60	Hauturu		Weathering break		S1		3-3438	Ssts. app. bded.-like along strike, variable weath. appearance.
										Bedded. sst.
Lwh	Aotea	50	Hauturu		Weathering break		S1		3-3437	Mass. ripply calc. ssts., surface ripples accentuated.
										Mass. ripply and bded. calc. ssts., often bding. weak and irreg. distrib.
Lwh	Glen Massey	40	Whaingarua Sst		Weathering break		S2		3-3436	36.6-37.2 m mass. smooth surf. calc. sst. with very occ. pebbles. Bored contact, ellip.-circ. borings av. 1.25-2.5 cm, in pebbly glauc. s. mst., pebbs. to 5 cm, av. 2 cm, mass. and fritt., undermined, contact blurred for 15 cm.
										Bl/gr. calc. mst., fritt. weath. surf., sl. sandier at base and very sandy 33.5-36.6 m.
Lwh	Glen Massey	30	Whaingarua Sst				S6		3-3435	Pure well-flagged av. 10-15 cm, lst.
										Mass. lsts., tends fritt., muddy.
Lwh	Eigood	20	Whaingarua Sst		Contact unseen Sharp break		L4		3-3435	Mass.-incip. seamed lst., thick seams.
										Mass.-incip. seamed lst., thick seams.
Lwh	Glen Massey	10	Whaingarua Sst		Break		L5		3-3435	Variable horizon of coals, carb. mst., leached red and white puggy clays, irregular distrib. and local.
										Mesozoic basement rocks.
Lwh	WCM	0	Wk		Contact unseen, measurements approx. Basal contact unseen					



**Stratigraphic Column No: C-56**

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2674344 - 2675224

**Location:** Mangaohoe Stream

**N:** 6318573 - 6317359

**C-56**

**NZMS 1 Sheet:** R16

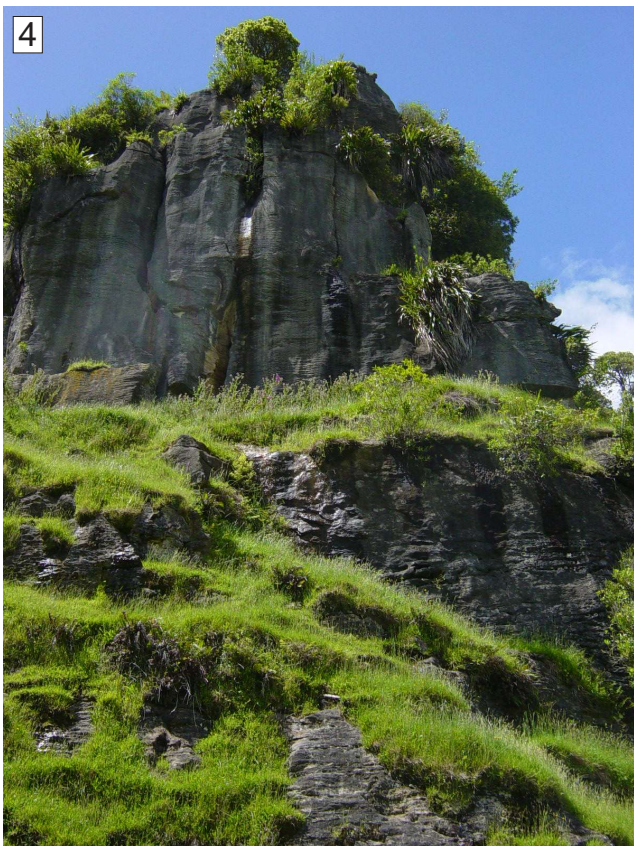
Page 2 of 2 **Author:** C. Nelson  
**Modified:** A. Tripathi

