

Fig. 4. Map showing location of stratigraphic columns within NZMS 260 Sheet V19.

Stratigraphic Column No. 1

Grid Reference: Top Bottom

NZMS 260 V19

GPS Waypoint No(s): Wp 574

E: 2840049 -

Region: Waitara

N: 6235605 -

Location: Mohaka River above Te Hoe River at bridge into forest, Waitara Station

Altitude: 185 m -

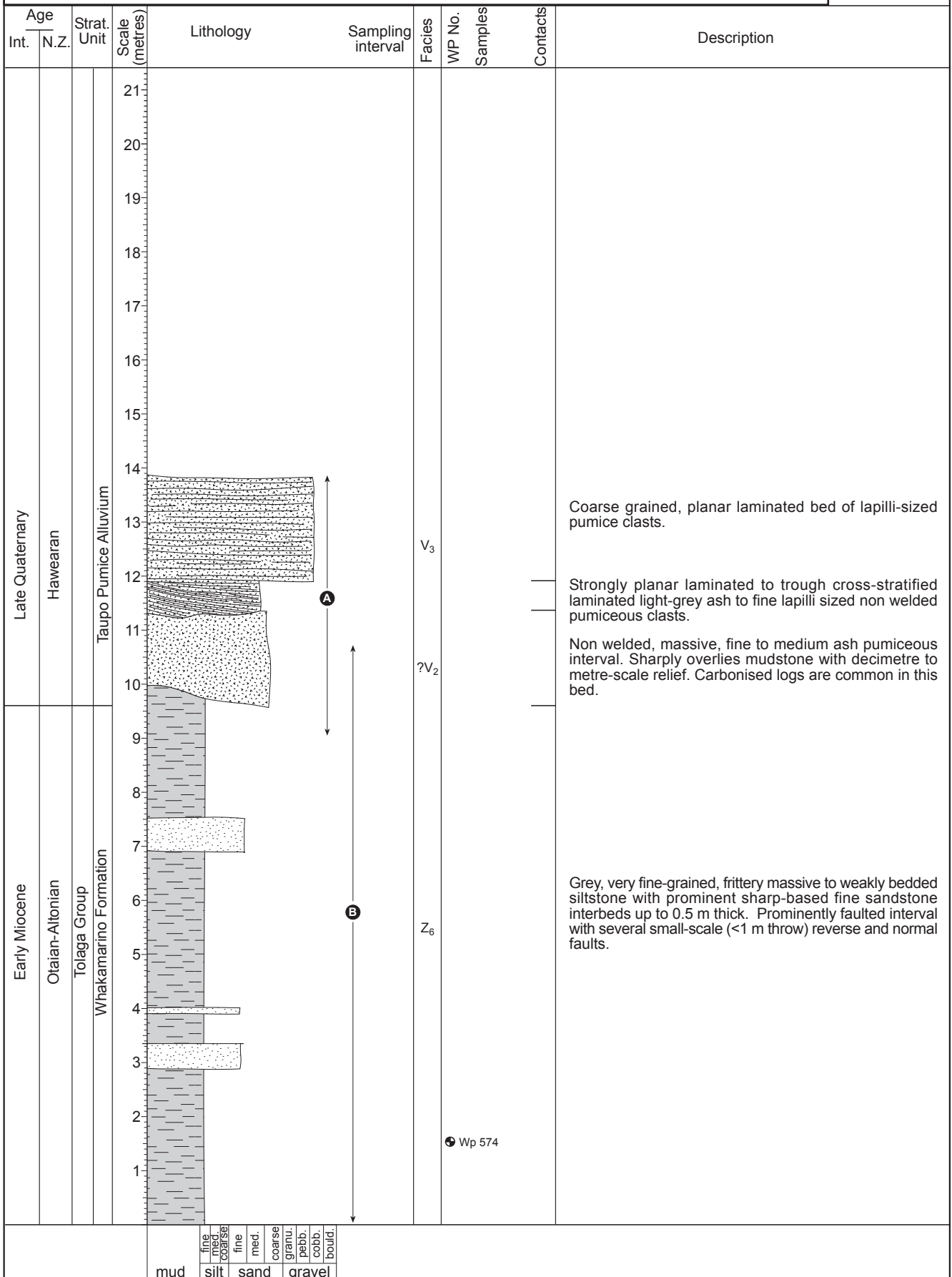
NZMS 260 Sheet: V19 Te Haroto

Page 1 of 1

Author: K. Bland

1 of 2

1



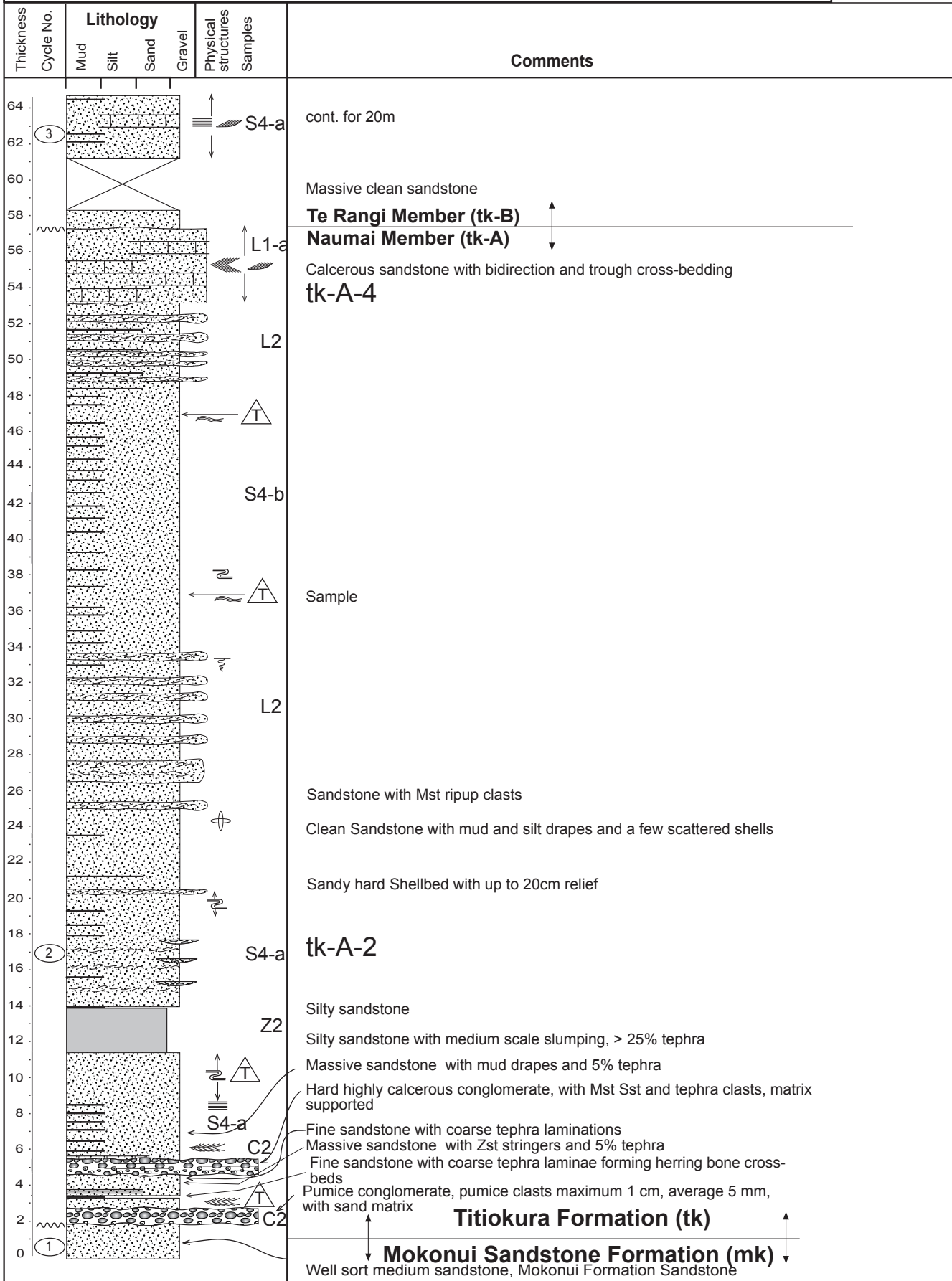


1

2 of 2



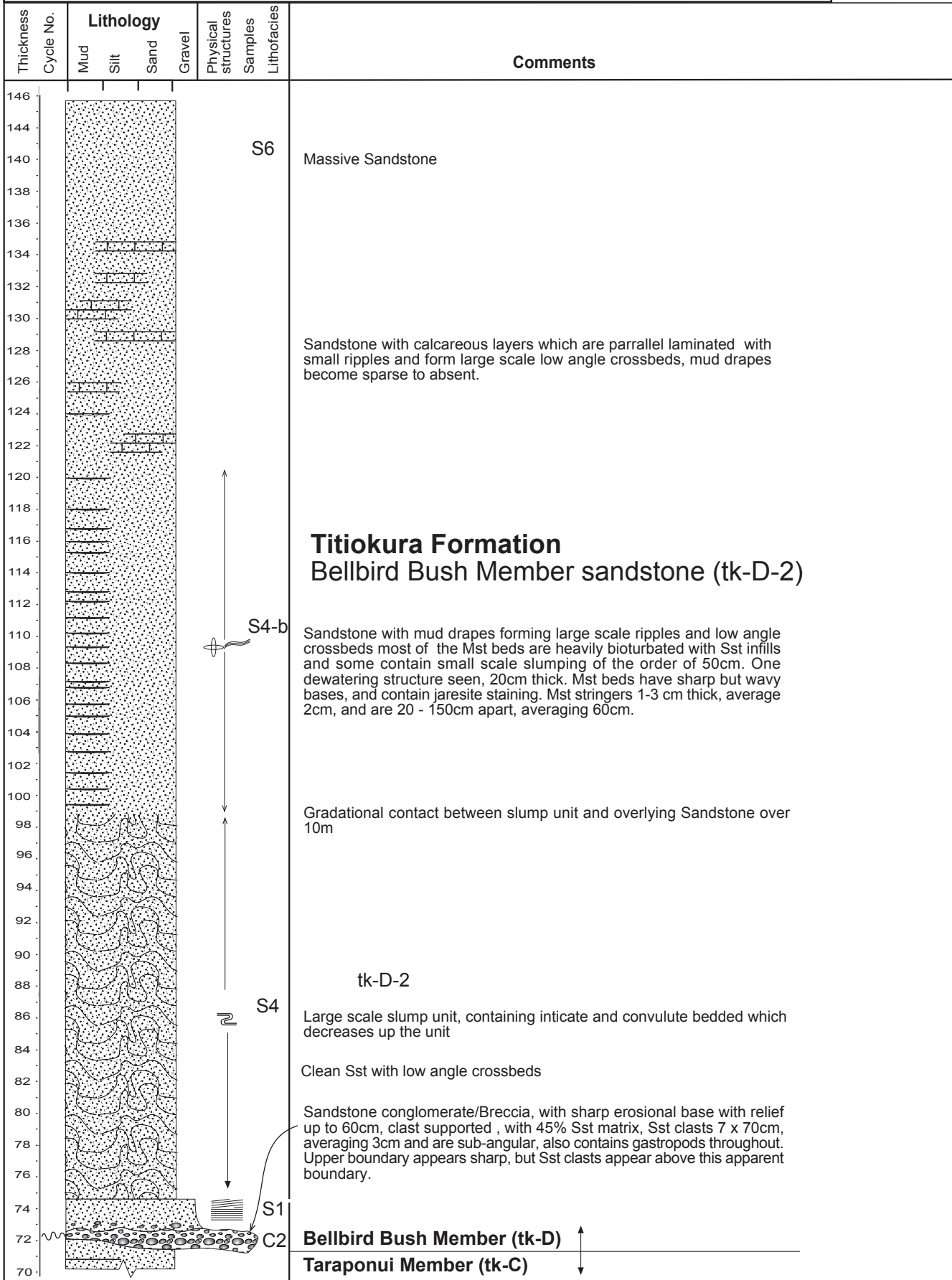
Stratigraphic Column No: 2	Grid Reference: Top	Bottom	<b>NZMS 260 V19</b>  <span style="font-size: 2em; color: red;">2</span>  1 of 1
Section:	E: 2841200	2841600	
GPS Waypoint No(s):	N: 6230600	6230100	
Region: Central Hawkes Bay	Altitude:	-	
Location: Te Rangi Station (3/3)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			