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Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description		
Lw	Otorohanga	0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150	Mahoenui	eroded top	Gradational contact		L8			Bl/gr. calc. mst. (Mn mst.), fritt. weath. surf., forms smoothly rounded cap-like hills.		
										L3	3-3449	Muddy f/gr. lst., some terrig. sand, relatively massive-large flagged, 15 cm. Incipient-well flagged, av. 5-7.6 cm lst., variable flag width.  Mod.-well developed flags, wide, av. 15 cm.  Semi-knobblly appearance more char.
	Waitanguru		Otorohanga Limestone	Waitanguru Lst				L5	9		3-3448	Pure white, cavernously weath. knobblly lst., often chalky, occ. rusty, occ. cross-bedded.  Semiknobblly, irregular weathering, incipient flags 7.6-10 cm and more, rare small pebbles. Well developed flags av.5-7.6 cm, veining common, rare grit.
											L3	10
	Pakeho		Te Angra Limestone	Pakeho Lst		Weathering break		L3-L6	6-8		3-3446	V. occ. oysters in non-incipient irregular seamed lst., occ. veining, gritty stuff. Incip. seams-mass. lst., rare oyster.
											3-3445	Flaggy, av. 2.5 cm lst, smooth surface.
	Te Angra		Orahiri Limestone	Orahiri Limestone							3-3444	Irregular seams 2.5-5 cm w. oysts. between 108.3-108.9 m, no red staining. Oysters common in incipient, gen. irreg. seamed lst., red iron-stained not affecting oysters.
											3-3443	Incip. seams, scatt. oysters above 103.3 m, becoming more abundant by 105 m, pitted surf., gen. matrix > oysters, no pebbs., oysters artic. and disartic., haphazard. Mod.-well dev. flags 2.5-5 cm, occ. veining. Incip. seam dev., 2.5 cm flags, gritty surf., becoming better flagged upwards.

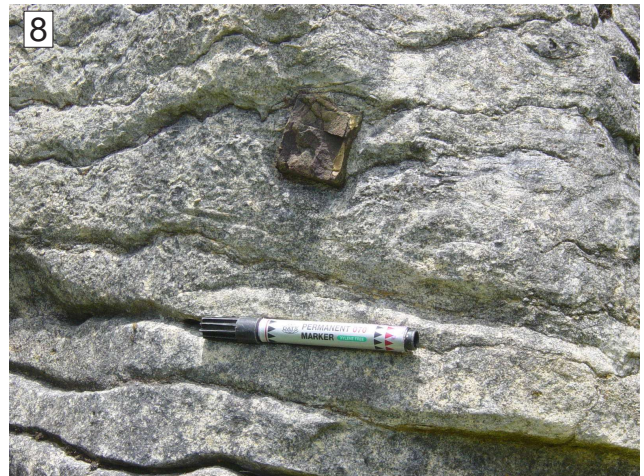
**C-56**

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**C-56**

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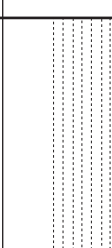
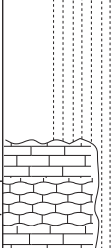
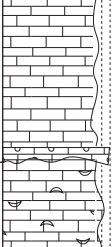
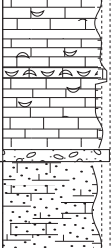

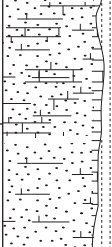

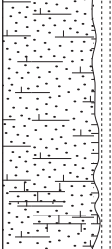
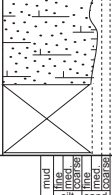
**Stratigraphic Column No: C 61**  
**Region:** Waitomo/King Country  
**Location:** Ngapaenga  
**NZMS 260 Sheet:** R16

**Grid Reference:**  
**E:** 2677818  
**N:** 6315274

**NZMS 260 R16**  
**C-61**  
**1 of 1**

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**Author:** C. Nelson  
**Modified:** A. Tripathi

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description	
Lwh	Aotea	0 10 20 30 40 50 60 70 80	Aotea Sandstone				S1			Slabby bedded calcareous sandstone	
											S2
	Hauturu		Aotea Sandstone					S1			Massive ripply calcareous sandstone, banded appearance at several horizons
	Mangaotaki		Orahiri Limestone					L4			Bedded calcareous sandstone, highly weathered, honeycombed surface appearance
	Orahiri		Te Anga				 Oyster bands	L6			Oyster bands, generally disarticulated, with scattered pebbles, irregular seams semi knobby appearance, occas haphazard oysters
	Ld		Te Anga				 Pectinids, bryozoans, scattered oysters	L6			Mod - well flagged 2.5-5 cm limestone, occas oyster
Lw	Pakeho Limestone					L3			Monotonous sequence of mod well developed flaggy 2.5-8cm limestone, occas veining, smooth surface		
											Well developed knobby limestone, slabby to semi-knobby in the lower part
Lw	Pakeho Limestone			Eroded		L3			Mod well flagged limestone, variable flag width, generally wide		

mud  
fine  
silt  
clay  
sand  
gravel

**Stratigraphic Column No: C-68**  
**Region:** King Country/Waitomo  
**Location:** Southeast of Ngapaenga

**Grid Reference:**

**E:** 2680545 - 2681183  
**N:** 6313887 - 6314630

NZMS 260 R16

**C-68**

**NZMS 1 Sheet:** R16

Page 1 of 1 **Author:** C. Nelson  
**Modified:** A. Tripathi

1 of 3

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
e. Lwh	WCM Mangakotuku	0-100	Wh Sist	King Country/Waitomo Coal Measures	[Lithology: Coal Measures]	[Fossils: Coal Measures]	[Facies: Coal Measures]	[Photo No. 1]	[WO No. 3-3421]	Interbedded coal and carb. msts. Mesozoic basement rocks.
	Glen Massey		Dunphail	[Lithology: Dunphail]	[Fossils: Dunphail]	[Facies: Dunphail]	[Photo No. 3]	[WO No. 3-3423]	Bl/gr. calc. mst., mass.	
										Whaingaroa
	Aotea		Hauturu	Aotea Sandstone	[Fossils: Aotea]	[Facies: Aotea]	[Photo No. 5-6]	[WO No. 3-3425, 3-3426]	V. mass. calc. sst., smooth surf. weaths. fritt., forms ledge in area. Poorly exposed glauc. s. lst., mass. ripply, forms gentle slope.	
										Ld
	Lw		Pakeho	Te Anga Lst	Orahiri Limestone	[Fossils: Limestone]	[Facies: Limestone]	[Photo No. 10-11]	[WO No. 3-3430, 3-3431, 3-3432, 3-3433, 3-3434]	
										Lw
	Lw		Pakeho	Te Anga Lst	Orahiri Limestone	[Fossils: Limestone]	[Facies: Limestone]	[Photo No. 10-11]	[WO No. 3-3434, 3-3433]	

**C-68**

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**C-68**

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**Stratigraphic Column No:** C-78  
**Region:** King Country/Waitomo  
**Location:** Between Mangaohae and Waitanguru  
**NZMS 1 Sheet:** R16

**Grid Reference:**

**E:** 2672653  
**N:** 6313773

NZMS 260 R16

**C-78**

Page 1 of 1 **Author:** C. Nelson  
**Modified:** A. Tripathi

1 of 1

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
e. Lwh	Glen Massey	0 to 70	Whaingaroa Silt							<p>Mesozoic basement rocks.</p> <p>Slightly sandy calc. mst.</p> <p>Bl/gr. frittery calc. mst.</p> <p>Bl/gr. muddy calc. sst., weathering fritt. with iron-stained concret. horizon some 15-60 cm thick.</p> <p>Mass. pure lst., with very occ. pebbles to 5 cm near base, over basal 30 cm scatt. pebbs. in white c/gr. knobly lst.</p> <p>L1 Incipient-mod. flaggy lst., gritty surface.</p> <p>L3-L4 Cross beds, dip 5° E. Incip. flaggy lst., weath. out to show seams only 1.3-2.5 cm apart.</p> <p>L2 Incip.-mod. seams, av. 4-7.6 cm apart, very occ. veining.</p> <p>L3 Mod.-well dev. flaggy 2.5-7.6 cm lst., common gritty surface feel.</p>
	Dunphail - Ahirau									
Ld	Mangaotaki	70 to 90								