Stratigraphic Column No: <b>4</b>	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">4</span>  2 of 2
Section:	E: 2843000	-	
GPS Waypoint No(s):	N: 6229700	-	
Region: Central Hawkes Bay	Altitude:	-	
Location: Te Rangi Station (2/3)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			



Stratigraphic Column No: <b>5</b>	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">5</span>  1 of 1
Section:	E: 2840700	-	
GPS Waypoint No(s):	N: 6228700	-	
Region: Central Hawkes Bay	Altitude:	-	
Location: Naumai Station (6/6)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness Cycle No.	Lithology				Physical structures	Samples	Lithotype	Comments
	Mud	Silt	Sand	Gravel				
0-22								
								<p>Sandstone with small scale, ripples and bidirectional cross bedding, concretion layers, bioturbation, mud drapes (often heavily bioturbated), contains ~ 5% tephra throughout.</p> <p>Matrix supported conglomerate, containing Mst and Sst clasts, maximum clast size 8 x 5 cm, average = 1cm. sandstone matrix ~ 45%. <b>tk-B-2</b></p> <p>Fossiliferous Sandstone beds, with Mst and Sst clasts</p> <p>Small sand waves, and small scale slumping in fine grained Sst, and bioturbation Small scale slumping in mud drape</p> <p>Fine well sorted Sandstone with concretions, bioturbated mud drapes and clasts.</p> <p>Fossiliferous Sandstone bed, with Mst and Sst clasts Clast supported conglomerate, containing Mst and Sst clasts, very poorly sorted, maximum clast size 35 x 20cm, average of 5mm. Crossbedded sandstone, with rare rippled and bioturbated mud drapes</p> <p><b>Te Rangi Member (tk-B)</b> <b>Naumai Member (tk-A)</b></p> <p>Calcareous bidirectional crossbedded calcareous sandstone, fossiliferous with &lt; 5% greywacke granule content <b>tk-A-4</b></p>

Stratigraphic Column No: <b>6</b>	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">6</span>  1 of 1
Section:	E: 2840800	-	
GPS Waypoint No(s):	N: 6228400	-	
Region: Central Hawkes Bay	Altitude:	-	
Location: Naumai Station (5/6)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
	Mud	Silt	Sand	Gravel				
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <p>10</p> <p>8</p> <p>6</p> <p>4</p> <p>2</p> <p>0</p> </div> </div>							<p style="text-align: center;"><b>tk-C-2</b></p> <p>Shellbed with rip-up clasts and flame structures at base</p> <p>Very hard calcereous mass flow conglomerate, containing large Mst and Sst rip-up clasts through-out unit, maximum 30 x 70cm, averaging 7 x 7cm. Also contains greywacke pebble component, which coarsens upwards until the middle, then fines towards the top at which pebble component becomes rare to absent. Contains high shell content</p> <p><b>Taraponui Member (tk-C)</b> ↑</p> <hr style="border: 0.5px solid black;"/> <p><b>Te Rangi Member (tk-B)</b> ↓</p> <p><b>tk-B-4</b> Sandy limestone bed</p> <p>S6 Sandstone with calcereous layers</p>	

<b>Stratigraphic Column No:</b> 7	<b>Grid Reference:</b> <b>Top</b>	<b>Bottom</b>	NZMS 260 V19  <span style="font-size: 2em; color: red;">7</span>  1 of 3
<b>GPS Waypoint No(s):</b> Wp 984	<b>E:</b> 2837583	-	
<b>Region:</b> Naumai	<b>N:</b> 6227623	-	
<b>Location:</b> Pohokura Road near Woodstock Road	<b>Altitude:</b> 681 m	-	
<b>NZMS 260 Sheet:</b> V19 Te Haroto	<b>Page 1 of 2</b>	<b>Author:</b> K. Bland	

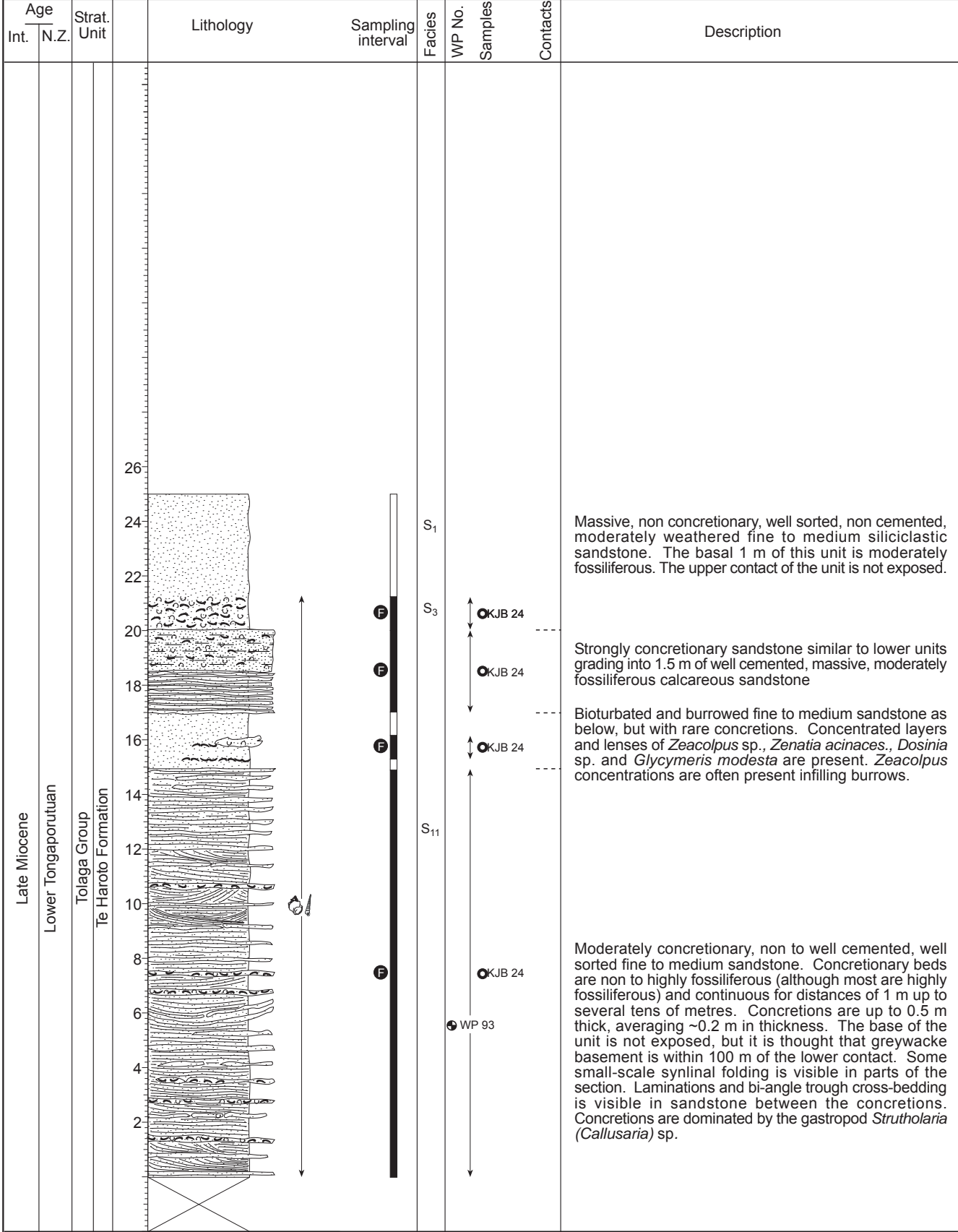
Age	Strat. Unit	Scale (metres)	Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description		
										Int.	N.Z.
Late Miocene	Lower Kapitean	Tolaga Group	Mokonui Sandstone		S <sub>10</sub>				Very fine sandstone with occasional coarser-grained sandstone beds up to 0.5 m thick that have a redeposited appearance.		
										42	⊙
										40	
										38	
										36	
										34	
										32	
										30	
										28	
										26	
24											
22											
20											
18											
16											
14	⊙	↕	A B					Slightly cemented, well sorted, very fine sandstone.			
12											
10					S <sub>1</sub>						
8						⊙ WP 985		Slightly cemented, well sorted, fine sandstone.			
6											
4											
2					Z <sub>1</sub>			Non cemented, non fossiliferous siltstone.			

mud	fine	med.	coarse	fine	med.	coarse	granu.	pebb.	cobb.	bould.
	silt	sand	gravel							





**Stratigraphic Column No: 8**      **Grid Reference: Top**      **Bottom**      **NZMS 260 V19**  
**GPS Waypoint No(s): Wp 93**      **E:** 2819661  
**Region: Te Haroto**      **N:** 6226539  
**Location: Napier-Taupo Road approx. 1km north of Te Haroto.**      **Altitude:** 712m      -  
**NZMS 260 Sheet: V19 TeHarato**      **Page 1 of 1**      **Author: K. Bland**      **1 of 2**