mud  
lime  
silt  
sand  
gravel

**Stratigraphic Column No:** C-85

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2674561

**Location:** North of Mangaotaki

**N:** 6310061

**C-85**

**NZMS 1 Sheet:** R16

Page 1 of 1

**Author:** C. Nelson  
**Modified:** A. Tripathi

1 of 1

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description	
e. Lwh	Glen Massey	0 10 20 30 40 50 60 70	Whaingaroa Silt		Unseen interval		S6			Mesozoic basement rocks.	
	Dunphail - Anirau			Contact unseen						Bl/gr. calc. mst., mass., fritt. surface as smooth slippery slope.	
i. Lwh	Aotea		Aotea Sandstone		Sharp contact		S1			Mass.-rippled surf. calc. sst., gen. very weathered.  Evid. of banded calc. sst. at various levels, hard bands protrude as elongated slabs from soft sandy zones, var. exposures.	
	Hauturu										
Ld	Mangaotaki		Orahiri Limestone	ORA		Weathering break		S1-S2			Pronounced strat. break, below seams v. irreg., semiknobbly app., v. occ. oysters.  Mass., incip. seamed s. lst.
	Te Anga			ORB			Fossil hash	L4			Flaggy 2.5-5 cm lst., occ. inv. seams and oysters, smooth surface feel, reg. seams.
				ORA				L6			Pure flaggy 2.5-5 cm lst., slightly wavy seams. Mass.-incip. seams, incip. knobbly lst., scatt. pebbs. av. 1.3 cm, max 2.5 cm. Fossiliferous-hash zone, iron-stained, occ. tiny pebbs., v. incip. seams occ. veining, oysters and pectins. 56.4-57.6 m reg. 2.5-5 cm flags, occ. oysters. 56.1-56.4 m oyst. band, gen. oysters < matrix, oysters artic., haphaz., grad. contacts. 55.2-56.1 m irregularly seamed lst.
					eroded top						

mud  
clay  
silt  
sand  
gravel

**Stratigraphic Column No:** C-94

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2680521

**Location:** Pungarehu Road, west of Mairoa

**N:** 6310624

**C-94**

**NZMS 1 Sheet:** R16

Page 1 of 1

**Author:** C. Nelson  
**Modified:** A. Tripathi

1 of 1

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description	
e. Lwh	Glen Massey		Whaingaroa Siltstone				S6			Poorly exposed leached red to white puggy clays. Mesozoic basement close by.	
	Dunphail										
I. Lwh	Aotea			Aotea Sandstone		(ledge) Weathering ident or swampy ledge (swampy ledge)		S1-S2		Incipient seamed, 10-15 cm apart, calc. sst. Incip.-mod. developed bedded. sst. Frittery weath. massive calc. sst., sl. glauc., forms smooth mossy slope. Banded sst.	
	Hauturu										
Ld	Orahiri			Or A		Deep w. indent		L4			Mass. sandy lst., ripply surface, non-seamed. Bded. sst., var. appearance along strike where only incip. bded.-mass. Contin. bands of better cem. calc. sst. separated by soft 2.5 cm wide sand seams (cf. flags and seams). Mass.-ripply near base.
	Mangapouaka			eroded top							

mud  
 lime  
 silt  
 clay  
 sand  
 gravel

Stratigraphic Column No: C-97

Grid Reference:

Top

Bottom

NZMS 260 R16

Region: Te Kuiti

E: 2682532

- 2682460

Location: Southeast of Mairoa settlement

N: 6310568

- 6310800

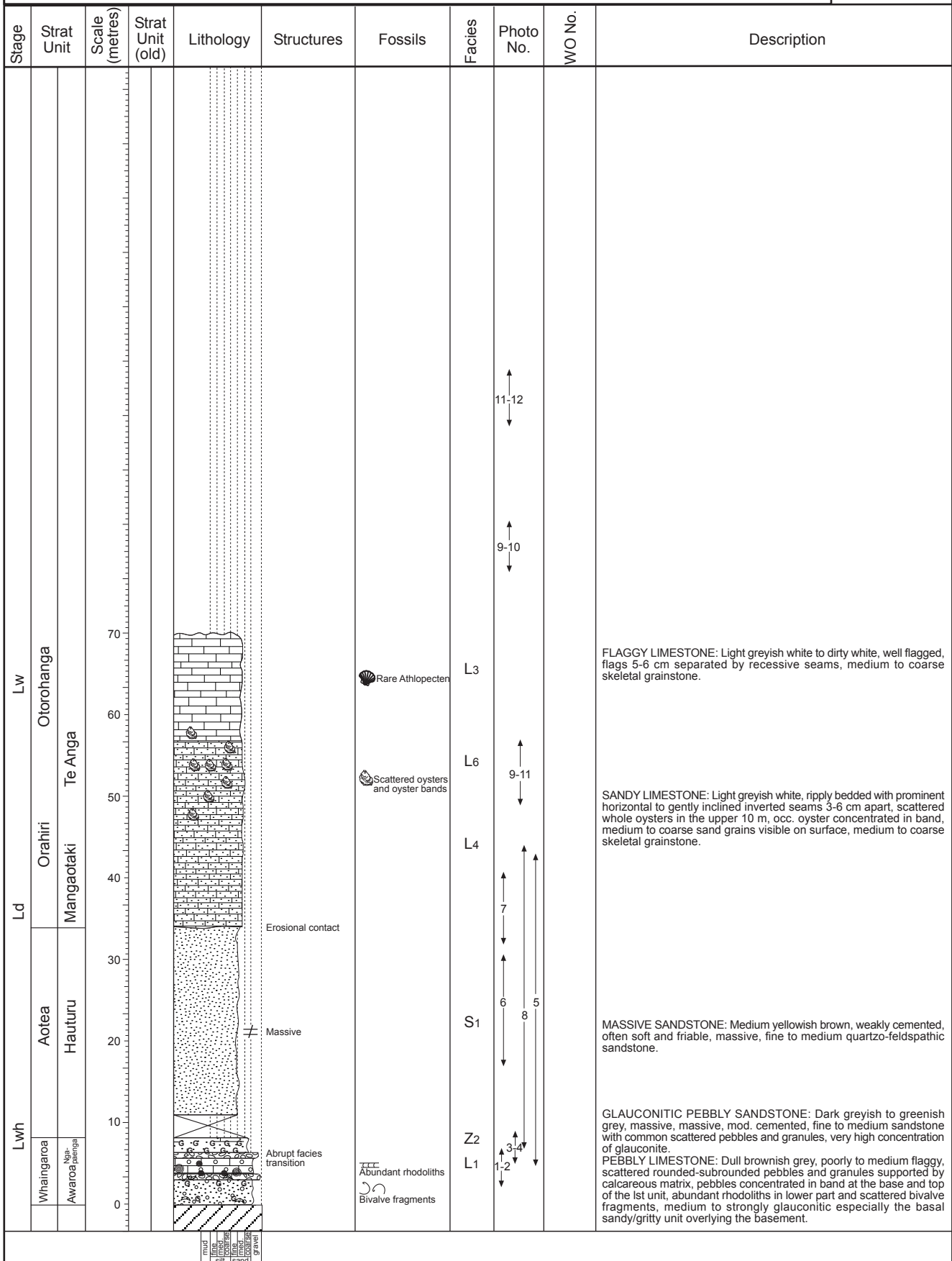
C-97

NZMS 260 Sheet: R16

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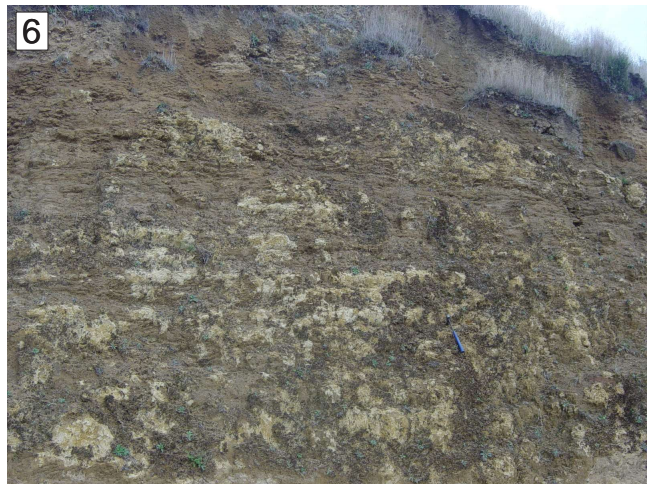
Author: C. Nelson