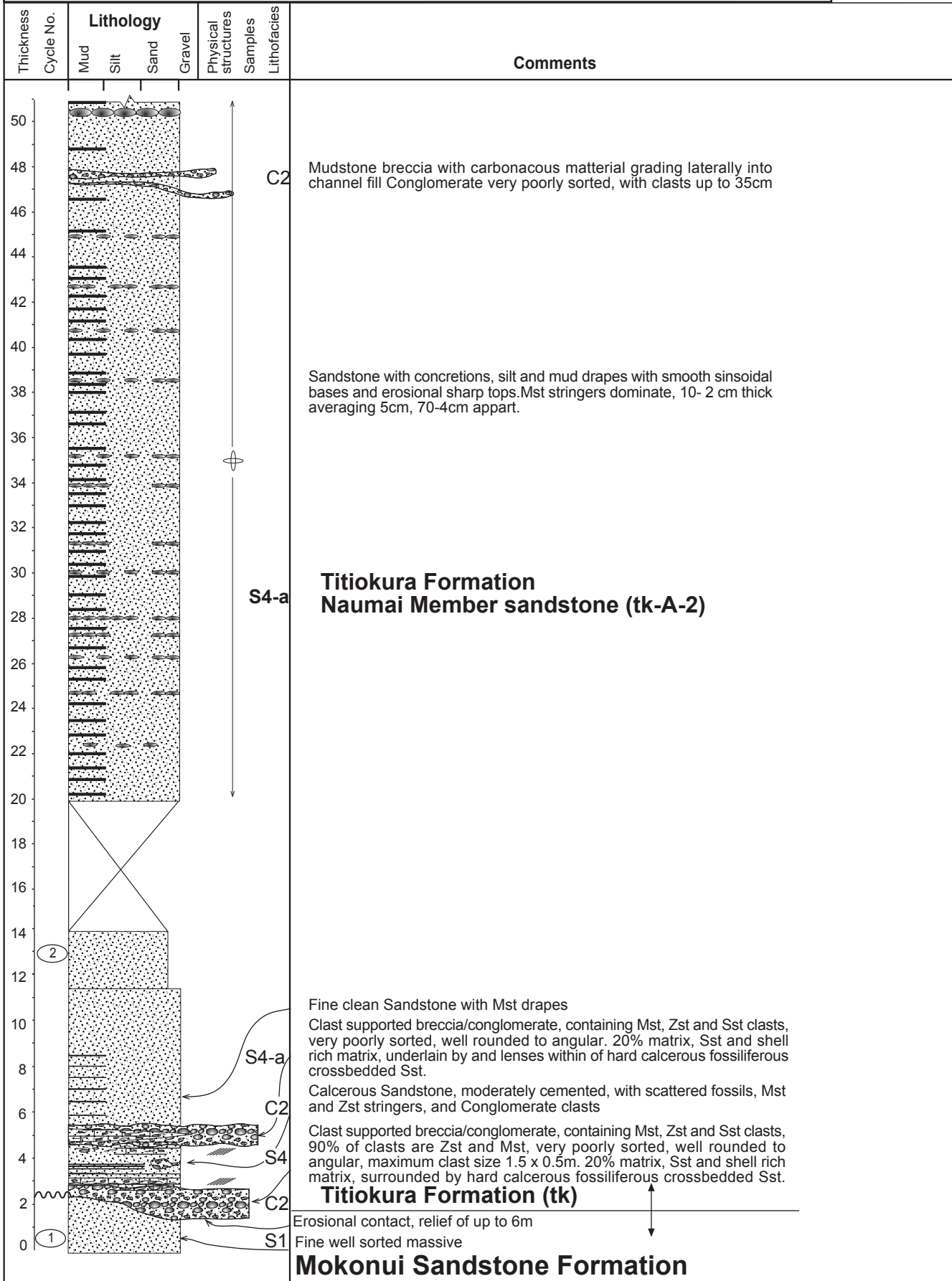


8

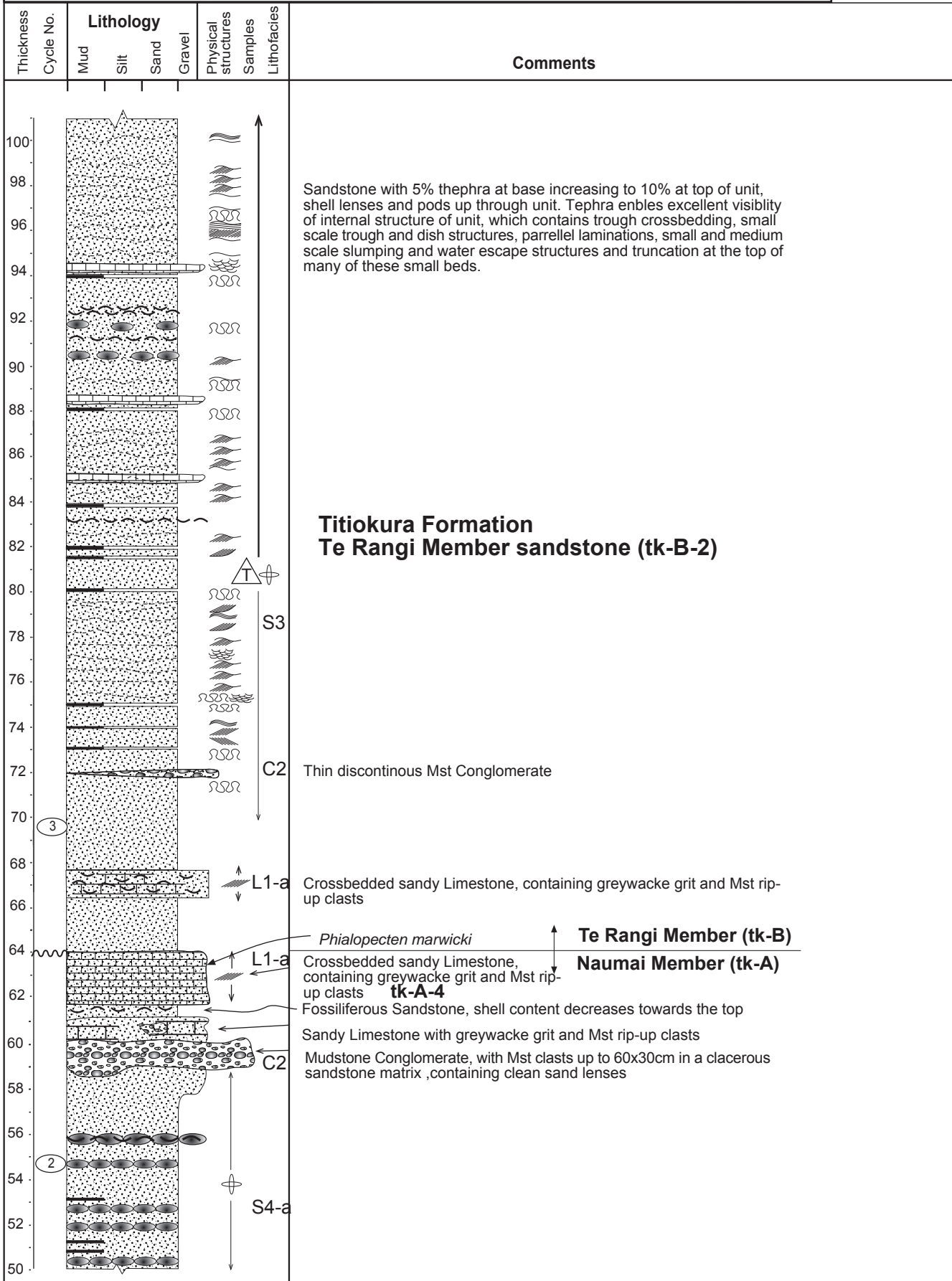
2 of 2



Stratigraphic Column No: 9 (1/4)	Grid Reference: Top	Bottom	<b>NZMS 260 V19</b>  <span style="font-size: 2em; color: red;">9</span>  1 of 4
Section:	E: 2838700	2838600	
GPS Waypoint No(s):	N: 6227300	6226200	
Region: Central Hawkes Bay	Altitude:	-	
Location: Naumai Station (1/6)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			



Stratigraphic Column No: 9 (2/4)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">9</span>  2 of 4
Section:	E: 2838700	2838600	
GPS Waypoint No(s):	N: 6227300	6226200	
Region: Central Hawkes Bay	Altitude:	-	
Location: Naumai Station (2/6)	Author: R. Graafhuis		
NZMS 260 Sheet: V19			



Thin discontinuous Mst Conglomerate

Crossbedded sandy Limestone, containing greywacke grit and Mst rip-up clasts

*Phialopecten marwicki*

Crossbedded sandy Limestone, containing greywacke grit and Mst rip-up clasts

**tk-A-4**

Fossiliferous Sandstone, shell content decreases towards the top

Sandy Limestone with greywacke grit and Mst rip-up clasts

Mudstone Conglomerate, with Mst clasts up to 60x30cm in a clacerosus sandstone matrix ,containing clean sand lenses

**Te Rangi Member (tk-B)**  
**Naumai Member (tk-A)**



Stratigraphic Column No: 9 (4/4)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">9</span>  4 of 4
Section:	E: 2838700	2838600	
GPS Waypoint No(s):	N: 6227300	6226200	
Region: Central Hawkes Bay	Altitude:	-	
Location: Naumai Station (4/6)	Author: R. Graafhuis		
NZMS 260 Sheet: V19			

Thickness	Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
		Mud	Silt	Sand	Gravel				
186									
184									<b>Taraponui Member (tk-C)</b> <b>tk-C-4</b> Crossbedded sandy limestone with Mst clasts, tephra clasts and shattered shells
182									
180									<b>S3</b> Sandstone with water escape structures, Mst clasts, heavily bioturbated and rippled/laminated mud drapes, and calcareous layers with shell hash.
178									<b>tk-C-2</b>
176									
174									
172									
170									
168									
166									
164									
162									
160									
158									<b>S1</b>
156									
154									
152									
150									



Stratigraphic Column No: 10 (2/2)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">10</span>  2 of 2
Section:	E: 2842200	2842300	
GPS Waypoint No(s):	N: 6227000	6227000	
Region: Central Hawkes Bay	Altitude:	-	
Location: Rangiora Stud (8/9)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness	Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
		Mud	Silt	Sand	Gravel				
86									
84									
82									
80								Thickly bedded parallel laminated amalgamated sandstone	
78								Sandstone with 1% < 5% shell material, parallel bedded, erosional contact with underling unit.	
76								Siltstone absent from unit, Sst forms amalgamated units, and contains very small scale crossbedding and ripple structures.	
74	4								
72									
70									
68									
66									
64									
62									
60									
58									
56									
54									
52									
50									
48									

**Titiokura Formation**  
Taraponui Member sandstone (tk-C-2)

**tk-C**

Fine well sorted Sandstone with concretions and mud drapes grading up into siltstone drapes, averaging 10cm thick, 40cm to 5cm apart. concretions become thicker up unit and range from 20cm to 1m thick, and are heavily bioturbated

Stratigraphic Column No: 11 (1/3)

Grid Reference:

Top

Bottom

NZMS 260 V19

Section:

E:

2844000

2843500

GPS Waypoint No(s):

N:

6228100

6227100

Region: Central Hawkes Bay

Altitude:

-

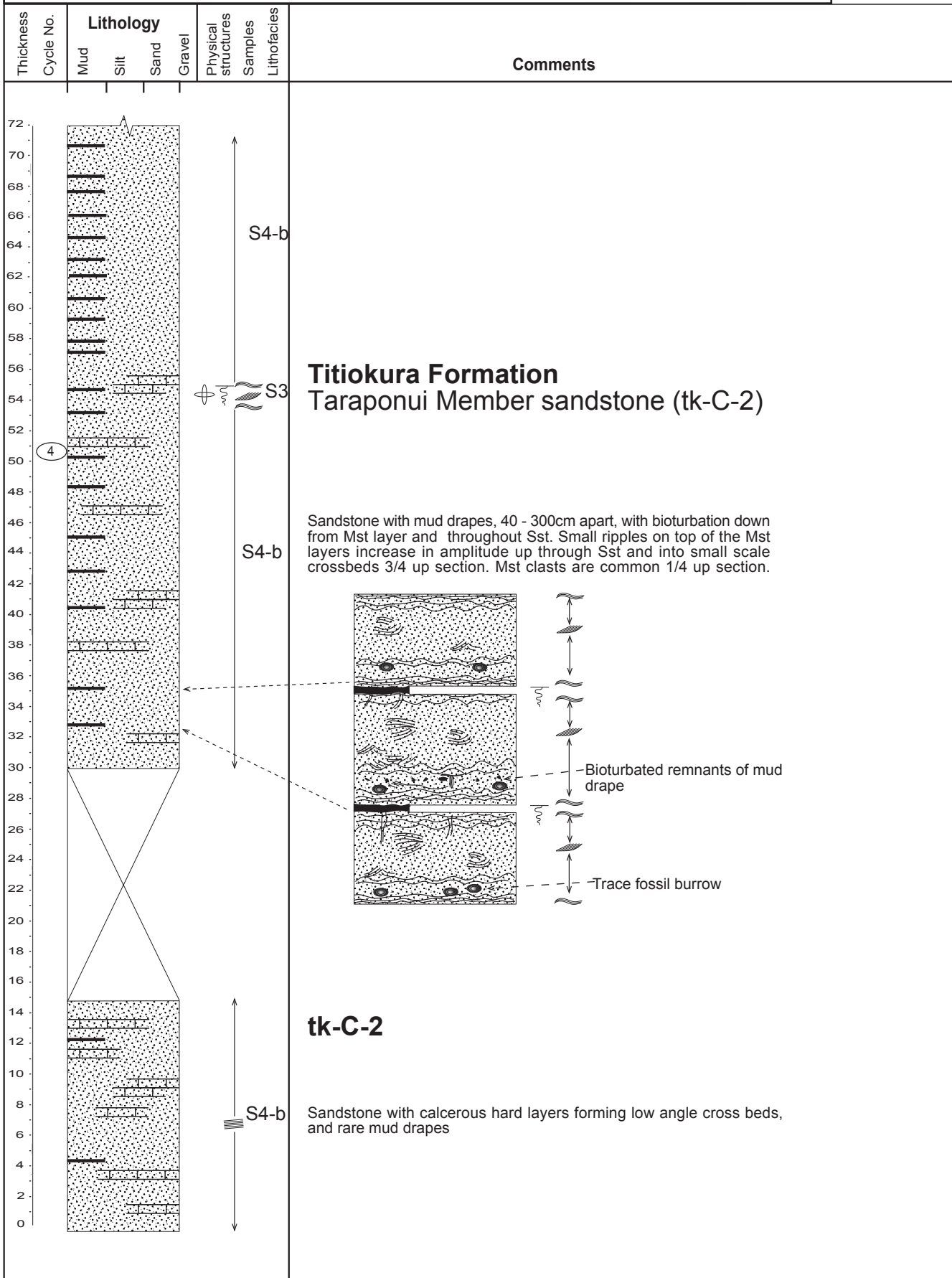
Location: Boundary Stream walkway (1/3)

NZMS 260 Sheet: V19

Author: R. Graafhuis

11

1 of 3



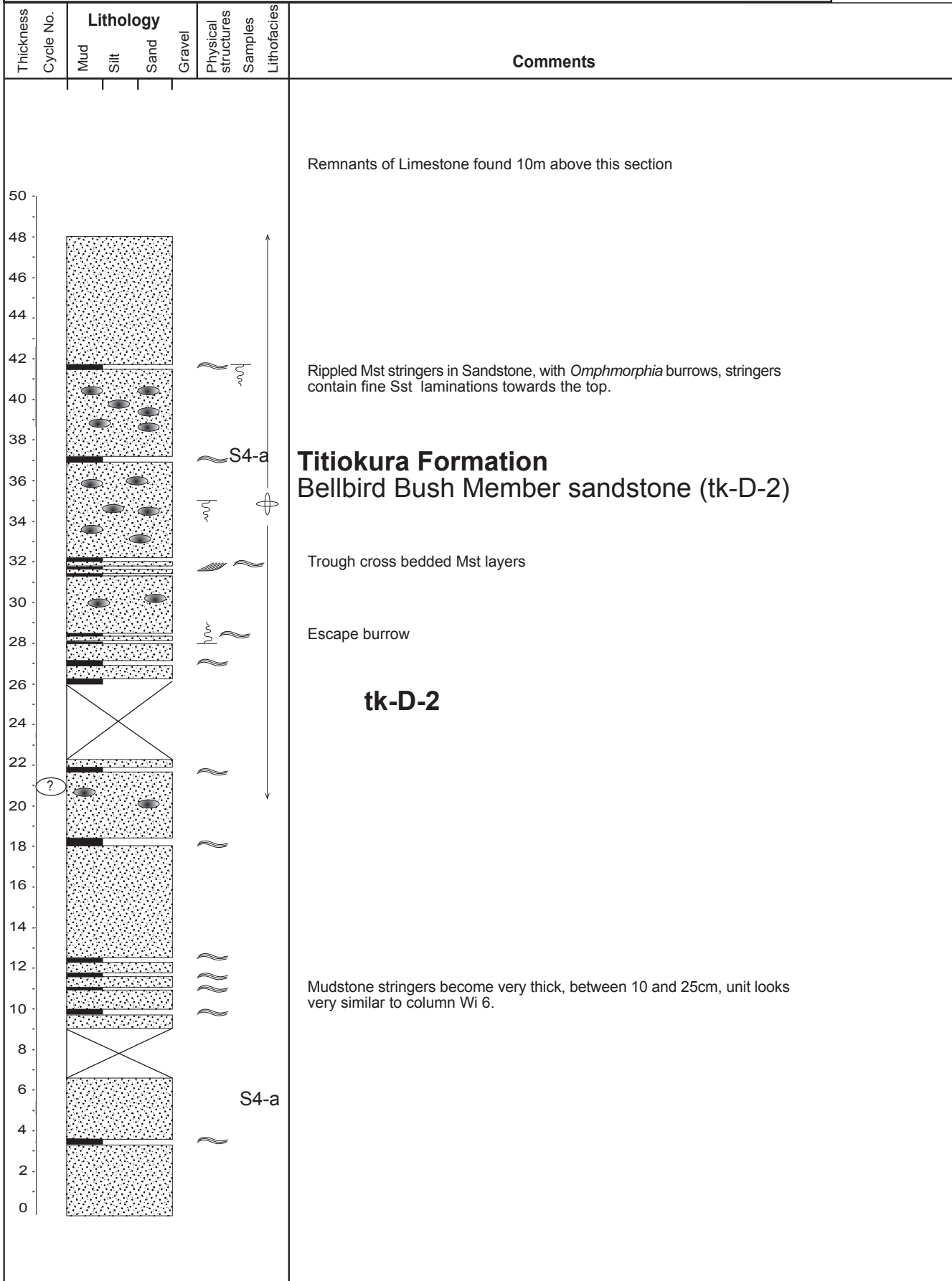
Stratigraphic Column No: 11 (2/3)	Grid Reference: Top	Bottom	<b>NZMS 260 V19</b>  <span style="font-size: 2em; color: red;">11</span>  2 of 3
Section:	E: 2844000	2843500	
GPS Waypoint No(s):	N: 6228100	6227100	
Region: Central Hawkes Bay	Altitude:	-	
Location: Boundary Stream walkway (2/3)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness	Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
		Mud	Silt	Sand	Gravel				
148									
146									
144									
142									
140									
136									
134								Sandstone with mud and silt drapes, with concretions formed by bioturbation and some small scale slumping and dewatering at the top of the Sst beds	
132									
130									
128								Crossbedded sandstone with high shell, heavy mineral, and Mst clast content	
126									
124									
122									
120									
118									
116									
114									
112								Heavily bioturbated sandstone, forming concretions 25cm thick, 10 - 100 cm apart	
110									
108									
106									
104									
102	5								
100								<b>tk-D-2</b>	
98									
96									
94									
92								S3 Crossbedded sandstone, cross beds angles from 12 to 40 degrees	
90								Parrellel laminated sandstone with calcareous layers	
88									
86									
84								Tephra rich ripple crossbedding grading into wavy laminations	
82									
80									
78									
76								Bellbird Bush Member sandstone (tk-C-2)	
74	5							Taraponui Member sandstone (tk-C-2)	
72								Steep crossbedding in tephra rich sandstone, ~ 30% , beds are truncated at the top and are overlain by wavy laminations and then small scale ripples	

Stratigraphic Column No: 11 (3/3)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">11</span>  3 of 3
Section:	E: 2844000	2843500	
GPS Waypoint No(s):	N: 6228100	6227100	
Region: Central Hawkes Bay	Altitude:	-	
Location: Boundary Stream walkway (3/3)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
	Mud	Silt	Sand	Gravel				
186 184 182 180 178 176 174 172 170 168 166 164 162 160 158 156 154 152 150 148					S5	Massive to parallel laminated sandstone with rare Zst stringers	<p><b>Titiokura Formation</b> Bellbird Bush Member sandstone (tk-D-2)</p> <p><b>tk-D-2</b></p>	

Stratigraphic Column No: 12	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">12</span>  1 of 1
Section:	E: 2840500	-	
GPS Waypoint No(s):	N: 6224600	-	
Region: Central Hawkes Bay	Altitude:	-	
Location: Maori Gully Track (1/2)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			



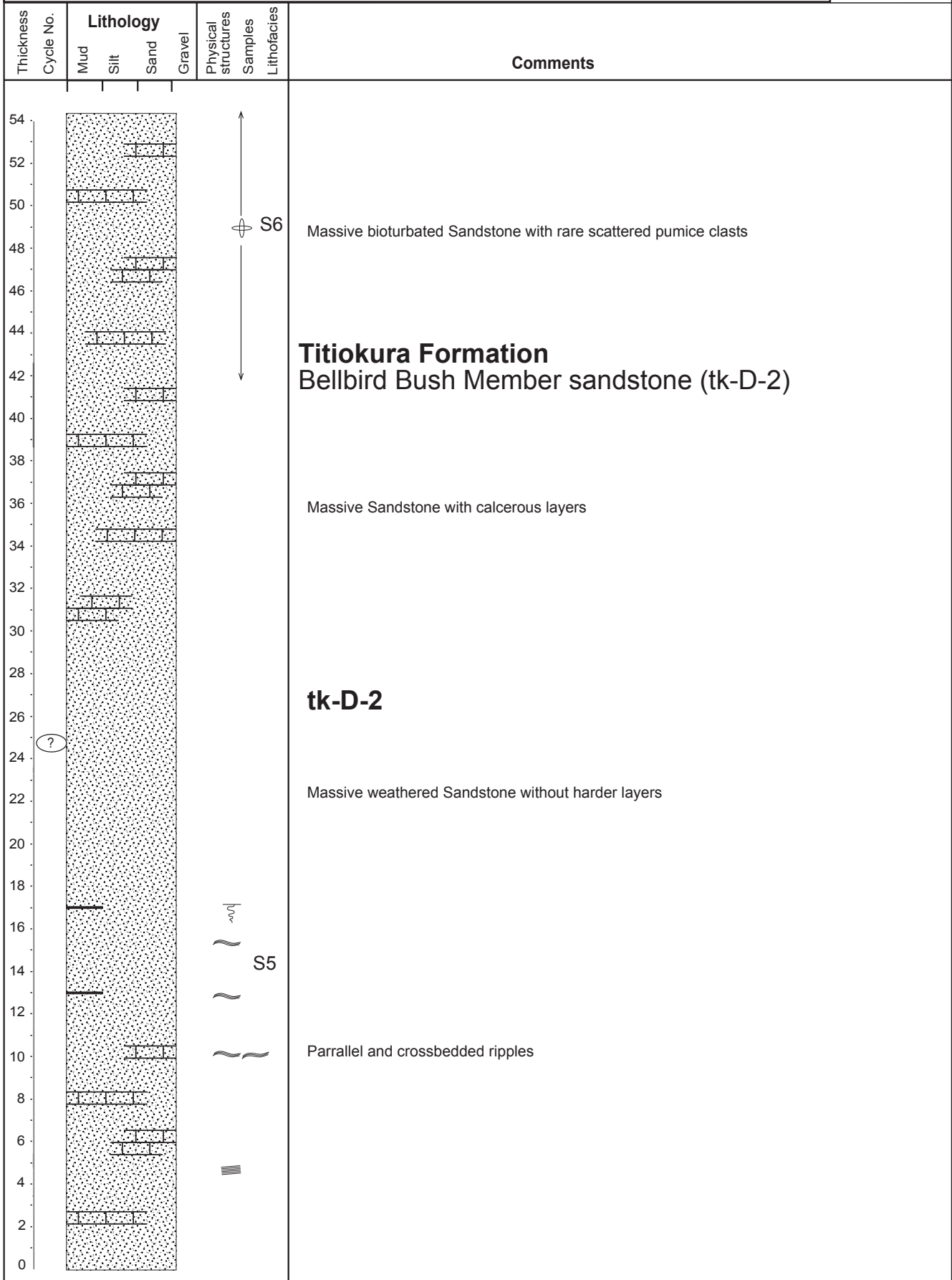
Stratigraphic Column No: 13 (1/2)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">13</span>  1 of 2
Section:	E: 2843400	2841800	
GPS Waypoint No(s):	N: 6225000	6224300	
Region: Central Hawkes Bay	Altitude:	-	
Location: Rangiora Stud (4/9)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
	Mud	Silt	Sand	Gravel				
110								
100							S5	Heavily bioturbated Sandstone with calcereous harder layers, Mst stringers also heavily bioturbated, scattered shells throughout
90								Parrellel laminated to rippled Sandstone , with harder calcereous layers, no bioturbation seen
80								Parrellel bedded Sandstone with shell lenses and biotubation
70								<b>Titiokura Formation</b> <b>Bellbird Bush Member sandstone</b> <b>(tk-D-2)</b>
60								<b>tk-D-2</b>
50								Parrellel laminated Sandstone extensively bioturbated, containing shell fragments
40							C	
30								Sandstone becoming more bioturbated up section, low angle crossbeds becoming smaller in scale
20							S5	Trough crossbedding onto large scale low angle cross bedding which can be followed for 50m along outcrop
10								Massive Sandstone with calcereous harder layers which form low angle parrellel crossbeds, 10-100cm apart, averaging 50cm, 5-15cm thick, averaging 10cm. These layers undulate and lense out, probably formed by bioturbation, ench shells found in one
0								