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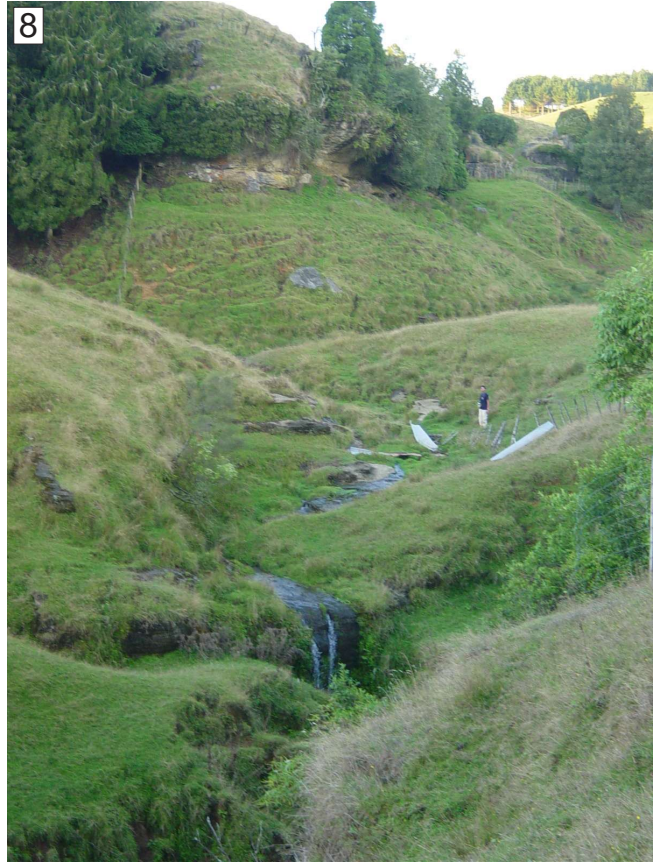
# C-97

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**C-97**

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**Stratigraphic Column No:** C-113

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2686084

**Location:** Near basement quarry, Oparure Road

**N:** 6313302

**C-113**

**NZMS 1 Sheet:** R16

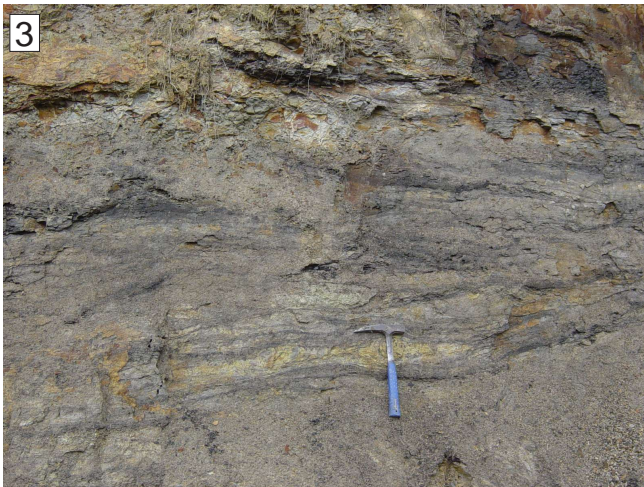
Page 1 of 1 **Author:** C. Nelson  
**Modified:** A. Tripathi

1 of 2

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description	
e. Lwh	WCM	0	WCM								
			Mangakotuku Silt								
			Whaingaroa Silt								
	Glen Massey Dunphail									Blue-grey massive calc. mst., frittery surface upon weathering.	
						Richly fossiliferous	S6			Richly ff. blue-grey calc. mst. with rare calc. concret., fossils include turrids, Panoepa, gastropods, bivalves. Gradual contact, increase in concret. along transition zone.	
								1-4		Purple silty msts., mass. fritt., concret., comm. dumb-bell shape, to 23 cm long, av. 5 cm. Nearby much of this interval shows alternations of grey silty sandy msts and carb. pebbly msts., pebbles leached greywacke. Carbonaceous mst. and coal streaks and lenses. Green-fawny purple siliceous mst., rare carbonaceous streaks. Strongly leached yellow-white puggy clays grad. down into basement rocks. Mesozoic basement rocks.	