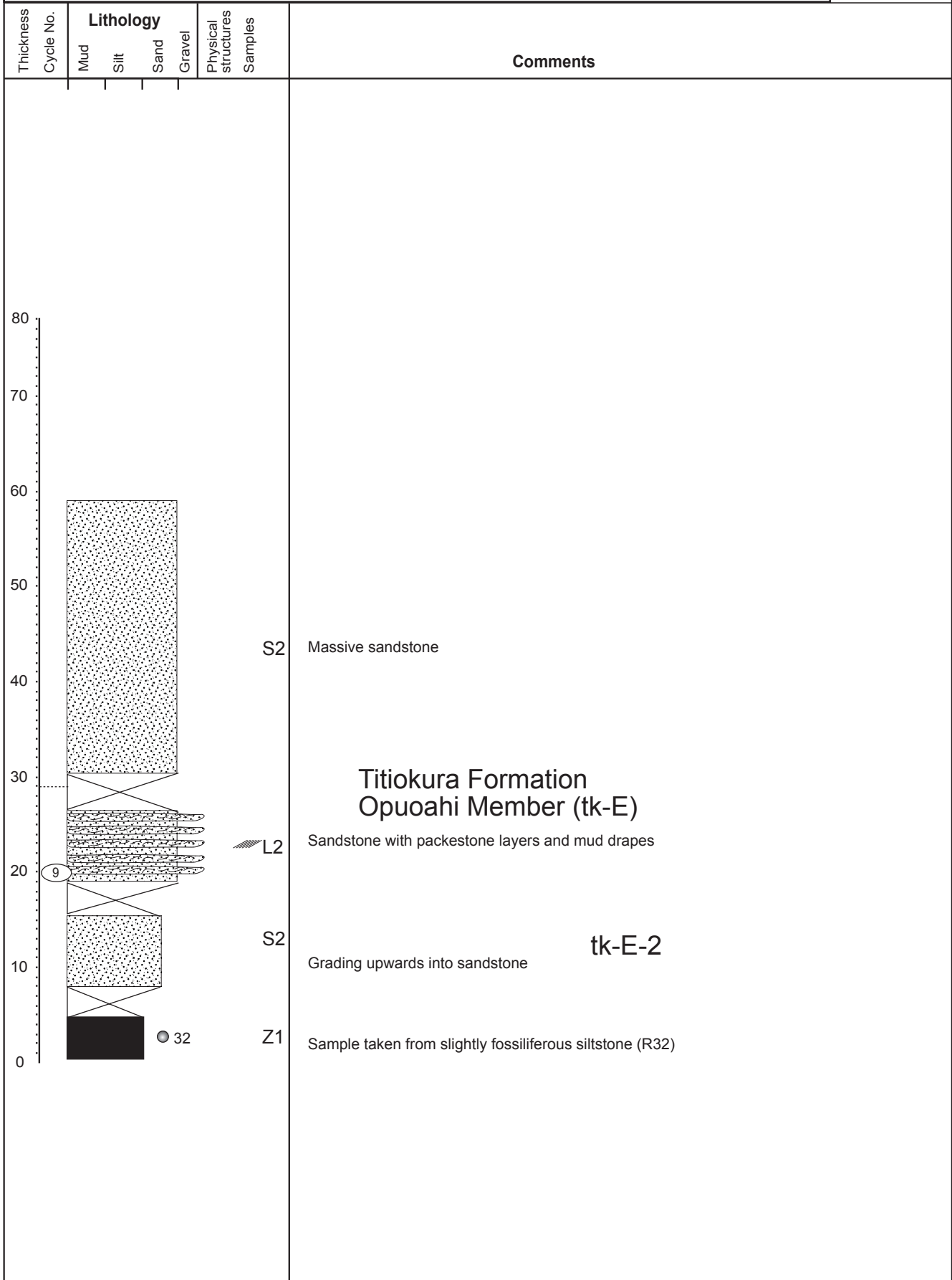
Stratigraphic Column No: <b>13</b> (2/2)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;"><b>13</b></span>  2 of 2
Section:	E: 2843400	2841800	
GPS Waypoint No(s):	N: 6225000	6224300	
Region: Central Hawkes Bay	Altitude:	-	
Location: Rangiora Stud (5/9)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness	Cycle No.	Lithology				Physical structures	Samples	Comments
		Mud	Silt	Sand	Gravel			
200								
190							S4-a	Sandstone with Mst stringers 40-400cm apart, 0.5-7cm thick, averaging 5cm, with wavy bases, inter-rippled with Sst toward the top, and bioturbated from the top. With some crossbedding.
180								
170							S4-a	Sandstone with Mst stringers 40-400cm apart, 0.5-7cm thick, averaging 5cm, with wavy bases, inter-rippled with Sst toward the top, and bioturbated from the top. Some crossbedding lower down in unit
160	(?)							<b>tk-D-2</b>
150								Heavily bioturbated Sandstone with calcerous harder layers
140							S4-a	Heavily bioturbated Sandstone with calcerous harder layers and low angle cross beds
130								
120							S4-a	Rippled to crossbedded shelly Sandstone
110								Mudstone stringers with wavy ripple form tops and bases, the thinner stringers are inter-rippled with Sst

Stratigraphic Column No: 14	Grid Reference: Top	Bottom	NZMS 260 V19
Section:	E: 2844500	-	
GPS Waypoint No(s):	N: 6225500	-	
Region: Central Hawkes Bay	Altitude:	-	
Location: Rangiora Stud (6/9)	Author: R. Graafhuis		
NZMS 260 Sheet: V19			1 of 1



Stratigraphic Column No: <b>15a</b>	Grid Reference: Top	Bottom	NZMS 260 V19
Section:	E: 2846600	-	<b>15a</b>
GPS Waypoint No(s):	N: 6225300	-	
Region: Central Hawkes Bay	Altitude:	-	
Location: Heays Access Road	<b>Author: R. Graafhuis</b>		1 of 1
NZMS 260 Sheet: V19			

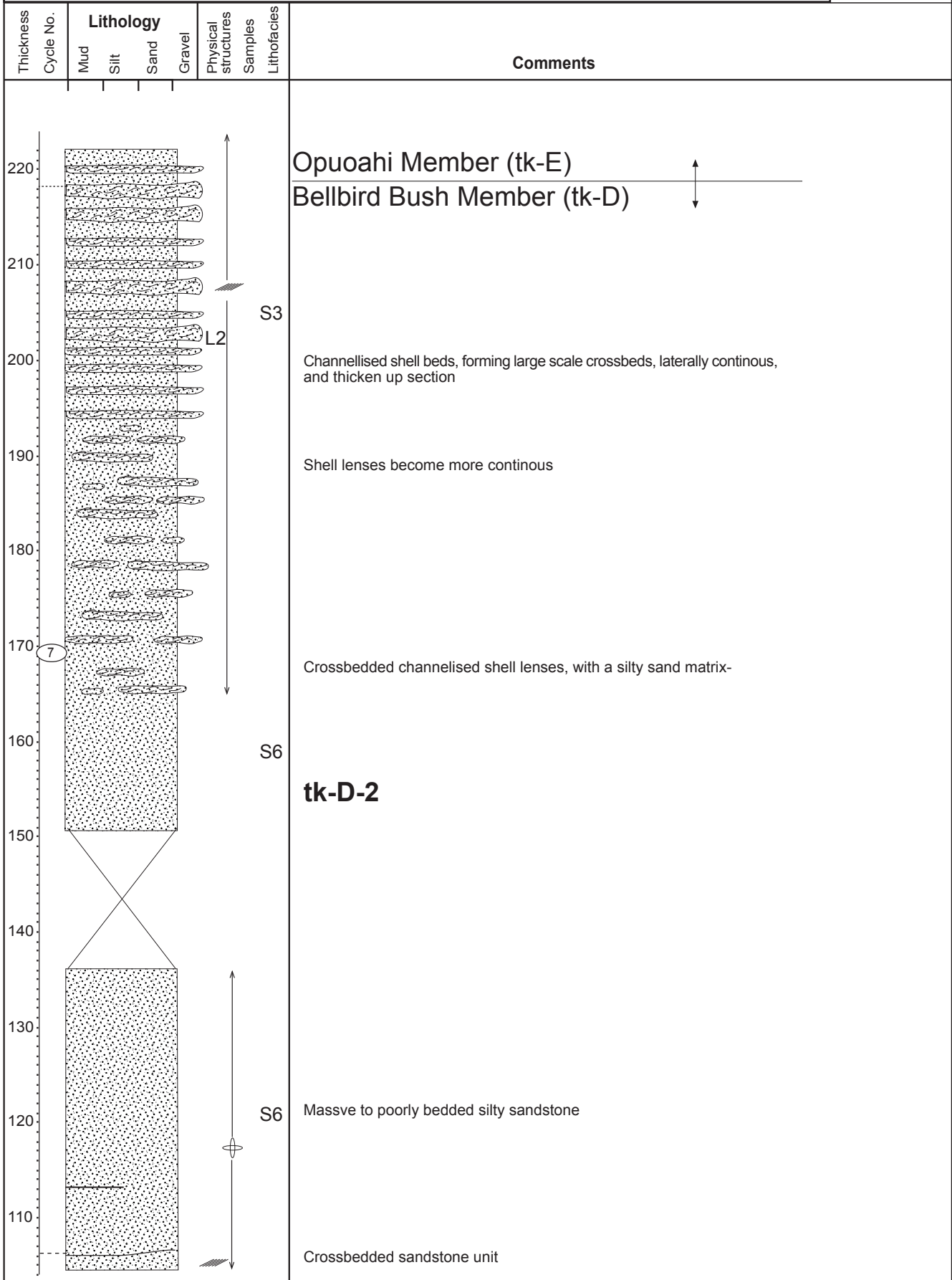


Stratigraphic Column No: <b>15b</b>	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;"><b>15b</b></span>  1 of 1
Section:	E:	2849500	
GPS Waypoint No(s):	N:	6224600	
Region: Central Hawkes Bay	Altitude:	-	
Location: Flat Hill Road	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
	Mud	Silt	Sand	Gravel				
84 82 80 78 76 74 72 70 68 66 64 62 60 58 56 54 52 50 48 46 44 42 40 38 36 34 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0								<p style="text-align: center;"><b>Pohue Formation</b> <b>Mokamoka Member</b></p> <p>Massive sandstone</p> <p style="text-align: center;">rg-B-2</p> <p style="text-align: center;">rg-B-1</p> <p>Fossiliferous calcareous siltsone</p>



Stratigraphic Column No: <b>16</b> (2/3)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;"><b>16</b></span>  2 of 3
Section:	E: 2843900	2844900	
GPS Waypoint No(s):	N: 6223500	6223500	
Region: Central Hawkes Bay	Altitude:	-	
Location: Sharky Hill on Rangiora Stud (2/9)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			



Stratigraphic Column No: 16 (3/3)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red; font-weight: bold;">16</span>  3 of 3
Section:	E: 2843900	2844900	
GPS Waypoint No(s):	N: 6223500	6223500	
Region: Central Hawkes Bay	Altitude:	-	
Location: Sharky Hill on Rangiora Stud (3/9)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness Cycle No.	Lithology				Physical structures Samples	Comments
	Mud	Silt	Sand	Gravel		
320					L1-a	Sandy bidirectionally crossbedded limestone, with greywacke fragments and sand lenses
310					L1-a	<b>tk-E-4</b> Opuoahi Member limestone (tk-E-4)
300					Z2-a	Silty sandstone with calcareous lenses throughout
290					L1-a	Bidirectional crossbedded calcareous fossiliferous sandstone, with greywacke grit and sand lenses, and small scale ripples
280					S6	<b>tk-E-2</b>
270					Z2-a	Massive silty Sandstone with heavily bioturbated discontinuous mud drapes
260						<b>tk-E-1</b>
250						Opuoahi Member sandstone (tk-E-2)
240					S3	Sandstone becoming more silty and shell lenses grading out
230						<b>tk-E-2</b> Shell lenses become less continuous

Stratigraphic Column No: 17a (1/2)  
 Section:  
 GPS Waypoint No(s):  
 Region: Central Hawkes Bay  
 Location: Quarry Road (1/2)  
 NZMS 260 Sheet: V19

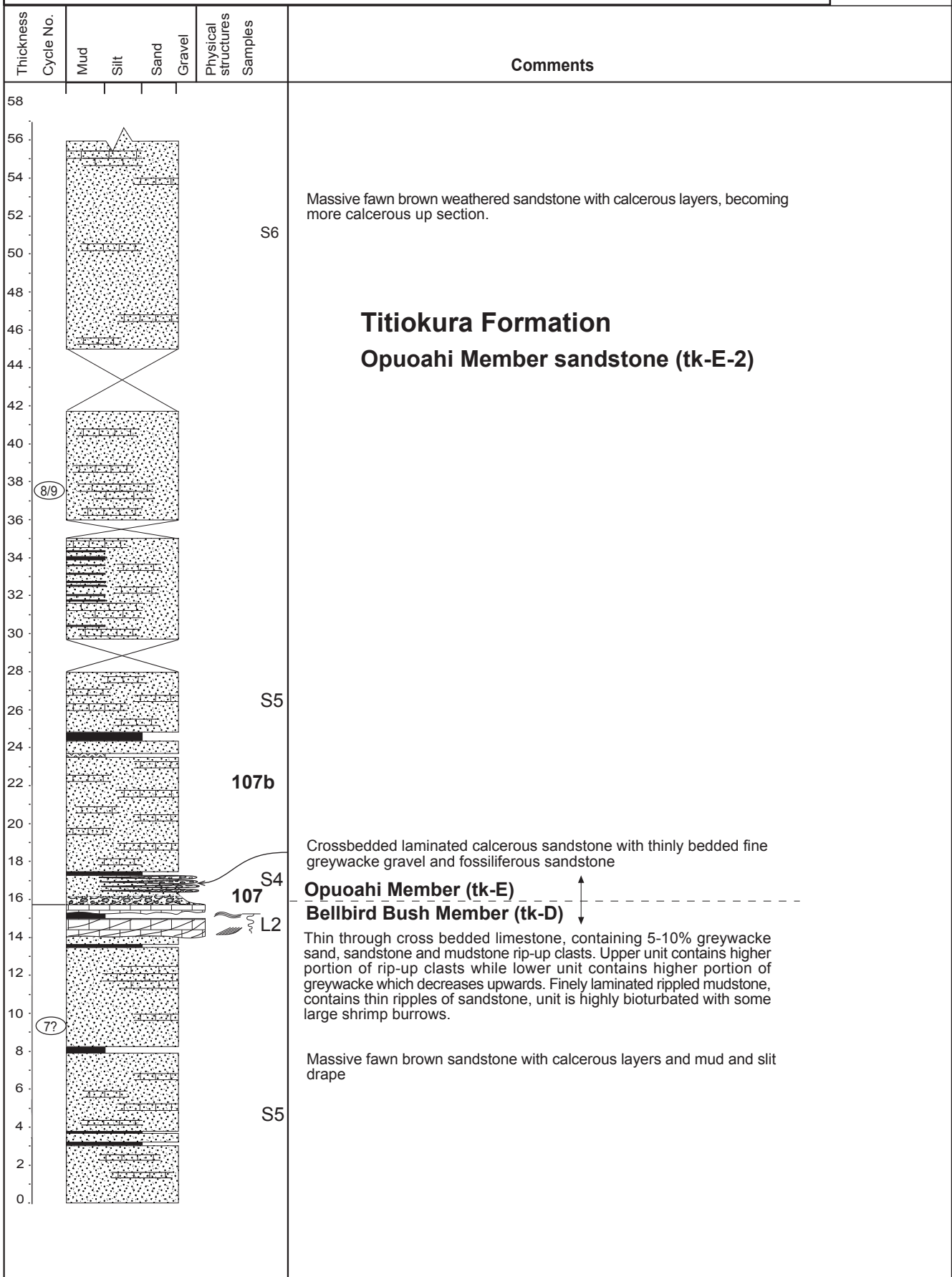
Grid Reference: Top Bottom  
 E: 2840100 2840300  
 N: 6222800 6222700  
 Altitude: -

NZMS 260 V19

**17a**

Author: R. Graafhuis

1 of 2



Stratigraphic Column No: **17a** (2/2)  
 Section:  
 GPS Waypoint No(s):  
 Region: Central Hawkes Bay  
 Location: Quarry Road (2/2)  
 NZMS 260 Sheet: V19

Grid Reference: Top Bottom  
 E: 2840100 2840300  
 N: 6222800 6222700  
 Altitude: -

NZMS 260 V19

**17a**

Author: R. Graafhuis

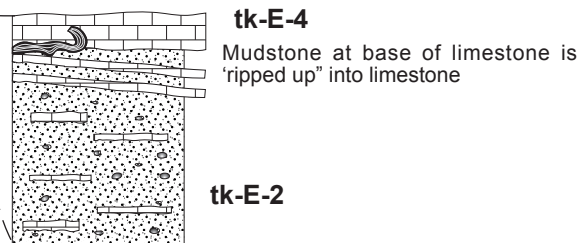
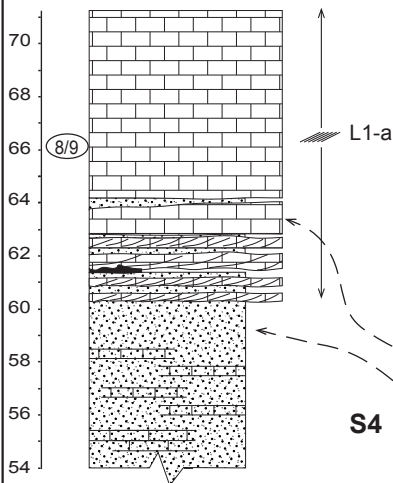
2 of 2

Thickness	Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
		Mud	Silt	Sand	Gravel				
70									
68									
66	(8/9)								
64									
62									
60									
58									
56									
54									

**Titiokura Formation**  
**Opuoahi Member limestone (tk-E-4)**

Low angle cross bedded limestone with calcereous sandstone lenses, which contains > 5% fossils and greywacke sand, decreasing up through the limestone. Basal units contain 10 -15% greywacke sand.

Crossbedded limestone lenses with high fossil and greywacke contents, also contains laminated mudstone layer at base of major limestone unit  
 Grading out of sandstone into limestone, fossil and greywacke pebble content increases up section



Stratigraphic Column No: **17b**  
 Section:  
 GPS Waypoint No(s):  
 Region: Central Hawkes Bay  
 Location: From Quarry Road, along Pohokara Rd and tributary of Waikoau River  
 NZMS 260 Sheet: V19

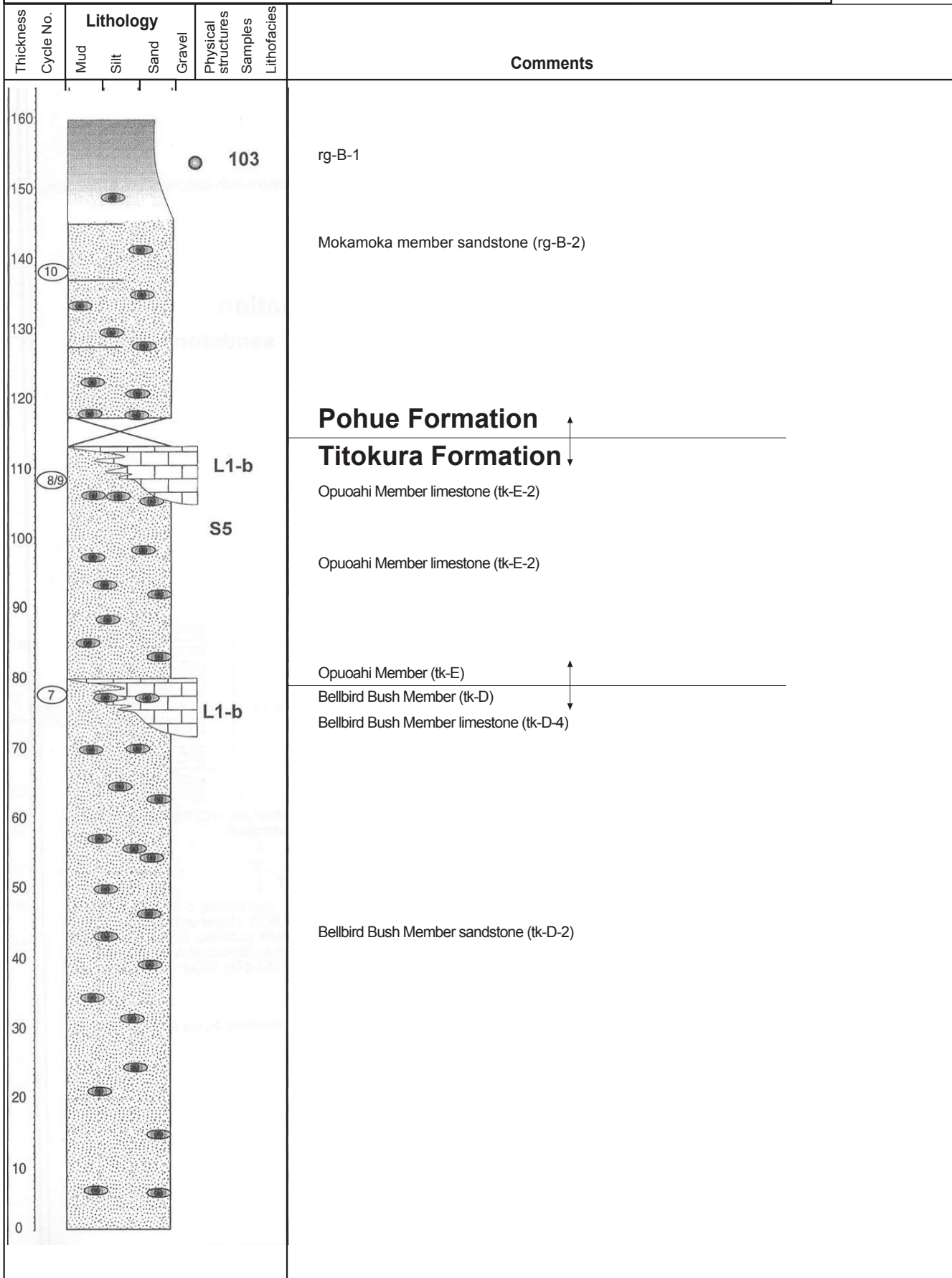
Grid Reference: Top Bottom  
 E: 2840200 284020  
 N: 6217200 622280  
 Altitude: -

NZMS 260 V19

**17b**

1 of 1

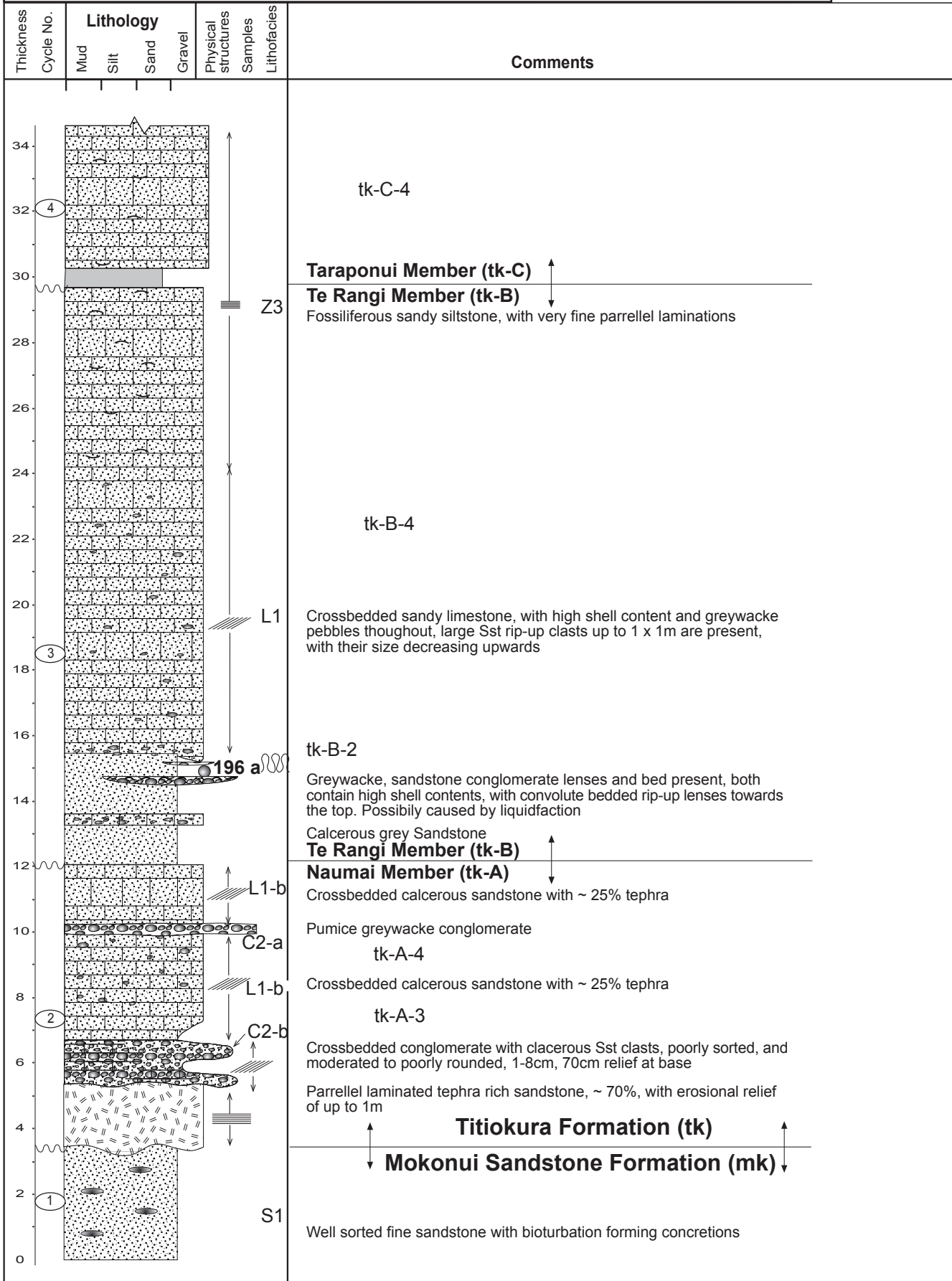
Author: R. Graafhuis



Stratigraphic Column No: <b>18</b>	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">18</span>  1 of 1
Section:	E: 2833200	2833200	
GPS Waypoint No(s):	N: 6223200	6223500	
Region: Central Hawkes Bay	Altitude:	-	
Location: Maungaharuru Range, Taraponui Trig	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
	Mud	Silt	Sand	Gravel				
66								<b>tk-E-4</b>  Sandy crossbedded limestone with greywacke grit, 4-2cm, average 5mm  <b>L1-b</b>
62								
60								<b>40m missing</b>  <b>Titiokura Formation</b>
20								
18								
16								
14								
12								
10								
8								
6								
4								
2								<b>L1</b>
0								