# C-113

2 of 2



**Stratigraphic Column No:** C-117

**Grid Reference:**

NZMS 260 R16

**Region:** King Country/Waitomo

**E:** 2688823

**Location:** South of Pakeho, Oparure Road

**N:** 6313133

**C-117**

**NZMS 1 Sheet:** R16

Page 1 of 1

**Author:** C. Nelson

**Modified:** A. Tripathi

1 of 1

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
Lw	Otorohanga Pakeho	0-70	Otorohanga Limestone							<p>L3</p> <p>Bl/gr. friitery calc. mst., Mn mst.</p> <p>Gradual contact; top 90 cm of harder muddy lst. bands 7.6-30 cm thick separated by 1.3-2.5 cm shaley zones. 58-59.5 m massive inv. seamed, 1-5 cm apart, sandy lst.</p> <p>Incip.-mod. flaggy lst., minor shale units, corresponds to seams.</p>
										<p>L5</p> <p>Semiknobbly-knobbly, slappy ap., slabs av. 20 cm, vertical joints, sl.-mod. irregular weathered, widish seams.</p> <p>Well flagged 2.5-7.6 cm, av. 5 cm lst., occ. 'dogtooth' flags.</p>
Ld	Te Anga	0-10	Orahiri Lst			<p>Fossil hash</p>				<p>L6</p> <p>Very occ. tiny pebb. in irreg. mod.-well developed seamed biomicrite, ff-hash, brachs., Athlopecten, barnacles (on oysters) shark teeth.</p> <p>Scattered oysters in irreg. seamed 2.5-7.6 cm apart lst. Oysters=matrix.</p> <p>Irreg. seamed, av. 7.6 cm apart, lst., scattered oysters.</p>
										<p>L1-L4</p> <p>Flaggy 7.6 cm lst.</p> <p>60-90 cm conglom. pebbles&gt;matrix, rounded. greywacke pebbles to 20 cm, av. 3.8 cm, sharp contacts.</p> <p>Very calc. sst.-s. lst. with scattered pebble horizons.</p> <p>Mesozoic basement rocks.</p>

Stratigraphic Column No: 94-35

Grid Reference:

NZMS 260 R16

Region: Te Kuiti

E: 2689000

Location: Boddies Farm

N: 6313200


94-35

NZMS 260 Sheet: R16/890132

Page 1 of 1 Author: A.S. Anastas

Modified: A. Tripathi

1 of 1

Stage	Strat Unit	Scale (metres)	Strat Unit (old)	Lithology	Structures	Fossils	Facies	Photo No.	WO No.	Description
Po	Mahoenui Gp	50								
Lw	Otorohanga Lst	40					L8			Argillaceous lst., massive with seams 3-5 cm apart.
Ld	Orahiri Formation	Otorohanga Limestone					L3			Horizontally bedded lst., 1% glauc. grains, irregular bedding planes. Grainstone, large (1-3 mm) echinoderms common. Planar cross-beds.
							L2-L3			Horizontally bedded lst., pectins, red algae, sharp upper contact, thickly bedded.
							L2			Gently inclined beds, bryozoans, echinoderms, algae, possibly crossbedded, beds decrease in size upwards.
							L2-L3			Cross-beds, packstone, large bryozoans.
							L3			Gently inclined beds.
							L2-L3			Bryozoan echinoderm grainstone.
		10					L3			Tabular cross-set. Cross-bedded bryozoan-echinoderm packstone. Horizontally to gently inclined beds (cross-bedded). Cross-bedded.
		0					L2			Horizontally to gently inclined beds (cross-bedded). Cross-bedded.
							L3			Horizontally bedded lst., top 1 m shows packaging, beds 5-15 cm.
							L2			Large cross-bed, packstone, foresets 7-12 cm. Tabular bedded lst., toesets?
							L3-L5			Horizontally bedded lst., 5-10 cm beds, undulatory. Horizontally bedded lst., wacke-packstone, oysters. Basement.

mud  
silt  
sand  
gravel