Stratigraphic Column No: <b>19</b> 1/3)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red; font-weight: bold;">19</span>  1 of 3
Section:	E: 2833100	2832200	
GPS Waypoint No(s):	N: 6222800	6223100	
Region: Central Hawkes Bay	Altitude:	-	
Location: Taraponui Trig (1/3)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			



Stratigraphic Column No: 19 (2/3)

Grid Reference:

Top

Bottom

NZMS 260 V19

Section:

E: 2833100

2833200

GPS Waypoint No(s):

N: 6222800

6223100

Region: Central Hawkes Bay

Altitude:

-

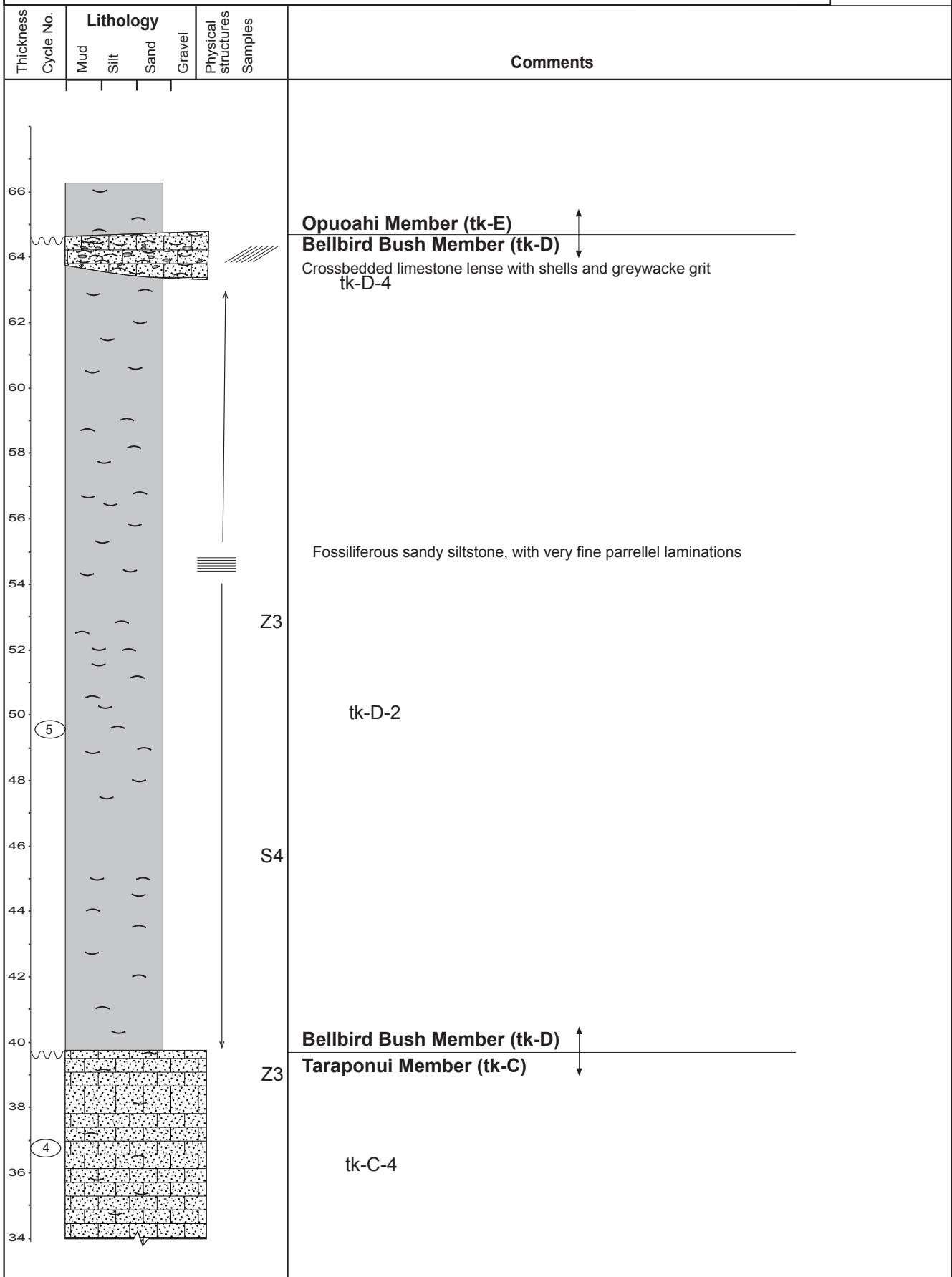
Location: Taraponui Trig (2/3)

NZMS 260 Sheet: V19

Author: R. Graafhuis

19

2 of 3



Stratigraphic Column No: 19 (3/3)	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">19</span>  3 of 3
Section:	E: 2833100	2833200	
GPS Waypoint No(s):	N: 6222800	6223100	
Region: Central Hawkes Bay	Altitude:	-	
Location: Taraponui Trig (3/3)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness	Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
		Mud	Silt	Sand	Gravel				
100									
9								Crossbedded sandy limestone with greywacke pebbles throughout and Sst rip-ups and lenses are present towards the base and decrease up section	
96									
94								<b>Bellbird Bush Member (tk-D)</b>	
92								tk-E-4	
90								Crossbedded limestone lense with shells and greywacke grit	
88									
86									
84								Titiokura formation, Opuahi Member (tk-E)	
82	6								
80									
78									
74								Fossiliferous sandy siltstone, with very fine parallel laminations	
72									
70								tk-E-2	
68									
66									

<b>Stratigraphic Column No:</b> 20	<b>Grid Reference:</b> <b>Top</b> <b>Bottom</b>	NZMS 260 V19
<b>GPS Waypoint No(s):</b> Wp 984	<b>E:</b> 2827073 -	<b>20</b>
<b>Region:</b> Waitara	<b>N:</b> 6222491 -	
<b>Location:</b> Waitara Road near Glenfalls Reserve	<b>Altitude:</b> 301 m -	
<b>NZMS 260 Sheet:</b> V19 Te Haroto		Page 1 of 1 <b>Author:</b> K. Bland <b>1 of 1</b>

Age	Strat. Unit	Scale (metres)	Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description							
										Int.	N.Z.					
Late Miocene	Upper Tongaporutuan	Waitere Fm/Tarawera Limestone Mbr	21		 F	MX <sub>3</sub> ● WP 984										
			20													
			19													
			18													
			17													
			16													
			15							Te Haroto Formation		S <sub>1</sub> / S <sub>4</sub>				
			14													
			13													
			12													
	11															
	10															
	9															
	8															
	7															
	6															
	5															
	4															
	3															
	2															
	1															

mud	fine	sand	coarse	gravel
	med.		pebb.	
silt	fine	med.	cobb.	bould.



**Stratigraphic Column No:** 21      **Grid Reference:**    **Top**                      **Bottom**  
**GPS Waypoint No(s):** Wp 1053-1054                      **E:** 2824799                      2824624  
**Region:** Waitara    **N:** 6222035                      6222154  
**Location:** Track off main farm road, Tarawera Station      **Altitude:** 385 m                      390 m  
**NZMS 260 Sheet:** V19 Te Haroto    **Page 2 of 2**                      **Author:** K. Bland                      **2 of 3**

Age	Strat. Unit		Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description											
	Int.	N.Z.																		
Late Miocene	Upper Tongaporutuan				S <sub>11</sub>				<p>Well cemented sandstone with common <i>Struthiolaria</i> (<i>Callusaria</i>) and <i>Zenatia</i>-rich beds.</p> <p>Sandstone.</p> <p>Non to slightly cemented concretionary sandstone. Concretionary bodies are well cemented and typically 0.2 m thick. Bioclastic material becomes less abundant upsection.</p>											
	Lower Tongaporutuan			Te Haroto Formation			MX <sub>3</sub>	● WP 1053			<p>Well cemented, moderately coarse grained shellhash limestone with abundant well rounded, very well sorted greywacke granules and pebbles. Intact macrofossils are dominated by <i>Zeacolpus</i> sp. Comprises well defined stacked beds about 0.3 m thick. Very sharply overlies sandstone across a contact with decimetre-scale relief. Gradationally passes upsection into concretionary sandstone.</p>									
			<table border="1"> <tr> <td>mud</td> <td>fine silt</td> <td>med. sand</td> <td>coarse gravel</td> </tr> <tr> <td></td> <td>med. coarse</td> <td>fine med.</td> <td>granu. pebb.</td> </tr> <tr> <td></td> <td></td> <td></td> <td>cobb. bould.</td> </tr> </table>	mud	fine silt	med. sand	coarse gravel		med. coarse	fine med.	granu. pebb.				cobb. bould.		S <sub>9</sub>			<p>Non cemented, slightly firm, well sorted fine sandstone with a slightly gritty texture. Contains scattered coarse sand to granule-sized, very well sorted, angular to sub-rounded greywacke clasts. No bioclastic material is visible in outcrop. This interval appears to pass downwards into alternating siltstone-sandstone beds 0.3-0.7 m thick, although this lower zone only crops out in adjacent cliff sections and cannot be easily accessed.</p>
mud	fine silt	med. sand	coarse gravel																	
	med. coarse	fine med.	granu. pebb.																	
			cobb. bould.																	

# 21

3 of 3



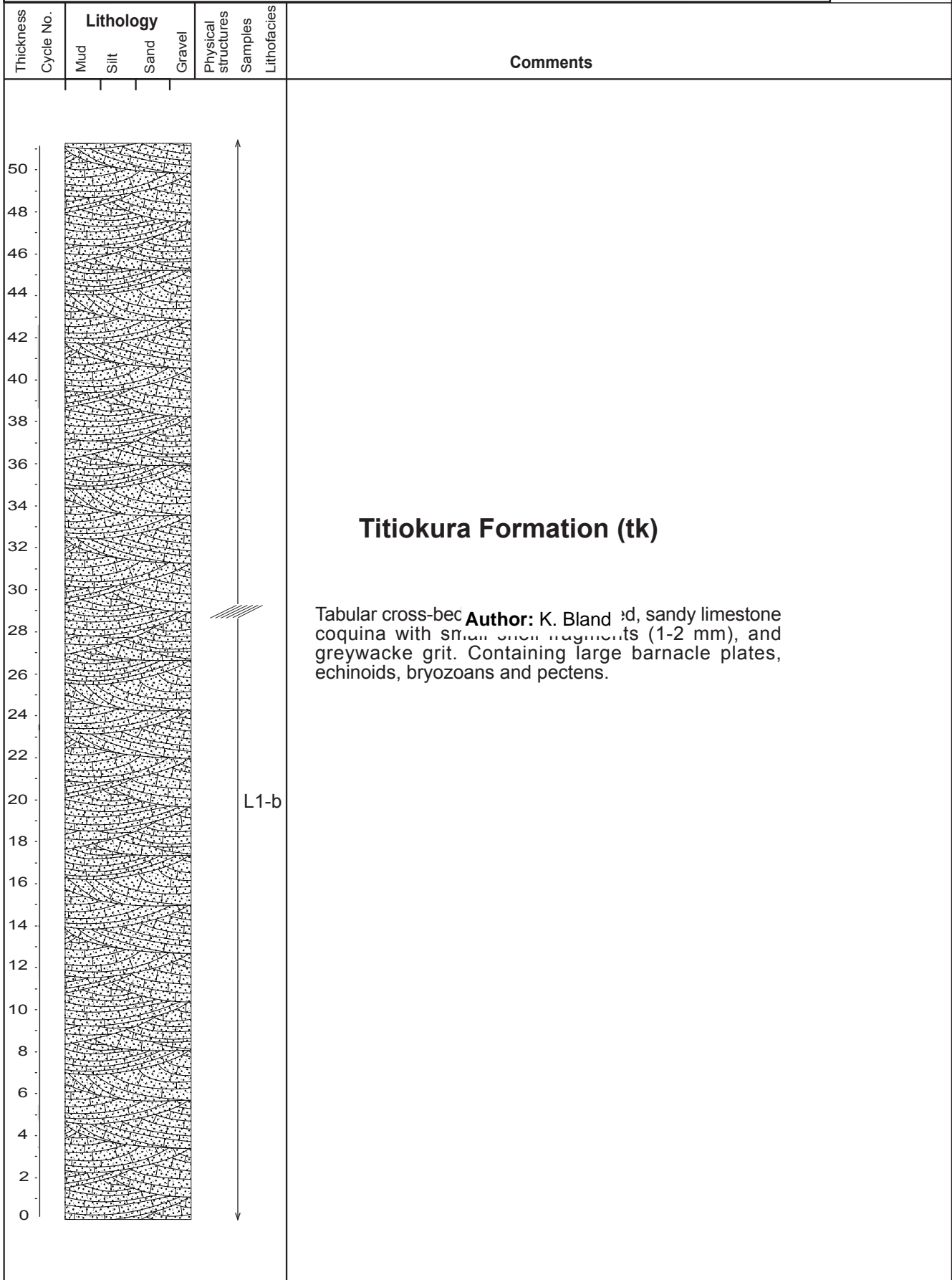
<b>Stratigraphic Column No:</b> 22	<b>Grid Reference:</b> <b>Top</b>	<b>Bottom</b>	<b>NZMS 260 V19</b>  <b>22</b>  <b>1 of 1</b>
<b>GPS Waypoint No(s):</b> Wp 111	<b>E:</b> 2812863		
<b>Region:</b> Ripia	<b>N:</b> 6220750		
<b>Location:</b> Simmonds farm above Ripia River on "Ripia Face"	<b>Altitude:</b> 696 m	-	
<b>NZMS 260 Sheet:</b> V19 Te Harato	<b>Page 1 of 1</b>	<b>Author:</b> K. Bland	

Age	Strat. Unit	Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description								
									Int.	N.Z.						
Early Pliocene	Upper Opoitian	Mangaheia Group/Pakaututu Formation Hukanui Limestone Member	18													
			17		BC <sub>3</sub>			Highly fossiliferous bioclastic sandstone bed very similar in characteristics to lower bed. Fossil content is dominated by <i>Tucetona laticostata</i> . The upper contact is obscured by vegetation.								
			16													
			15		S <sub>1</sub>		Non cemented, very well sorted fine to medium siliciclastic sandstone sharply overlying limestone bed.									
			14													
			13													
			12		BC <sub>3</sub>		Highly fossiliferous shell-rich sandy limestone dominated by <i>Tucetona laticostata</i> , with some <i>Phialopecten</i> sp (prob. <i>P. marwicki</i> ), <i>Glycymeris</i> sp. and <i>Eucrassiatella</i> sp.									
			11													
			10													
			9		S <sub>5</sub>		Greywacke conglomerate bed directly overlying basement. The conglomerate comprises well rounded and lensoidal clasts set in a gritty coarse-sand matrix of greywacke clasts. Grains average 30 mm in diameter and are between ~8 and 50 mm across. The unit is almost clast supported in places. Many angular clasts of a similar size to the rounded ones are present, as are some greywacke boulders up to 0.6 m diameter. Occasional <i>Crassostrea ingens</i> valves are present, as well as some <i>Phialopecten</i> sp. and <i>Glycymeris</i> sp. The unit then fines up over 1.1 m into a gritty coarse sand-sized greywacke sandstone with occasional greywacke pebbles and shell fragments before grading into the overlying shelly sandy limestone.									
8		MX <sub>1</sub>														
7		S <sub>9</sub>	WP 111													
6		Cg <sub>7</sub>														
5	Mesozoic	Torlesse composite terrane	4					Intensely deformed basement comprising alternating sandstone-mudstone beds of several centimetres thickness. Tens of centimetres of relief is present on the upper boundary with the overlying conglomerate bed, and in places small stacks of greywacke extend up to 2.5 m into the overlying deposits. Cracks and fissures in the greywacke are frequently infilled with greywacke pebbles and sandstone from the overlying conglomerate. No encrusting fauna is visible on the upper surface of the greywacke.								
3																
2																
1																
		<table border="1"> <tr> <td>mud</td> <td>fine coarse med</td> <td>fine med.</td> <td>coarse granu. pebb. cobb. bould.</td> </tr> <tr> <td>silt</td> <td>sand</td> <td>gravel</td> <td></td> </tr> </table>		mud	fine coarse med	fine med.	coarse granu. pebb. cobb. bould.	silt	sand	gravel						
mud	fine coarse med	fine med.	coarse granu. pebb. cobb. bould.													
silt	sand	gravel														

<b>Stratigraphic Column No:</b> 23	<b>Grid Reference:</b> <b>Top</b>	<b>Bottom</b>	<b>NZMS 260 V19</b>  <b>23</b>  <b>1 of 1</b>
<b>GPS Waypoint No(s):</b> Wp 110	<b>E:</b> 2813013		
<b>Region:</b> Ripia	<b>N:</b> 6220634		
<b>Location:</b> Simmonds Farm above Ripia River on "Ripia Face".	<b>Altitude:</b> 695m	-	
<b>NZMS 260 Sheet:</b> V19 Te Harato	<b>Page 1 of 1</b>	<b>Author:</b> K. Bland	

Age Int.	N.Z.	Strat. Unit	Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description				
Early Pliocene	Upper Opoitian	Mangaheia Group/Pakaututu Formation Hukanui Limestone Member	20										
			19										
			18										
			17										
			16										
			15										
			14										
			13										
			12					BC <sub>3</sub>		Whole-shell sandy limestone, very similar to lower limestone sheet at this locality. The lower contact of this unit is intensely burrowed with large bulbous burrows present into the underlying greywacke sandstone. Fauna is dominated by <i>Tucetona laticostata</i> .			
			11										
			10					S <sub>1</sub> S <sub>10</sub>		Gritty coarse sand to granule-sized greywacke sandstone. Concretions are present immediately above the lower boundary of this interval.			
			9										
			8					BC <sub>3</sub>		Whole-shell sandy limestone with common greywacke pebbles. The basal 1.5-2 m contains common rounded and some angular clasts. Larger clasts (50-60 mm diameter) tend to be more rounded. Most clasts are well-rounded and moderately well sorted. Angular clasts typically average 25 mm in diameter. A gritty coarse sand-sized greywacke matrix is present in this unit. Fauna is dominated by <i>Tucetona laticostata</i> .			
			7										
6													
5													
4													
3													
2													
1								Extremely indurated, intensely deformed basement. Flysck-type facies.					
			<table border="1"> <tr> <td>mud</td> <td>fine coarse med.</td> <td>fine med.</td> <td>med. coarse</td> <td>granu. pebb.</td> <td>cobb. bould.</td> <td>gravel</td> </tr> </table>	mud	fine coarse med.	fine med.	med. coarse	granu. pebb.	cobb. bould.	gravel			
mud	fine coarse med.	fine med.	med. coarse	granu. pebb.	cobb. bould.	gravel							

Stratigraphic Column No: <b>24</b>	Grid Reference: Top	Bottom	NZMS 260 V19  <span style="font-size: 2em; color: red;">24</span>  1 of 1
Section:	E: 2832700	2832600	
GPS Waypoint No(s):	N: 6220000	6221000	
Region: Central Hawkes Bay	Altitude:	-	
Location: Ahuateatua Trig	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			



Stratigraphic Column No: 25  
 Section:  
 GPS Waypoint No(s):  
 Region: Central Hawkes Bay  
 Location: Toronui Station (4/5)  
 NZMS 260 Sheet: V19

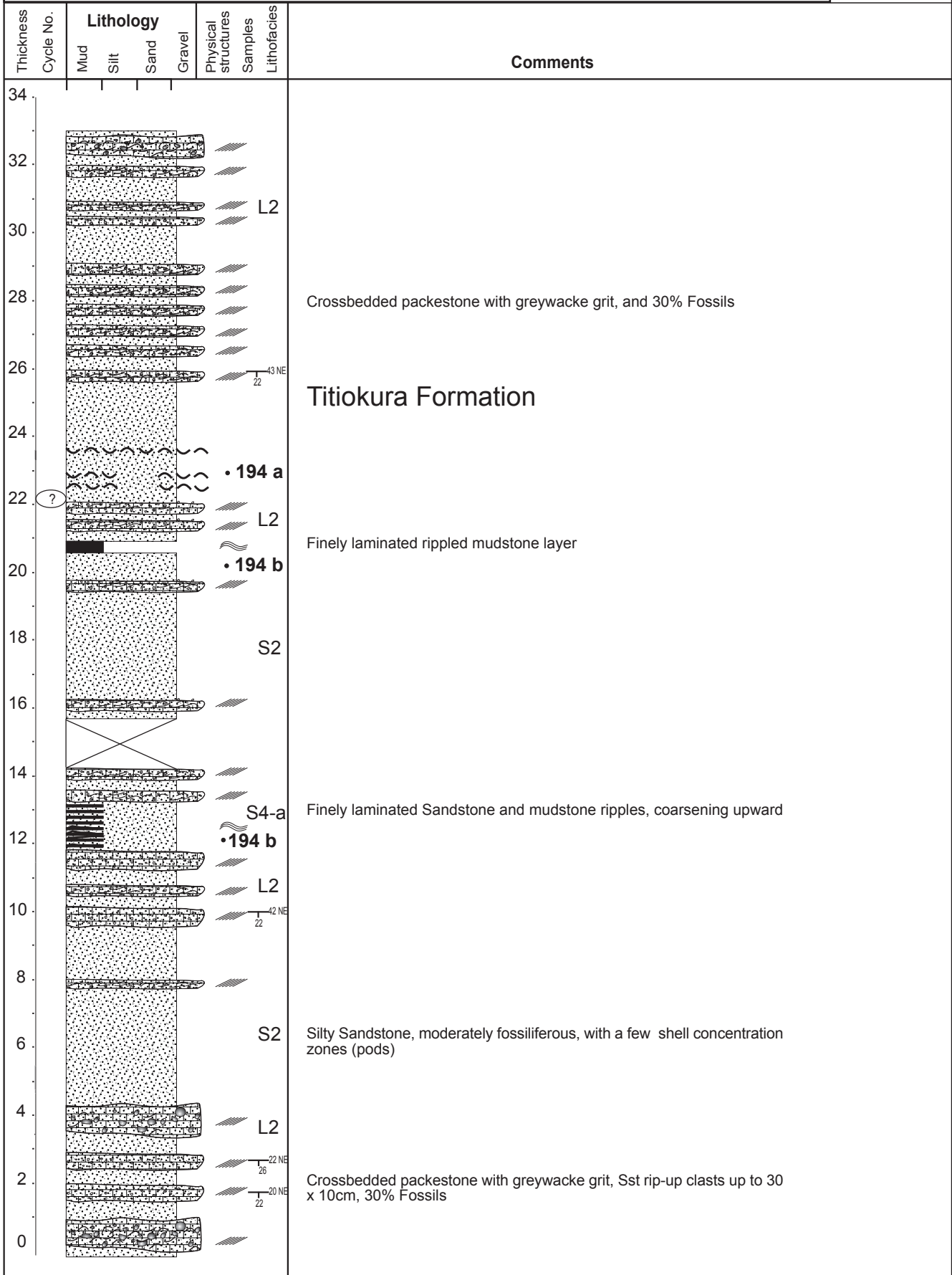
Grid Reference: Top Bottom  
 E: 2835000 2834200  
 N: 6220200 6220400  
 Altitude: -

NZMS 260 V19

25

Author: R. Graafhuis

1 of 1



Stratigraphic Column No: <b>26</b>	Grid Reference: Top	Bottom	NZMS 260 V19  <b>26</b>  1 of 1
Section:	E: 2836800	-	
GPS Waypoint No(s):	N: 6220800	-	
Region: Central Hawkes Bay	Altitude:	-	
Location: Toronui Station (5/5)	<b>Author: R. Graafhuis</b>		
NZMS 260 Sheet: V19			

Thickness Cycle No.	Lithology				Physical structures	Samples	Lithofacies	Comments
	Mud	Silt	Sand	Gravel				
0-20								<p>Fossiliferous, calcareous sandy siltstone with large (2-3 m) round concretions, and fossil lenses/pods</p> <p><b>Pohue Formation</b> Mokamoka Member siltstone rg-B-1</p> <p>Silty sandstone with scattered shells, lenses, and large concretions (1 x3m), possibly fining upwards</p> <p>Fossiliferous calcerous Siltstone</p>